Sinhgad Institutes

National Level Student Conference

IEEE TECHNICOKNOCKDOWN-2022

TKD-22

Organised by Department of E&TC, SIT Lonavala

Technically Sponsored by

IEEE Bombay Section & IETE, Pune Center

June 05, 2022

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IEEE SITSB & IETEISF

National Level Student Conference

"IEEE TECHNICOKNOCKDOWN-2022 (TKD-22)"

Organized by Department of E&TC, SIT Lonavala

Technically Sponsored by IEEE Bombay Section and IETE, Pune Local Center

Supported by IEEE SITSB & IETEISF, SIT Lonavala

June 05, 2022

(Online mode)

Theme: Digital India

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Welcome to

TECHNICOKNOCKDOWN-2022

It is our great pleasure to welcome you all for the virtual "TECHNICOKNOCKDOWN-2022 (TKD-22)" National Level Students Conference for technical paper presentation on June 05, 2022. The TKD-22 is organized by Department of Electronics and Telecommunication Engg, Sinhgad Institutes of Technology, Lonavala, Pune, Maharashtra. The conference is technically sponsored by IEEE Bombay Section and IETE, Pune local center and supported by IEEE SITSB and IETEISF, SIT Lonavala. TKD-22 provides an ideal platform for exchange of ideas among researchers, students, and practitioners.

TECHNICOKNOCKDOWN-2022 received research papers from all over India. TKD-22 received more than 100 papers out of which 45 regular papers are selected for the oral presentations after peer review. The registered and presented papers are published in IEEE TKD-22 proceeding with ISBN No. 978-81-992245-4-3.

We hope that you will find this event interesting and thought provoking. TKD-22 will provide you with a valuable opportunity to share ideas with other researchers, students, and practitioners from institutions. We look forward to the contribution towards the event and see you virtually.

Team
TECHNICOKNOCKDOWN-2022

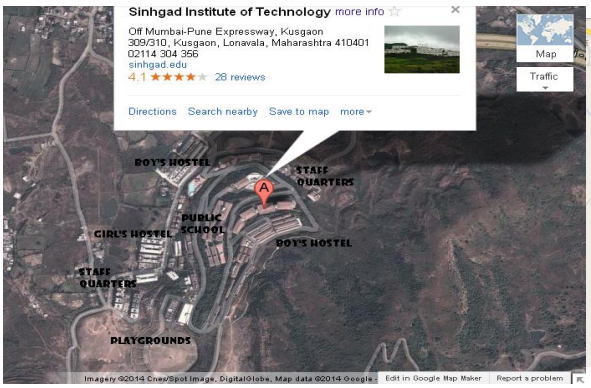
About STES:

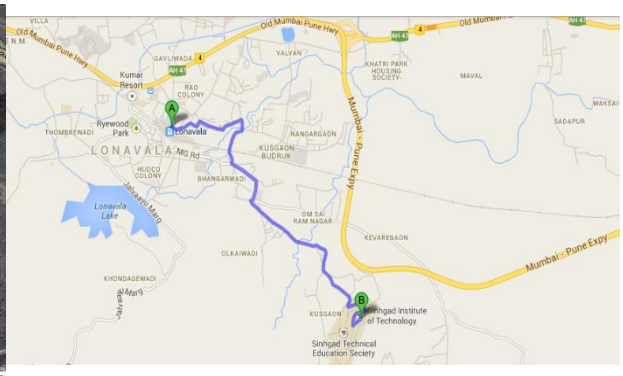
Sinhgad Technical Education Society (STES) was set up in August 1993, under the able and dynamic leadership of Prof. M.N. Navale with an objective of providing quality education in the field of Engineering, Dentistry, Management, Computer, Pharmacy, Architecture, Hotel Management and the basic school education from kinder garden onwards. There are 58 institutes under the aegis of STES offering full-fledged school education, Diploma, Graduation, Post-Graduation courses and Ph.D. programs in various branches of Engineering, Science and Management at five educational campuses ideally located in pollution free lush green and picturesque environment conducive for learning. (sit.sinhgad.edu).

About SIT, Lonavala

Sinhgad Institute of Technology (SIT), Lonavala since its establishment in 2004 is involved in practicing teaching-learning methodologies of excellence to deliver quality engineering education for students all over India. The institute is housed in beautiful surroundings, fully residential campus of 200 acres on Pune-Mumbai expressway at Lonavala. Academic discipline with space for individual innovations, emphasis on life skill development of students, 'willing to work' team of faculty members and initiative for Industry interface, have been the silent activity of the college. Institute has following branches;

1. E&TC, Engineering 2. Mechanical Engineering, 3.Electrical Engineering,
4. Computer Engineering, 5.Information Technology & 6. Masters in Electrical and Power Systems





Vision and Mission of the Institute

VISION

उत्तमपुरुषान् उत्तमाभियंतॄन् निर्मातुं कटीबध्दाः वयम्।

We are committed to produce not only good engineers but good human beings, also.

MISSION

We believe in and work for the holistic development of students and teachers. We strive to achieve this by imbibing a unique value system, transparent work culture, excellent academic and physical environment conducive to learning, creativity and technology transfer.

Vision and Mission of the Department

VISION

The department of Electronics & Telecommunication is committed to grow on a path of delivering distinctive high quality education, fostering research, creativity and innovation.

MISSION

- The department of Electronics & Telecommunication in partnership with all stake holders will harness Talent, Potential for application based indigenous product development in future.
- Our Endeavour is to provide conductive environment for life skill development of students while exercising effective Learning Strategies.

Short Term Goals

- To improve the results of UG classes
- To implement activity plan for overall development of students.
- To establish professional bodies/students forum for life skill development and expose students and faculty to latest business environment.
- To initiate relevant value addition programs and certifications for improving employability.
- To develop Laboratories for meaningful implementation of curriculum and then for Research.
- To encourage continuous up gradation of faculty members through higher education and external interface with other universities.

Long Term Goals

- To practice Project Based Learning (PBL) approach for UG program by creating collaborations with national and International institutions of reputation.
- To create opportunities for students to expose to industry environment through value addition programs and Industry projects for practical training.
- To foster research in the field of Electronics and Telecommunication Engineering for the benefit of society.
- IEEE International conference in the area of Wireless communication.

Program Educational Objectives (PEOs)

PEO1 To develop students to achieve high level of technical expertise with Strong theoretical background and sound practical knowledge

PEO2 To inculcate research environment for enhancement of Academia – Industry collaboration through conference

PEO3 To prepare graduates to be sensitive to ethical, societal and Environmental issues while engaging their professional duties, Entrepreneurship and leadership.

PEO4 To enhance ability of students for providing Engineering solution in a global and societal context

PEO5 Pursue higher education for professional development.

Program Specific Outcomes (PSOs)

PSO1 Get solid foundation in design and development of electronics modules useful to society.

PSO2 Able to handle skills based challenges

Department Team — always ready to accept challenge

Principal's Message

Dear Friends,

I am extremely delighted to assert that Sinhgad Institute of Technology (SIT) is hosting a National level student conference "IEEE Technicoknockdown-2022" on June 05, 2022 at Sinhgad Technical Education Societies (STES) Campus Lonavala.

The TKD-22 has Theme of "Digital India", and is very much aligned with the recent technological developments with make in India concept. The information and communication technology has made a profound impact on almost all sphere of social and personal life of human. The impact of these technologies is likely to continue unabated, therefore it is important that educators, scholars and technocrats keep themselves abreast with the latest trend of technologies. I am sure that the gap between industry and institute will be narrowed by these initiatives enabling mutual benefits and growth I believe that this conference will be an outstanding event for thousands of decision and policy makers , academicians , technocrats and educators.

I congratulate all my participants who have come from various colleges .I assure very delegate attending this event will experience the best academic ambience ,hospitality and state of art infrastructural facilities .I am sure that the time spent by you all at Technicoknockdown-22.

Dr. M. S. Gaikwad
Director STES Lonavala campus &
Principal, SIT, Lonavala

Message from Vice-Principal & HoD EnTC

On behalf of the institution, I am very happy to publish this issue of **TECHNICO KNOCKDOWN-2022** for the academic year 2021-2022. This event is in collaboration with IEEE and IETE student's branch of our Institute. Sinhgad Institute of Technology, Lonavala is established with the aim of providing quality education at par with international standards. In the recent era of engineering technology it is necessary to have overall personality development of the students and this issue may work as a booster for the same.

This very event is the outcome of the student's consistent effort in regular curricular activities. At SIT our goal is to produce a workforce of technocrats and managers who will be globally acceptable for their technological skills, their quality of work and their hard work. We also support to develop their basic philosophy of life to live with honour and dignity. The papers presented here may lead to right path of innovation. I really appreciate the efforts taken by the all the members of organizing committee and the students for exploring the excellent quality of this issue.

Dr. D.D.Chaudhary
Vice-Principal &
HoD of EnTC Deptt.

Convener's Message

Dear All,

It gives me an immense pleasure to thank all the participants and working team contributed in the virtual National Level Student Conference for technical paper presentation, "TECHNICOKNOCKDOWN-2022" with theme "Digital India" on June 05, 2022. TKD-22 is hosted by Department of Electronics and Telecommunication Engg, Sinhgad Institute of Technology, Lonavala, Pune, Maharashtra. TKD-22 is technically sponsored by IEEE Bombay Section and IETE, Pune local center, it is supported by IEEE SITSB & IETEISF, SIT Lonavala. The organizing committee of the TECHNICOKNOCKDOWN-2022 is quite unanimous in their determination to make the event highly successful. Department of E&TC, SIT Lonavala always aims to provide the platform for "Willing to Work" professionals and researchers.

The tracks of TKD-22 are grouped broadly according to the theme

1. Internet of Things (IoT)
2. Artificial Intelligence and Machine Learning
3. Cyber Security
4. Communication Network
5. Media and Signal Processing
6. Green ICT
7. Advanced Smart Grids and Power Systems
8. Robotics and Automation
9. Others

TKD-22 received more than100 papers out which only 45 were selected for the oral presentation after peer review.

Keeping in view to support authors to write and improve the writing and presentation skills skilled experts were invited as session chair.

I am quite pleased to mention that this event is successful in true spirit. This is only because of hard work, cooperation and dedication of all the coordinators as well as the participants, reviewers and faculties of the department. At the last, but not the least, I am thankful to Management of STES, Pune and Dr M. S. Gaikwad, Director STES Campus Lonavala, Principle SIT Lonavala & Organizing chairman TKD-22 for unstinting support to work as the convener of TKD-22.

Dr. Dnyaneshwar S. Mantri
Convener TKD-22

Co-ordinators Message

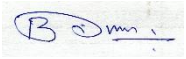
Dear friends,

On behalf of the organizing committee, I warmly welcome your participation in the National Level Students Conference TECHNlCOKNOCKDOWN-22, June 05, 2022. The main focus of this conference is to explore ideas and knowledge of under graduate and post graduate students in the field of Emerging Technologies. This conference has given an opportunity for presenting the very best research results, problem solutions, and insight on new challenges facing the field of emerging technologies. In future connect, in addition to the technical and social program at TKD-22, you can also take your time to explore Pearl of Orient and discover its character, charm, and dynamism. I sincerely hope you are enjoyed TKD-22 conference excellence, and make this event an unforgettable experience of yours!

Dr. Sharad B. Gholap
Coordinator TKD-22

Co-ordinator's Determination

It gives me immense pleasure that Department of Electronics and Telecommunication Engineering, Sinhgad Institute of Technology, Lonavala has taken up a great challenge of addressing the multidisciplinary aspect of learning and research through A National Level Student Conference IEEE TECHNICOKNOCKDOWN-2022 (TKD-22), technically sponsored by IEEE Bombay section and IETE, Pune Center, supported by IEEE SITSB and IETE, SIT Lonavala. The theme of the conference is not only challenging but also relevant to the present scenario in many disciplines as is evident from the range of papers which have been contributed by the students, research scholars and academicians. I hope that this volume which has been brought out by our team will be of great academic value for scholars and common readers.



Mr.Prashant Dike
Co-ordinator TKD-22

Faculty Advisor IEEE Student's Chapter

It gives me immense pleasure to present proceedings of the "IEEE TECHNICOKNOCKDOWN-2022 (TKD-22)" National level student conference on Green Technology, Technically Sponsored by IEEE Bombay section and IETE ,Pune Center supported by IEEE SITSB and IETE, SIT Lonavala on June 05, 2022, organized by Dept of E&TC, Sinhgad Institute of Technology, Lonavala.

IEEE opens the door to opportunities that will help you develop your professional identity in IEEE's designated fields of interest: sciences, technology, engineering, and mathematics. I congratulate all participants for their contribution and valuable research in different tracks of IEEE TKD-22. I am enlightened to note that students of IEEE SIT student's chapter and IETE student chapter under the guidance of faculty members have taken this massive task as a challenge and I am confident that they will meet to the expectations of participants.

We are infinitely indebted to all the esteemed members of the Advisory Committees, reviewer team, for their invaluable advice and guidance in conception and organization of the conference. I gratefully acknowledge the full support and cooperation I received from all the organizing members along with our student coordinators, without their cooperation and help, this dream could not have been realized at all.

I am thankful to Dr. M. S. Gaikwad, Organizing chairman & Principal, Dr. D.D. Chaudhary, Vice-Principal, & HOD, Dept. of E&TC, Dr. D. S. Mantri, Convener for Full support to work as the convener of this event.

With Most Respectful Regards

Mrs.Vaishali Baste.
Brach Counsellor, IEEE SITSB, Lonavala

Faculty Advisor IETE Student's Chapter

Dear All,

It gives me an immense pleasure to welcome you all at a National level TPP "TECHNICOKNOCKDOWN-2022" organised by Dept. of E&TC SIT Lonavala. The event has brought to its success by both IETE & IEEE students chapter. The objective of IETE student's chapter is to segregate the technical knowledge and ideas to give a platform to students, researchers & developers through "TECHNICOKNOCKDOWN-2022".

I am very much Thankful to all staff & student co-ordinators for their kind support throughout the event. At last but not least I am very much thankful to all the participants and wish you all the best for future

Prof. D. K.Shende
Faculty In-charge IETE

Message from Chairperson, IEEE Bombay Section

The role of science and technology for human health and welfare has not been so visible and sought after ever before than during the past couple of years or so, due to the unprecedented situation through which the whole world has gone through. While many existing technologies could be quickly adapted to deliver new applications for fighting the virus, some novel technologies have emerged and deployed on phenomenal time scales. Some of the examples in this regard are the computerised tomography, novel and low power sensors for digital pathology, robotics, IoT and so on. AI/ML/DL based image processing systems are able to successfully replace the expert radiologists in patient monitoring. Much of the healthcare system has gone digital to alleviate some of the strain imposed by the coronavirus. Telemedicine and remote diagnostics are helping patients to get medical advice and diagnoses at home. It is not uncommon from the history that rapid progress in science and technology was made during periods of acute human suffering – be it is during wars or pandemics. Even though it may sound bizarre, this is also an unusual opportunity for the students to work on these technologies and produce useful products and applications for the society. In this context, it is heartening to know that the IEEE Student Branch of the Sinhgad Institute of Technology (SIT), Lonavala, in association with IETE is organizing the second edition of the Student National Conference with "Digital India" as the theme, on June 05, 2022. I am really glad to note that most of tracks of the Conference are very relevant to the current situation that I described above. I wish to congratulate the Organizers and the Conference a grand success.

Dr. B. Satyanarayana,
Chairperson,
IEEE Bombay Section

Message from, IETE Pune Center

Greetings!

On behalf of Institute of Electronics & Telecommunication Engineers (IETE) and IETE, Pune Centre, I welcome participants and dignitaries for National Level Students' Conference: TECHNICOKNOCKDOWN-22, organized by Sinhgad Institute of Technology, Lonavala. The conference gives opportunity for budding researchers to exhibit their talent and innovation in the areas of IoT, Cyber Security, Automation, AI and other related domains. The conference provides the platform for students to have dialogue with eminent academicians and researchers which facilitates conversion of research into innovation and products.

The IETE is India's leading recognized professional society devoted to the advancement of Science & Technology of Electronics, Telecommunication and IT. IETE is founded in 1953. Now IETE has more than 125000 members which include corporates, students and ISF members .IETE Pune Centre is one of the largest center in Western India .It has 46 ISFs and 10 organizational members.

Considering the need of Industry 4.0 and Industry 5.0 revolutions, IETE Pune Centre has been organizing workshop, conferences, FDPs and competitions in domains including Machine Learning, Solar, E Mobility, and Smart Sensors.

All of us know, we have been passing through very critical phase of COVID 19, pandemic. The digital transformation involving ICT finds application in identifying, tracing, understanding, managing, treating and perceiving the pandemics. The IETE has been actively involved in creating awareness about use of digital technology to accept the challenges of COVID 19.

The IETE members and ISFs have been trying hard to give solutions using the technology. Our Senior fellow member Capt (Retd) Rustom K. Bharucha has successfully developed Ventilator which was appreciated by medical fraternity . Our ISF students have successfully developed AI based system to assist migrant workers. The system grabbed second prize in Hackathon organized by IBM and NASCOM among 45000 + participants consisting of start-ups, working professionals and students.

I am very sure that TECHNICOKNOCKDOWN-22 will definitely result in effective outcomes which will give us great strength to pursue the digital transformation to accept the challenges of present scenario.

Once again I congratulate and extend my best wishes to organizers and Sinhgad Institute of Technology, Lonavale on taking the initiative for organization of National Students' Conference.

Dr.R.D.Kharadkar
Chairman, IETE, Pune Centre

SAC Chair, IEEE Bombay Section,

Dr. Sarika Chouhan

Dr. Sarika Chouhan is a Senior Member of IEEE. She is currently an Executive Committee member and Chairperson of Student Activities Committee at IEEE Bombay Section. She has represented IEEE Bombay Section at several international and national events.

Dr. Sarika Chouhan is a Chief Academic Officer at Vidyalankar School of Information Technology in Mumbai. She is Ph.D in Computer Science, M.Phil in Computer Science, Masters in Computer Applications, and Masters of Science in Computer Science. She has nearly two decades of experience in teaching and specializes in computer programming and web technology. She is also greatly interested in the transformation of teaching-learning processes and implementation of suitable pedagogical strategies. She has published many research papers related to latest IT technologies, and digitization in education at various national and international level conferences and journals for which she has also received best paper awards. She has also guided several students at doctoral, master's and undergraduate level. She has been a paper reviewer for many International & National Conferences and Journals.

Dr. Sarika Chouhan was one of the core team member of AICTE approved Faculty Development Program on Digital Transformation in Teaching-Learning Process offered by NPTEL Swayam platform by IIT-Bombay. She also serves as the Branch Counselor of IEEE-VSIT Student Branch; Advisor of WIE Affinity Group, IEEE-VSIT Student Branch; Coordinator, Center of Excellence (ATS); and Owner, IQAC Criteria VI at VSIT. She is also associated with renowned organizations such as CII and BCCI. She was a member of University of Mumbai syllabus revision committee of FYBMS in the subject of Computer Applications in Business, University of Mumbai. She has also served as the Chairperson of Vigilance Squad for University of Mumbai. .

Dr. Sarika Chouhan
SAC Chair, IEEE Bombay Section

Keynote Speaker Details

Dr. B. Satyanarayana
Chair, IEEE Bombay Section

Dr. B. Satyanarayana did his B. Tech in Electronics and Communication Engineering from J.N.T. University, Hyderabad and Ph.D. in Physics from IIT Bombay. He is working in the Department of High Energy Physics, TIFR since 1983 – and is currently a Scientific Officer (H) and Coordinator of INO Project. He is also a Visiting Professor at the Applied Science Department of the American College, Madurai. His areas of interest include 'Detectors and Instrumentation for high energy and nuclear physics experiments'. Dr. Satyanarayana has published about 250 research papers and proceedings in national and international journals and conferences, besides scores of invited talks. His very first paper won the best paper award by Institution of Electronics and Telecommunication Engineers (IETE). Recently he was honoured with Homi Bhabha Award in Science Education (HBASE-2020) and has been selected as AICTE-INAE Distinguished Visiting Professor at the Symbiosis Institute of Technology, Pune.

Dr. Satyanarayana is a Fellow of Institution of Electronics and Telecommunication Engineers (IETE) as well as Institute of Engineers (IE). He is a Life member of the Instrument Society of India (ISOI) as well as a Member of Indian Physics Association (IPA). He guided a large number of doctoral, master and undergraduate students. He served on many of doctoral and expert committees as well as academic councils, boards of studies and advisory boards on colleges, universities and many national organisations of eminence. He is on the editorial and refereeing teams of several prestigious science and engineering journals.

Dr. Satyanarayana is a Senior Member of IEEE. He is currently an Executive Committee member and Chair of the IEEE Bombay Section. He previously served as the Vice Chair, Secretary, Chair of Technical and Professional Activities Committee of the Section as well as the Chair of its Signal Processing Society. He also served as an Executive Committee member as well as Vice Chair (Technical Activities) of the IEEE India Council. He won IEEE Bombay Section's Outstanding Volunteer Award for 2014 and IEEE Head Quarter's MGA Achievement Award for 2016.

Details of Session Chairs

Dr. Nandkumar P. Kulkarni received Bachelor of Engineering (B.E.) degree from Walchand College of Engineering, Sangli, Maharashtra, (India) in 1996. He has been with Electronica, Pune from 1996 -2000. He worked on retrofits, CNC machines and was also responsible for PLC programming. In 2000, he received the Diploma in Advanced Computing (C-DAC) degree from MET's IIT, Mumbai. In 2002, He became Microsoft Certified Solution Developer (MCSD). He worked as a software developer and system analyst in CITIL, Pune and INTREX India, Mumbai respectively. He has 23 years of experience both in industry and academia. From 2002 onwards he is working as a faculty in Savitribai Phule Pune University, Pune. Since 2007, he is working with SKNCOE, Pune as a faculty in IT Department. He completed a Master of Technology (M. Tech) degree with computer specialization from COEP, Pune (India) in 2007 and Ph.D. from Aarhus University, Denmark in 2019. His area of research is in WSN, VANET, and Cloud Computing. He has published papers in 18 International Journals, 15 International IEEE conferences, 03 National Conferences

Dr. Sarita D. Deshpande is graduated in Electronics Engineering from Basweshwar college of Engineering, Latur, MH and post graduated in Electronics Engineering from Government college of Engineering Aurangabad, MH. She has awarded PhD in Electronics Engineering from Dr. Babasaheb Ambedkar Marathwada University, Aurangabad,(MAH). She is Life time Member of ISTE and also a member of IEEE and CSI.

She has teaching experience of more than 26 years. Currently working as an Assistant Professor and HOD of Information Technology at PES's Modern college of Engineering, Pune since 2007. She also worked as Lecturer in Shree Tuljabhavani college of Engineering, Tuljapur (1996-2007). She has published 9 Journal papers in indexed and reputed Journals (Springer, Scopus indexed and UGC care journals) also presented papers in conferences. She has attended various FDP's, workshops and seminars at different levels. She served her duty as a reviewer of 3rd IEEE international conference on Emerging smart computing and Informatics (2021) organized by AISSMS (IOIT), Pune. She worked on various committees at University and College level. Her research area of interests are in Pattern Recognition, Forensic Imaging, Communication and Network, Machine Learning, Computer Vision**.**

Dr. Ramesh Sahadu Pawase is graduated in Electronics Engineering from Amrutvahini College of Engineering, Sangamner (MS) India in 2004 and completed M.Tech in E&TC from Dr. Babasaheb Ambedkar Technological University, Lonere in 2009. He is awarded with Doctor of Philosophy from Savitribai Phule Pune University in 2019. He was involved in funded research project and Doctor of Philosophy work in the area of Application Specific Integrated Circuit development for MEMS Sensors. He is actively contributing in the field of Engineering Education and Research with teaching experience of 16 years at Amrutvahini College of

Engineering, Sangamner, Permanently affiliated, NAAC 'A' grade and three times accredited institute.

He published and presented more than 32 papers in SCI and Scopus indexed, reputed International journals and IEEE International conferences. He is reviewer of International Journals and contributed as TPC member for International Conferences. He is awarded with 'Engineering Achievement Award' by Institution of Engineers, India (IEI), Ahmednagar Centre on Engineer's Day 2020. He is active member of professional bodies like IEI, ISTE, IAENG, and IACSIT. He had worked for five years as National Social Scheme-University Section level Coordinator and Institute-Program Officer and actively coordinated Social activities.

Dr. Milind B. Tadwalkar has been graduated and Post graduated in Electronics Engineering from from Shivaji University, Kolhapur. He has awarded Ph.D. Degree in Electronics & Communication Engineering from Maharshi University of Information Technology, Lukhnow in July 2019. He has total teaching experience of 35 years. From 1986 to 2005 he was working as a lecturer in Electronics Engineering in STB College of Engg. Tuljapur (MS) India].

From 2005 he is associated with JSPM's Jayawantrao Sawant College of Engineering, Pune and presently working as Professor and NBA Coordinator in Department of Electronics and Telecommunication Engineering. He is Life Member of ISTE. He has published more than 8 papers in indexed and reputed Journals (IEEE etc.) and IEEE conferences. He is reviewer of international journals (IEEE Transaction, Communication society etc.) and conferences organized by IEEE. He worked on various committees at University and College. His research interests are in Phishing Attacks in Wireless Networks and their Remedies , Wireless Sensor Networks, Wireless and Mobile Communications and Computer Networks.

Mr. Abdul Hameed Ansari, Work experience. 24 years B.E (E&TC) in 1997. M.E. (Digital Electronics) in 2005 from Sant Gadge Baba Amravati University Amravati. Pursuing PhD from Sant Gadge Baba Amravati University Amravati as well.Worked for Poonitronics (India) Pvt. Ltd, Pune as Design Engineer, Worked in Rajaram Shinde College of Engineering, Pedhambe for eight years under Mumbai University,

Working as an Associate Professor in Pravara Rural Engineering College, Loni since 2006,Worked in various capacities like, Convener for the Pravara Institute of Skill Development, Loni.,Minority Scholarship Cell Officer, working as the principal investigator for SC/ST skill and Personality Development Cell, Convener for International Conference and National Conferences at PREC, Loni.,Skill Development Coordinator under NSDC., Principle investigator for various AICTE based funded schemes, He has published more than 23 papers in national and international conferences.

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Schedule - Session I,II and III

Sunday, June 05. 2022 https://tinyurl.com/bdff3u2s

Inauguration : 09.30 am to 09-48 am	https://teams.microsoft.com/l/meetup-join/19%3ameeting_ZDI1ZjdiZDYtMjVlYy00NjQxLWI0MzgtMDdhNWY4M2RjZjdk%40thread.v2/0?context=%7b%22Tid%22%3a%2222796e7e-c327-42e9-bef4-6f0d422b5fde%22%2c%22Oid%22%3a%22ba97df0e-3bf2-404d-a62b-41b5c983c037%22%7d
Keynote Speaker: 9.50 am to 10.20 am	Dr. B Satyanarayana, Chair, IEEE Bombay Section, "Transformation of Rural India to Digital India "

Artificial Intelligence and Machine Learning — Session-I

Session-I Link: https://teams.microsoft.com/l/meetup-join/19%3ameeting_NGJlYjdmMTgtNDA5ZC00MjE0LTk0OTEtMjc2NmNmMzZhM2M2%40thread.v2/0?context=%7b%22Tid%22%3a%2222796e7e-c327-42e9-bef4-6f0d422b5fde%22%2c%22Oid%22%3a%22679279f8-07d4-4ff4-88cb-ce5a3211c13f%22%7d

SN	Time	Paper ID	Title of Paper	Author Name	Coordinator/Chair
1	10.30 am to 1.00 pm	AIML-01	Fruit recognition and feature extraction of fruits using deep learning	Yogi Patel	https://tinyurl.com/c4e9w9mr
2		AIML-05	Campus Navigation Application using Augmented Reality	Niranjan Ashok Gaikwad	Student Coordinator
3		AIML-07	E-Commerce Chatbot	Lavania Bajaj	Devansh Patil 9619538954
4		AIML-08	Self-Learning Yoga Pose with Accuracy Detection using Deep Learning	Vislavath Vikas	Session Coordinator
5		AIML-09	Realtime Face-Spoofing Detection using rPPG Technology	Om Dandade	Mrs. Vashali S. Baste 9881431811
6		AIML-10	Virtual Assistant and Diagnostic Analysis in Mental Healthcare System	Mansi Vaidya	Session Chair
					Prof. A.H. Ansari

Internet of Things (IoT) — Session-II

Session-II Link: https://teams.microsoft.com/l/meetup-join/19%3ameeting_NGRmNzBmODQtOGFhNy00MTM2LTgwNGItYzAzNTQ5NTFjMDFl%40thread.v2/0?context=%7b%22Tid%22%3a%2222796e7e-c327-42e9-bef4-6f0d422b5fde%22%2c%22Oid%22%3a%222c98da8d-963b-4296-bab7-d7b0edb56a41%22%7d

SN	Time	Paper ID	Title of Paper	Author Name	Coordinator/Chair
1	10.30 am to 1.00 pm	IoT-01	Arduino Based Remote Control Car	Sawant Anrag Ramkrishna	https://tinyurl.com/4s7mp4u5
2		IoT-02	Classroom Automation	Suraj Nayak	Student Coordinator
3		IoT-03	Smart Agriculture Monitoring and Control System Using IOT	Abhilash Lad	Arya Patil 9156447274
4		IoT-05	Face Mask Detection for COVID 19	Ekansh Bharadwaj	Session Coordinator
5		IoT-07	Smart Home Design and Fabrication Using the Internet of Things	Shraddha Omprakash Khatri	Mrs. Dipali Shende 9011042725
6		IoT-08	Rakshan-Secure the WOMEN	Prof. A. B. Gavali	Session Chair
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Communication Networks and Robotics and Automation — Session-III

Session-III Link: https://teams.microsoft.com/l/meetup-join/19%3ameeting_MjhjNjMxODUtNGE1ZS00ZDgwLWE4ZWItMDJjZWM1MTNmNjE0%40thread.v2/0?context=%7b%22Tid%22%3a%2222796e7e-c327-42e9-bef4-6f0d422b5fde%22%2c%22Oid%22%3a%22e74ba49c-67ca-4d01-a76a-de31c2869cc0%22%7d

SN	Time	Paper ID	Title of Paper	Author Name	Coordinator/Chair
1	10.30 am to 1.00 pm	CN-01	V2X communication for autonomous vehicle	Abhijit Mandavgade	https://tinyurl.com/3hyzyhfp
			Robotics and Automation		Student Coordinator
2		RA-05	Automate Cargo Tracking System	Avinash Dugane	Shivraj Kete 7378757800
3		RA-06	Self-Sanitizing Robotic Wheelie Bin	Lokesh M.Giripunje	Session Coordinator
4		RA-08	Exhaust Gas Filtration Using Aqua Silencer	Nishikant Dhaktode	Mr. Prashant R. Dike 9422014174
5		RA-09	"Performance Analysis of Solar Based Mini Seed Driller"	Rajsingh S Jagtap	Session Chair
					Dr. Milind. B. Tadwalkar

Lunch Break 1.00 pm to 2.00 pm					
Internet of Things (IoT)					Session-IV
Session-IV Link		https://teams.microsoft.com/l/meetup-join/19%3ameeting_MDU2ZWIwNTAtNzM1NS00M2UwLWJhMGUtNzQyNmNmNmYxZDkz%40thread.v2/0?context=%7b%22Tid%22%3a%2222796e7e-c327-42e9-bef4-6f0d422b5fde%22%2c%22Oid%22%3a%2287a97f3b-e9c4-476b-a882-963e2407cc55%22%7d			
SN	**Time**	**Paper ID**	**Title of Paper**	**Author Name**	**Coordinator/Chair**
1	02.00 pm to 4.00 pm	IoT-09	IoT Based Home Automation	Namrta Namdev Shinde	https://tinyurl.com/2p2df2d2
2		IoT-11	Sewage Water Monitoring Using IOT & ML	Mehdi Rasoolji Valiji	Student Coordinator
3		IoT-12	Smart Health Node	Karan Goverdhan Dhande	Rishabh 9204483931
4		IoT-17	IoT Based Flood Monitoring System Using Node MCU	Megha Ramchandra Bhosale	Session Coordinator
5		IoT-26	Smart Agricultural Field using IoT	Sonali Gupta	Mr. Vikram M. Chavan 9970125757
6		IoT-25	IoT Based Hydroponic System for Digital India	Aditya Chaudhary	Session Chair
					Dr. Sarita D. Deshpande
Cyber Security and Others					Session-V
Session-V Link		https://teams.microsoft.com/l/meetup-join/19%3ameeting_ODlmYTdiZDktNmUxYS00MTM3LTg0YTctMmZmMjYyMDE5NTUy%40thread.v2/0?context=%7b%22Tid%22%3a%2222796e7e-c327-42e9-bef4-6f0d422b5fde%22%2c%22Oid%22%3a%22708e4914-1687-4cb9-a5e2-c4ba00a200ba%22%7d			
SN	**Time**	**Paper ID**	**Title of Paper**	**Author Name**	**Coordinator/Chair**
1	02.00 pm to 4.00 pm	CS-01	Smishing Identifier	Shrinivas Tanaji Shirkande	https://tinyurl.com/yc7kbtyk
2		CS-02	Prevention of Data Leakage via SQL Injection on a cloud based web application	Prof. Nalawade Vinay Shivajirao	Student Coordinator
			Others		Samartha Nirmal 9021540398
3		OT-01	AR Based Navigation System For Universities	Muskan Singh	Session Coordinator
4		OT-05	Dry handwashing Machine by Fog Disinfection to Save Water	Dipti Gaikwad	Dr. Sharad B. Gholap 9763461767
5		OT-06	Disinfection Cloth Through Ultraviolet Radiation	Supriya Subhash Hasabe	Session Chair
6		OT-08	Detecting Driver Drowsiness based on Eye Aspect Ratio Technique	Pramod Aswale	Dr. Ramesh S. Pawase
7		OT-10	IOT Based Smart Energy Grid Control and Power Monitoring	Rajendra Nimbalkar	

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FRUITS RECOGNITION AND FEATURE EXTRACTION OF FRUITS USING DEEP LEARNING

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Abstract: **Fruit segmentation has gained focus over the last few years, it is a vital and troublesome task in the agriculture industries such as food production, marketing, packaging, and education as well. The paper deals with the images inserted by the user, after the image classification process is executed which results in the fruit name, and then the fruit name is matched according to that, all the nutrients will be shown as the final result. Another model helps to identify the quality of fruit which is segregated into two kinds, fresh and rotten. This paper proposes different CNN algorithms, for Fruit detection and also to attain the quality of fruit. For fruit, image recognition models crop the image in 100X100 pixels for proper formatting to get accurate results. Considering various factors like depth, height, and colour grading model is trained, which provides better accuracy when trained with a 90,380 images dataset. For detecting the quality of fruit simple CNN is trained which segregates two types of images that are fresh and rotten.**

Keywords- Deep Learning, Computer vision, CNN,GPU.

I. INTRODUCTION

Deep learning (DL) is a machine learning method that allows computers to mimic the human brain, usually to complete classification tasks on images or non-visual data sets. Deep learning has recently become an industry-defining tool for its advances in GPU technology. Deep learning is now used in self-driving cars, fraud detection, artificial intelligence programs, and beyond. With the development of computer vision, image Identification is gradually applied to the field of agriculture, and fruit image recognition plays an important role in smart agriculture, unmanned supermarkets, and healthy living [5]. [6] Shown the classification of fruits approach which makes to overcome the cost of recognizing the fruits manually. In the image processing approach as it is known that the filtering technique is to be applied first, then segmentation followed by feature extraction and training and testing using the Neural networks.

There are various models in deep learning, Supervised Models are Classic Neural Networks (Multilayer Perceptron), Convolutional Neural Networks (CNNs), Recurrent Neural Networks (RNNs), and Unsupervised Models Self-Organizing Maps (SOMs), Boltzmann Machines, Auto Encoders. Fruit detection can be considered and formulated as an image segmentation problem. The proposed recognition model has used Convolutional Neural Networks (CNN) for detecting fruit information systems from images. Deep learning algorithms have powerful advantages over other models like:

• Unstructured data handling: Once trained with structured data, deep learning models can automatically make sense of unstructured data. This means businesses can plug all available data they have without formatting or standardizing it first.

• Recognize unexpected patterns: Most models require engineers to select what pattern the ML algorithm will look for. Any correlations beyond those directly selected go undetected. Deep learning algorithms can track all correlations, even those not requested by engineers.

• Unmatched accuracy: Deep learning delivers more accurate results and scales better with large data pools than other methods

II. RELATED WORK

In [1], the Authors discuss the fig recognition method based on the YOLO v4 deep learning technique to achieve fast and accurate recognition and localization of fig fruits in complex environment images. In this paper author also compares the detection effect of YOLO v4 with Faster R-CNN and YOLO v3 algorithms, which were widely used in the field of fruit recognition in the past, on the same fig dataset. The experimental results show that the detection effect of the fig fruit recognition model constructed based on the YOLO v4 algorithm has improved to a certain extent in terms of average precision and other core metrics.

In [2], the Authors aim to design an image classifier for a web application. Image classification will eliminate the need for manual search in the web application. CNN is an efficient algorithm to classify the images according to the category label. An image classification model has been designed using CNN to classify the images of fruits and vegetables. The accuracy of the model is based on the classification technique. For successful classification of data pre-processing, data augmentation and feature extraction are involved.

In [3], the Authors discuss a great approach to the detection of fruits using deep convolutional neural networks. The Paper aims to build an accurate, fast, and reliable fruit detection system using machine learning facts. The proposed system has applied a convolutional neural network (CNN) to the tasks of detecting fruit images. For fruit image detection, CNN also showed significantly higher accuracy than a conventional method did.

In [4], the Authors are Inspired by the recent progress of the Food and Agriculture Organization, the world production of date fruits is 8,526,218 tons. In this paper, the authors propose a smart harvesting decision system to estimate date fruits type, maturity level, and weight using computer vision (CV) and deep learning (DL) techniques. The proposed system consists of three sub-systems: The dates maturity estimation system (DMES), type estimation system (DTES), and dates weight estimation system (DWES).

In [5], the Authors have used methods based on the Convolution Neural Network (CNN) based classification method is proposed which gives a better classification result of 90methodologies till now. In this paper, experiments are held with the dataset of 200 images of fruits in which apple fruit images are 50, mango 50, orange 50, and the remaining 50 are grapes.

In [6], the Authors find Classification of fruits into edible and non-edible classes can be proved a very important aspect in such an industry. In our proposed system four fruits are classified namely, Banana, Papaya, Mango, and Guava into three stages raw, ripe, and over-ripe using Convolutional Neural Networks. In the model, a dataset of local fruits is used and studied their life cycle in different stages. In this, an accuracy of 97.74.

In [7], the authors mainly focus on the problem of fruit classification under complex background and propose a fruit classification model based on an improved darknet53 convolutional neural network. In this model, the group normalization method is used instead of the original batch normalization method, andthe softmax classifier with 22 tags is used instead of the softmax classifier in the original darknet53. These changes can optimize the model structure and parameters.

In [8], the authors have described a Classification and identification of fruit that has significant application prospects in smart agriculture. The author constructs a convolutional neural network model applied to the classification and identification of various fruits. Concretely, the study explores how learning rate, batch size, and the number of epochs, three parameters of this model, influence the network performance. It shows that when other parameters remain unchanged, errors trained by the network model significantly decrease as the learning rate increases, the batch size reduces and the number of epochs accumulates within a certain range.

In [9], the Authors are Inspired by Automation in fields like robot harvesting, farming, health, and education. The author proposed a Pure Convolutional Neural Network (PCNN) with a minimum number of parameters. The PCNN consists of 7 convolutional layers, some of them followed with stride. Additionally, to reduce overfitting and taking an average of whole feature maps we employed a recently developed Global Average Pooling (GAP) layer that was verified to be very effective.

In [10] Author have presented a method hierarchical multi-feature classification (HMC) system for multiclass fruit recognition problem. The author's approach to HMC exploits the advantages of combining multimodal features and the fruit hierarchy property. In the construction of hybrid features, the authors take the advantage of using a color feature in the fruit recognition problem and combine it with the 3D shape feature of the depth channel of RGBD (Red, Green, Blue, Depth) images.

In [11], the Authors have used methods based on the no-reference method built on Convolutional Neural Network (CNN) is proposed for interpolated image quality assessment. To enhance the performance, the authors incorporate attention modules with the proposed network to facilitate

feature extraction and quality prediction. Experimental results show that the proposed method outperforms related IQA metrics in perceptual quality evaluation of image interpolation.

In [12], the author mainly focuses on the problem of fruit classification under complex background and proposes a fruit classification model based on .

III. MOTIVATION

Fruit classification has gained focus over the last few years, it is an important and difficult task in the agriculture industries such as food production, marketing, packaging, and education as well.

Until the several years, agriculture was labor-intensive finding trained farm labor in the agriculture production was one of the most demanding factors

Additionally, collecting and sorting specialty crops such as apple, citrus, cherry, orange, and mango are time-consuming and tiresome jobs due to the number of varieties of the same fruit, e.g., more than 7,000 varieties of apples are grown all over the world as reported.

As such consequence, automation can reduce labor costs and increase production rapidly.

Fruits recognition approach to overcome the cost of manual recognition of fruits.

Nowadays it is necessary to detect the quality of fruits, so we have to detect the quality into two categories is it fresh or rotten?

IV. PROBLEM STATEMENT AND OBJECTIVES

A. Problem Statement.

To develop a web interface for recognition of fruits and extraction of features of Fruit like nutrients values, scientific name using deep learning.

B. Objectives:

- To capture the image and display the captured image.
- To re-size and contrast-enhancement of image.
- To perform segmentation of the captured image.
- To identify the type of captured fruit.
- To extract features of identified fruit.
- To compress the image for optimal storage and reconstruction.

an improved darknet53 convolutional neural network. In this model, the group normalization method is used instead of the original batch normalization method, and the softmax classifier with 22 tags is used instead of the softmax classifier in the original darknet53. These changes can optimize the model structure and parameters.

- To identify the quality of fruit (fresh or rotten).

V. SYSTEM ARCHITECTURE

The system architecture is a conceptual model which specifies the overview of the whole process of the project. It describes each step in the project making with the help of a flow. It specifies every step descriptively.

The system architecture is as follows,

We have the required dataset, with the help of neural network data is pre-processed and trained according to the inputs and outputs required by the user. The user inserts the image in the web interface then it is connected to the trained model which is the Convolutional Neural Network, and after that image, a description is shown in the output (Fruit name and fruit nutrients)

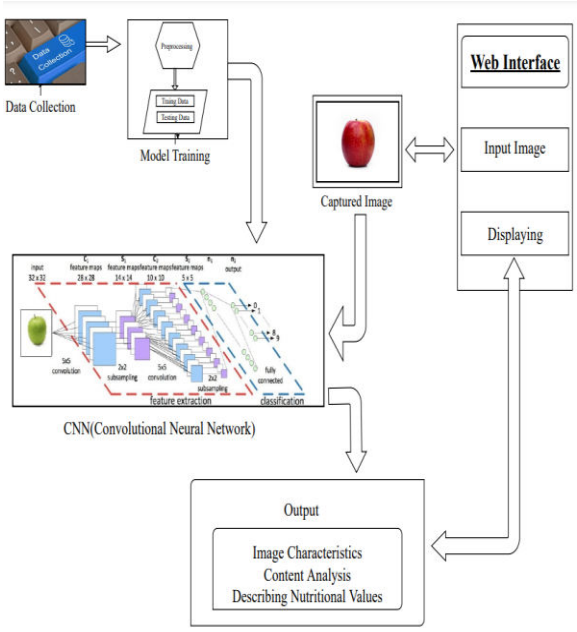

Fig 5.1. System Architecture

VI. PAPER OVERVIEW

Deep Learning:
Deep learning is a subset of machine learning, which is essentially a neural network with three or more Layers. These neural networks attempt to simulate the behavior of the human brain—albeit far from Matching its ability—allowing it to "learn" from large amounts of data. While a neural network with a Single layer can still make approximate predictions, additional hidden layers can help to optimize and Refine for accuracy.

Artificial Neural Network:
The term "Artificial neural network" refers to a biologically inspired sub-field of artificial intelligence modeled after the brain. An Artificial neural network is usually a computational network based on Biological neural networks that construct the structure of the human brain. Similar to a human brain having neurons interconnected to each other, artificial neural networks also have neurons that are linked to each other in various layers of the networks.

Convolutional Neural Network (CNN):
A Convolutional Neural Network (ConvNet/CNN) is a Deep Learning algorithm that can take in an input image, assign importance (learnable weights and biases) to various aspects/objects in the image, and be able to differentiate one from the other. The architecture of a ConvNet is analogous to that of the connectivity pattern of Neurons in the Human Brain and was inspired by the organization of the Visual Cortex.

YOLO:
This is an algorithm that detects and recognizes various objects in a picture (in real-time). Object Detection in YOLO is done as a regression problem and provides the class probabilities of the detected Images.

Darknet-53:
It is a convolutional neural network that acts as a backbone for the YOLOv3 object detection approach. The improvements upon its predecessor Darknet-19 include the use of residual connections, as well as more layer

VII. IMPLEMENTATION

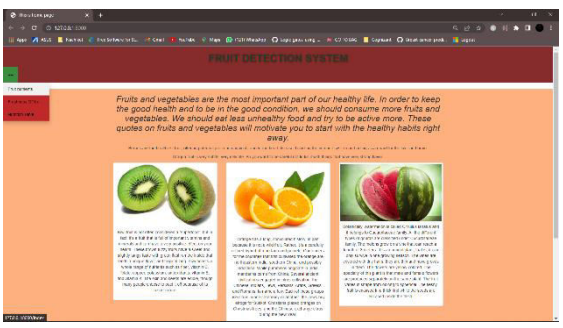

Fig 7.1. Home Page

Taking image as a png,jpeg, etc file format from the user and sending it into a model for classification

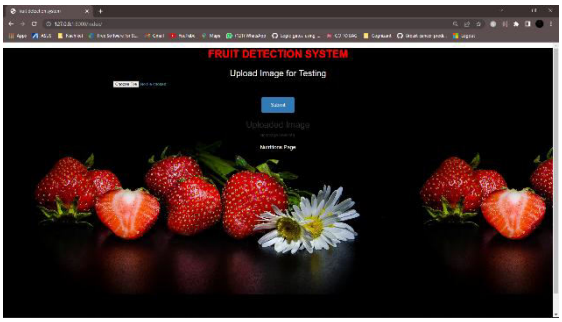

Fig 7.2. Insert Images.

Firstly in this module we have to take an image from the user input then the image is inserted in the CNN model then it is segmented according to the trained module it detects the desired image and gives the output after properly detecting the fruit and gives the output.

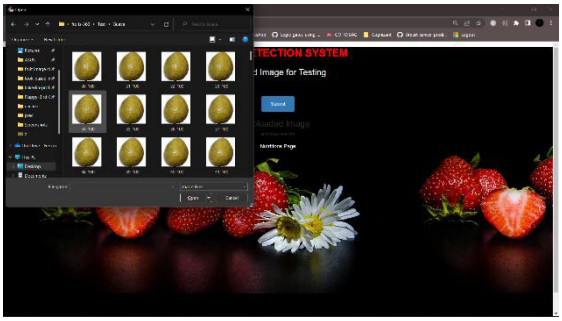

Fig 7.3. Getting Images from Local Device

After getting the fruit name from the first module it is inserted into another function which is programmed to give the desired nutritional values using the fruit name. For example, if the fruit detected is Apple it will match and give the nutritional values of the desired fruit

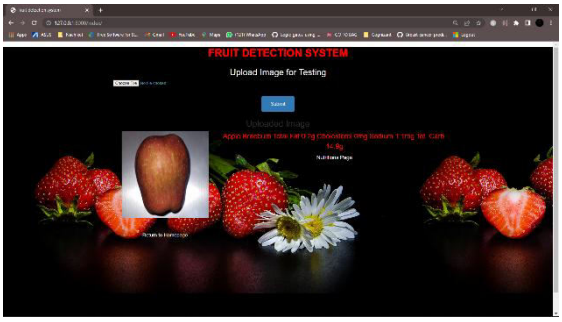

Fig 7.4 Final Result

VIII. CONCLUSION

The proposed work concludes overall accuracy of 96% using CNN when compared to other classifiers like PNN (Pure Neural Network) and BPNN (Back Propagation Neural Network). A Dataset of 131 different classes with 90380 fruits is taken for experiments which also can be extended to more varieties of fruits which helps in lessening waging charges for fruits-based industries by automatically classifying the fruits.

IX. FUTURE SCOPE

This paper is working on only fruit images, for evolution we can gather data related to other things like vegetables, junk foods, and various more like this. And training the model accordingly will be much helpful for proper diet. We can add one more feature like direct capture image and detection in real-time using computer vision, Quality detection of the fruit is necessary, building a system for automated detection will lower manpower and will ease the work for segregating the stale fruit..

REFERENCES

[1]. Rucha Dandavate; Vineet Patodkar CNN and Data Augmentation Based Fruit Classification Model,2021

[2]. Yuting Lin; Wei Liu; Xiaowen Cai; Weiling Chen; Lanlan Li; Chengdong Lan A CNN-based Quality Model for Image Interpolation,2021

[3]. Shivani; Nidhi Gaur, Design of Image Classifier for Web Application,2020

[4]. Wu Yijing; Yang Yi; Figure Fruit Recognition Method Based on YOLO v4 Deep Learning, Wang Xue-fen; Cui Jian,2020

[5]. Fouzia Risdin1, Pronab Kumar Mondal1, Kazi Mahmudul Hassan1, Convolutional Neural Networks (CNN) for Detecting Fruit Information Using Machine Learning Techniques 1(Jatiya Kabi Kazi Nazrul Islam University, Trishal, Mymensingh, Bangladesh) *Corresponding author: Fouzia Risdin,2020

[6]. Rajesh yamparala, Ramaiah Challa, Computerized Classification of Fruits using IEEE 7th International Conference on Smart Structures and Systems ICSSS 2020Convolution Neural Network,2020

[7]. Hui Wang, Fan Zhang, Li Wang, Fruit Classification Model Based on Improved Darknet53 Convolutional Neural Network,2020

[8]. MOHAMMED FAISAL 1, (Member, IEEE), FAHAD ALBOGAMY2, HEBAH ELGIBREEN3,MOHAMMED ALGEBRA 4, AND FATTOH ABDU ALQERSHI 4, Deep Learning and Computer Vision for Estimating Date Fruits Type, Maturity Level, and Weight, 2020

[9]. Asia Kausar1, Mohsin Sharif2, JinHyuck Park3, and Dong Ryeol Shin4, Pure-CNN: A Framework for Fruit Images Classification Department of Electrical and Computer Engineering Sungkyunkwan University, Suwon, South Korea,2018

[10]. Research on the Influence of Convolutional Neural Network Parameters on Fruit Classification Naicheng Xu School of Mathematical Sciences, Department of Mathematics and Applied Mathematics Ocean University of China Qingdao, China,2018

[11]. Ema Rachmawati1, Iping Supriana2, Masayu Leylia Khodra3, Toward a New Approach in Fruit Recognition using Hybrid RGBD Features and Fruit Hierarchy Property Ema Rachmawati1, Iping Supriana2, Masayu Leylia Khodra3, School of Electrical Engineering and Informatics Institut Teknologi Bandung,2017

[12]. Hossam M. Zawbaa1,3,5, Maryam Hazman2,5, Mona Abbass2,5, Aboul Ella Hassanien3,4,5, Automatic fruit classification using random forest algorithm. Faculty of Mathematics and Computer Science, Babes-Bolyai University, Romania, 2Central Lab. for Agricultural Expert System, Agricultural Research Center, Egypt. 3Beni Suef University, Faculty of Computers and Information, Beni Suef, Egypt. 4Cairo University, Faculty ofComputers and Information, Cairo, Egypt. 5Scientific Research Group in Egypt (SRGE),2015.

CAMPUS NAVIGATION APPLICATION USING AUGMENTED REALITY

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Abstract - - For all the new comers to the school field it's tough to search out all the places, whether it is the cafeteria or the library. Therefore, by this analysis, a mobile application is designed for field navigation. The underlying technology on which the application is primarily based is increased reality, that is used to enhance the quality and straightforward use of the appliance, as users may get the knowledge easily. Communication with lecturers was extravagantly faster than within the traditional approach. Increased Reality could be a realistic, direct or indirect read of the physical reality atmosphere whose components square measure "enhanced" through computer-generated or sensory input like sound, video, graphics, tactile, or GPS information. during this research, we have a tendency to gift a completely unique field navigation APP that uses increased reality to supply users with a replacement and attention-grabbing thanks to meet our field. With advanced increased reality technologies like pc vision and seeing, the knowledge regarding the field atmosphere and its objects is overlaid on the $64000 world and becomes interactive. so as to boost the APP potency, this analysis presents a virtual parcel modelling interface with deep learning to boost the item recognition ability.

INTRODUCTION

In recent years, the huge diffusion of smart devices has had a dramatic impact on people's lives. Users are now accustomed to exploit these devices as a tool for web search and fruition of information, communication, collaboration, both for work and entertainment purposes. Moreover, smart devices. are typically equipped with a wide range of heterogeneous sensors (Ex. GPS, accelerometer, microphone, camera etc.) that, by exploiting the existing network infrastructures, allow to collect and share a large amount of information about user's surroundings, thus providing context without re quiring the deployment of expensive systems. All these creatures play a key role in a smart environment scenario, where data collected by embedded sensors of smart devices can be used to improve the quality of life of users. In particular, smart environmental systems apply data fusion techniques to combine information from different sensors, paving the way to new applications that would not otherwise be possible [1].

A university campus is a particularly suitable scenario for this type of analysis because it represents, on a small scale, a cross-section of the urban fabric of the city. In particular, thanks to the information collected and shared by heterogeneous sensors, it is possible to improve the services provided to students, teaching and administrative staff, while also making them more efficient. Moreover, a campus can be regarded as a social ecosystem in which different entities coexist and interact with each other, thanks to social tools allowing users to share information [2].

Different types of users normally inhabit a typical campus, and each of them has specific needs depending on the type of role played. In particular, it is convenient to separately consider the different roles of students, administrative technicians, teaching staff and external users (Ex. occasional visitors). Therefore, the main challenge is to provide services that are tailored to each type of users, and that allow the experience of people within the university campus to be improved. The University of Palermo fits within this scenario, having recently started a process of innovation that aims to overcome the limits of teaching, the divulgation of scientific knowledge, and the creation of new science and culture, in order to create a smart campus ready accommodate students.

IMPLEMENTATION

The project was implemented in the Android Studio 1.6 environment and in the Java language. The LG Nexus 7 tablet was used as hardware. MongoDB will be used as the database. The database is being tested on a Linux PC; Ubuntu 14.04 LTS and Apache web server. OpenCV library and java wrapper are used for image detection. Also, PostgreSQL with PostGIS (GIS software) is used. The prototype of the application's user interface is given in 3.x. The system's running cycle can be described in 5 steps:

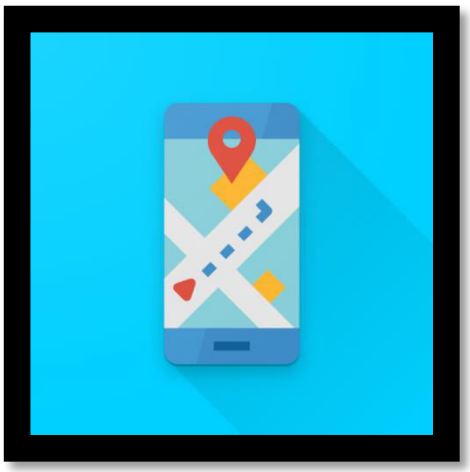
Step 1: The user will open the application and activate the GPS in the smartphone.

Step 2: The user will look at the scene through the interface and take a snapshot (photo) if he/she wants detailed information.

Step 3: The application will send the photo or the GPS data to the web server. Scene discovery will be implemented and locations will be determined. Two different methods are tested; Image processing and coordinate based calculation.

Step 4: Information will be added to the image. The processed image will be sent to the user interface and displayed.

Step 5: The user will see detailed information about the buildings and places on the scene.



Procedure

Augmented anchors were placed using AR Core in android studio.

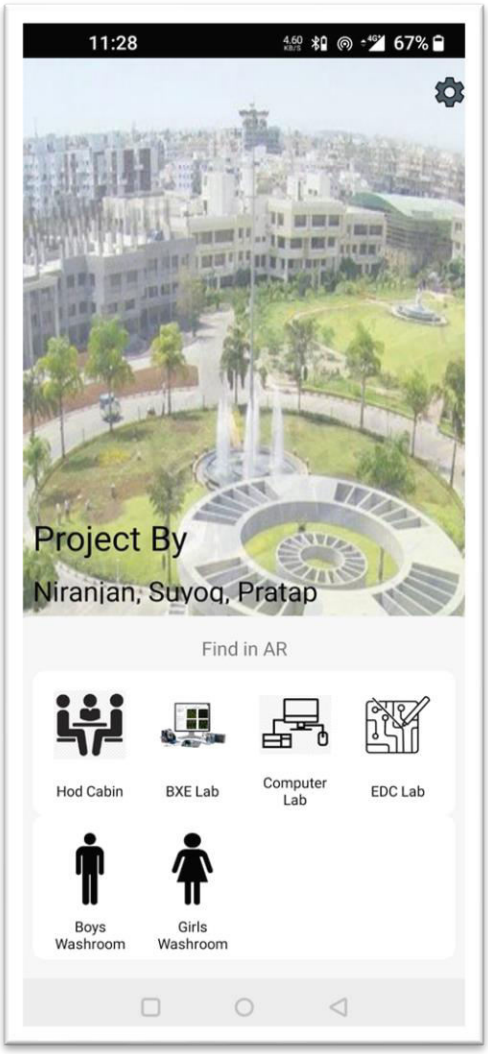
ADMIN :

1. Admin has to place anchors while scanning the environment under each section.
2. Wait for each anchor to get hosted in the Google Cloud space.
3. A message pops up saying "Anchor Placed Successfully" followed with its anchor tag.
4. Repeat the same process for each section.

USER :

1. User has to just select the section where he wants to get navigated.
2. Give permission to access the Camera.
3. Follow the Augmented Arrows.
4. Destination Reached !

Interface



CONCLUSION AND FUTURE WORKS

A prototype of campus augmented reality application is developed. Methods of the implementation are discussed. The buildings in the scene have been successfully defined and tweets about these buildings in the photo were taken successfully from the database. Future work will include enrichment of the application content like putting a radar, map, and pathways, making a better graphic design. The user will be able to see more details and statistics about the related place. The user will get information about the tweets and number of students. Comments of the visitors will be pulled from other social media applications and websites.
These data will be presented clearly in our application. Google Cardboard and Augmented Reality technology will be combined. This application is aimed to be applied to other campuses and also cities in Turkey. Some of these purposes will be finished till the conference.

ACKNOWLEDGEMENT

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Reference

[1] Kari Alanne and Arto Saari "Distributed Energy Generation and Sustainable Development" Renewable and Sustainable Energy Reviews, vol.10 (6), Dec.2006, pp.539–558 doi:10.1016/j.rser.2004.11.004.

[2] N. Phuangpornpitaka and S.Tia "Opportunities and Challenges of Integrating Renewable Energy in Smart Grid System" 10th Eco- Energy and Materials Science and Engineering Symposium, Energy.

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R.

O

3] Jyothilal Nayak Bharothu, M. Sridhar and Srinivasa Rao "A Literature Survey Report On Smart Grid Technologies" 2014 International Conference on Smart Electric Grid, 19-20 Sept.2014, pp.1-8, doi:10.1109/ISEG.2014.7005601.

E-COMMERCE CHATBOT

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Abstract : This paper presents the development of an e-commerce chatbot in order to provide 24/7 customer support. The system uses python as the core programming language along with Django framework. This project helps to streamline the day to day operations of a business by automating the entire process. The system has several components such as, a web based application for helping customers order online, tracking and cancelling of orders. Moreover the easy to use nature of this system improves accessibility for the customers.

Keywords— chatbot; Django framework; python; automating; e-commerce; accessibility; customer support.

I. INTRODUCTION

The rise of ecommerce over the past decade has majorly impacted the way business can be globally carried out. The invention of ecommerce has revolutionised the business industry on both, industrial and consumers on a personal level. Alongside new emerging online businesses more and more existing businesses have commenced transitioning towards online selling. However, with the expansion of an industry online, it becomes tedious to track the barrage of incoming orders and ever growing clientele. Customers request while shopping online often go unanswered as conventional methods to manage such skyrocketing workloads tend to be time consuming and counter productive. Enabling online shopping has proved to have a monumental impact on customers across the globe. The perks of online shopping include having a greater variety of products available at much lower rates. There's one visible downside about using ecommerce as a means to sell products could be that some consumers are wary of not having direct face to face contact with a sales representative.

II. LITERATURE SURVEY

A chatbot is an automated software program that allows for human-bot interaction. These conversations can be implemented through text interfaces and voice interfaces.
Recently virtual assistance for customer service have gained wide popularity with business which is ecommerce oriented. Most of these are built from human conversations in the past which are direct and to the point. A large number of businesses are increasingly using machine learning and artificial intelligence to provide a more personalized service experience for customers, chatbots are embedded
AI features in websites and messenger applications and in some instances even serve as stand alone bots. Chatbots have several synonyms such as 'Chatterbot', 'Chat Robot', 'Talk bot' and 'Virtual assistants'.

In this project a chatbot is developed to automate the process for a business as well as a customer to order, track shipment and delete an order. The user friendliness of this project improves accessibility for customers, thereby allowing businesses to better connect with the consumers. This project makes use of artificial intelligence and machine learning to streamline day to day operations of a business making it easy to use and thereby improving accessibility for customers. This literature review reveals that several authors have contributed significantly towards the development of chatbots. The first chatbot was developed by MIT Professor Joseph Weizenbaum in 1960s called 'Eliza'. John McCarthy, the Father of AI has paved the way for future generations to automate the process in every sector. The intent of the this project is to push the boundaries of natural language processing (NLP) and natural language understanding (NLU) and take them a step closer to understanding context.

III. METHODOLOGY

The main objective of this project is to develop a modular chatbot architecture for improved efficiency and better customer interaction. The goal of this project is to create several small components which are interconnected with each other to improve modularity and make refactoring easier. The system comprises of two major modules with their submodules as follows :

A. Admin

1. Add products - admin can add products.

2. View users-admin can view and delete user.

3. View products- admin can view products added by him.

4. View feedbacks - admin can view feedbacks.

5. View live users - admin can view which users are active.

B. User

1. Chat- you can chat with the chatbot and get answers and also ask the chatbot to delete a particular order.

2. Purchase products- see the products and its cost added by admin and buy them.

3. View products - see the products and add to cart.

4. Product history and tracking- see the products you have purchased and see their tracking status (it will show dispatched if you buy the product).

5. Feedback - give feedback and rating.

PROPOSED SYSTEM

- The android application is developed using Django Framework with Python as a programming language.
- Proposed system is accessed by two entities namely, Admin and User.
- The admin need to login with their valid login credentials first in order to access the android application.
- After successful login, the admin can access all the modules and perform/manage each task accurately.
- The admin can perform task such as view users, view orders, delete users, etc.

Project Implementation

This project uses python as the main programming language along with Django framework. The databases of this project are created and maintained with the use of MySQL 5.6 . This project is then further loaded in
Visual WAMP (Windows Apache MySQL and PHP)
and Notepad++.

Hardware Requirement:

- i3 Processor Based Computer or higher
- Memory: 1 GB
- Hard Drive: 50 GB
- Monitor
- Internet Connection

Software Requirement:

- Windows 7 or higher
- WAMP Server
- Notepad++
- My SQL 5.6
- Google Chrome Browser

IV. RESULT

This project is built using several small components which are interconnected in order to perform accurately. Therefore, every individual component needs to be tested in order for the project to run successfully. It is only if each of these components work together efficiently that the desired output can be achieved. The code for this system has been completely written using python as the coding language and Django framework as the interface for front end designing. This system is easy to use with great precision. It has helped businesses manage their online orders and has proved to be a boon to this modern generation. This system has improved accessibility for consumers and has many positive impacts on the industry. It is a single page application which serves all the front end log-in and the views as a single file whenever the user browses the site it improves the performance by reducing server side call and provides the consumer with a smooth experience.
Fig. - ADMIN AND USER SCREEN

V. CONCLUSION

A Chatbot manages and executes all kinds of online businesses that are presently handled by a living human. For better cost savings, comfort and ease in workflow of the logistics industry, a chatbot is very effective. It helps a lot with the productive functioning for its consumers and also with the supply chain management end. The reason we build such a consumer friendly and modular system is to make the design easily accessible to more number of platforms. This system currently uses NLU engine for classified and controlled data training provided by the admin module. This project improves the relationship of businesses with customers which can lead to more sales, also it has the power to make customer services that are provided, cheaper and a lot more satisfying. By incorporating chatbots in an industry, we can easily offer high quality support for a larger quantity of consumers simultaneously and provide better solutions to their problems at any time of day. Chatbots are intelligent and can be trained using the various libraries provided in python to communicate with the targeted audience in their language. A chatbot is an intuitive operator and a conversational space rooted in AI. It is outlined with a predesigned dialogue box based on a natural language processing system. When a customer asks a question, the bot reacts quickly providing the consumer with instant human-like interaction. Chatbots can reach out to a larger audience and be more effective than humans. The invention of the chatbot with the use of artificial intelligence has dramatically changed businesses as it is capable of gathering a large amount of information which can be accessed easily.

VI. FUTURE SCOPE

The future of chatbots in businesses will help automate the entire process of online shopping. It will work within the capabilities of the system to boost user accessibility and flexibility with artificial intelligence in chatbots today, understanding the consumers requirements has become much more easier. The chatbot can read user intent in order to provide the best responses to satisfy the users requirements. The chatbot uses Natural Language Processing (NLP) and Machine Learning technology to turn complex business interactions into simple daily interactions, because of this chatbots are increasing in popularity among businesses and consumers. Chatbots are evolving every new day, to be effective and useful towards the contribution in the ecommerce industry.

Chatbots are everywhere from customer service tickets to online ordering assistance. Chatbots provide 24/7 service to customers which is crucial in maintaining the chatbots longevity in enterprise settings. In the future we will focus on two main problems. First, we need to integrate a customers query intent detection module, so that we can better leverage individual engines. Secondly, we will have a deeper delve on multi-turn queries where context modelling will be further investigated. Chatbots can increasingly be given a smart and adaptive personality that makes each chat unique. Over the next few decades engineers would experiment with more effective and helpful chatbot applications as well as new and better functions that will further expand the scope of how chatbots are defined. A study conducted by 'Chatbot Magazine' concluded, businesses can save up to 35% of customer service costs by developing and implementing a virtual assistant.

VII. REFERENCES

[1] Phillips, M., Banjo, S. (2015, July 23). Amazon is now bigger than Walmart. Quartz from https://qz.com/462605/amazon-is- now- bigger-than-walmart/

[2] Androutsopoulos, I., Ritchie, G. D., & Thanisch, P. (1995). Natural language interfaces to databases–an introduction. Natural language engineering.

[3] Joachims, T. (1998). Text categorization with support vector machines: Learning with many relevant features. Machine learning: ECML-98, 137- 142.

[4] Kassabgi, G. (2017, January 11). Text Classification using Algorithms. Chatbotslife. Retrieved from https://chatbotslife.com/text- classification- using-algorithms-e4d50dcba45/

[5] Kassabgi, G. (2017, January 24). Text Classification using Neural Networks. Machinelearnings. Retrieved from https://machinelearnings.co/text-classification- using-neural- networks- f5cd7b8765c6/

[6] Dzmitry Bahdanau, Kyunghyun Cho, and Yoshua

[7] Bengio. 2014. Neural machine translation by jointly learningto align and translate.
CORR abs/1409.0473. http://arxiv.org/abs/1409.0473.

[8] Lushan Han,Abhay L. Kashyap, Tim Finin, James Mayfield, and Jonathan Weese.2013.

[9] Umbcebiquity-core: Semantic textual similar- ity systems.

[10] In Second Joint Conference on Lexical and Computational Semantics (*SEM), Volume 1: Proceedings of the Main Conference and the Shared Task:

[11] Semantic Textual Similarity. Association for Computational Lin- guistics, Atlanta, Georgia, USA.

Self-Learning Yoga Pose with Accuracy Detection using Deep Learning

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Abstract*— An approach to accurately recognize various Yoga pose Assessment using deep learning algorithms has been presented in this work. In this system, we propose a Yoga pose assessment method using pose detection to help the self-learning of Yoga. The system detects a Yoga stance using simply a PC camera and multi-part detection. In this approach, we also provide an enhanced method for calculating scores that can be applied to any position. Our application is evaluated on different Yoga poses under different scenes, and its robustness is also. For Yoga recognition on real-time videos, a hybrid deep learning model using convolutional neural networks (CNN) and long short-term memory (LSTM) is proposed, in which the CNN layer extracts features from key-points of each frame obtained from Open-Pose and is followed by LSTM to give temporal predictions..

I. Introduction

Activity of Human recognition was well-proposed pc vision drawback. Many obstacles have been required over many years. This has the downside of locating key points and therefore the posture of an individual's from the detector knowledge. Recognition activity is helpful in several domains as well as video-surveillance, biometrics, power-assisted living, human–computer interaction, sports arbitration, in-home health observation, etc. The health condition of someone may be calculated and foretold victimization of observation and recognizing their activities. Yoga is ancient science that is found in Asian nation. consistent with the Geeta, it's remedies of misery and destroyer of pain.Yoga is becoming more popular around the world as a result of its physical, mental, and spiritual benefits. In 2014, the final Assembly of world organisation has
declared 21st Gregorian calendar month because the 'International Day of Yoga.

III. Literature Survey

Yoga has grown in popularity in the medical world over the last decade, and numerous|and numerous|and diversified literatures have been projected for various medical applications such as viscus rehabilitation, positive body image intervention, mental disorders, and so on.

Yoga will treat various disorders without the need of any medication. Yoga boosts physical health still as helps to refresh the body, mind, and soul. There are numerous asanas, each of which symbolises static bodily postures.

Yoga learning and self-instruction systems will popularize and unfold Yoga whereas guaranteeing that it's practiced properly. Such self-training systems for sports and exercises will improve the performance level of participants and forestall from injuries. As countless works in literature have introduced machine-controlled and semi-automated systems for analysing the sports and exercise activities like jock ranking, swimming, lawn tennis strokes, badminton, rugby, basketball, vertical high jump, hurdles sport, etc.

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To determine the difference in postures between a practitioner and a professional, a 'Yoga Tutor' project victimisation expedited strong alternatives was proposed (SURF). In any case, using only the contour information to match and describe the stances is insufficient. We've designed a Yoga coaching system using an interface suit that includes sixteen mechanical phenomenon measure units (IMUs) and a half-dozen factors, but it's intrusive to the user and may cause the user to adopt a perform attitude during a traditional technique. We often display an image and text-based professional Yoga system, but they do not need to analyse the practitioner's posture, etc. projected Yoga cause recognition by features-based approach to style a self-training system. It uses a Kinect for gathering organic structure contour and capturing the body map. A star skeleton was used for speedy skeletonization to induce a descriptor for the human cause. He works to create a computer-assisted posture correction solution based on Kinect. It took three postures in thought, i.e., somebody III, downward facing dog and tree. However, the speed of accuracy is extremely low regarding eighty two.84%. In, a Yoga detection system is projected for 6 asanas victimization Kinect and enzyme boost classification with ninety four.78% accuracy score. They do, however, use a depth sensor-based camera, which is usually unavailable to consumers. We have applied image recognition techniques for Indian classical dance and Convolutional neural network (CNN) and stacked auto encoder (SAE) algorithms are used to recognise yoga poses from photographs. However, they were calculated their performance on pictures solely and not on videos.

We projected a Yoga self-training system to help in rectifying postures whereas acting Yoga employing a Kinect depth camera for twelve totally different asanas. However, it uses manual options extraction & developing separate models for every yoga attitude. Features, sort of a human skeleton, ar obligatory to extract for describing the human poses. There are numerous skeletonization techniques in literature, like distance transformation and cutting. anyway, these steps have a high price and ar sensitive to noise. The classic skeletonization strategy has been overtaken by deep learning-based strategies since the publication of Deep Cause.

Deep cause leads the shift toward deep network-based approaches from classical ones. this method uses deep neural network based mostly regressors to directly regress on coordinates of joints. It anticipates the activity of an individual's and it find organic structure components still. However, their approach has a problem with localization.

V. PROPOSED SYSTEM

Our method automatically acknowledge the user's Yogasana from real time and recorded videos. The procedure is usually divided into four basic parts.1st, data assortment is performed where it ar typically either period technique running in parallel with detection or ar typically previously recorded videos. Second, Open cause is used to point the joint locations by practice [*fr1] Confidence Maps and [*fr1] Affinity Fields followed by bipartite matching and parsing. this could be the first step of our pipeline, and conjointly the Open cause library is employed for it. whereas recorded videos, this procedure takes place offline, whereas for period predictions, practice input from the camera is done online to provide critical points to the projected model. Open cause is a code library for multi-person key purpose identification that recognises the soma, hand, and face key points at intervals the image. The cause extraction was performed at the default resolution of Open cause network for optimum performance. Our mission is to accurately recognise the user's asanas in real time. First, key purpose choices unit extracted practice Open cause and recorded the joint location values at intervals the JSON file, thus LR and LSTM models unit applied for the prediction of asana. Owing to the mixture of every, we have a tendency to tend to induce the only set of choices filtered by LR and semi-permanent data dependencies established practice LSTM.

a) SYSTEM ARCHITECTURE

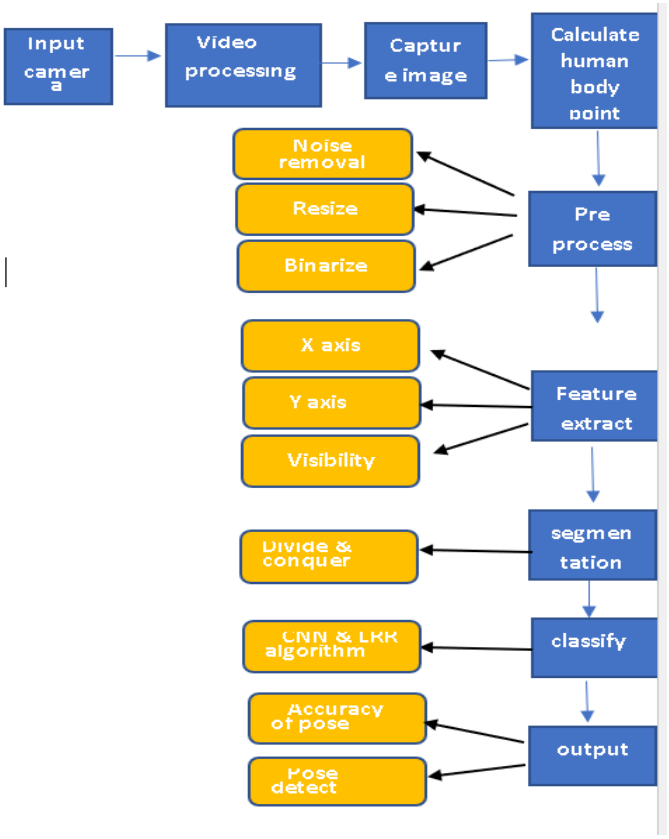

Fig.1 System Architecture

VI. ALGORITHM

Logistic Regression is a type of Machine Learning technique used to handle categorization problems. The potential idea is supported by a revelatory analytic technique. A logistic regression model is comparable to a regression to the mean model, but instead of utilising a linear function, it employs a more difficult value function known as the 'Sigmoid perform' or the 'logistic operate.' Like regression toward the mean, logistic regression employs the Associate in Nursing equation as its illustration. To forecast Associate in Nursing output worth, input values (x) unit integrated linearly practice weights or constant values (referred to as a result of the Athinai letter Beta) (y). It's possible that the output value being modelled is a binary value (0 or 1) rather than a numeric value, which is a key contrast from regression toward the mean.

V. Conclusion

In this paper, we have a tendency to tend to projected a Yoga identification system using a ancient RGB camera. The data was gathered using an HD 1080p Logitech camera on fifteen people (10 men and 5 women) and made available on the market. Open cause is used to capture the user and sight key points. The end-to-end deep learning-based framework removed the need for making handcrafted choices permits for adding of recent asanas by coaching the model with new data. We used the time distributed LR layer to see patterns between important places in a single frame and the LSTM to con the patterns discovered at intervals the recent frames. The outcomes generate the system even more cheap by lowering the error due to false key purpose detection by using LSTM for frame memory and polling for denoising.

References

[1]. Act recognition on a depth dataset, Gao Z, Zhang H, Liu AA, et al.Figure neural Apply between 2047 and 2054. www.doi.org/10.107/s00521-015-2002-0

[2]. Poppe R (2010) A survey on vision-based act recognition. Image Visual figure 28:976–990. https://doi.org/10.1016/j. imavis.2009.11.014 [3]. Weinland D, Ranford R, Boyer E (2011) A survey of vision-based methods for action illustration, segmentation, and recognition. Figure 115:224–241. https://doi.org/10.1016/j.cviu.2010.10.002

[4]. Ladjailia A, Bouchrika I, Merouani HF et al (2019) act recognition via optical flow: mouldering activities into basic actions. Neural figure Appl.

https://doi.org/10.1007/ s00521-018-3951-x

[5]. Suto J (2018) Comparison of offline and period act recognition results practice machine learning techniques. https://doi.org/10.1007/s00521-018-3437-x Neural figure Appl.

[6]. RR Guddeti , Dang G, Williams MA, Alla VM (2018) Role of Yoga in organ illness and rehabilitation. J cardiopulmonary Relabel Prev. https://doi.org/10.1097/hcr.00000372

[7]. D. Neumark-Sztainer, A. Watts, and S. Rydell (2018) Yoga and body image: but how do active young adults describe the impact on their body image? 156–168 in Body Image. DOI: 10.1016/j.bodyim.2018.09.001

[8]. E. Halliwell, K. Dawson, and S. Berkey (2019) A typical experimental investigation of a yoga-based body image intervention.Body Image 28:119–127.

https://doi.org/10.1016/j.bodyim.2018.12.00.

[9]. Satyanarayana G, Vengadavaradan A, Bharadwaj B (2019) Role of yoga and attentiveness in severe mental illnesses: a narrative review. Int J Yoga 12:3–28. https://doi.org/10.4103/ijoy. IJOY_65_1

[10]. Patil S, Pawar A, Keshava (2011) Yoga tutor: representation and analysis practice SURF formula. ICSGRC 2011, Proceedings of the 2011 IEEE System Graduate Colloquium, pages 43–46.

[11]. HT Chen, YZ He, CC Hsu, and colleagues (2014) Yoga posture recognition for self-training. In: Lecture notes in technology (including subseries lecture notes in artificial intelligence and lecture notes in bioinformatics), pp 496–505

[12]. Chen HT, He YZ, Chou CL et al (2013) computer assisted self-training system for sports exercise practice Kinect. In: Electronic proceedings of 2013 IEEE international conference transmission and exposition work ICMEW 2013 3–6.

https://doi.org/10.1109/ icmew.2013.661830.

Realtime Face-Spoofing Detection using rPPG Technology

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***Abstract*— Recently, face recognition systems have become popular and are being used heavily in mobile devices and surveillance systems due to the convenience they provide. Face biometric provides a convenient, contactless, accurate, and instruction-less way for authentication when compared to other biometrics like fingerprint and voice recognition. As the technology is evolving, face recognition is being even accurate and safer. But it's well known there are always two sides, unluckily they are even unsafe due to how easy it is to do presentation attacks like photos, videos of currently 3D prints of a registered user. And capturing photos and videos without consent makes it even easier. A lot of research is already been done for the development of a face anti-spoof system. This Paper proposes a yet another face Anti-spoof method for using rPPG. rPPG is latest clue that can be used to distinguish a false input from a real person. It also discusses about the way this method can be implemented for live monitoring.**

Keywords*— *Face Spoofing, Remote Photoplethysmography, Face recognition, 3d face printing

I. INTRODUCTION

Generic face recognition system extracts facial. FACE SPOOFING ATTACK Conditions and features from input data (photo, video, or 3Ddata) to compare to a face-to-face pre-registered website for the same. [1][31] Face recognition is considered one of the strongest affirmations due to the number of data points that can be collected from the face leading to a password with more than a billion permissions and combinations, also a variety of facial features for all people at once. Compared to other faces biometric is much simpler and less of a command as it requires the user to only make his face appear audible. Also, uncontrolled reassurance makes it very useful in epidemic situations where infections are spread by touch [2][20].

More recently, facial recognition has become increasingly common on IOT gadgets like Smartphones, Tablets, and laptops. Some of them only use a sensor that can detect facial contours in real time while others use only 2D data from their cameras. A comparison of authentication methods fig 1.1 shows that the same may be violated. The probability that false inputs are accepted is calculated based on possible combinations of the method it provides. Facial recognition is very safe but useful.

Also, if there is a lock there is always a key-maker, unfortunately, face recognition also can be fooled by someone who is pretending to be someone else. And this high accuracy comes with the disadvantage of more vulnerabilities which is been discussed below [4] [12 – 15].

SMARTPHONE UNLOCK METHOD	TOTAL POSSIBLE COMBINATIONS	APPROX FALSE ACCEPTANCE RATE
ANDROID 9 PIN PATTERN	389,112	0.0003%
iOS 6 DIGIT PIN	1,000,000	0.0001%
ANDROID 2D FACE UNLOCK	1000	0.1%
CAPACITIVE FINGERPRINT	50,000	0.002%
iOS FACE-ID	1,000,000	0.0001%
ANDROID 6X6 GRID	≅100,000,000	≅0.0000001%

Fig 1.1 comparison of authentication methods in mobile devices [3]

II. FACE SPOOFING ATTACKS

Fraudulent attack is nothing but false acceptance when attackers submit false evidence to a biometric system to obtain authenticity [4] [5]. Such an attack is easy because one can take pictures / video of someone remotely without their permission and can also be found on a social networking site. Figure 2.1 represents a simple face attack using a registered user image.

Fig. 2.1 Simple face spoof attack using a photo [4]

These attacks can be categorized as 1. 2D attacks and 2. 3D attacks [4][6].

1. 2D attacks

2D attack where the attacker can deceive the camera sensor by using high resolution image or playing video directly to the camera. Popularly called as print attacks and replays, fig 2.2 represents a print model and replay attack. These can easily break the face recognition system that relies solely on the camera and does not use any anti-poverty measures. Some examples include using high-resolution imagery, using a

monitor, using any mobile display such as a smartphone, tablet, etc.[16 – 19]

Fig. 2.2 Example of print and replay attack [4]

2. 3D attacks

When 3D is where the attacker tries to imitate a real person's face like a fake input. Now that the attacker has a face copy with the 3D details of the registrant can easily break the camera-based system and 3D hearing systems too. It can be done using a 3D printed face model with details or a face mask. Figure 2.3 gives a similar example.

Fig. 2.3 Hyper-realistic 3D printed face model [16]

Currently, 3D printers are already available and use materials like plastic, polycarbonate, and some UV-sensitive materials providing great details.[9][11]

III. Methodology

Because of immerging technology, the clues which ever used before for spoofing detection doesn't holds much of a change. Starting from skin texture, subject movement and the expression can be mimicked. rPPG (remote Photoplethysmography) is the new clue that can be used as a feature to distinguish between real person and a spoof.

PPG (Photoplethysmography) is the tech through which a sensor can extract ECG (electro-cardio-graph) signal from the certain part of the body. The sensor is placed on the body and the signal is close the ECG or more of a heart rate signal. The rPPG now does the same by mealy using only the webcam or camera of a computer/machine.

rPPG (remote Photoplethysmography)

rPPG is the method through one can extract heart rate signal using the video feed of the person face. Fig. 3.1 give the quick idea about isolation of ppg signal remotely form a face. This signal contains lot of thermal noise and noise due to ac lightings [10].

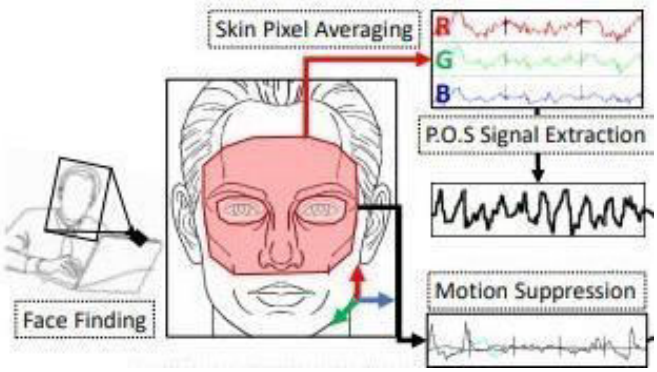

Fig. 3.1 rPPG extraction

The method of rPPG extraction used for this project uses change in brightness of average pixels in that area and this change in brightness in plotted as PPG signal.

Spoof Detection

Now we have the PPG signal extracted from the input it can go under processing i.e., first reducing noise due to motion by already tracking the face second passing the signal from a pass-band filter. As human heart range can vary between 50 to 200 bits per minute, passing the signal through a pass band signal will remove the noise due to ac lightings [21-24]. For this scenario the output is robust to the noise as we not much interested in the quality of signal, because as can be seen in the Fig 3.2 exhibiting of signal is necessary only [7].

For each frame, an array 100 units representing PPG signal is generated containing amplitude of signal at instance. For each frame a data point is added to the array of signal and then each array is passed to the deep neural network which is been trained on input signal array generated using same method. For humans heart rate can be between 50 to 200 so for a meaningful signal we need to have data points for at least 3 sec so that there is more probability of capturing at least 1 peak into the array. Because data point is added every frame and model need a complete input signal the program takes time to initialize i.e., 3+ sec [24][26].

Further the feature i.e., PPG signal is passed to the DNN (Deep Neural Network) which is trained to identify human PPG signals which works exactly same as a speech recognition system. And this happing for every frame, hence result can be presented in Realtime on the screen. For all image processing the very famous library OpenCV is used.

And the program is written in pythons so the it can be opensource and because of the wide community available for python [27-30].

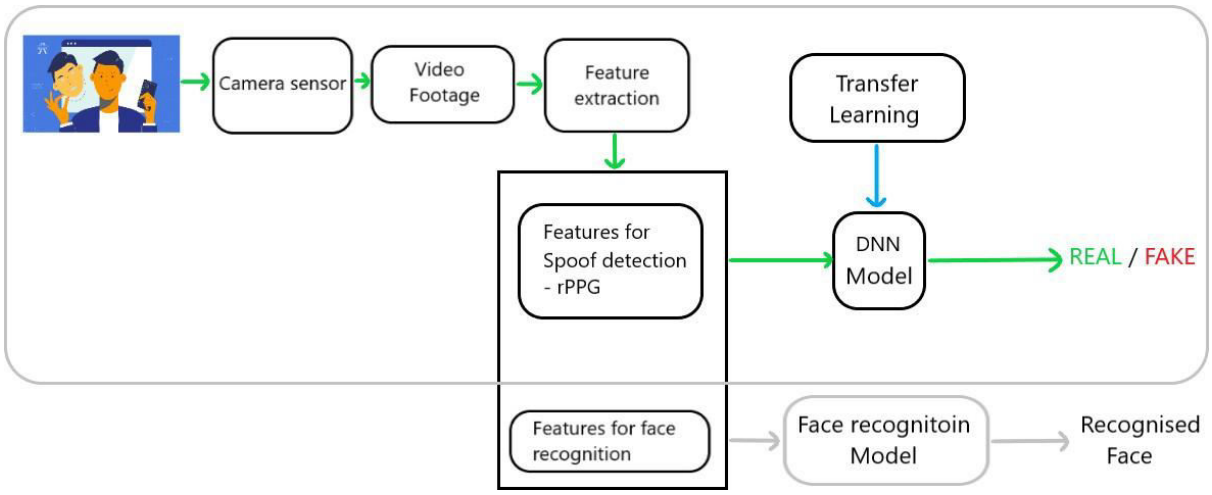

Fig. 3.2 Flow of Spoof detection from the video feed

IV. Observations and Results

For the Machine Learning model which was trained using python had an overall accuracy of 98 % where size of validation data was 10 % of total data. Fig 4.1 and 4.2 represents the acuity and losses of model for training respectively.

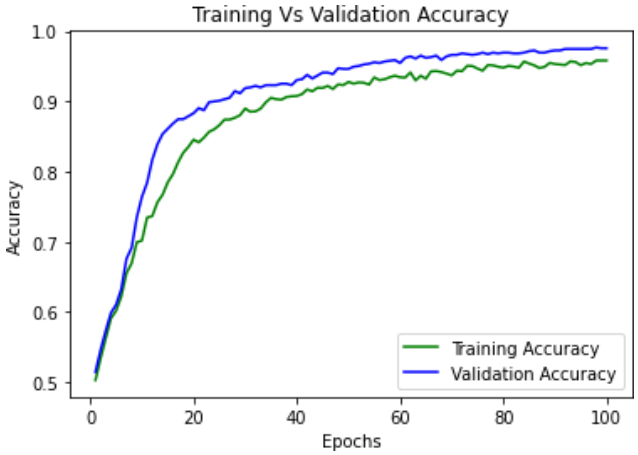

Fig. 4.1 Training Vs validation Accuracy

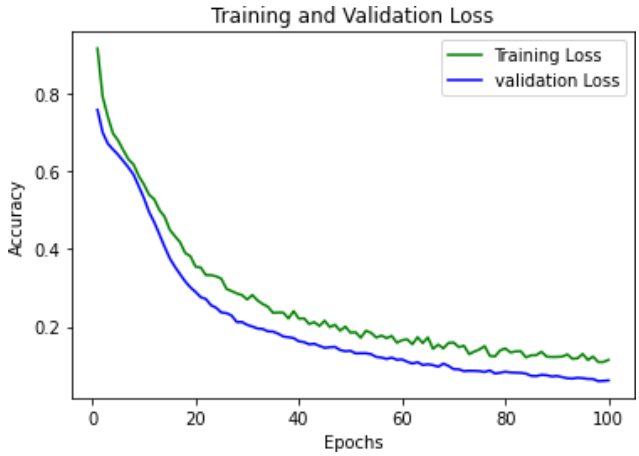

Fig 4.2 Training and Validation Loss

As can be seen in Fig. 4.3 the python app detecting spoof and real person in real-time for the 98% of the time with ideal light and less motion. Accuracy reduces with more motion for the subject but still it won't allow false input to be passed.

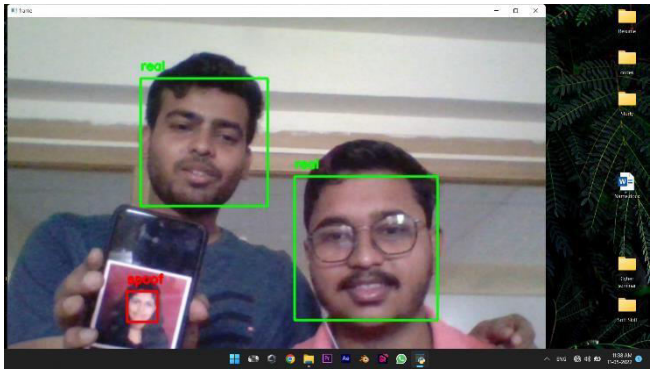

Fig 4.3 Spoof detection in action

V. Conclusion

rPPG has proven to be reliable clue for spoof detection against 3D attacks. In this paper we proposed a approach of spoof detection which has minimal hardware requirement which actually most of current IOT devices satisfy i.e., possess a webcam (monocular camera) with decent processing power. And easily eliminates all 2D and 3D spoof attacks improving the security of already existing system. And opening wide area of application on existing system. For example, using face ID for authentication on already existing devices, face identification of entrance.

Our method successfully distinguishes between real and spoof person where is had overall accuracy of 98 % and was implemented on windows machine. But as this method need some time to be initialized it wouldn't be the best fit for point use applications. Also, this initialization time is static I can take advantage to higher processing powers or improved hardware's from futures.

Acknowledgment

This research and paper were supervised and supported by our mentors/supervisors, Dr Priya Charles, Mrs B. Lakshmiprabha and Ass. Prof. Lokesh M. Giripunje. Because of their knowledge and enthusiasm, we were able complete our research.

References

[1] O. De Vel,S. Aeberhard, "Line-based face recognition under varying pose", IEEE Transactions on Pattern Analysis and Machine Intelligence 1999

[2] Article published on www.thejakartapost.com (Shuhei Okawara, 30, owner of mask shop Kamenya Omote, holds a super-realistic face mask based on his real face, made by using 3D printing technology, in Tokyo, Japan, on December 16, 2020.) (REUTERS/Issei Kato)

[3] Arun Maini. "How secure your Android Unlock Pattern ACTUALLY is". YouTube.

[4] Sandeep Kumar, Sukhwinder Singh, Jagdish Kumar. "A Comparative Study on Face Spoofing Attacks". ISBN: 978-1-5090-6471-7/17/, 2017 IEEE.

[5] Galbally, Javier, Sébastien Marcel, and Julian Fierrez. "Biometric antispoofing methods: A survey in face recognition." IEEE Access, vol. 2, pp. 1530-1552, 2014.

[6] Rajat Bhati,Shubham Saraff,Chhandak Bagchi,V. Vijayarajan, "Critical Decision Making Using Neural Networks", International Journal of Engineering & Technology 2018

[7] Zinelabidine Boulkenafet, Jukka Komulainen and Abdenour Hadid, "Face Spoofing Detection Using Colour Texture Analysis", DOI 10.1109/TIFS.2016.2555286, IEEE Transactions on Information Forensics and Security 2015

[8] Nesli Erdogmus and Sébastien Marcel, "Spoofing Face Recognition With 3D Masks", IEEE TRANSACTIONS ON INFORMATION FORENSICS AND SECURITY, VOL. 9, NO. 7, JULY 2014

[9] Andrea Lagorio, Clinton Fookes, Sridha, "LIVENESS DETECTION BASED ON 3D FACE SHAPE ANALYSIS", 978-1-4673-4989-5/13 ©2013 IEEE

[10] Chenglin Yao, Shihe Wang, Jialu Zhang, Wentao He,Heshan Du, Jianfeng Ren, Ruibin Bai, and Jiang Liu," RPPG-BASED SPOOFING DETECTION FOR FACE MASK ATTACK USING EFFICIENTNET ON WEIGHTED SPATIAL-TEMPORAL REPRESENTATION" 978-1-6654-4115-5/21 ©2021 IEEE

[11] Daniel Rodriguez, Jing Wang, Changzhi Li, "Spoofing Attacks to Radar Motion Sensors with Portable RF Devices", 978-1-7281-8062-5/21 © 2021 IEEE

[12] SHERVIN RAHIMZADEH ARASHLOO1, JOSEF KITTLER2, AND WILLIAM CHRISTMAS, "An Anomaly Detection Approach to Face Spoofing Detection: A New Formulation and Evaluation Protocol", IEEE Access VOLUME 5, 2017

[13] Tetsushi Ohki Vishu Gupta and Masakatsu Nishigaki, "Efficient Spoofing Attack Detection against Unknown Sample using End-to-End Anomaly Detection", APSIPA Annual Summit, November 2019

[14] Sandeep Kumar, Sukhwinder Singh, Jagdish Kumar "A Comparative Study on Face Spoofing Attacks", International Conference on Computing, Communication and Automation, 2017

[15] Jukka Mtitittti, Abdenour Hadid, Matti Pietiktiinen, "Face Spoofing Detection From Single Images Using Micro-Texture Analysis", 978-1-4577-1359-0111 IEEE

[16] Samarth Bharadwaj, Tejas I. Dhamecha, Mayank Vatsa and Richa Singh, "Computationally Efficient Face Spoofing Detection with Motion Magnification", 2013 IEEE Conference on Computer Vision and Pattern Recognition Workshops

[17] Akinori F. Ebihara, Kazuyuki Sakurai, Hitoshi Imaoka, "Efficient Face Spoofing Detection with Flash", DOI 10.1109/TBIOM.2021.3076816, IEEE

[18] Raden Budiarto Hadiprakoso, Hermawan Setiawan, Girinoto. "Face anti-spoofing Using CNN classifier and liveness detection". 3rd International conference, IEEE 2020

[19] Pirnar, Ž.; Finžgar, M.; Podržaj, P. Performance Evaluation of rPPG Approaches with and without the Region-of-Interest Localization Step. Appl. Sci. 2021, 11, 3467. https://doi.org/10.3390/app11083467

[20] Lokesh M.Giripunje, Om Dandade, Poorvi K.Kulkarni, Pranita H.Kulkarni, " Face Spoofing Attacks and Detection: A Review", IJSART - Volume 8 Issue 3 – MARCH 2022

[21] N. Erdogmus and S. Marcel, "Spoofing in 2D face recognition with 3D masks and anti-spoofing with Kinect," Biometrics: Theory, Applications and Systems (BTAS), pp. 1–6, September 2013.

[22] S. Liu, B. Yang, P. C. Yuen, and G. Zhao, "A 3D mask face anti-spoofing database with real world variations," in IEEE Conference on Computer Vision and Pattern Recognition Workshops (CVPRW), 2016, pp. 100–106.

[23] S. Wu, M. Kan, Z. He, S. Shan, and X. Chen, "Funnel structured cascade for multi-view face detection with alignment-awareness," Neurocomputing, vol. 221, pp. 138– 145, 2017.

[24] X. Niu, S. Shan, H. Han, and X. Chen, "RhythmNet: end-to-end heart rate estimation from face via spatial-temporal epresentation," IEEE Transactions on Image Processing, vol. 29, pp. 2409–2423, 2019.

[25] M. Sandler, A. Howard, M. Zhu, A. Zhmoginov, and L. C. Chen, "Mobilenetv2: Inverted residuals and linear bottlenecks," in IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2018, pp. 4510–4520.

[26] J. Hu, L. Shen, and G. Sun, "Squeeze-and-excitation networks," in IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2018, pp. 7132–7141.

[27] A. G. Howard, M. Zhu, B. Chen, D. Kalenichenko, W. Wang, T. Weyand, M. Andreetto, and H. Adam, "Mobilenets: Efficient convolutional neural networks for mobile vision applications," arXivpreprintarXiv:1704.04861, 2017.

[28] A. Howard, M. Sandler, G. Chu, L. C. Chen, B. Chen, M. Tan, W. Wang, Y. Zhu, R. Pang, V. Vasudevan, et al., "Searching for mobilenetv3," in IEEE International Conference on Computer Vision (ICCV), 2019, pp. 1314–1324.

[29] Y. Chen, J. Li, H. Xiao, X. Jin, S. Yan, and J. Feng, "Dual path networks," Advances in Neural Information Processing Systems, vol. 30, pp. 4467–4475, 2017.

[30] Y. Liu, A. Jourabloo, and X. Liu,"Learning deep models for face anti-spoofing: Binary or auxiliary supervision," in IEEE Conference on Computer Vision and Pattern Recognition (CVPR), 2018, pp. 389–398.

[31] "Amsterdam airport's facial ID fooled by simple photo," Biometric Technology Today, vol. 2020, no. 1, pp. 11–12, 2020

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Virtual Assistant and Diagnostic Analysis in Mental Healthcare System

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ABSTRACT - Mental health is a significant general wellbeing concern worldwide and ought to be an unmistakable piece of the medical services industry. The world's progress has been impaired due to an increase in the number of mental health patients and sluggish growth. Recently, AI procedures have drawn in a great deal of consideration in various enterprises, including emotional wellness. Artificial Intelligence has the potential to greatly aid in the detection of symptoms of depression, anxiety, and other mental diseases. AI is also capable of delivering psychological counseling to patients in addition to diagnosing symptoms. Image recognition and deep learning are key applications of Artificial Intelligence. In this paper, we examine various frameworks for mental health, focusing on virtual guidance, accuracy therapy, and symptomatic models. The research digs into the constraints and the calculations of these frameworks.

KEYWORDS - Mental Health, AI, Deep Learning, Computer Vision, framework, data analysis

1. INTRODUCTION

Mental wellness is a huge public health issue all over the world, and it should be a big element of the medical service sector. Regardless, the rate of progress in this field looks to be somewhat slow. Many businesses giving a lot of attention to this topic is a huge step toward improving society's mental health. The figure 1.1 shows the growth in mental health patients in comparison with other illnesses.

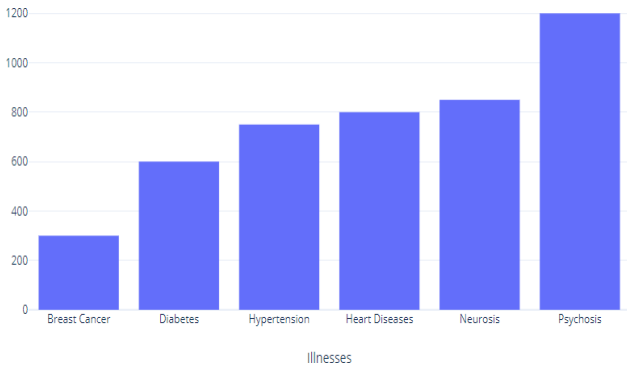

Figure 1.1: comparison of the number of mental health patients and patients with other illnesses

As evidenced by the relevance of mental health in the Sustainable Development Goals, there has been a growing recognition of the role mental health plays in achieving global development goals in recent years. People with serious mental illnesses die considerably sooner than they should, up to two decades earlier – as a result of curable physical ailments.

Mental illnesses are frequently subjected to severe human rights breaches, racism, and stigma. Despite the fact that many mental health illnesses can be adequately treated at a reasonable cost, the gap between those who need care and those who have access to it remains significant. The percentage of people who receive effective treatment is still very low. The figure 1.2 shows the number of people getting proper treatment with respect to the number of untreated patients.

It's not always easy to spot the difference between normal behaviors and what indicators of mental illness. There is no simple method that can determine whether someone has a mental illness or whether their actions and ideas are typical of their personality. Although each condition has its own range of symptoms, the following are some out of many prevalent indicators of mental illness.

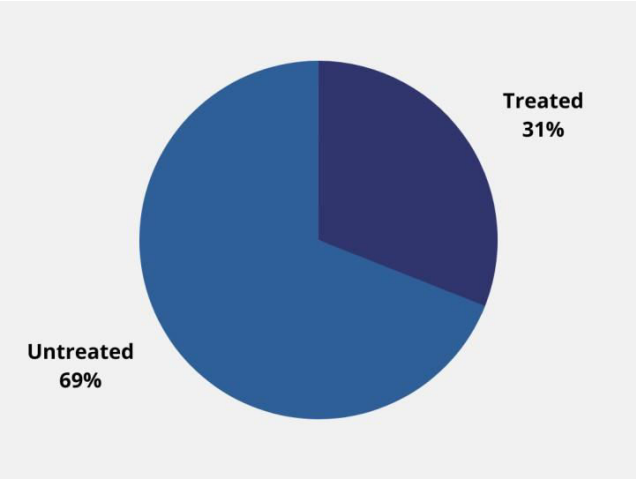

Fig 1.2 comparison of treated mental health patients and untreated mental health patients

1. Extreme mood fluctuations, euphoric feelings
2. Understanding or relating to others is difficult.
3. Sleeping patterns that have changed or a feeling of exhaustion and low energy
4. Avoiding social situations and people
5. Irritability or anger that lasts for a long time or is very intense

2. USE OF AI IN MENTAL HEALTH

Artificial intelligence (AI) technology and approaches are valuable in many areas of psychiatric and medical care, including decision support, therapies, diagnosis, self-care, health administration, research, etc. Artificial intelligence (AI)-based solutions have the potential to raise therapists' current capabilities, allowing them to cope with complicated challenges and ever-expanding data streams that push human capacities to their limits. Technological advances, particularly those involving natural language processing, have the capability to make a big difference in public health and monitoring.

Some of the Artificial Intelligence Applications are listed below:

Computer Vision

Computer vision is a part of artificial intelligence (AI) that allows computers and devices to extract useful information from photos, recordings, and other visual data and act or suggest decisions based on that data. Advancements in the field of image processing have resulted in the creation of effective systems capable of recognising emotions from facial photographs in a much more coherent way.

Fig. 2.1Facial Expressions

Chat System

Individualized counselling can be provided via the conversational service to users on a one-on-one basis. It is critical to end the isolation of people suffering from mental illnesses such as sadness and fatigue. Isolation can be efficiently resolved through one-on-one discussion. Chatbots are useful when a user requires immediate assistance. Critique, Inherency, Thesis, and Plan are all ways that a Chatbot system can aid the industry.

3. LITERATURE REVIEW

Counseling Therapy

Cognitive Behavior Therapy

This study explored SERMO, a mobile app with an integrated Chatbot that uses cognitive behavior therapy (CBT) methods to help mentally ill people regulate their emotions and deal with their thoughts and feelings. Cognitive behavioral therapy (CBT) is a

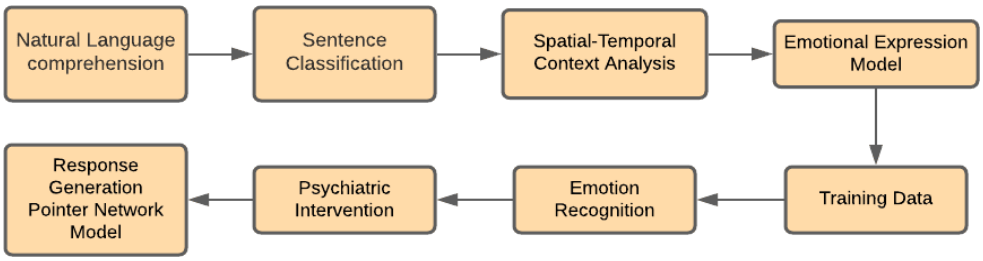

Fig 3.1 System Procedure

psychotherapy treatment that teaches people how to recognize and alter harmful or distressing thoughts that affect their behavior and emotions.[1]

Types of Cognitive Behavioral Therapy
1) Cognitive therapy
2) Dialectical behavior therapy
3) Multimodal Therapy
4) Rational emotive behavior therapy

As the thought pattern is now comprehended, the app focuses on a variety of ways to assist people in overcoming these ideas, such as journaling, role acting, relaxation techniques, and mental distractions. The following are some common factors in all of these strategies:
1) Identifying Negative Thoughts
2) Practicing New Skills
3) Goal-Setting
4) Problem-solving
5) Self-Monitoring

This app also has additional features such as an emotion diary. The user is prompted to rate his mood on a scale of 1 to 5 on a slider. They are either offered ideas to strengthen their abilities or the Chatbot asks for the mood trigger based on this reading.[1]

Chatbot- Psychiatric Counseling

This system is a dialogue service for psychiatric therapy that uses high-level natural language understanding (NLU) and multi-modal emotion identification to understand counseling material. Out of the many modes of communication, like image, video, text, audio, etc. this chat service focuses on building a rapport with the user through text format.

Understanding the user's inputs lays the groundwork for delivering a suitable response. Depending on their linguistic aptitude and vocabulary level, each user will have different conversation expressions. It then employs a thorough sentence analysis strategy. The utterance purpose of the sentence entered by the user is assessed, as well as the domain analysis. Unstructured expressions are converted into structured data concerning spatial-temporal information throughout the analysis. The information is useful in providing a response that is appropriate for the Chatbot's spatial-temporal context. Simultaneous building of training data works in this process. An analysis conclusion is made and an appropriate response is generated using a pointer network model. Figure 3.1 shows the procedure of the system.[3]

3.1.2 The Chatbot- A Counseling Service Using Emotional Response Generation

In this paper, a novel Chatbot application that provides mental health care counseling services based on emotion recognition methods is introduced in a chat assistant platform that consists of user sensitive emotion and context extraction.[2] This paper focuses on chat assistants which can recognize and monitor human emotion and understand natural language conversation, the most crucial technologies in the conversational psychiatric counseling service.

This paper focuses on chat assistants which can recognize and monitor human emotion and understand natural language conversation, the most crucial technologies in the conversational psychiatric counseling service.[2] The work-related included:

Image Processing

3.2.1 Image processing for counseling students

The identification of depression at the college level is desirable in this research such that it can be controlled by providing better counseling from the outset. The facial expressions of a student suffering

Sr. No.	Authors	Title	Findings	Publication
1	Kerstin Denecke, Sayan Vaaheesan, Aaganya Arulnathan	A Mental Health Chatbot for Regulating Emotions(SERMO)-Concepts and Usability Test	Implements methods from cognitive behaviour therapy (CBT) and oscova interpreter is used for emotion detection from text	IEEE Transactions on Emerging Topics in Computing **IEEE - 2020**
2	Kyo-Joong Oh, Dongkun Lee, Byungsoo ko, Ho-Jin Choi	A Chatbot for Psychiatric Counseling in Mental Healthcare Service Based on Emotional Dialogue Analysis and Sentence Generation	Establishment of textual chat system for psychiatric counseling	18th IEEE International Conference on Mobile Data Management(MDM) **IEEE – 2017**
3	Charith Silva	Data Science in Public Mental Health	Projection and deeper understanding of disease classification, specifically in mental health.	**IEEE - 2019**
4	N.S.Parameswaran and D.Venkataraman	A computer vision based image processing system for depression detection among students for counselling	Identification of Depression using Students facial expressions	2019 April

from depression would reveal his or her troubled mental state. A study has been completed on an automated system that gathers and analyses student facial photos in order to diagnose depression effectively.[2]

This computerized system will be programmed to recognize positive and negative facial expressions. A video of the student is captured, from which the student's face is retrieved, in order to forecast depression. The face traits are then extracted using Gabor filters. The SVM classifier is used to classify these facial traits. The amount of negative feelings present throughout the entire film is used to determine the level of depression. Notification of the student's disturbed mental state is sent to the class adviser, department counselor, or university counselor, depending on the extent of depression. The current research suggests a system that will be trained with happy, neutral, disdain, and disgust facial features.

The only limitation to this system is that it has a reliability of 64.38 per cent. To improve the system accuracy, other inputs like academic results, social material, peer opinions, and hostel activities can be examined in the development of a hybrid system for depression identification, which the current system does not take into account.[5]

3.2.1 Predicting Depression Using Texts from Contact Subsets

Due to the sheer importance of social interactions and intimate relationships on mental health, the concept of forecasting depression scores based on received communication was born.[5]

The method employed in this paper is to create a subset of the most influential contacts, construct a rich diversity of attributes from messages, and use a machine-learning algorithm to predict a binary depression score.

A. Contact Subset Creation

The system examines text messages from each of the user's contacts, only the top contacts with whom the user is comfortable were chosen.[5]

B. Text & Emotion Feature Engineering

Extraction of features includes the following steps

1. **Polarity:** Having scores ranging from -1 to 1, communications are classed as positive or negative. Finally, the average polarity is determined.
2. **Subjectivity:** Text Blob used to extract Subjectivity.
3. **Part of Speech Tags**: POS tags can capture linguistic style.
4. **Volume:** For each participant P, the number of contacts, text messages, and an average number of POS tags per text is calculated.

C. Machine Learning Methodology

The cutoff for an interim diagnosis of depression and therapy suggestion is a PHQ-9 score of 10. Since the research is concerned with extracting characteristics from a subset of contacts, the average feature score was dramatically increased by 13.2 per cent.[5]

4. PROCESS

DATA COLLECTION

Data collection is the most crucial step in the process of building a machine learning model. It is the foundation for any study or work to be accomplished. Data collection assists you in saving all the data and evaluating critical information.

Tabular data collecting is always recommended because it presents data more clearly. It makes it simple to read and evaluate the data. The simplest and most widely used format for most tabular datasets is CSV (comma-separated values). A csv file has a specific data storage format, it is easy to create and human-readable.

The data is written and stored in multiple csv files once it has been analyzed in order to develop a machine learning model for emotion prediction.The data is divided into four csv files depending on four different emotions via ‘happy’, ‘sad’, ‘angry’, ‘neutral’ in the present model. The tables have two columns: one for emotions and another for reference statements or intents demonstrating that feeling.

TRAINING DATASET

The next step includes reading the csv files for training the dataset. CSV files are read through pandas. In pandas, similar data is stored as blocks. An array is used to store data in columns or groups of columns with comparable data types. This approach is more costly. Concatenating all files is a better approach because adding rows is a more difficult process. Concatenation is used to bind the four csv files together.[7]

After linking the files together the data in it is skimmed. The sentences within the dataset are altered for the model to learn better. All the hashtags, symbols, special characters and urls are removed. The skimming is done by following the regex (regular expression) pattern. Regex displays generic text or number patterns, which can subsequently be compared to the input string to filter it. To convert raw feature vectors into a representation that is more suited for downstream estimation techniques, the sklearn.preprocessing package contains various common utility functions and transformer classes. The input text after skimming is preprocessed and stored using sklearn.preprocessing packages. Once the input text is transformed, the model selection function within sklearn, train_test_split, splits the array of data into two subsets, one for the train dataset and the other for the test dataset.[7]

The input is now categorized into sets of arrays. A function for discovering unique elements in a numpy array is included in Python's numpy model. A sorted array is the result of this phase. Shape is a tuple that always specifies the array's dimension. The.shape function can be used to get the size of any array. We can then convert the sentence into a matrix of token counts using the function Feature extraction.text.

Countvectorizer is a code that converts a text into a vector based on the frequency of each word that appears in the text. Vectored strings help to analyze each word easily. The pipeline is the next phase. The goal of a pipeline is to group together numerous phases that may be cross-validated while varying parameters. Pipelines work by allowing a linear flow of data to be transformed into a chain, resulting in a measurable modeling process.

To validate the work done so far, Seaborn can be used for statistical graphics display of data. A classification report is generated to visualize the performance of the trained model. Confusion matrix is finally used. It's a N X N table with the number of correct and wrong categorization model predictions.Compares the current value to the expected value. Once the values are satisfactory, the model is now ready to make accurate predictions.

Ⅲ. Image Processing

Using image processing for emotion detection can be one way to give assistance in times of stress. The model can be easily built using computer vision and deepFace libraries.

Computer vision is a machine intelligence field that teaches computers how to analyze and comprehend images. Machines can properly recognise and classify objects using digital photographs and webcams, as well as deep learning models, and then react to what they "view." DeepFace is Python's easiest face recognition and facial attribute analysis package. Facial Attribute Analysis: Facial attribute analysis is the process of describing the visual features of face images.[6]

The webcam and real time webcam images can be recognised using matplotlib.pyplot. Matplotlib.pyplot is based on the matplotlib interface. It has graphing capabilities similar to MATLAB. pyplot is primarily designed for testing the effectiveness and simple programmable chart generating scenarios.[6]

The results can be realized as shown in the figure below.

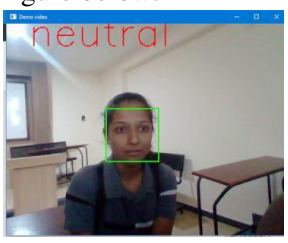

Fig. 4.1 “Neutral” Face

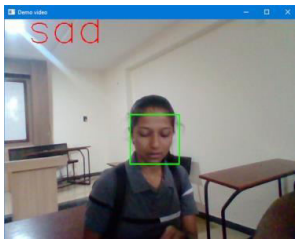

Fig.4.2 “Sad” Face

5. CONCLUSION

This research examines the benefits and drawbacks of artificial intelligence (AI) as a tool for detecting and intervening in mental health concerns. Chatbots are a convenient approach to give mental health treatments using devices. Chatbots use various techniques like multi-modal emotion recognition, intonations, etc. to reach a better accuracy level.

Computer vision on the other hand helps to recognise emotions beyond text conversations. Using facial expressions, an intelligent responding technique such as psychiatric specific instance reasoning and surveillance, and ethics judgement helps train and execute models. Although every system has its limitations, the advancement of technology will help minimize these disadvantages in the near future.

6. REFERENCES

[1] A Chatbot for Psychiatric Counseling in Mental Healthcare Service Based on Emotional Dialogue Analysis and Sentence Generation DOI 10.1109 IEEE 18th International Conference on Mobile Data Management

[2] A Mental Health Chatbot for Regulating Emotions (SERMO) - Concept and Usability Test DOI: 10.1109/TETC.2020.2974478 Date of Publication: 17 February 2020

[3] Data Science in Public Mental Health: A New Analytic Framework

[4] Depression Detection using Emotion Artificial Intelligence Mandar Deshpande Electrical and Electronics Engineering Department Visvesvaraya National Institute of Technology

[5] Mental Health Data Analysis Using Cloud Aishwarya Paul CHRIST (Deemed to be University), India e 2nd International Conference on Electrical, Communication and Computer Engineering (ICECCE)

[6] Artificial Intelligence in Digital Media: The Era of Deepfakes IEEE TRANSACTIONS ON TECHNOLOGY AND SOCIETY

[7] Investing in Mental Health: World Health Organisation Department of Mental Health and Substance Dependence, Noncommunicable Diseases and Mental Health, World Health Organization, Geneva

[8] You're Making Me Depressed: Leveraging Texts from Contact Subsets to Predict Depression Published in 2019 IEEE EMBS International Conference on Biomedical & Health Informatics (BHI) DOI: 10.1109/BHI.2019.8834481

[9] A Chatbot for Psychiatric Counseling in Mental Healthcare Service Based on Emotional Dialogue Analysis and Sentence Generation DOI 10.1109 IEEE 18th International Conference on Mobile Data Management

[10] https://www.nami.org/About-Mental-Illness/Warning-Signs-and-Symptoms.

[11] Artificial Intelligence in Behavioral and Mental Health Care David D. Luxton

[12] Facial expression (mood) recognition from facial images using committee neural networks Saket S Kulkarni, Narender P Reddy & SI Hariharan BioMedical Engineering OnLine volume 8, Article number: 16 (2009) Published: 05 August 2009

[13] IEEE Transactions on Emerging Topics in Computing

[14] Artificial Intelligence in Digital Media: The Era of Deepfakes Stamatis KarnouskosDOI 10.1109/IEEE TRANSACTIONS ON TECHNOLOGY AND SOCIETY

ARDUINO BASED REMOTE CONTROL CAR

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Abstract— Nowdays the working without manpower is increases. Everywhere automatic machines are used due to the speed and accuracy in the work and products without any difficulty with smartness. As the ARDUINO is an open source device that has been the brain for number of projects. It is user friendly & used for any idea to build. The project aims is to design an android based remote control car using ARDUINO. The android or mobile phone was used as a remote to reduce the e-waste as well as cost effective. The extra money and maintenance not needed for separate remote. And smart mobile are available easily with all. For sanitization in this pandemic or in regular routine and in fertilization process in the field the car can be used and modified easily. Also used for supervisory and counting the events by installing the counter and the others sensors.
So here android phone is used as transmitting device and Bluetooth module placed in car is used as receiver. Android phone will transmit command using its in-built Bluetooth to car so that it can move in the required direction like moving forward, reverse, turning left, turning right and stop.

Keywords— Arduino, Remote control, Smart phone, Bluetooth

1. INTRODUCTION

Arduino car contains Arduino microcontroller with basic mobility features. The car can be move forward, backward, left & right using the mobile. Arduino programs contains instructions mediating between android controller and Arduino car. Android mobile controller uses different mobile sensors to supervise motion. This Work is based on Arduino, motor driver and Bluetooth module. Since robotics has become a major part in our daily life and also in the engineering field and it plays a vital role in the development of new technology. Here the car proper direction in small place or in parking. Most of time we park the car safely but because of the space we can't come easily outside from the car since other cars are park their and door can't open. In future this project can be modify to make prototype car to move and park the car in proper place without sitting inside the car.

By mobile controlling we can move the car and their wheels as per requirement ordinary micro-controller has been replaced by Arduino and IR sensors has been replaced by a Bluetooth module. The remote can be any android cell phones. This project can be made in prototype. This type of applications can be used in different way.

An Arduino based, Bluetooth controlled RC car is controlled by a smart phone application. Bluetooth controlled car is controlled by using Android mobile phone instead of any other method like buttons, gesture etc. Here only needs to touch button in android phone to control the car in forward, backward, left and right directions. So here android phone is used as transmitting device and Bluetooth module placed in car is used as receiver. Android phone will transmit command using its inbuilt Bluetooth to car so that it can move in the required direction like moving forward, reverse, turning left, turning right and stop.

This project is related to ARDUINO BASED REMOTE CONTROL CAR, which makes this project arduino an

important part of identifying commands and delivering them to the car via a wireless smart phone bluetooth. Identification of commands such as forward, backward, left & right using the mobile. This undertaking has numerous elements like, interaction between laptop and microprocessor, input and understanding of commands, Wireless numerical data distribution microprocessor to microprocessor, the control of several motors using microprocessors [1].

The system hardware consists of a controller equipped with Bluetooth communication module. It'll be connected to the motors and other alternative components of car. When the car app is turned on and is connected with the current system via Bluetooth, one will operate the car by giving wireless commands from the app using the functions already programmed in the app. The vehicle will move all four told directions: left, right, front and back [4].

1.1 Hardware details

1. Arduino Uno

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board provides sets of digital and analog input/output (I/O) pins used to interface different expansion boards (shields) and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with the Arduino IDE (Integrated Development Environment), via a type B USB cable. It contains everything needed to support the

microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started [4].

The word "uno" means "one" in Italian and was chosen to mark the initial release of Arduino Software.

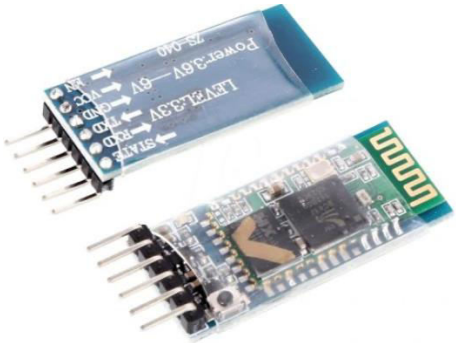
2. HC-05 Bluetooth Module

HC-05 Bluetooth Module is use to wireless communication between Arduino Uno and smartphone. It is an easy to use Bluetooth SPP (Serial Port Protocol) module, this module can be used in a master or slave configuration. It uses the 2.45GHz frequency band. The transfer rate of the data can vary up to 1Mbps and is in range of 10 meters. The HC-05 module can be operated within 4-6V of power supply. It supports baud rate of 9600, 19200, 38400, 57600, etc.

Pair HC-05 and smartphone

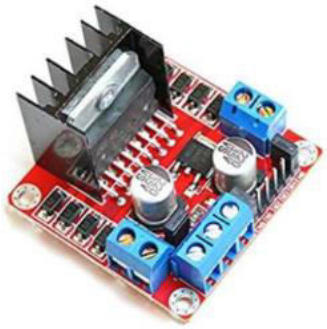
Search for new Bluetooth device from your phone. You will find Bluetooth device with “HC-05” name.

Click on connect/pair device option; default pin for HC-05 is 1234 or 0000.



3. L298N Motor Driver Module

This motor driver used input signal from Arduino uno and then gives the required voltage to the motor to move the car forward and backward left and right direction. The L298N Motor Driver module consists of an L298 Motor Driver IC, 78M05 Voltage Regulator, resistors, capacitor, Power LED, 5V jumper in an integrated circuit. 78M05 Voltage regulator will be enabled only when the jumper is placed.When the power supply is less than or equal to 12V, then the internal circuitry will be powered by the voltage regulator and the 5V pin can be used as an output pin to power the microcontroller. The jumper should not be placed when the power supply is greater than 12V and separate 5V should be given through 5V terminal to power the internal circuitry.



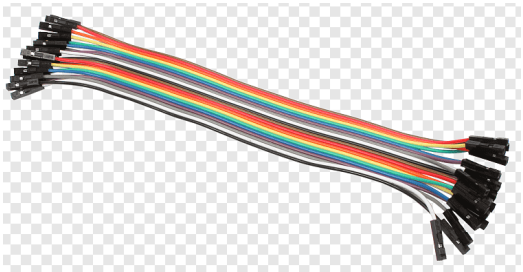
4. Dc Motor

12 volt DC motor input voltage is 12V, rpm is 10820rpm. The two motor are used one to move the car forward and backward. Another motor to move the car left right direction.

5. Jump Wire

A jump wire (also known as jumper, jumper wire, DuPont wire) is an electrical wire, or group of them in a cable, with a connector or pin at each end (or sometimes without them – simply "tinned"), which is normally used to interconnect the components of a breadboard or other prototype or test circuit, internally or with other equipment or components, without soldering.

Individual jump wires are fitted by inserting their "end connectors" into the slots provided in a breadboard, the header connector of a circuit board, or a piece of test equipment.

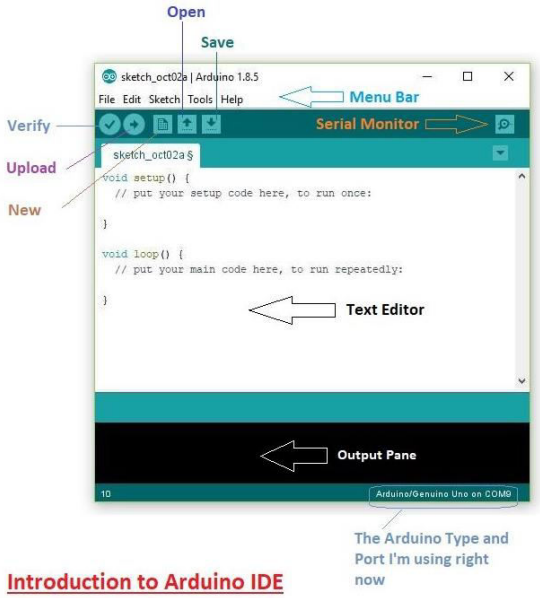


2 Software details

2.1 Arduino Software (IDE)

The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. This software can be used with any Arduino board. The Arduino IDE supports the languages C and C++ . Operating system: Windows, macOS, Linux.

The Arduino Integrated Development Environment - or Arduino Software (IDE) - contains a text editor for writing code, a message area, a text console, a toolbar with buttons for common functions and a series of menus. It connects to the Arduino hardware to upload programs and communicate with them [4].



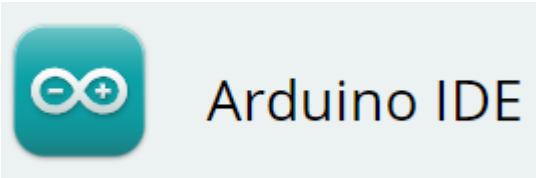
Writing Sketches

Programs written using Arduino Software (IDE) are called sketches. These sketches are written in the text editor and are saved with the file extension .ino. The editor has features for cutting / pasting and for searching / replacing text. The message area gives feedback while saving and exporting and also displays errors. The console displays text output by the Arduino Software (IDE), including complete error messages and other information. The bottom righthand corner of the window displays the configured board and serial port. The toolbar buttons allow you to verify and upload programs, create, open, and save sketches, and open the serial monitor.

Uploading

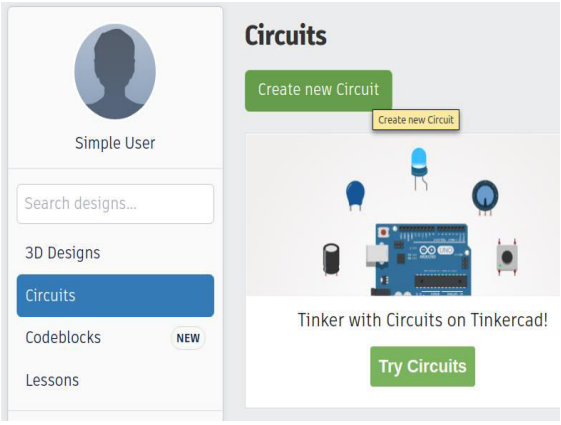
Before uploading your sketch, you need to select the correct items from the Tools> Board and Tools> Port menus. The boards are described below. On the Mac, the serial port is probably something like /dev/tty.usbmodem241 (for an UNO or Mega2560 or Leonardo) or /dev/tty.usbserial-1B1 (for a Duemilanove or earlier USB board), or / dev / tty .USA19QW1b1P1.1 (for a serial board connected with a Keyspan USB-to-Serial adapter). On Windows, it's probably COM1 or COM2 (for a serial board) or COM4, COM5, COM7, or higher (for a USB board) - to find out, you look for USB serial device in the ports section of the Windows Device Manager. On Linux, it should be / dev / ttyACMx, / dev / ttyUSBx or similar. Once you've selected the correct serial port and board, press the upload button in the toolbar or select the Upload item from the Sketch menu. Current Arduino boards will reset automatically and begin the upload. With older boards (pre-Diecimila) that lack auto-reset, you'll need to press the reset button on the board just before starting the upload. On most boards, you'll see the RX and TX LEDs blink as the sketch is uploaded. The Arduino Software (IDE) will display a message when the upload is complete, or show an error [4].

When you upload a sketch, you're using the Arduino bootloader, a small program that has been loaded on to the microcontroller on your board. It allows you to upload code without using any additional hardware. The bootloader is active for a few seconds when the board resets; then it starts whichever sketch was most recently uploaded to the microcontroller. The bootloader will blink the on-board (pin 13) LED when it starts (i.e. when the board resets).



2.2 Tinkercad Circuits

Tinkercad also helps the new learners to learn the Circuit diagram, circuit connection Virtual in safety so the learner don't have to worry about whether the circuit get shot or not. Uploading of the sketch is similar to Arduino IDE. Tinkercad Circuits allows anyone to virtually create and program Arduino projects without the need for physical. Tinkercad is tool that allows you to simulate Arduino-based systems (and a lot more). You can (perhaps you SHOULD) simulate all exercises and even your own designs before trying them on real hardware. It also allows you to do programming using blocks. You can download / copy-paste the generated code later into Arduino IDE to program the real Arduino board, rather than having to write it from scratch.



2.3 Controller App

Different Bluetooth apps are available on Play Store to Communication between mobile and the Arduino car.

Any one of these app can be used as per user requirement

1.3 Objectives

a) To develop an automatic smartphone base control car using Arduino.

b) To recycle the toy car & to reduce the e-waste.

c) Use of the car to floor cleaning, Home, hospital, office & school disinfection/sanitization.

2. Proposed System Power Supply:

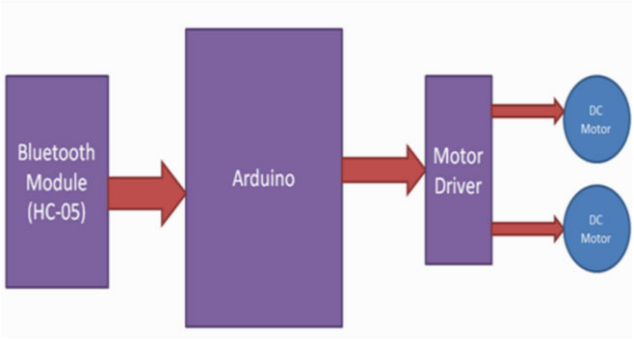
A power supply is an electronic device that supplies electric energy to an electrical load. The primary function of a power supply is to convert one form of electrical energy to another and, as a result, power supplies are sometimes referred to as electric power converters

Bluetooth module: It is small wireless serial communication module that can be connected with a Micro-Controller to receive and send data when connected with other Bluetooth devices.

Arduino-UNO: Arduino is an open-source prototyping platform based on easy-to-use hardware and software. Arduino consists of both a physical programmable circuit board and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board[4].

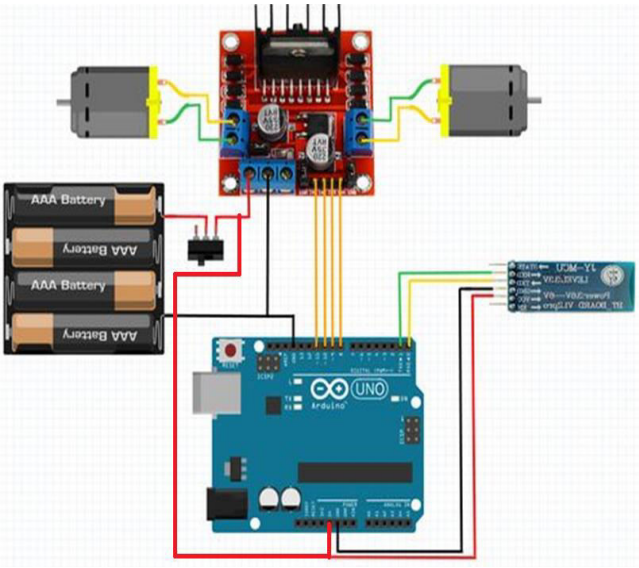
Motor driver: It is a small circuit that hoists the motor driving IC, and can control two motors at the same time. It controls the motor speed by pulse width modulation (PMW) [2].

2.1 **Block Diagram:**



Two dc batteries are required. First supply of 5v dc is needed to power the Arduino board, and the second supply of 6-12v dc supply is needed to power the driver circuit. Once the device is all set up the Android Device require an application called ―CAR BLUETOOTH RC which sends the command to the Bluetooth Module connected with the Arduino. The Arduino receives these commands and transfers them to the Motor Driver from the digital I/O pins of the Arduino. The motor driver has two DC motor connected to it output terminals and it runs the two motor according to the commands send by the Arduino. The motor driver can run a single motor or both the motor at the same time in different direction. This provides to the user an extra flexibility and advantage to run the motor in any direction. For example, in parking system this is today's requirement to adjust and park the car perfectly in small places also.

2.3 Circuit Connection and Description

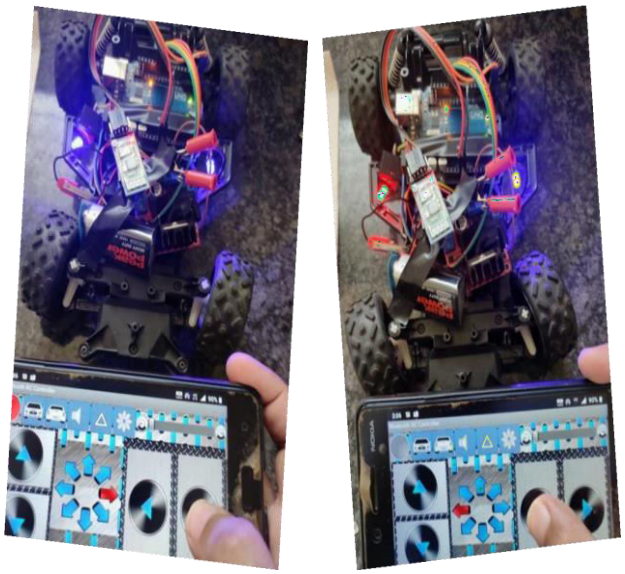


As show in the diagram, rechargeable batteries as supply is used which is connected to motor driver and arduino respectively. When the circuit is energized, we will have to first pair the android phone with the Bluetooth module through the phones Bluetooth setting the default password of the Bluetooth module will be 1234. Once the phone gets paired, open the application 'CAR BLUETOOTH RC',

which can download from Google play store. By starting the application there will be sets of control displayed on the screen. If the device has not been connected the control will be locked meaning the control buttons cannot be pressed. When the car is at its initial position the application automatically sends the command "S" meaning stop. The stop command is put in a loop that keeps on repeating throughout the execution of the program. As the user presses any control buttons the stop command will be interrupted by the move forward, backward, right, left, depending on the user and the car moves like wise. The program is designed in such a manner that we can also give two commands at the

same time i.e. move front and turn right or left and same with the backward motion. The Arduino also stores the program in its memory so it does not require reuploading of Program. The IN1, IN2, IN3 and IN4 are the inputs for the motor driver that receives command from the Arduino for the two motors respectively. The motor driver should be grounded with the Arduino ground pin (GND). The motor driver requires minimum of 6v and above to run, any voltage below 6v the motor remains off. The RXD pin of the Bluetooth module is for receiving commands from the Android devices and sends to Arduino through this pin and the TXD is for

transmitting or sending dates or information‘s. It is supplied with a 5v dc source from the Arduino 5v pin. The main part of the above circuit diagram is Arduino UNO. The power supply section is very important. It should provide constant voltage to the devices for successful working of the project.



Results & Conclusion

For sanitization in this pandemic or in regular routine and in fertilization process in the field the car can be used and modified easily. Also used for supervisory and counting the events by installing the counter and the others sensors. To us the need of internet and the things which are internet based are very much important nowadays. IOT or internet of things is the very important part in both computer and our daily lives. The above model describes how the Arduino programs the car motor module and by IoT we actually rotate the wheels & give direction to the car. IoT gives us the opportunity to work with different platforms and it helps us to create various interesting modules to work on. We also tested the applications used to drive the car. Due to the new concept of Wireless Controlled Car using Bluetooth, Wifi and IOT, we were able to come up with various possibilities that can take place. This project is also used full for parking.

Future scope

This car can be used as a fire extinguisher simply few changes in the circuit by adding the BJT as a motor driver. When the signal sent by the Arduino to the Transistor, it triggers and provides the signal to switch on the water pump motor and work like a fire extinguisher.

Reference

[1]
https://www.ijeat.org/wp-content/uploads/papers/v9i2/B3673129219.pdf
International Journal of Engineering and Advanced Technology (IJEAT) ISSN: 2249 – 8958, Volume-9 Issue-2, December, 2019

[2]
https://www.ijser.org/researchpaper/Blutooth-Controlled-Robot.pdf
International Journal of Scientific & Engineering Research, Volume 7, Issue 4, April-2016 ISSN 2229-5518

[3]
https://www.ijcsmc.com/docs/papers/May2016/V5I5201630.pdf
Amanpreet Kaur et al, International Journal of Computer Science and Mobile Computing, Vol.5 Issue.5, May- 2016, pg. 105-109 Volume 1, Issue 1 | Pages 1-8 Received: 13 Mar 2019 | Accepted: 14 Mar 2019 | Published: 15 Mar 2019

[4]
https://www.arduino.cc/

Classroom Automation

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***Abstract*—Electricity is an important part of the present life and most important to the economy of India. People use electricity for lighting, heating, cooling and refrigeration and operating appliances, computers, electronics, machinery and public transportation systems. To avoid wastage of electricity we can design a smart electric automation system. Electrical automation can wirelessly control electrical systems.**

In this classroom automation project, we are designing an automation system to control all fans and tubes in the classroom. Our system has two types of control of devices: 1st through voice commands and second through the mobile app. Detect intrusion and automatically turn on lights and activate automation functions when entering a room our controlling board will work along with our normal switchboard to operate the electric appliance. Classroom automation means controlling the classroom using a mobile application. (*Abstract*)

Keywords—ESP 32, automation, classroom, relays, Bluetooth, mobile application. (keywords)

I. INTRODUCTION

Classroom Automation definition can be understood as a room in a college, where Devices in the Classroom are operated via Software.
-Lights and Fans at Application Operated.
-Curtains go spread

At College and even at Home, we reflect Irresponsibility and Laziness by not switching OFF the Lights and Fans. Due to this Behaviour, a lots of Electricity is wasted and as a consequences, poor people have to face load shedding and increase in Electricity Rates per Unit.

The Lights and other Devices will Turn ON & OFF via Manual Swiches/Mobile Application/On Specific Time.

PIR Sensor is used to Operate the Devices in the Room as it senses the Presence of the Person.
The devices will come in Action as the Clock will touch 8 am and will be disabled as the Clock will Touch 5 pm.

II. LITERATURE REVIEW

A. Book Review:

[1]IoT (Internet of Things) is a powerful new invention in today's world that can make a person's life easier and less stressful. The scope of this field is unlimited and emerges as a winner in various fields ranging from Medicine, Engineering, Computer Science, Space and Technology, Automobiles and so on. The objective centre uses IoT-based technologies to achieve automation in classrooms. In this paper, we propose a way to control and manage electrical equipment such as fans and lamps based on human presence. Our focus is on building a solution that can help reduce energy consumption. The camera is used to detect the presence of people in the classroom and to analyse the living space. Here the class is divided into two parts. Whenever a human presence is detected in a particular area a lamp and a fan will be turned on. The purpose of this paper is to build a smart classroom where we can switch electrical items with a focus on energy saving.

[2] The rapid development of automation technology makes people's lives easier and easier. In today's world, it is all about dependence on automatic systems. An intelligent IoT-based class system primarily works with automated electronic objects in the Internet-based Material (IoT) protocol called MQTT. The system architecture contains several wireless nodes, middleware, and user interface. All wireless nodes connect to a dedicated or existing network with middleware. This communication is based on the

Message Queue Telemetry Transport (MQTT) communication protocol built-in Internet of Things. MQTT protocol uses publishing / subscribed message based on TCP / IP protocol. With the user interaction phase, the user can interact with the middleware of the system. Interaction is done by seeing the user's command with his or her speech. Basically, the secret commands are used to interact with the middleware. The Raspberry Pi is the backbone of the system. It works as a middleware, in system building. The wireless nodes used in this program are called Node MCU, and this Node MCU is assigned to each class. After performing a user interaction phase, the controller is transferred to the middleware installed in the staffroom. Finally, based on user privacy instructions, the automation of each class equipment will be done with the Node MCU which leads to class automation.

[3] This offers great benefits to smart classroom systems that use the Internet of Things. This project helps teachers in the classroom to allow them to control the classroom using the android system on the Android smartphone.

[4]This paper address two aspects of the problem of classroom automation through audio and visual methods. These factors were: (a) the institutional background on which the support of the previous audio and visual foundation by the Payne Fund and the Rockefeller Foundation compared to the current, extensive support of audio and visual teaching support systems. the Ford Foundation, its limited finances and affiliate organizations; and (b) the theoretical nature of the need for audio and visual authenticity that has been shown to be based on a shortage of teachers and equipment in the country over the next two decades of student and college enrolment, and therefore, technical solutions to classroom size problems are required. and construction site.

[5]Visual and integrated reading is suggested as a way to support students' learning through the lesson. Current research seeks to explore how one classroom teaching tool; especially Google Classroom, used by a teacher of automation and planning in high school. Another high school teacher and two of her students participated in the re-study. The data collection tools were of two types: discussions with participants with structured questions and asking the teacher to demonstrate how she used Google Classroom options to engage her students in online learning. Written interviews were analysed using theme analysis based on the De Lone and McLean Information Systems Success model. Research results have shown that the Google Classroom has contributed to student learning quality, positively affecting teacher and student satisfaction and the purpose of using this automated classroom learning tool and programs.

B. Motivation

An ideal classroom is an environment in which teachers can focus completely on their lectures and the students can concentrate on the information they are being conveyed. Unfortunately, this does not happen in most Indian Classrooms. Disruptions also occur throughout class time such as temperature and light variation in the summer and winter seasons respectively. These problems cause affected students to wander around the class guessing for the right switch and adjusting it to equilibrate the environment back to satisfying or comfortable conditions. Also, after all the classes are completed, students forget to turn off the light and fan in the classroom which in turn results in wastage of electricity. This causes disturbances for both teachers and all the other students, and so to eliminate these irritations an automated classroom is created which allows the classroom to become more efficient, and eliminate any human assistance in controlling the atmosphere

C. Problem Definition

It is observed that consumption of electricity is high in schools and colleges to reduce human efforts and overcome the problem of overconsumption automating things and devices using a programmed microcontroller (esp32) can save electricity and reduce human efforts as well.

D. Aim

To automate the classroom using ESP 32 and to control the lights and fan in the classroom by mobile application.

E. Objectives

- To save electricity
- To Automate the fans and lights in the classroom
- To control the appliances in the classroom from anywhere in a specific range of Wi-Fi using a mobile application
- To make the device smart
- Controlling the overall devices through the software.

F. Algorithms

Our Project is basically based on the Automation of any type of Room.
We can either control the Devices in the Room via Manual Switches or a Mobile Application.

- A Signal to either turn ON or turn OFF the Device/ Devices will be sent via Mobile Application

- Micro-controller will receive it here, ESP32 C6 DEV KIT WROOM
- The Relay will receive a Command to either turn ON or turn OFF the Device
- Device (Tube Light/Fan) will be either turn ON or turn OFF

BONUS:

- We can Control the Devices via Manual Switch even though the Device is ON via Mobile Application

G. *Abbreviations*

USB: Universal Serial Bus
Fig.: Figure

III. PROPOSED SYSTEM

- Working of System
  - Firstly, through the software or the app, we will give the instructions that will be accepted by the microcontroller in our case it is in the Esp32c6 Module.
  - All the instructions given through the microcontroller will be then given to the Esp32c6 Module and then the instructions will be uploaded to the Module and it is attached to the server through the USB Port.
  - The instruction given to the software or the app now it is accepted by the microcontroller and then the further instruction related to turning the lights and fans (i.e. ON OR OFF) is now given to the relay module.
  - After the instructions are given through the relay module the further process of turning the lights and fans will be done.

METHODOLOGY

Through literature reviews, we have formulated some of the existing methodologies and designed our system based on the difficulties faced by the existing authors.

A. Existing Methodology

There are two methods which is being followed previously.

They are 1. Manual method 2. Automation without IoT and individual costly systems

Advantages of the existing system are:

- Manual methods are used in small schools with less number of students
- Automation can be implemented for only needy systems which may reduce cost

The main disadvantages of these existing systems are given below:

- Time-consuming
- Relatively high cost
- Contains a minimum number of automated systems
- Students and teachers will get disturbed
- Electricity is wasted due to carelessness
- However, in our system, these disadvantages are overcome effectively.

A. *Figures and Tables*

Now we are going to see the tables and list of figures used in classroom automation.

TABLE I. LIST OF TABLE

Sr. No.	List of Table	
	Description	***Table No.***
1.	List of Figures	Table II
2.	List of Hardware	Table III

TABLE II. LIST OF FIGURES

Sr. No.	Figures	
	Description	***Fig No.***
1.	Flowchart	Fig. 1
2.	Manual switches, ESP 32 & Relay Module Connection	Fig. 2
3.	Bulb & Relay Connection	Fig. 3
4.	Block Diagram of ESP 32 Connection	Fig. 4
5.	Operating 4 Bulb via Bluetooth Application	Fig. 5

TABLE III. LIST OF HARDWARE

Sr. No.	Hardware List	
	Description	***Fig No.***
1.	ESP-32-C6	Fig. 6
2.	Relay (5V)	Fig. 7
3.	Terminal Connector (3pin)	Fig. 8
4.	Jumper Wires	Fig. 9

Sr. No.	Hardware List	
	Description	*Fig No.*
1.	Bug strip boat type (1 strip)	Fig. 10
2.	USB cable (ESP 32)	Fig. 11

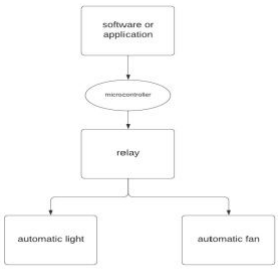

Fig. 1. Flowchart.

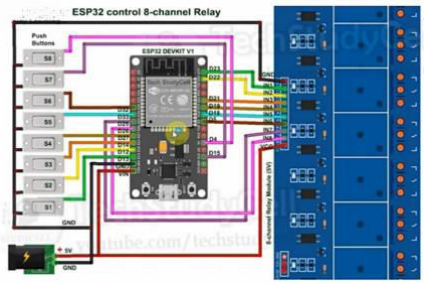

Fig. 2 Manual switches, ESP 32 & Relay Module Connection

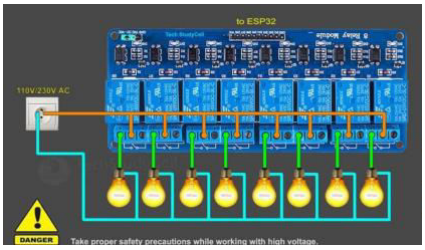

Fig. 3 Bulb & Relay Connection

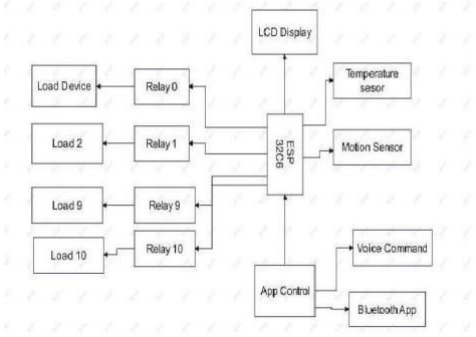

Fig. 4 Block Diagram of ESP 32 Connection

Fig. 8 Operating 4 Bulb via Bluetooth Application

- This figure shows that the Bulb is glowing with the help of the Bluetooth control app.

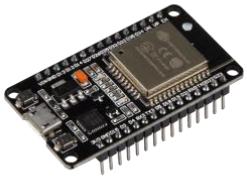

Fig. 9 ESP 32

ESP32-C6 has a single-core, 32-bit RISC-V microcontroller that can be clocked up to 160 MHz. It has a 384KB ROM, a 400KB SRAM, and works with external flash.It comes with 22 programmable GPIOs, with support for ADC, SPI, UART, I2C, I2S, RMT, TWAI andPWM

Fig. 10 Relay (5V)

Description:-

A relay is **an electrically operated switch**. It consistsof a set of input terminals for a single or multiple control signals, and a set of operating contact terminals. The switch may have any number of contacts in multiple contact forms, such as make contacts, break contacts, or combinations.

Fig. 13 Terminal Connector (3pin)

A terminal block (also called as connection terminal or terminal connector) is **a modular block with an insulated frame that secures two or more wires together**. It consists of a clamping component and a conducting strip.

Fig. 16 Jumper Wires

Jumper wires are used to connect the two points in the circuit. All the electronic jumper wires consists of the different length and assortments. These are frequently used with the bread borads for the connection.

Fig. 21 USB Cable (ESP32)

The USB cable is used, whatever the instructions stored into the Esp32 that information will be then that instructions will be connect with the code, for that purpose we use the USB cable port through that we connect the one part of the USB to the ESP-32 and other end to the pc.

Advantages of the Automation without IoT and individual costly systems are:

- Electricity wastage will be drastically reduced
- Fast and Effortless controlling of Devices
- Controlling of devices by kids without going close to main switch board would
- be possible and dangerous situation would be avioded

Disadvantages of the Automation without IoT and individual costly systems are:

- Laziness will be motivated.
- Mobile is a must for controlling of devices

B. Authors and Affiliations

In today's world, it is all about dependence on automatic systems. An intelligent IoT-based class system primarily works with automated electronic objects in the Internet-based Material protocol called MQTT. The system architecture contains several wireless nodes, middleware, and a user interface. All wireless nodes connect to a dedicated or existing network with middleware.

This communication is based on the Message Queue Telemetry Transport communication protocol built-in Internet of Things. Interaction is done by seeing the user's command with his or her speech. Basically, the secret commands are used to interact with the middleware.

Finally, based on user privacy instructions, the automation of each class equipment will be done with the Node MCU methods

IV. RESULT

- We can reduce the usage of electric energy or save energy.
- As energy usage will reduce it will lower Utility Bills.
- Quantifiable Metrics: Eliminate the guesswork. Know how much energy is being used where and when.
- However, in our system, these disadvantages are overcome effectively

ACKNOWLEDGEMENT

We have great pleasure in presenting the report on **Classroom Automation.** We take this opportunity to express our sincere thanks to my guide **Prof. Shilpa Shinde** Department of CSE(AIML), ViMEET, Khalapur for providing the technical guidelines and suggestions regarding the line of work.We thank Dr **S. S. Patil** Head CSE(AIML), ViMEET for his encouragement during the progress meeting and for providing guidelines to write this report.

REFERENCES

[1] Ani, R., Krishna, S., Akhil, H., & Arun, U. (2018, September). An approach towards building an IoT based smart classroom. In *2018 International Conference on Advances in Computing, Communications and Informatics (ICACCI)* (pp. 2098-2102). IEEE.

[2] Paul, C., Ganesh, A., & Sunitha, C. (2019). An IoT-based smart classroom. In *International Conference on Computer Networks and Communication Technologies* (pp. 9-14). Springer, Singapore.

[3] Yasodharan R et.al.(2018) IoT based Classroom Automation using Arduino" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-2 | Issue2, February 2018.

[4] Finn, J. D. (1957). Automation and education: II. Automatizing the classroom background of the effort. Audiovisual communication review, 5(2), 451-467.

[5] Abuzant, M., Ghanem, M., Abd-Rabo, A., & Daher, W. (2021). Quality of using google classroom to support the learning processes in the automation and programming course. *International Journal of Emerging Technologies in Learning (iJET)*, *16*(6), 72-87. Carelessne.

Smart Agriculture Monitoring and Control System Using IOT

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***Abstract*—India is agriculture sector, on either side, is losing ground every day, affecting the ecosystem's output capacity. In order to restore vitality and put agriculture back on a path of higher growth, there is a growing need to resolve the issue. A large-scale agricultural system necessitates a great deal of upkeep, knowledge, and oversight. The IoT is a network of interconnected devices that can transmit and receive data over the internet and carry out tasks without human involvement. Agriculture provides a wealth of data analysis parameters, resulting in increased crop yields. The use of IoT devices in smart farming aids in the modernization of information and communication. For better crop growth moisture, mineral, light and other factors can be assumed. This research looks into a few of these characteristics for data analysis with the goal of assisting users in making better agricultural decisions using IoT. The technique is intended to help farmers increase their agricultural output.**

***Index Terms*—Soil, Rain, Sensors, IoT, Smart Irrigation**

I. Introduction

The India is an agricultural country. Nowadays, at regular intervals the lands are manually irrigated by the farmers. There is a chance that the water consumption will be higher or that the time it takes for the water to reach the destination will be longer, resulting in crop dryness. Realtime temperature and humidity monitoring is crucial in many agricultural disciplines. However, the old method of wired detection control is inflexible, resulting in several application limitations. This project achieves irrigation automation as a crucial answer to this problem [1]. This is accomplished with the aid of a Arduino Uno, which controls the moisture and temperature sensors based on the input provided [2] [5]. Moisture sensors are used in the construction of an automated plant watering system for this purpose. The main aim of our project is to reduce the complexity of supervision and to avoid the continuous monitoring. We can accomplish smart agriculture using our system. This system includes IoT-based agricultural monitoring. The Internet of Things (IOT) is transforming the agriculture business and addressing the enormous difficulties and huge obstacles that farmers confront today in the field [7]. The soil moisture sensor is put into the soil to determine whether the soil is wet or dry, and If the moisture level in the soil is low, the relay unit attached to the motor switch must be monitored on a regular basis. When the soil is dry, it will turn on the motor, and when the soil is moist, it will turn off the engine.

II. Project Process Modeling

We are using waterfall model for our project.

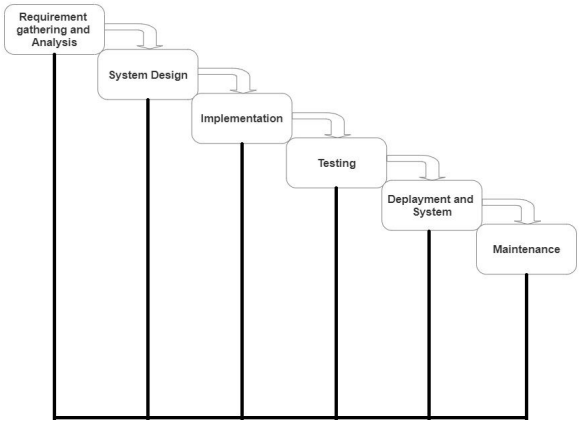

Fig. 1. Waterfall Model

The Waterfall Model was the first Process Model to be launched. It is also called the successive life cycle model. It is very easy to understand and use. In the waterfall model, each phase must be completed in full before the next phase begins. This type of model is basically used for a small project and there are no uncertain requirements. In this model the test starts only after the end of the upgrade. In the stages of the waterfall model do not overlap [4].

A. *Phases In Waterfall Model*

- Information Gathering: In this we gather the information required to our system.

- Design: After gathering the information required, we design the model based upon that information.
- Implementation: In this phase we actually implement the system using the design done in design phase.
- Testing: In this phase we perform the unit as well as integration testing to check whether system is working as per our requirement or not [15].
- Deployment: After testing the system we deploy the system in the market.
- Maintenance: According to user feedback maintenance will be done.

B. *Block Diagram*

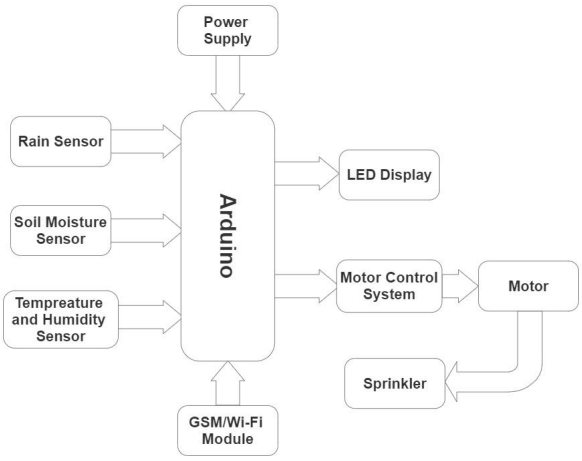

Fig. 2. Block Diadgram

III. Methodology And Working

A. *WORKING*

The [9] system is an intelligent irrigation system. Knowing the conditions of the agricultural field is a must. In the project the main controller is Arduino uno. Temperature sensor, soil moisture sensor, rain sensors are used to monitor conditions in the farm field. A rain sensor is one type of switching device used to detect rain. It works like a switch and the operating principle of this sensor is that, whenever it rains, the button will usually be turned off. So in a rain sensor project find the rain and inform the farmer [3]. The module / rain sensor board is shown below. Basically, this board consists of nickel-bound lines and works on the resistance principle. This sensor module allows you to measure humidity using analog output pins & provides digital output while the humidity limit exceeds. Soil moisture sensor is mainly used to measure groundwater volume. Soil moisture sensor uses energy to measure the dielectric clearance of the environment. On the ground, dielectric clearance is the function of water content. The sensor creates a voltage equal to the dielectric clearance, hence the water content in the ground. This sensor uses a lot of energy to measure the water content in the soil. The operation of this sensor can be done by placing this sensor on the ground and the condition of the groundwater content can be reported in a percentage way [9]. Temperature sensor consists of a capacitive sensor and a thermistor temperature sensor. The moisture-sensitive capacitor has two damp electrodes holding the substrate as a dielectric between them. A change in capacitance value occurs with a change in humidity levels. The IC rating, we consider, has changed the resistance values and converted them into digital values. Thermistor is used to measure local temperature. Temperatures are 0 to 50 degrees Celsius. Here the engine is used to start water in the field. An engine is an electric motor that converts electrical energy into mechanical energy. In a car, the input power of direct power is converted into mechanical rotation. The Wi-Fi/GSM module is used to send all the sensor data to the user. A sprinkler is a system that used to supply water to the field [16].

B. *Arduino Uno*

Arduino Uno is an open source control board based on Microchip ATmega328P small controller and developed by Arduino.cc. The board is equipped with sets of digital anchors and analog input / output (I / O) that can be connected to various extension boards (shields) and other regions [11]. The board has 14 digital I / O pins (six capable of PWM output), 6 PINM analog I / O pins, and is configured via Arduino IDE (Integrated Development Zone), in the form of a USB cable of type B. [4] It can be powered by a USB cable or an external 9-volt battery, although it accepts volumes of between 7 and 20 volts. Same with Arduino Nano and Leonardo. Hardware reference design is still distributed under a Creative Commons Attribution Share-Alike 2.5 license and is available on the Arduino website. Construction and production files for other hardware versions are available.

Arduino Uno specifications:

- Recommended Input Voltage: 7-12V Input Voltage Limits: 6-20V
- Analog Input Pins: 6 (A0-A5)
- Digital I/O Pins: 14 (Out of which 6 provide PWM output)

Why Arduino Uno?

Simple connection to computer. The Arduino Uno board has a USB port and can therefore easily be connected to a computer. Easy wiring. All the pins on the AT- mega328P micro controller are connected to headers on the side [7]. Simplified programming language. Arduino Uno Pins: The 14 digital input/output pins can be used as input or output pins by using pin- Mode(), digitalRead() and digitalWrite() functions in arduino programming. Each pin operate at 5V and can provide or receive a maximum of 40mA current, and has an internal pull-up resistor of 20-50 KOhms which are disconnected by default. Out of these 14 pins[12], some pins have specific functions as listed below: Serial Pins 0 (Rx) and 1 (Tx): Rx and Tx pins are used to receive and transmit TTL serial data. They are connected with the corresponding ATmega328P USB to TTL serial chip [15]. External Interrupt Pins 2 and 3: These pins can be configured to trigger an interrupt on a low value, a rising or falling edge, or a change in value. PWM Pins 3, 5, 6, 9 and 11: These pins provide

an 8-bit PWM output by using analogWrite() function. SPI Pins 10 (SS), 11 (MOSI), 12 (MISO) and 13 (SCK): These pins are used for SPI communication. In-built LED Pin 13: This pin is connected with an built-in LED, when pin 13 is HIGHLED is on and when pin 13 is LOW, its off. Along with 14 Digital pins, there are 6 analog input pins, each of which provide 10 bits of resolution, i.e. 1024 different values. They measure from 0 to 5 volts but this limit can be increased by using AREF pin with analog Reference() function. Analog pin 4 (SDA) and pin 5 (SCA) also used for TWI communication using Wire library. Arduino Uno has a couple of other pins as explained below: AREF: Used to provide reference voltage for analog inputs with analog Reference() function [7].

Reset Pin: Making this pin LOW, resets the micro contSimple connection to computer. The Arduino Uno board has a USB port and can therefore easily be connected to a computer. Easy wiring. All the pins on the AT- mega328P micro controller are connected to headers on the side. Simplified programming language[13].

Arduino Uno Pins: The 14 digital input/output pins can be used as input or output pins by using pin- Mode(), digital-Read() and digitalWrite() functions in arduino programming. Each pin operate at 5V and can provide or receive a maximum of 40mA current, and has an internal pull-up resistor of 20-50 KOhms which are disconnected by default. Out of these 14 pins, some pins have specific functions as listed below: Serial Pins 0 (Rx) and 1 (Tx): Rx and Tx pins are used to receive and transmit TTL serial data. They are connected with the corresponding ATmega328P USB to TTL serial chip[15]. External Interrupt Pins 2 and 3: These pins can be configured to trigger an interrupt on a low value, a rising or falling edge, or a change in value. PWM Pins 3, 5, 6, 9 and 11: These pins provide an 8-bit PWM output by using analogWrite() function. SPI Pins 10 (SS), 11 (MOSI), 12 (MISO) and 13 (SCK): These pins are used for SPI communication. In-built LED Pin 13: This pin is connected with an built-in LED, when pin 13 is HIGHLED is on and when pin 13 is LOW, its off. Along with 14 Digital pins, there are 6 analog input pins, each of which provide 10 bits of resolution, i.e. 1024 different values. They measure from 0 to 5 volts but this limit can be increased by using AREF pin with analog Reference() function. Analog pin 4 (SDA) and pin 5 (SCA) also used for TWI communication using Wire library. Arduino Uno has a couple of other pins as explained below: AREF: Used to provide reference voltage for analog inputs with analog Reference() function[14]. Reset Pin: Making this pin LOW, resets the micro controller

Fig. 3. Arduino Uno.

C. Rain Sensor

What is a Rain Sensor?

A sensor used to monitor rainfall or rain is known as a rain sensor. This type of sensor acts like a switch. This sensor includes two components such as a hearing pad and a sensor module. Whenever rain falls on the sensor pad then the sensor module reads data from the sensor pad for processing and converts it into analog or digital output. The output of this sensor is therefore analog and digital [3]. Rain sensor details.

- Operating voltage ranges from 3.3 to 5V.
- The operating current is 15 mA.
- The sensing pad size is 5cm x 4 cm with a nickel plate on one face.
- Comparator chip is LM393.
- Output types are AO (Analog o/p voltage) DO (Digital switching voltage).
- The length width of PCB module 3.2cm x 1.4cm.
- Sensitivity is modifiable through Trimpot.
- Red/Green LED lights indicators for Power Output.

Fig. 4. Rain Sensor

D. Temperature Sensor

What is a temperature Sensor?

The LM35 is an integrated analog temperature sensor that emits its power equivalent to Degree Centigrade. The LM35 sensor does not require external measurement or cutting to provide normal accuracy. The low output impedance of the LM35, line output, and accurate environmental measurement make integration to read or control rotation particularly easy [3] [8].

Temperature Sensor specifications:

- Calibrated directly in Degree Celsius (Centigrade).
- Linear at 10.0 mV/°C scale factor.
- 0.5°C accuracy guarantee-able (at a25°C).
- Rated for full -55°C to a 150°C range.
- Suitable for remote applications.
- Low cost due to wafer-level trimming.
- Operates from 4 to 30 volts.

Fig. 5. Temperature

E. Soil moisture Sensor

What is a soil moisture Sensor?

Soil Moisture Sensor [10] is one type of cheap electric sensor used to detect soil moisture. This sensor can measure the amount of water in the soil. This sensor has two main components, one is Sensing Probs and the other is the Sensor Module [6]. The probes allow the current to pass through the ground and obtain a resistance value in accordance with the amount of moisture in the soil. The Sensor Module reads data from sensor surveys and processes data and converts it to digital / analog output. Therefore, Soil Moisture Sensor can provide both digital and external analog output [6].

Soil moisture Sensor specifications:

- Operating Voltage: 3.3V – 5V.
- Operating Current: 15 mA.
- Sensitivity: Adjustable via Trimpot.
- Output type: Analog output voltage and Digital switching voltage.
- LED lights indicators: Power (red/green) and Output (red/green).
- Sensing Probes: Nickel plate on one side.

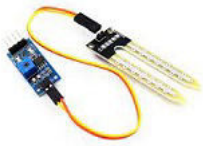

Fig. 6. Soil Moisture Sensor

F. OLED Display

What is OLED display?

16 × 2 OLED is so named because; has 16 columns and 2 rows. There are many combinations available such as, 8 × 1, 8 × 2, 10 × 2, 16 × 1, etc. but the most widely used is 16 × 2 OLED. Therefore, it will be (16 × 2 = 32) with 32 characters in total and each letter will be made 5 × 8 Pixel dots.

OLED display specifications:

- Operating Voltage is 4.7V to 5.3V.
- Current consumption is 1mA without backlight.
- Alphanumeric OLED display module, can display alphabets and numbers. Consists of two rows and each row can print 16 characters.
- Each character is build by a 5×8 pixel box.
- Can work on both 8-bit and 4-bit mode.
- It can also display any custom generated characters.
- Available in Green and Blue Backlight.

Fig. 7. OLED Display

G. DC Motor

What is DC Motor A DC motor is an electric motor that converts electrical energy into mechanical energy. In a DC motor, the input voltage is directly converted into a machine rotation. When stored in a magnetic field, the current conductor gains torque and improves the tendency to move. In short, when electric fields and magnets meet, mechanical power emerges. This is the principle in which DC motors operate [10].

Motor specifications:

- Standard 130 Type DC motor.
- Operating Voltage: 4.5V to 9V.
- Recommended/Rated Voltage: 6V.
- Current at No load: 70mA (max).
- No-load Speed: 9000 rpm.
- Loaded current: 250mA (approx).
- Rated Load: 10g*cm.
- Motor Size: 27.5mm x 20mm x 15mm.
- Weight: 17 grams.

Fig. 8. DC Motor

H. GSM Module

This is a GSM modem [10] which has a serial interface and plug and play facility. The modem can be used to send SMS, receive and make the calls, and do the basic GSM operations with the help of AT commands. A standard RS232 interface is used so that we can use it to interface with microcontrollers and PCs. It has power regulation, SIM holder and external antennas [9].

GSM Module specifications:

- Uses SIM800C GSM module transmission.
- Operating Voltage: 7 – 15V AC or DC.

- Comes with an onboard wire antenna for better reception.
- SIM800C GSM GPRS with Bluetooth
- Speaker (SPKP. SPKN) = Differential Signal Pins
- Works with standard AT Commands
- ADC = Analog to Digital Input pin STAT = Status Signal Pin RI = Ring indicator UART Pins: DTR, DCD, CTS, RTS, RXD, TXD

Fig. 9. GSM Module

I. ARDUINO IDE

Arduino IDE is an open source software, used to write and upload codes to Arduino boards. The IDE system is suitable for different operating systems such as Windows, Mac OS X, and Linux. Supports editing languages C and C ++. Here, IDE represents the Integrated Development Environment [7][15].

RESULT

Project should successfully monitor the agriculture field. Parameters like soil moisture, temperature humidity, rain level should read successfully by the sensors. Data of sensor should send to farmer via SMS. Controller will monitor and control the agriculture field. Motor should turn on if the moisture level reduces.

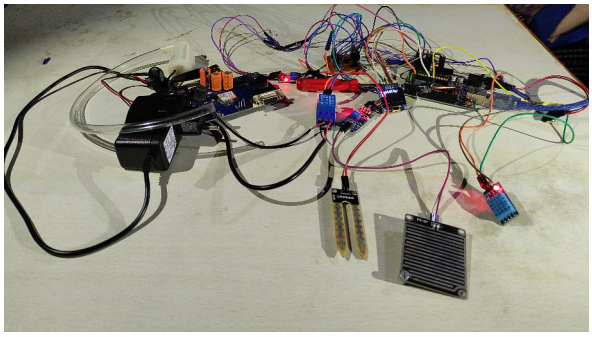

Fig. 10. HARDWARE KIT

OLED displays real time values with 0% noise. The accuracy of system increased comparing to existing systems.

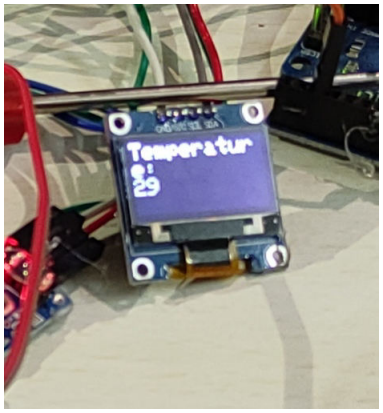

Fig. 11. REAL TIME TEMPREATURE VALUE

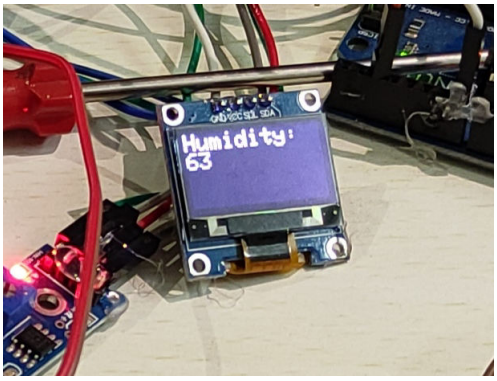

Fig. 12. REAL TIME HUMIDITY VALUE

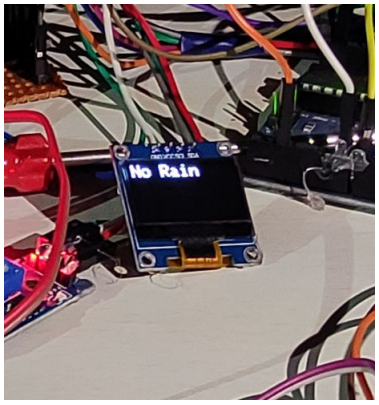

Fig. 13. REAL TIME RAIN CONDITION

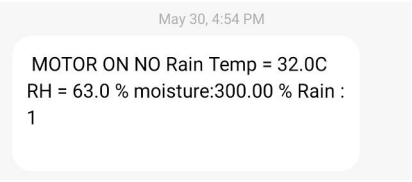

Fig. 14. SMS RECEIVED TO FARMERS AFTER TURNING ON MOTOR WITH ALL THE ENTITIES

Fig. 15. PROJECT IMPLEMENTATION

CONCLUSION

Conclude The proposed work provides the information on various soil parameters that includes soil temperature, soil moisture and atmospheric temperature to predict irrigation suitability. This system helps to analyze the soil parameters thereby ensuring a better system of irrigation for agriculture. The data collected from the sensors are made to learn using machine learning techniques to ensure a fully automated system. Implementing an IoT based smart agriculture system helps in obtaining quality crops and it also reduces the human involvement in agricultural activities.

ACKNOWLEDGMENT

It gives us great pleasure in presenting the preliminary project report on '**Smart Agriculture Monitoring and Control System Using IOT**'. We would like to take this opportunity to thank our internal guide for giving me all the help and guidance we needed. We are really grateful to them for their kind support. Their valuable suggestions were very helpful. We are also grateful to **HOD**, Head of **Electronics and Telecommunication Engineering Department**, **Dr. D Y Patil Institute of Engineering Management and Research, Akurdi, Pune** for his indispensable support and suggestions.

REFERENCES

[1] Zuraida Muhammad,Muhammad Azri Asyraf Mohd Hafez,Nor Adni Mat"Smart Agriculture Using Internet of Things with Raspberry Pi." 2020.
[2] Divya J., Divya M.,Janani V."IoT based Smart Soil Monitoring System for Agricultural Production" 2017.
[3] H.G.C.R.Laksiri, H.A.C.Dharmagunawardhana, J.V.Wijayakulasooriya "Design and Optimization of loT Based Smart Irrigation System in Sri Lanka"2019.
[4] Anushree Math, Layak Ali, Pruthviraj U "Development of Smart Drip Irriga- tion System Using IoT"2018.
[5] Dweepayan Mishra1 ,Arzeena Khan2 Rajeev Tiwari3 , Shuchi Upadhay,"Automated Irrigation System-IoT Based Approach",2018.
[6] R. Nageswara Rao, B.Sridhar,"IOT BASED SMART CROP-FIELD MONI- TORING AND AUTOMATION IRRIGATION SYSTEM". 2018.
[7] Shweta B. Saraf, Dhanashri H. Gawal,"IoT Based Smart Irrigation Monitoring And Controlling System".2017.
[8] Shrihari M, "A Smart Wireless System to Automate Production of Crops and Stop Intrusion Using Deep Learning" 2020.
[9] G. Sushanth1, and S. Sujatha, "IOT Based Smart Agriculture System"2018.
[10] Vaishali S, Suraj S, Vignesh G, Dhivya S and Udhayakumar S, "Mobile Integrated Smart Irrigation Management and Monitoring System Using IOT",2017
[11] Anurag D, Siuli Roy and SomprakashBandyopadhyay, "Agro-Sense: Precision Agriculture using Sensor-based Wireless Mesh Networks", ITU-T "Innovation in NGN", Kaleidoscope Conference, Geneva 12-13 May 2008.
[12] C. Arun, K. Lakshmi Sudha "Agricultural Management using Wireless Sensor Networks – A Survey"2nd International Conference on Environment Science and Biotechnology IPCBEE vol.48 (2012) © (2012) IACSIT Press, Singapore 2012.
[13] Bogena H R, Huisman J A, OberdEˆ rster C, etal. Evaluation of a low cost soil water content sensor for wireless network applications [J].Journal of Hydrol ogy, 2007.
[14] R.Hussain, J.Sehgal, A.Gangwar, M.Riyag" Control of irrigation automatically by using wireless sensor network" International journal of soft computing and engineering, vol.3, issue 1, march 2013.
[15] Hamza BENYEZZA, Mounir BOUHEDDA, Khauola DJELLOUT, Amina SAIDI, "Smart Irrigation System Based Thingspeak and Arduinmo", 2018.
[16] An Efficient Irrigation System for agriculture. 2018.

Face Mask Detection for Covid-19

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ABSTRACT

Our lives have been drastically changed over the last few years because of a global pandemic situation that closed the whole world for literally over a year and half. This pandemic definitely showed us one of the most important aspects of life - Health. Since the pandemic hit, millions have started to become aware of health as an overall necessity. In this paper, we have highlighted the manual security and biometric security finding a new non-contact solution to security to ensure safety of people indoors in closed spaces. The idea is a face mask detection safety door to ensure everyone who enters the indoor space must be in with basic protection against the virus. We have used the Haar Cascade Classifiers, a machine learning object detection program that is used for facial recognition. The NodeMCU is used to power the program which works with the camera module.

INTRODUCTION

The Covid-19 pandemic has led to a dramatic loss of human life worldwide and had given us an obstacle related to public health, world hunger and the world of work. The social, emotional and economical unsettlement and destruction caused by the pandemic was pure disastrous. The Covid 19 virus is a respiratory flu like disease that took over 6 million lives causing a global pandemic. It was first discovered in Wuhan, China and was very quick to spread all around the world. Within a few months of its discovery the global aspects of life were already disrupted and countries had to go into a total lockdown arrangement to lower the transmission rate of Covid 19, since the majority of the transmission was due to person-to-person contact.

The common symptoms included fever, loss of taste and smell, nausea, tiredness and cough which was one of the major sources of transmission as well. To protect the globe from the mass destruction happening, wearing of masks everywhere especially in public settings became a compulsion. Wearing masks and regularly sanitizing were our key tools to battle the Covid 19 back then since no medications and vaccinations were available back then. Times have changed now; the world is recovering from the rupturing pandemic and the loss of human life.

Vaccinations have played an important role in fighting the disease. The concern that arises is that can there be any other virus that could possibly be more or as equally destructive as the Covid 19. Just like how Covid 19 came out of the blue can some other disease rise as well?

In this paper we have come out with a solution which works as a security system that detects face mask on a person. As humans we always believe in prevention is better than cure, and after seeing all that has happened in the last few years we surely need to work on a healthy and safe lifestyle to prevent the world from another global pandemic. The face mask detection works on the Node MCU and has a machine learning model and classifier that works and trains for facial mask detection.

OBJECTIVE

- The objective is to create a security system that helps in protection against transferable diseases like Covid19.
- An infrastructure where humans have an upper hand next time a pandemic like Covid 19 threatens us.
- Making sure every person entering public places follows protocol.

LITERATURE REVIEW

Covid 19 was declared to be the sixth health emergency of an international scale and was declared as a global pandemic by the World Health Organization (WHO) on the 30th of January 2020. This pandemic also had a difficulty apart from the fact of the transmission, some people who caught the Covid 19 virus were asymptomatic which means they could be carrying the virus without knowing. To fight against its mass testing was performed and ad to be reinforced. OpenCV, an Intel computer vision library helps in multiple domains like face detection and face recognition. This is achieved by simplifying the computer vision.

The accuracy to about 90% - 95% is normally achieved in facial detection. Face recognition is when you compare a face to the database. This process includes the involvement of the Haar features where the facial features are compared and computed by taking the difference of the added pixel intensities in adjacent rectangular window at a particular location in a window. This process can be fastened by using Integral Images.

With the completion of the facial mask recognition the table is updated with data of the analysis performed. This would be very curial and helpful to places such as workspaces and universities where the time of manual attendance can be completely written off. Apart from various and helpful uses this can be used for security as well in many different ways. The Wi-Fi module can be used to send details of the reports generated by the analysis. The ESP8266 has been dominating the globe for quite some time in IoT projects. This global module can be programmed using the Node MCU.

PROPOSED IDEA

The proposed setup is to give entry to people in indoor spaces and compact crowded spaces with masks only. Covid 19 surely has been suppressed with all the vaccinations and testing conducted on a mass level. But as humans we always believe in prevention is better than cure. This idea is based on prevention hoping that if Covid 19 or some other virus has to rise we will already be having a

good infrastructure and mindset to battle it. The face mask detection will allow humans to enter the indoor places like malls, schools, hospitals, workspaces etc. only with masks

on. The door will open only for the people who have their masks on. The people who won't have a mask will be requested to wear a mask before entering the designated perimeter. The person can continue to go in the spaces only if mask is on which means a person without mask won't be able to walk in. The proposed setup will also keep a count of people entering the space and will decline entry if the allowed number of people is fulfilled. We eventually would have people wearing masks because the masks will basically work as an ID or a pass to enter restricted areas.

HARDWARE

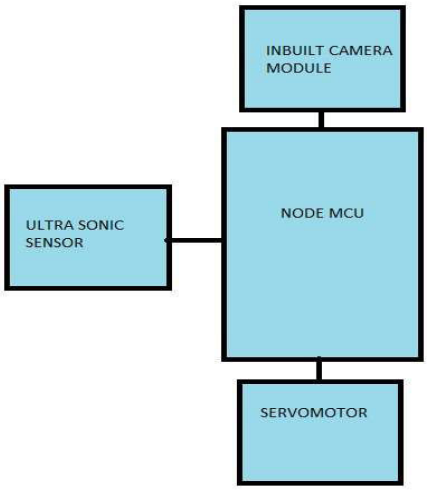
1. Node MCU ESP8266
2. Ultra-Sonic Sensor HC-SR04
3. Servomotor
4. Jumper Wires
5. Camera Module

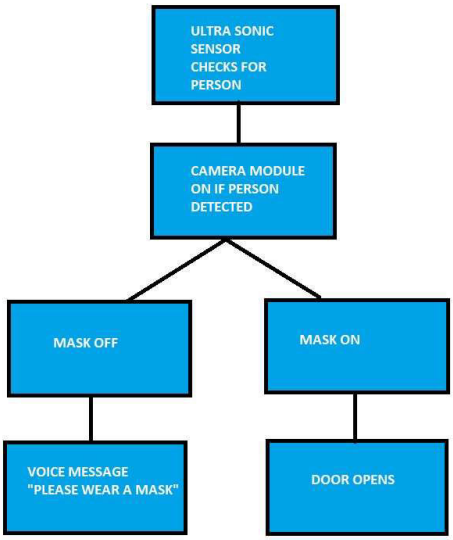
SOFTWARE

1. Arduino IDE
2. OpenCV
3. Visual Studio Code

SYSTEM DESIGN

The Ultrasonic sensor HC-SR04 senses the person in front of camera. The VCC pin of the ultrasonic sensor is connected to the VCC pin of the Node MCU. The ground is connected to the ground of the Node MCU. Now the trig pin of ultrasonic sensor is connected to one of the digital pins D2 of Node MCU. With the help of two series resister echo pin of the ultrasonic sensor is connected to the D1 pin of node MCU. The digital pins of Node MCU are used for this purpose. Here we use the web camera for the face mask detection using OpenCV. The web camera is already inbuilt to the laptop/pc or you can use separate web camera that can enhance the location and resolution. The servo motor is representing as a door to and will respond to the program running in back end. The servo motor will rotate to show the opening of the door when mask is detected. The servo motor is connected to 3.3V VCC and GND respectively to the Node MCU pins. There is a webserver running in Node MCU that is connected to python program via serial. Once you have the firmware on the device that is ESP8266 you can access the REPL over UARTO which is connected to USB serial convertor depending upon board. The python libraries need to be installed here such that pyttsx, serial, OpenCV python. If the person is in front of ultrasonic sensor, then it will type a string in this case ‘H’ in serial and then python will read it via pyserial library and start the procedure of the mask detection using Haar Cascading libraries. If it finds that the person is wearing a mask a HTTP request will be sent to the Node MCU which connects to the servomotor asking for it to rotate which implies to opening like a door. In case of no mask detected, the user is asked to wear a mask in a computer-generated voice. The setup also keeps count of people entering the premises. This will help in reducing overcrowding in public places.

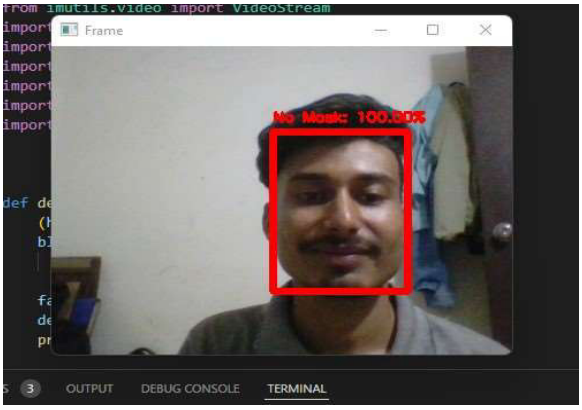


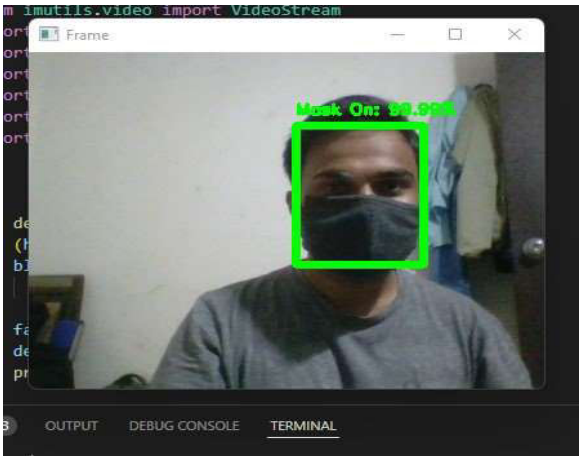


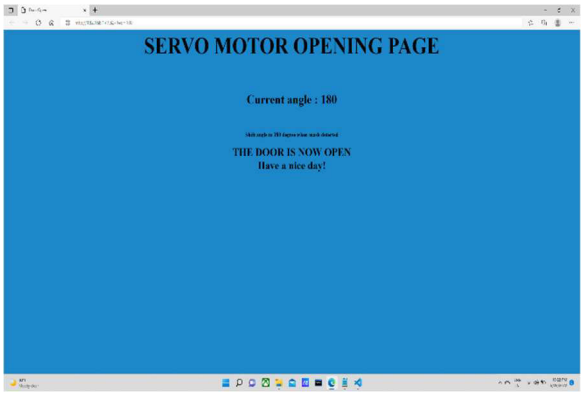
RESULTS AND DISCUSSION

The person walks in and the ultrasonic sensor HC-SR04 detects the person in front and the camera starts in search for a face for it to recognize. The camera puts up a display screen for the person to view if they are in the camera detection range. The python program in the back end runs to check if the person is wearing the mask or not. The face is detected by the Haas Classifiers used in OpenCV (Python). If the person is wearing the mask the servomotor in the project implied as a door rotates to open the pathway for the person to walk in. If the person is not wearing a mask the servomotor remains idle implying the doors are not open and a voice message is heard asking the person to wear a mask to enter the public space. The setup also keeps track of people entering the room to ensure a limit of people who can enter the premises. This is done by using count function in python. This helps in keeping track of people entering and exiting spaces preventing overcrowding.

The program has been trained using machine learning including large number of data set taken from online google photos. In the backend a dataset which has two categories namely Mask on and Mask off train itself to provide optimal accuracy of 95%. The training model detects a normal face, a mouth and a face with mask. Using this method, the face detection was made. Increase of the dataset can increase the accuracy of identifying masks and other things covering up the face.







The project can be definitely be enhanced by using better sensors and adding more to the existing project. The enhancement and further ideas have been stated below in the conclusion and the future scope if the project.

CONCLUSION AND FUTURE SCOPE

The current model checks for the face mask on a person and allows entry through the door for only the person who is wearing a mask and denies the entry for one who isn't. It also keeps track of people to prevent overcrowding. The model will check for masks as Covid 19 safety guidelines are clear about wearing masks. This will make certain, people wearing masks avoiding a global pandemic to re rise. In the future, this model can be transformed into a security system as a whole with thermal sensors, temperature sensors, metal detectors, scanning systems and many more. With a large dataset a facial recognising system can also be made using this as a base setup. The future has endless possibilities towards this project and can be used everywhere around the globes where transmission risks are high or need to be controlled.

REFERENCES

i. World Health Organization Covid Report
ii. Varshini, HR Yogesh, Syed Danish Pasha, Maaz Suhail, V Madhumitha, Archana Sasi: IoT-Enabled smart doors for monitoring body temperature and face mask detection
iii. Nenad Petrović and Đorđe Kocić : IoT-based System for COVID-19 Indoor Safety Monitoring
iv. Amaan Javed : Python OpenCV NodeMCU Mask Detection
v. Kaaviya Bhaskaran, Bhaskaran P, Rajaram V, N Kumaranathan : IOT based COVID preventive system for work environment.

Smart Home Design and Fabrication Using the Internet of Things

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***Abstract*—Into this era of digitization and automation, human life is becoming simpler since most things are becoming automated, replacing traditional manually controlled systems. People's lives have become so reliant on the internet that its absence leaves them feeling helpless. The Internet of Things (IoT) is a platform which admits us for interacting with devices that can sense and control networked equipment. This model employs a Node MCU in conjunction with a relay module and a touch sensor to remotely control electrical appliances such as lights, fans, and air conditioners. The built web application gives users with an interface that includes buttons for operating the electrical equipment. This model's major goal is to provide a low-cost, simple-to-use, and adaptive solution. The seminar's goals are to discuss smart switchboard studies, including the components utilized in the project, the model's step-by-step execution, and certain benefits. 'Smart Switch Board is a touch sensor switchboard that is both safe and secure, as well as providing IoT functionality for managing all functioning devices from a single location. Smart Switchboard identifies whether or not your phone is present and activates accordingly.' As a result, component information and an introduction are mentioned in this paper.**

***Keywords*—Internet of Things, Smart home, ESP32S, Amazon Web Services, MIT**

I. INTRODUCTION

With high-speed internet working in every day appliance, we plan to enhance the simplicity of utilizing everyday appliances at this time in the world. Physically handicapped folks find it challenging to operate these machines [1]. Furthermore, if the person is not physically there, he will be unable to handle or monitor the appliance's status. This could result in an energy waste. As a result, we created a Smart switchboard that allows you to remotely control all of your household appliances. You can manage fans, lighting, and other appliances with this smart switchboard.

Using a web application, you can control tube lights, for example. The Internet of Things makes implementing this smart switchboard concept simple. The Node MCU sends information to the cloud.

A. Home Appliance Management

Provides a cloud platform for controlling consumer electronics that are cloud-hosted. The managing service allows the user to control the outcomes of digital devices interconnected to home equipment like lamps and fans. Smart actuators, such as valves and switches, perform tasks like as turning objects on or off or altering an operating system. On/off control services, proportion accessible position, regulating to control flow behavior, as well as abrupt shutting are all operations of actuator (ESD). To activate an actuator, a digital written message is sent to it.

B. Managing Home Access

Residential access technologies are generally utilized open access doors. In a conventional system, a directory with the biggest factor of authorized persons is used. When a user reaches the authentication protocol, their identifying features are immediately recorded and compared against the dataset. If the data in the dataset allows it, access is permitted; else, it is refused. For a big spread institute, cloud servers could be used to collect and process data centrally. Face detection technologies, biometrics, and RFID are used by used by some, whereas magnetism or acoustic identification documents are used by someone else.

II. RELATED WORK

Table 1. Related Work [9]

Ref.	Controller Used	Focus Criteria	Wireless Interface	Real Implementation
[1]	Raspberry Pi	Indoor control Monitoring Smartphone	Bluetooth/Wi-Fi	No
[2]	Arduino Mega	Indoor Control Outdoor Control Safety Monitoring Energy Management Smartphone Web-based	Bluetooth/Wi-Fi	No
[3]	Node MCU	Indoor control Smartphone Web-based	Wi-Fi	No

[4]	Raspberry Pi	Indoor Control Outdoor Control Monitoring Energy Management Web-based	Fog-IoT	Yes
[5]	8051 microcontroller	Indoor control Outdoor control Web-based	GSM	No
[6]	PC Server	Security Energy Management	Wi-Fi	No
[7]	PC Server	Safety Monitoring Web-based	GSM/Wi-Fi	No
[8]	Arduino	Indoor Control Security Energy Management Smartphone	GSM	No
[9]	Arduino Mega	Indoor Control Monitoring Smartphone	Wi-Fi	No

III. METHODOLOGY PROPOSED

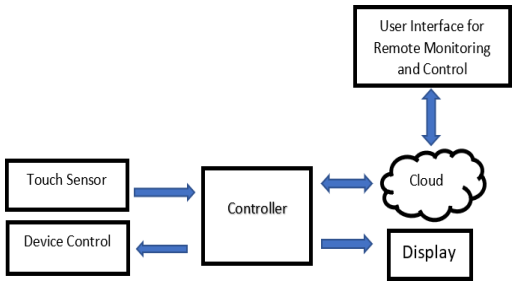

Fig.1. Proposed System Block Diagram

Smart cities require remote control and power monitoring of household appliances and business gadgets. The motive of this project is to design and make the smart switchboard for home automation [6]. For remote control, this switchboard is Wi-Fi enabled and connects to the internet. Each switchboard will be mesh networked and connected to other switchboards in the house. Multiple device control and fan speed control will be available on the switchboard. With internet connectivity, a device can be managed from anywhere at any time with manual override. A controller (ESP32S), touch sensors, display, power management, and device system will be included in the hardware. A remote program for remote monitoring and device control will be integrated into the cloud. The smart switchboard prototype is being transformed into a solution for home and workplace automation [5].

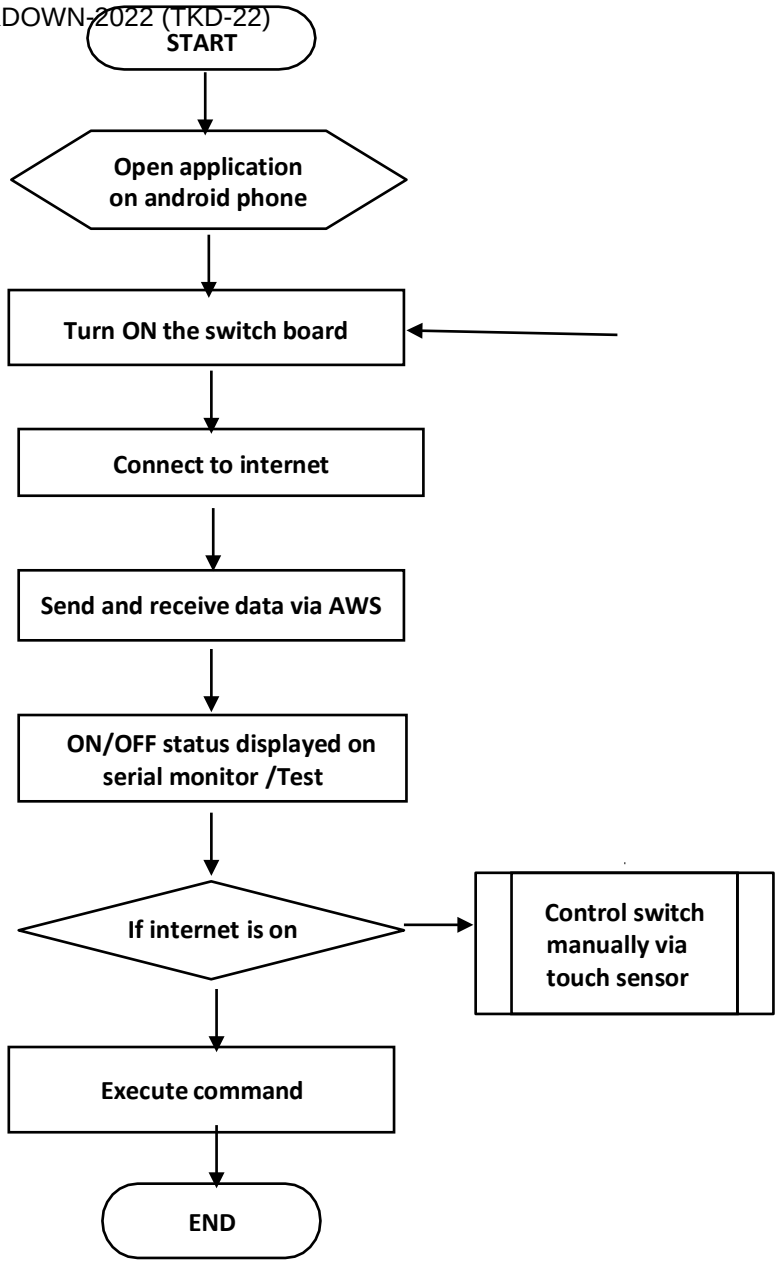

Fig.2. Flowchart for Proposed Methodology

A. Touch Sensor:

Here we've got a used touch sensor with IC TTP224. Which takes input and supplies that information to a controller. Operating voltage 2.4V~5.5V. For each touchpad, the capacitances outside can change the sensitivity. By using the pad, you may choose between Fast and Low Power modes. After powering on, wait around 0.5 seconds before touching the keypad; else, the feature will be disabled.

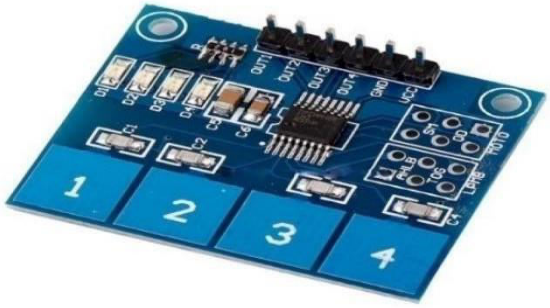

Fig.3. Touch Sensor Module

A touch sensor is a gadget or instrument that recognizes and analyses physical connection or embraces. Touch sensor admits a tool or object for sensing touch, generally through the usage or operator of an individual. Tactile sensors are touch sensors that are responsive to touch, force, or pressure.

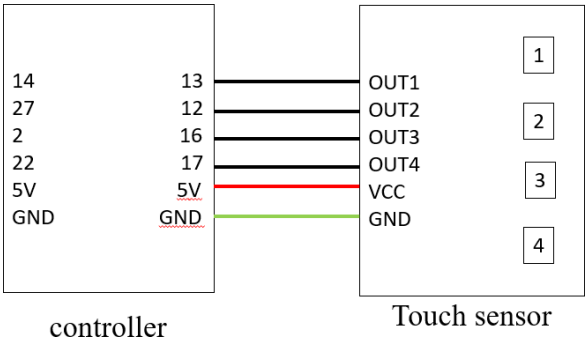

Fig.4. Circuit Diagram of Touch Sensor with Controller

A 6-channel capacitive touch sensor could be the item in question. The project is based on the TTP224 IC, which features six (4) separate capacitive touch sensor inputs with configurable sensitivity for use in fine-tuned sensor applications. Each sensor input is calibrated to compensate for parasitic capacitance in the system and automatically recalibrated to compensate for environmental changes. The TTP224 features Multiple Pattern Touch recognition that permits the user to pick a selected set of buttons to be touched simultaneously. If this pattern is detected, a standing bit is about and an interrupt is generated.

B. Controller

Controllers are the brain of an intelligent home automation system. they permit you to integrate and control security, heating, and air lighting. It has Multi- connections. Broadcast encryption, Authentication and encryption, Secure Simple-Pairing.

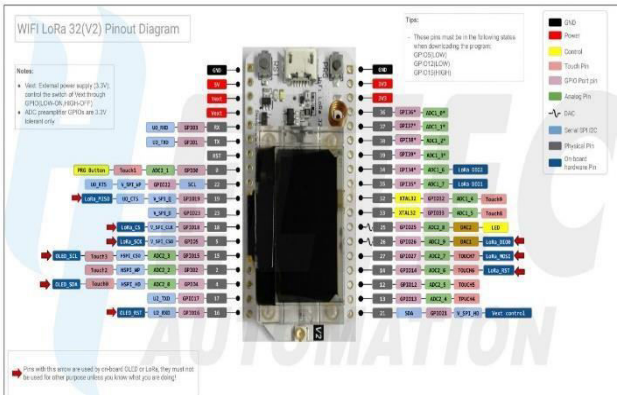

Fig.5. Pin Configuration of ESP32S

The ESP32S can work as a single application or as a slave module to a hosted MCU, freeing up the service feature CPU from protocol suite overhead. The ESP32 may provide Wi-Fi and Bluetooth functionality to other systems via its SPI / SDIO or I2C / UART interfaces. The ESP-32S can be used to build active products that accept inputs from various of switches or sensors and loads connected, actuators, and other output devices. Projects on the ESP-32S can be done on their own or in collaboration with source code on windows System. It is used for processing serial data from sensors, comparing data with predefined values, and controlling appliances and data from the cloud. It is also able to control data according to the input from the switch available on boards, providing feedback to indicate whether the home appliance is on or off.

- The Heltec Wi-Fi Lora 32 V2 is an ESP32S development kit of 8 MB of flash memory which uses the EPS32S microprocessor. It includes a Lora WAN module from Semtech (SX1276 or SX1278) and an SSD1306 0.96-inch 128x64 OLED display connected via I2C.
- The Node MCU IoT platform is free and open-source. It comprises both software and hardware for the ESP8266 Wi-Fi SoC and the ESP-12 module. The Node MCU is used to determine the module's internet connection to the cloud. It's a network layer-specific microcontroller. NodeMCU-32S is a Lua Wi-Fi IoT development board that is compatible with the Node MCU ESP-32S controller board. The event board maintains Node MCU's classic look.

C. Channel relay module

The relay module is an occasional Level 4- channel 5V relay board, and a 15- 20mA driver current is needed by every channel. Relay is wont for controlling several devices and equipment with a large current. It is furnished with high-current relays that job in AC250V 10A or DC30V 10A. it is a typical alliance which a microcontroller will control directly.

A relay works as a switch which has the capability of switching many circuits that can be either separate, concurrent, or in series. A relay is used by the exponents to accommodate 3 output devices. Node MCU's output pins are linked to every of the input pins of the module.

Characteristics:

- Rough, epoxy capsulated architecture
- Optical isolation – 4,000 volts
- In between encapsulating, exposed to maximum power testing and 6 times the average electrical surges
- Thermal mechanism is unique
- Guaranteed for life

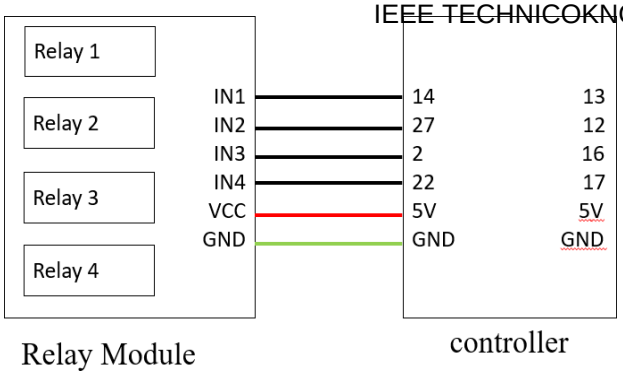

Fig.6. Circuit Diagram of Relay Module with ESP32S

D. Cloud

Data is frequently stored in the cloud. It provides data storage, servers, databases, networking, and software services over the internet. Cloud memory admits to avoid wasting folders on a distant dataset and access whenever you need them [3].

Browser sites, program and datasets which work on such web server, often referred to here as "server." Internet servers are located in cloud services all over the globe. Systems eliminate the need for individuals and organizations to manage data centers or execute operating systems upon their computers. Clouds computing is a decentralized virtual machine which offers clients liquidity computer solutions [8].

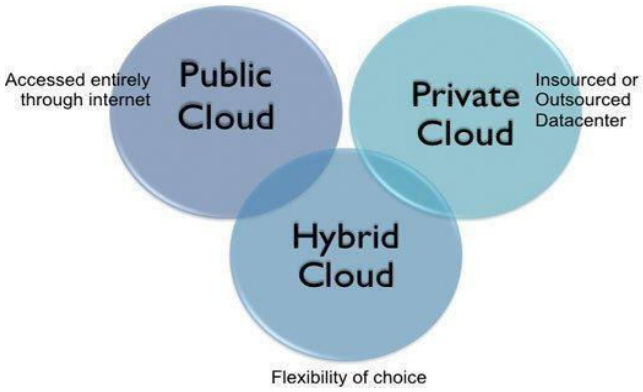

Fig.7. Types of Cloud

Users of the cloud can give more consistent, available, and updated services to their customers. Physical devices placed in cloud providers' data centers make up the cloud. These services are accessible via the internet everywhere in the globe, with the server functioning as a single contact for all consumers. Cloud computing is divided into four types:

Personal clouds: Personal cloud is kept within a business and is only utilized for internal purposes. HP Data Centers, Microsoft, and Ubuntu, for example.

Public clouds: In public clouds, a company rents cloud services from cloud providers on an as-needed basis. The utility computing model is used to provide services to users. Amazon EC2, Google, and Azure, for example.

Hybrid clouds: Clouds that are hybrids are made up of various internal or exterior clouds. When a company switches from its own private cloud to the public cloud, this is a possible scenario. Amazon Web Services and Microsoft Azure, for example.

Multi-clouds: This type of cloud is made up of multiple cloud vendors, either public or private. Multi-clouds are hybrid clouds, however not all hybrid clouds are multi- clouds. When various clouds are connected by some type of integration, they become hybrid clouds. Two public Infrastructure as a Service (IaaS) providers and a public Platform as a Service provider are included (PaaS).

E. MIT App

MIT App Inventor could be a Google-developed web application integrated development environment. An App Inventor is a tool that allows you to create Android apps using an application. Your work is saved on the App Inventor servers, which makes it easier to maintain track of your projects. The MIT app inventor assists in the remote control of home appliances.

App Inventor allows you to create Android applications using a web browser and either a connected phone or an emulator. Your work is saved on the App Inventor servers, which makes it easier to maintain track of your projects. The App Inventor Blocks Editor is where you put together programmer blocks that tell the components how to work together.

The Massachusetts Institute of Technology may manage MIT App Inventor, a web application integrated development environment that was previously offered by Google and is now maintained by the Massachusetts Institute of Technology (MIT). It enables novice programmers to create application software (apps) for two operating systems.

(OS): Android and iOS, both of which are in final beta testing as of July 8, 2019. It's free and open-source software with two licenses: an ingenious Commons Attribution Share Alike 3.0 Unported license for the ASCII text file, and an Apache License 2.0 for the rest. It employs a graphical user interface (GUI) similar to that of the programming languages Scratch (programming language) and Star Logo, which allows users to drag and drop visual objects to create an app that runs on Android devices, while an App-Inventor Companion (the program that allows the app to run and debug on iOS devices) is still in development. Google drew on extensive earlier research in educational computing as well as internal Google work on online development environments to create App Inventor. Constructionist learning theories, which highlight that programming can be a vehicle for engaging powerful ideas through active learning, are supported and guided by App Inventor and hence the other initiatives. As such, it's a part of an ongoing movement in computers and education that began with the work of Seymour Paper and therefore the MIT Logo Group within the 1960s and has also manifested itself with Mitchel Resnick's work on Lego Mind storms and Star Logo. App Inventor also supports the utilization of cloud data via an experimental Firebase #Firebase Real Time Database component [2].

III. HARDWARE IMPLEMENTATION

The system's hardware architecture consists of a USB-powered Node MCU that is connected to a four- channel relay module through a 230V power supply. The relay can be used to link a variety of home equipment. The internet address 80 has been put into the Node MCU. The client can use it to upload data and change the status of the GPIO pins. As a result, the relay linked to the relevant GPIO pin can be controlled [9].

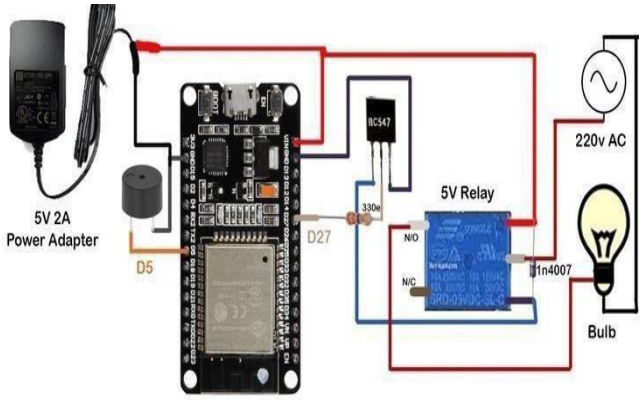

Fig.8. Hardware Architecture

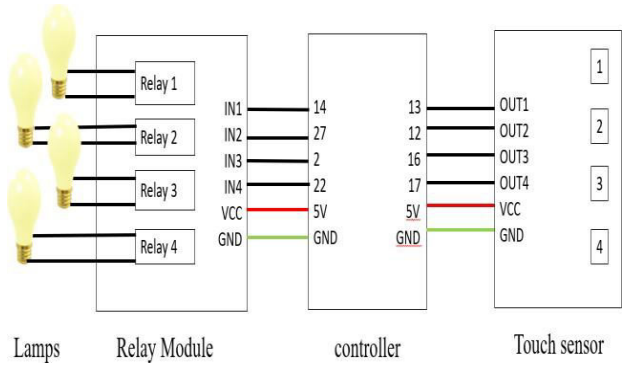

Fig.9. Circuit Diagram of Switch Board

IV. RESULT

We have successfully controlled home appliances via controller ESP32S Heltec, the size of switch board was reduced by the use of touch sensors. Data sending and receiving was implemented easily and securely through AWS. Theusers are able to operate switch board remotely.

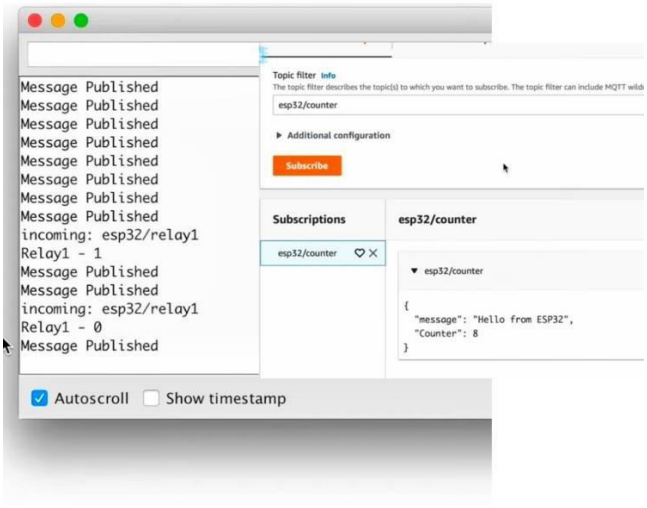

Fig.10. Serial monitor and AWS MQTT output

Above figure 10 indicates that the data from controller to cloud and cloud to controller is transmitted and received respectively correspondence to route of data transmission. This shows our project runs successfully and home appliances are controlled by the cloud and mobile application.

The following table shows the status of home appliances and relay connected to the respective touch sensor which will turn on/off light/fans.

Table 2. Status of Home Appliances

INPUT		OUTPUT		Status of home appliances
Touch sensor	Status	Relay	Status	
1	ON	1	ON	L1- ON
2	OFF	2	OFF	L2- OFF
3	ON	3	ON	L3- ON
4	OFF	4	OFF	L4- OFF

V. CONCLUSION

Users can control home appliances with the Smart Switch Board based on IoT. The online application provides a framework for controlling home appliances. The Node MCU is used by the smartboard to be controlled all components inside the smartboard. The Node MCU is equipped with a low-cost, high-power board. This system has the following qualities when compared to other home automation systems: Other home automation systems are more expensive. It is a small, portable board that can operate basic household equipment such as fans and tube lights. The smartboard examines the use of electrical frameworks and generates a report on electricity usage. The smartboard is controlled by a web app that can be modified.

REFERENCES

[1] B. Davidovic and A. Labus, "A smart home system based on sensor technology," Facta Universitatis, Series: Electronics and Energetics, vol. 29, no. 3, pp. 451-460, 2015.

[2] N. David, A. Chima, A. Ugochukwu and E. Obinna,"Design a home automation system using arduino," International Journal of Scientific & Engineering Research, vol. 6, no. 6, pp. 795-801, 2015

[3] R. K. Kodali and S. Soratkal, "MQTT based home automation system using ESP8266," in 2016 IEEE Region 10 Humanitarian Technology Conference R10-HTC), 2016, pp. 1- 5: IEEE.

[4] U. Ozeer, L.Letondeur, F.G. Ottogalli, G. Salaün, and J. M. Vincent, "Designing and Implementing Resilient IoT Applications in the Fog: A Smart Home Use Case," in 22nd Conference on Innovation in Clouds, Internet and Networks, 2019

[5] E. Ganesh, "Implementation of IOT Architecture for SMART HOME using GSM Technology," International Journal of Computer Techniques, pp. 2394-2231,2017

[6] O. Bhat, S. Bhat, and P. Gokhale, "Implementation of IoT in Smart Homes.

[7] S. Badabaji and V. S. Nagaraju, "An IoT Based Smart Home Service System,"International Journal of Pure and Applied Mathematics, vol. 119, no. 16, pp.4659-4667, 2018.

[8] S. Kaur, R. Singh, N. Khairwal, and P. Jain, "Home Automation and Security System," Advanced Computational Intelligence: An International Journal (ACII), vol. 3, no. 3, 2016

[9] W. A. Jabbar, M. H. Alsibai, N. S. S. Amran, and S. K. Mahayadin, "Design and Implementation of IoT Based Automation System for Smart Home," in 2018 International Symposium on Networks,Computers and Communications (ISNCC), 2018, pp. 16: IEEE.

RAKSHAN-SECURE THE WOMEN

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Abstract: **Women's security could be a crucial issue in today's world and it's significantly required for each individual to be acting over such a difficulty. This document describes a GPS primarily based "Women Security System" gives the mixture of GPS device yet as provide alerts associated messages with an emergency button trigger whenever someone is in bother they could not have such a lot time, all that they need to try and do is generate a distress emergency signal by shaking up their phone. Our system provides realizable, value effective answer to drawback detection. currently days thanks to recently happened cases like rape by drivers or colleagues, felony etc., girls security, particularly girls security has become the foremost priority of the planet. System uses the worldwide Positioning System (GPS) technology to seek out out the situation of ladies. the knowledge of ladies position provided by the device may be viewed on Google maps victimization net or specialized package. we have a tendency to concentrate on the projected model which will be wont to manage the matter of security issue of ladies victimization GPS primarily based following system**.

Keywords – Smart Phone, Android, Registered Contacts, GPS location, Database.

I. INTRODUCTION

Women area unit adept at mobilizing numerous teams for a typical cause. They typically work across ethnic, religious, political, and cultural divides to market peace. we have a tendency to area unit all aware of importance of safety of women's however we have a tendency to should understand that they must be properly protected. Women's don't seem to be as physically robust as men, in associate emergency state of affairs a aid would be a relief for them. The simplest thanks to minimize your probabilities of changing into a victim of violent crime (robbery, regulatory offense, rape, domestic violence) is to spot and invoke resources to assist you out of dangerous things. whether or not you're in immediate bother or get separated from friends throughout an evening out and don't acumen to urge home, having these apps on your phone will cut back your risk and convey help after you would like it. though many were originally developed for college kids to scale back the danger of regulatory offense on field, they're appropriate for all girls within the light-weight of recent outrage in Delhi that barrel the state and woke United States to the security problems for our daughters, individuals area unit power train up in numerous ways that to fight back.A host of recent apps are developed to produce security systems to girls on their phones. Here we have a tendency to introduce associate app that ensures the security of ladies. This helps to spot and invoke resources to assist the one out of dangerous things. These cut back risk and convey help after we would like it and facilitate United States to spot the situation of the one in peril. This app designed to produce security to girls main purpose of this app to produce the notice on the time of crucial state of affairs for ladies. usually user will activate this service by adding the emergency contacts victimization the emergency contacts icon within the app. While in emergency the user would got to shake up his/her telephone, then a distress signal(SOS) can mechanically got generated from the user finish and send SMS to those contacts that has been saved at the time of registration. The SMS contains your message and your precise location.

II. LITERATURE SURVEY

The cases of harassment and rapes on girls square measure increasing therefore security issue for such lady is a lot of important. So, it's essential to develop a system to produce security to girls. during this he devised a system permits women to guard themselves from attackers. In recent days the attacks on girls square measure increasing and generally they're not even ready to take their mobile and dial-up to police, this system can facilitate girls in such things to tell concerning attacks and conjointly in giving their actual location to a close-by police station for necessary action. In this, the author designed a tool, in that, by pressing the button of the device a message beside her location are transmitted by the system to the police office and her few relatives, so that they can get alert to her current scenario. He told that with that message she is additionally for his or her defensive purpose they can ready to provides a shock to the aggressor it'll be a lot of helpful to girls at that crucial scenario, this technique is designed because the defence instrumentality, it'll them to attack the attacker. So, she has a while to rescue herself from that. [1] .developed a security device to defend girls from vulnerable activity and lonely traveling on the road victimization IoT supported the fingerprint security methodology. This device alerts closure individuals yet as a police office, if any wrong or criminal movements with that girls. Saikumar et al.

[2].planned a device to find a risky place and plenty of threats for ladies through IoT modules like Arduino UNO controller. therefore this controller is additionally integrated with Bluetooth device, teaser and mechanical man app. however the general system is tracked the risky spot of the ladies with the assistance of GSM and GPS module. Ullah et al. [3].have designed AN IoT primarily based good system and mechanical man application that will track the closest location of the bus and police office victimization the GPS module. Similarly, the IR sensing element provides knowledge concerning seat handiness. however any girls harassment state of affairs occurred then press an alert button that offered in an exceedingly seat. once the button ironed, it forwards the message to the closest police office with this spot of the bus. Roy et al. [4].have made a wearable sensing element band that protects girls from varied threats like lonely walking on road and harassment. Whereas that band is meant through body sensing element, Bluetooth module, GPS, SMS and mobile information system that job followed by a supervised methodology of machine learning. Khandoker et al. [5].enforced a sensible security wearable ring for ladies supported IoT modules that connected with Raspberry Pi controller, Pi camera and buzzer. this technique is activated by pressing the button then the buzzer is enabled and also the camera has captured an image of offender or offender. so connected info forwards to police through a smartphone for taking protective action. Khandoker et al.

A.EXISTING SYSTEM

As a section of literature survey, we have a tendency to investigated some applications that supply a similar or similar services for golem and different platforms. The aim is to envision however these applications work and to envision however they will be improved. Today the cases of atrocities on girls area unit growing. In these varieties of cases , a wise phone plays a vital role for safety of ladies. currently golem is budding on some apps for ladies security purpose. These apps area unit as follows –

1. ***FIGHTBACK: -*** This app is developed by Mahindra faction. Fightback is an Associate India specific mobile app.On the Market For Choose Google, Blackberry, and Nokia smartphones. It uses Promptly on the market technologies on a smartphone for emergencies like GPRS, GPS, and SMS, to alter each time period following and to send alerts to five emergency contact.

2.***SECUREME BETA: -*** This app is developed by suppose MPI on sulting non-public restricted. It facilitates United States to boost alert and that we will get help just in case of life threatening emergencies. when putting in the app, ab initio we've to relinquish a PIN number for security purpose so when emergency contacts should be registered within the app. By pressing a faucet on secure button, it notifies the contacts with location co-ordinates.

3.VANITHA ALERT: - This app is developed by ABC's Mobile Learning Communication click on " HELP" button on our mobile's home screen in associate emergency state of affairs will deliver a distress text message to the registered mobile range ,E-mail id, face book id seeking facilitate and indicating the user's location.

4.GLYMPSE – SHARE GPS LOCATION: this is often the recent application developed on Gregorian calendar month twenty eight, 2015. This app could be a quick, free and an easy thanks to share our location victimization GPS following in real time with friends and family. This app doesn't would like any check in and don't would like any contacts to manage.

5.GUARDLY: - Guardly could be a free mobile application for smartphones which will facilitate students et al. sweet-faced with chemical analysis violence, abusive relationships or an easy want to feel safe once walking alone at nighttime. Guardly empowers its users by providing one-touch access to their personal safety network. merely launching Guardly on a smartphone can instantly establish a user's location and alert family, friends yet as field security (across the United States) that they're having associate emergency. With an extra faucet, you'll increase your state of affairs to 911 authorities.

6.STREET SAFE: - This application is developed on worldwide Women's day. It will call community to help woman in any situation and has four features for crisis which would be started by just clicking on the button.

B. PROPSED SYSTEM

The device can offer the position info like latitude, great circle of the user. The planned system is predicated on advanced sensors. Whenever the user shakes his/her phone, a signal can get generated mechanically so a message alert is distributed to the contacts that are supplementary within the emergency contacts list.

BLOCK DIAGRAM:

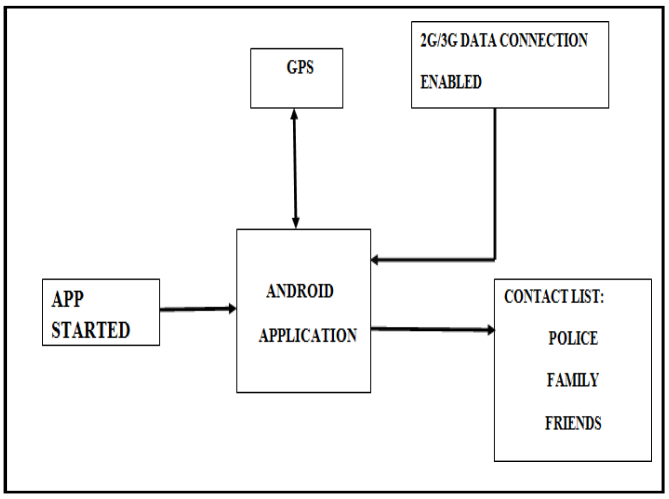

Fig. 1. Block Diagram for the Proposed System

"Fig 1" shows the diagram of the system. Initially, once we click on the app, it 1st checks whether or not the situation settings, knowledge association settings within the application are on or not. Then, it tracks the situation of the victim via GPS and sends these location co-ordinates within the type of URL through message to the registered contacts. Here, registered contacts means that the contact details that are saved within the Rakshan-Secure the ladies application throughout its initialization. Now, at the received device, by clicking on the URL within the message, it spots the precise location of the victim. Also, because the message containing victim's location is distributed for each 5 minutes from the foundation device, the victim may be half-track where she goes and may be reclaimed safely and quickly.

III. OBJECTIVE

- Track the current location of the person which has an android enabled mobile by extracting the longitude and latitude of that target person .

- Women's safety involves strategies, practices and policies which aim to reduce gender-based violence (or violence against women), including women's fear of crime. Women's safety involves safe spaces

IV. ADVANTAGES

- It's Used For Safety of ladies .
- Quick Transmission knowledge .
- Straightforward to Use and Low price .
- Feeling safe is to feel protected.
- This Application Sends Live Location of the User.

V . FEATURES

- This project presents associate degree alert system for girls safety detection.
- the appliance is straightforward to use all the girl.
- The system provides a realizable and economical.

VI. ARCHITECTURE

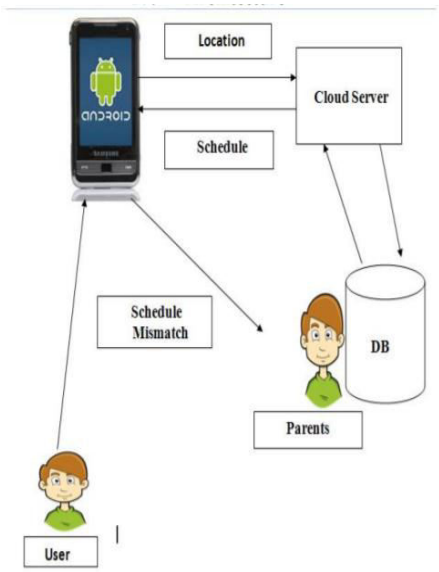

Fig. 2. Architecture System

"Fig 2" shows the diagram of the system. In the Architecture many women in the world don't perceive the public realm as safe, welcome, or comfortable. This in turn makes them feel sceptical when allowing their children to access these spaces by themselves. In many places, women's fear of going out alone after dark means that they confine themselves indoors along with their children. This has a huge impact on women's and children's ability to engage in employment, education, civic and community participation, and social and leisure activities.

VII.RESULT

Fig. 3.1 Login

Fig. 3.1 shows when user launches the appliance in his/her phone, the terribly initial screen that lands is that the Login Screen. initial the user ought to register himself by coming into the main points because the individual name and phone range of the user.

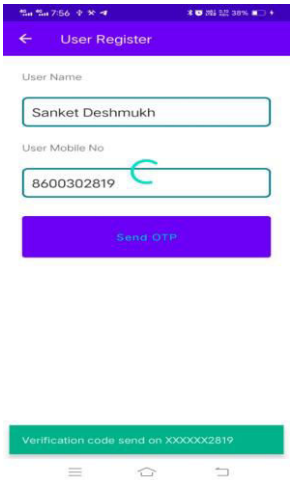

Fig.3.2 User Login

Fig.3.2 shows entering the right details so as to check in, the confirmation code (OTP) are sent to the user at his/her various contact variety, successfully logged in by the user, main application pop window can open up that consists of the subsequent functions.

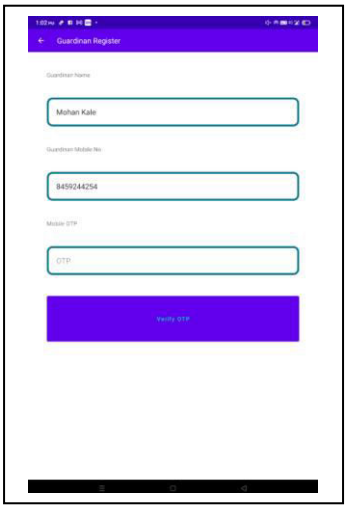

Fig.3.3 Guardian Login

Fig. 3.3 shows Guardian Registration is the care person of women who will get notification of alert and having authority to track location of user. guardian gets OTP for registration and gets all details from application.

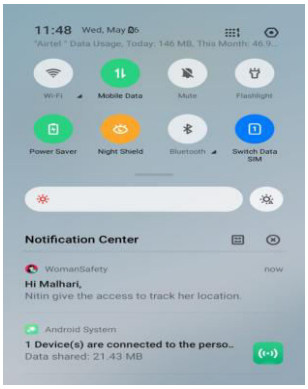

Fig. 3.4 Guardian Alert

Fig.3.4 shows In Guardian alert notification parent come to know about what is happening with the child and exact notification comes and we need to call and check whether this location is found and set location it will track after 20 seconds.

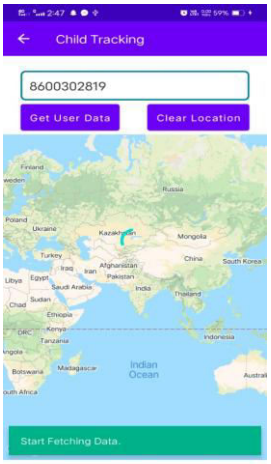

Fig 3.5 Tracking

Fig 3.5 shows the track Maine feature permits the user to look at the precise dynamic location of the victim.

1st user need to send the Track Maine request at the receivers finish. The receiver can settle for the request then his/her name can seem on the buddies you're following on all-time low of the appliance. The user may choose that friend from there then it'll get mechanically re-directed to the Google maps from wherever the user may read the precise location of the victim and additionally where's he/she heading to.

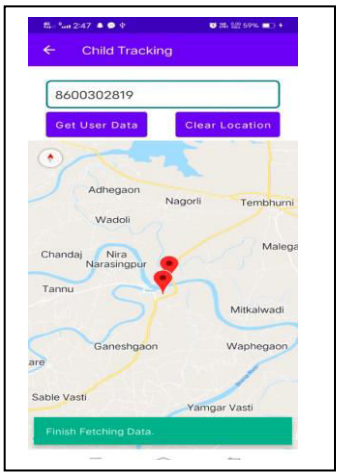

Fig 3.6 Track Location

Fig 3.6 shows Gives the Correct Location

VI . CONCLUSIONS

It may be finished that ladies may be powerful actors for peace, security, and prosperity. after they participate in peace processes and alternative formal decision-making processes, they will play a vital role in initiating and galvanizing progress on human rights, justice, national reconciliation and economic resurgence. they will conjointly build coalitions across ethnic and sectarian lines and speak up for marginalized and minority teams. investment in women's leadership is so good security also as good development.

IX. REFERENCES

[1] Pasha S., Kavana J., Mangala G.K.R., Nischitha K., Surendra B.K., Rakshitha M.S. (2016). BSecure for women.

[2] Saranya N., Karthik K. (2015). Women safety application using android mobile, International Journal of Engineering Science and Computing, pp. 1317-1319.

[3] Thota B., Kumar U.K.P. (2015). Sauver: an android mobile for women safety, International Journal of Technology Enhancements and Emerging Engineering Research, Vol. 3, No. 05, pp. 122-126.

[4] Pawar V., Wankhade N.R., Nikam D., Jadhav K., Pathak N. (2014). SCIWARS android app for women safety, International Journal of Engineering Research and Application, Vol. 4, No. 3 (Version 1), pp. 823- 826.

[5] Mandapati S., Pamidi S., Ambati S. (2015). A mobile based women safety application (I safe apps), IOSR Journal of Computer Engineering, Vol. 17, No. 1 (Version 1), pp. 29-34.

[6] Uma D., Vishakha V., Ravina R., Rinku B. (2015). An android application for women safety based on voice recognition, International Journal of Computer Science and Mobile Computing, Vol. 4, No. 3, pp. 216-220.

[7] Paradkar A., Sharma D. (2015). All in one intelligent safety system for women SBPCOE ,Department of Computer Engineering 2021-22 25 security, International Journal of Computer Applications, Vol. 130, No. 11.

[8] Sharma K., More A. (2016). Advance woman security system based on android, IJIRST – International Journal for Innovative Research in Science Technology, Vol. 2, No. 12.

[9] Poddar T., Ritesh C, Bharath Nagaraja (2015). Using wearable technology to answer women's safety, International Journal of Science, Technology Management, Vol. 04, No. 05.

[10] Westmarland N., Hardey M. (2013). Protecting women's safety? The use of smartphone 'apps' in relation to domestic and sexual violence, Durham University, Durham centre for research into violence andabuse.

IoT Based Home Automation

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***Abstract*—Home automation means nothing but a system which is based on wireless technology for controlling or managing all our electrical appliances like lamps, doors, fans, washing machines etc. In which all the devices are connected to the cloud via internet, which means it is a part of the internet of things. These will help people to control or monitor their all home appliances from anywhere around the world. With the help of these we can save precious time as well as electricity. We can manage our home from any location or any country too. It is basically ArduinoIot cloud connected to the NodeMCU ESP8266 which is a Wifi module. These will make human life peaceful and comfy**.

***Index Terms*—NodeMCU, Internet of Things(IOT), ESp8266, ArduinoIot Cloud.**

I. INTRODUCTION

Home automation is often called smart home. It includes the command and manage the device like light, fan, door, irrigation etc. These all are connected to the cloud and all of them can be examined at any location and any time around the world. Most popular protocols used for communication include X10, Ethernet, ZigBee, and Z-Wave, and many more protocols that are all conflicting with each other.

The reputation of the appliances is controlled with the aid of the switch it both ON or OFF the use of the pc era. It also gives the safety, strength green and simplicity of use; therefore its miles followed greater. It additionally enables through presenting to control and monitoring on internet browser.The essential objective of the task is to help handicapped humans and elderly humans by alerting them inside the essential situations. All the gadgets can be utilized in our own sitting area itself. The hassle overcome by way of this paper is about that home automation is generally applied with the aid of using internet through our PC or mobile phone.

The tool ESP8266, that's the embedded device used to get admission to the cloud. IOT gadgets make use of exceptional kinds of protocols. MQTT (Message Queuing Telemetry Transport) is one of the useful and developed. Because it is straightforward to put into effect, open, lightweight, low bandwidth protocol.

The internet of things, or IOT, is a network of interconnected computing devices, mechanical and digital machines, gadgets, animals, or people that can be provided with unique identifiers and the ability to exchange data over a network without requiring human-to-human or human-to-computer interaction.

One of the foremost features of IOT is a clever home. The technology of the in no way-finishing growth of the internet and its utility, smart home devices or domestic automation devices, is surprisingly increasing to provide comfort in life and enhance the pleasure of life.

LITERATUREREVIEW

A. IoT Based Smart Home Automation gadget over Cloud.
In this paper the author describes home automation gadget the use of various sensors and actuators had been connected to the node controller which updated the statistics to IoT server[1].

B. Home Automation System Using ESP8266 Microcontroller and The Blynk Application.
In this Paper author developed a system which offers excellent convenience to the user, as it makes it possible to control the devices connected to the relay module and monitor the temperature, humidity from a remote location via a WiFi [2].

C. Home Automation System
In this paper the effort targeted on home automation concept where the controlling and monitoring operations are expediting through smart devices[10].

D. Smart Home Automation System Using on IoT
In this paper author developed such a system which update the data within 3 second that helps user to take quick decision[8].

E. A Novel Home Automation System using Bluetooth and Arduino
In this paper the author developed the system which used to control and operate the appliances through a mobile. The limitation of this system is of it's range[5].

III. PROPOSED METHADOLOGY

We designed a system for controlling home appliances using IoT Cloud and Node MCU(ESP8266). The objective of this project to control the all electrical home appliances from anywhere around the world using Arduino IoT Cloud.

A. Hardware Used:

1.Relay:
Relay has functionality for acting as transfer for turning ON and OFF electric loads. The work simply by providing small electrical power in form of electrical signal. This permit excessive energy masses controlled by means of using small quantity of power. This permit excessive energy masses controlled by means of using small quantity of power.

2. Node MCU :
The Node MCU, it is a microcontroller unit. It is an open source hardware and software development board. Node-MCU-ESP8266 is a one type of controller. It is a board which takes the input from the connected devices to it. The Node MCU ESP8266 development board comes from the ESP-12E module containing it is having 32bit microprocessor.

This Node MCU acts as a wi-fi module. The Arduino IOT Cloud is the software used for programming. Node MCU is compatible with the PC, and it can be easily connected to the PC using a USB cable.

If you're acquainted with Arduino, the usage of NodeMCU is a logical subsequent step if you're searching out a more compact, WiFi-prepared opportunity. NodeMCU is based totally on theEsperessif ESP8266-12E WiFi System-On-Chip. It is loaded with an open-source, Lua-based total firmware.

It's ideal for IoT applications and other wireless connectivity programs. This chip has a great deal in common with the Arduino.

–They're both microcontroller-prepared prototyping boards that can be programmed using the Arduino IDE. The ESP8266 is a more recent launch than the Arduino, and it additionally has more potent specifications. It has a 32-bit RISC processor clocked at 80MHz, along with a beneficiant RAM supplement and guide for up to 16 MB of external flash memory.

3.Bulb :A mild bulb is a device that produces light from electricity. Light bulbs turn the strength into light by means of sending current through a thin cord referred to as the filament.

Here we're using four-channel relay modules, which is why we required four bulbs to show the output. The bulbs are linked across the relay module for the output.

B. Software Used:
1.Arduino IOT Cloud:
The Arduino community launched an IOT platform you can interface multiple devices to each other and permit them to exchange real-time data. Besides this, you will be able to monitor and control data from anywhere using a simple interface.
Connected devices around the arena are growing with the aid of billions every year. The ArduinoIoT Cloud is a platform that permits anyone to create IoT projects with a person-friendly interface and a multi-functional solution for configuration, writing code, importing, and visualization.

C.Block Diagram:

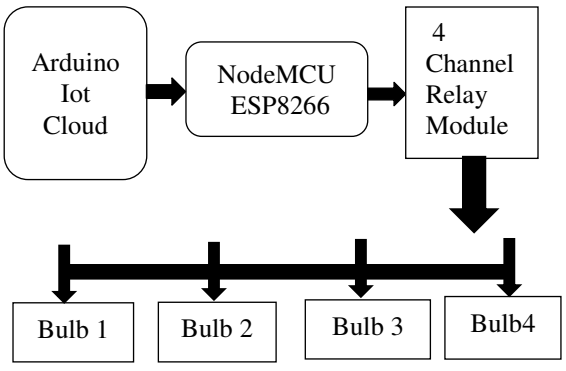

Fig.1.IoT Based Home Automation

D. Working:

The above block diagram shows the workings of an IOT Based Home Automation system. The system is designed by using three main components; the first is the Arduino IOT Cloud; the second is the Wi-fi module ESP8266, and the third is the relay module. We can control multiple electrical appliances from the Arduino IOT Cloud dashboard as well as Arduino IOT Remote App through mobile from anywhere and at any time. The working of this system is very easy, as shown in the block diagram. Firstly, we have to give commands from the cloud to ESp8266 then Node will control the relay module. We control the home appliances with the help of the relay module. Across the relay, we used a bulb to display the output.

IV. RESULTS

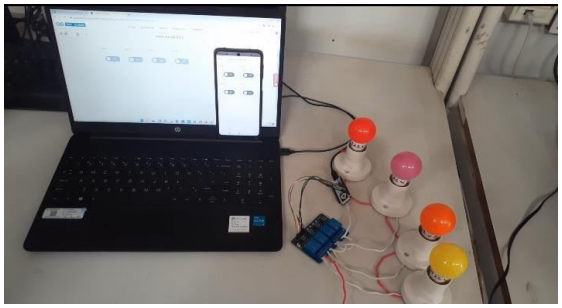

Fig.2.When all switches are OFF

Whenever the person wants to switch OFF the blubs they could switch OFF them from everywhere around the world at any time using ArduinoIot cloud dashboard in addition to the usage of the ArduinoIoT cell app.

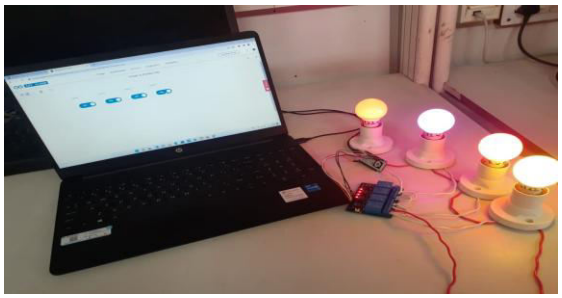

Fig.3.When all Switches are ON

Whenever the person wants to switch ON the blubs they could switch ON them from everywhere around the world at any time using arduinoIoT cloud dashbord in addition to the usage of arduinoIoT cell app.

V. APPLICATIONS

- It is used in our day-to-day life to control all electrical appliances from one place.
- It is helpful for handicapped and aged humans.
- Useful for public places like gardens, Hospitals, Hotels, Colleges, etc. to control lights and other appliances.
- Security Purpose.

CONCLUSION

This paper offers a simple understanding of IoT, where all of the appliances are managed, and can also replace the popularity of the tool. ESP8266 is very useful in IoT enterprises wherein it is free, green, safe; electricity is saved, compact in design and its performance is reliable. Mainly used for aged people, handicapped in which all of the gadgets are easily managed while the users are out of town. The convenience is elevated via getting access to any place and saves our precious time, and price. ESP8266 would no longer be burned via the customer's heating invoice and additionally, it is cheap in value for our home automation.

ACKNOWLEDGEMENT

The researcher would really like to express the profound feelof appreciation to Electronics and telecommunication Engineering Department at SVERI college of engineering Deemed to be an AhilyadeviHolakarSolapur University, Solapur, Maharashtra, India: for their treasured Support and positiveinstructions.

REFERENCES

[1]R. ArchaThampi, and Dr.Derick Mathew, "IoT Based Smart Home Automation System over the Cloud," Journal of Emerging Technologies and Innovative Research, June 2021.

[2]Visan, E.M. Diaconu, "Home Automation System Using ESP8266 Microcontroller and Blynk Application," The Scientific Bulletin of Electrical Engineering Faculty, Feb 2022

[3]Sarishma, SushantChamoli, and Vivudh Fore, "Smart Home Automation Using ESP8266 and IoT, " NGCT, March 2020.

[4]SayedaGauhai Fatima, SayedAdil, and SayedSatter, "Home Automation Using Zigbee Technology and IoT", IJARET, March 2019.

[5]KannapiranSelvaraj, ArvindChakrapani, "A Novel Home Automation System using Bluetooth and Arduino," International

Journal of Advances in Computer and Electronic Engineering, October 2016.

[6]AhamdSinaliAbdulraheem, Hilmi Abdullah, and AzarAbidSalih, "Home Automation System Based on IoT," Technology Repots of Kansai University, Jun 2020.

[7]Cristina Stolojescu-Crisan, CalinCrisan, Bogban-PetruButunoi, "An IoT-Based Smart Home Automation System", MBPI May 2021

[8]International Journal of Scientific and Engineering Research, June 2020, "Smart Home Automation System Using IoT."

[9]Dr. C. K. Gomathy, "Home Automation Using IoT," IJSREM, Oct 2021.

[10]Neha Malik and YogitaBodwade, "Home Automation System," International Journal of Advanced Research in Computer and Communication Engineering, Jun. 2017.

Sewage Water Monitoring Using IOT & ML

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ABSTRACT

This biodegradable pollution surroundings observation system mistreatment web of Things alongside the fusion of Machine Learning has been projected as an answer to assist the sewer employees World Health Organization place their lives in peril, and guarantee lowest health risk. several sanitation employees had suffered serious health considerations at Associate in Nursing early age and have lost their lives thanks to being unendingly exposed to poisonous surroundings of emptying, totally different sorts of work are done to observe, maintain and manage the system however only a few are in hot water protective the lives of individuals World Health Organization eff. the target of this observation system is to get an efficient low-priced and versatile resolution for checking Associate in Nursing keeping an update mistreatment sensors and aggregation and analysing information mistreatment the web of Things and Machine Learning. This method is predicated on the perusing of real- time information provided by the wireless detector network that generates immense quantity of information; this data is then processed by the microcontroller and represented on the cloud. The info obtained on the cloud is then employed by Machine Learning Model for more systematic analysis creating sensible use of this large volume of information so as to predict the condition of the employee with hefty irresponsibleness and accuracy.

INTRODUCTION

Many types of researches and surveys have disclosed that the shortage of treatment of waste once crossing dangerous levels ends up in the deaths of thousands of waste cleaners throughout the year. This proves inadequacy in our health observation system. The projected system provides a way to stay a track of the health standing of those staff and conjointly guarantee their safety. The hardware of the system is hooked up through a gliding joint band or inserting into the jacket creating it wearable for the staff. This may facilitate give needed knowledge once that the processed knowledge is uploaded to the observation system via IoT and via machine learning the trained knowledge can predict the quality of the environment for the employee.

Totally different styles of infectious agents like viruses, bacteria, and protozoans area unit gift in waste water that comes connected with staff. These agents cause diseases like inflammatory disease, sterile infectious disease, polio, food poisoning, bacillary dysentery, dysentery, and phrenitis that have symptoms of temperature rise, similarly,

metabolism issues area unit common among the waste staff. To avoid these issues at the terribly initial stage sensors that area unit capable of measure a rise in temperature, pulse rate, and chemical element saturations will are available handy. Also, waste staff area unit incessantly exposed to harmful gases like alkane, carbon monoxide gas, chemical element disulphide and ammonia. Prolonged exposure to those gases causes heart vas issues, vision issues, respiratory issues, and memory issues. The most necessary issue for human health and for socio-economic growth of country wishes water. Not just for citizenry, all the living organisms, agriculture and industrialisation want water. Across the planet, water plays a serious role as a result of it satisfies all civilization demands however reserving transportable water is speedy one and total quantity of water gift within the planet remains constant throughout the world. Water resources isn't maintained properly in extremely inhabited areas that is chargeable for discharging of venomous chemicals, climate changes, growing pollution, untreated waste and alternative human activities.

Parameter	Safe Range
PH	6.5 to 7.5
Turbidity	1 to 5 NTU
Hardness	500/I

OBJECTIVE

- The objective prevent pollution of the receiving water.
- Prevent offensive PH in water.
- Prevent offensive Turbidity in water.
- To prevent the sewage disposed on the land, to avoid sick soil.
- To maintain odour of water and check on maintenance/hardness of water.
- To send alert to the user via mail using ML.

LITERATURE REVIEW

- Nikhil Kedia entitled “Water Quality observance for Rural Areas-A detector Cloud primarily based Economical Project.” printed in 2015 first International Conference on Next Generation Computing Technologies (NGCT-2015) Dehradun, India. This paper highlights the complete water quality observance strategies, sensors, embedded style, and data dissipation procedure, role of presidency, network operator and villagers in making certain correct info dissipation. It additionally explores the detector Cloud domain. Whereas mechanically up the water quality isn't possible at this time, economical use of technology and economic practices will facilitate improve water quality and awareness among individuals.
- Jayti Bhatt, Jignesh Patoliya entitled “Real Time Water Quality observance System”. This paper describes to confirm the safe offer of water the standard ought to be monitored in real time for that purpose new approach IOT (Internet of Things) primarily based water quality observance has been planned. During this paper, we have a tendency to gift the planning of IOT primarily based water quality observance system that monitor the standard of water in real time. This technique consists some sensors that live the water quality parameter like pH, turbidity, conduction, dissolved chemical element, temperature. The measured values from the sensors area unit processed by microcontroller and this processed values area unit transmitted remotely to the core controller that's raspberry pi exploitation ZigBee protocol. Finally, sensors knowledge will read on net browser application exploitation cloud computing.
- Michal Lom, Ondrej Pribyl, Miroslav Svitek entitled “Industry four.0 as a vicinity of good Cities”. This paper describes the conjunction of the good town Initiative and also the idea of trade four.0. The term good town has been a development of the last years that is extremely inflected particularly since 2008 once the globe was hit by the money crisis. The most reasons for the emergence of the good town Initiative area unit to make a property model for cities and preserve quality of lifetime of their voters cannot be seen solely as a technical discipline, however totally different economic, humanitarian or legal aspects should be concerned additionally. Within the idea of trade four.0, the web of Things (IoT) shall be used for the event of so–called good merchandise. Subcomponents of the merchandise area unit equipped with their own intelligence. Additional intelligence is employed each

throughout the producing of a product additionally as throughout resulting handling, up to continuous observance of the merchandise lifecycle (smart processes). alternative necessary aspects of the trade four.0 area unit net of Services (IoS), which has particularly intelligent transport and provision (smart quality, good logistics), additionally as net of Energy (IoE), that determines however the natural resources area unit employed in correct approach (electricity, water, oil, etc.). IoT, IoS, IoP and IoE are often thought-about as part that may produce an affiliation of the good town Initiative and trade four.0 – trade four.0 are often seen as a vicinity of good cities.

- Zhanwei Sun, Chi Harold Li, Chatschik Bisdikian, Joel W.Branch and Bo principle entitled "QOI-Aware Energy Management in Internet-of-Things Sensory Environments". During this paper associate economical energy management frame work to produce satisfactory QOI expertise in IOT sensory environments is studied. Contrary to past efforts, it's clear and compatible to lower protocols in use, and conserving energy-efficiency within the end of the day while not sacrificing any earned QOI levels. Specifically, the new idea of QOI-aware "sensor-to-task relevancy" to expressly take into account the sensing capabilities offered by associate detector to the IOT sensory environments, and QOI needs needed by a task. A completely unique idea of the "critical covering set" of any given task in choosing the sensors to service a task over time. Energy management call is created dynamically at runtime, because the optimum for semi-permanent traffic statistics beneath the constraint of the service delay. Finally, an in depth case study supported utilizing the detector networks to perform water level observance is given to demonstrate the concepts and algorithms planned during this paper, and a simulation is created to indicate the performance of the planned algorithms.
- Sokratis Kartakis, Weiren Yu, Reza Akhavan, and Julie A. McCann entitled "Adaptive Edge Analytics for Distributed Networked management of Water Systems" This paper presents the burst detection and localization theme that mixes light-weight compression and anomaly detection with graph topology analytics for water distribution networks. We have a tendency to show that our approach not solely considerably reduces the number of communications between detector devices and also the rear servers, however can also effectively localize water burst events by exploitation the distinction within the arrival times of the vibration variations detected at detector locations. Our results will save to ninetieth communications compared with ancient periodical news things.

PROPOSED SYSTEM

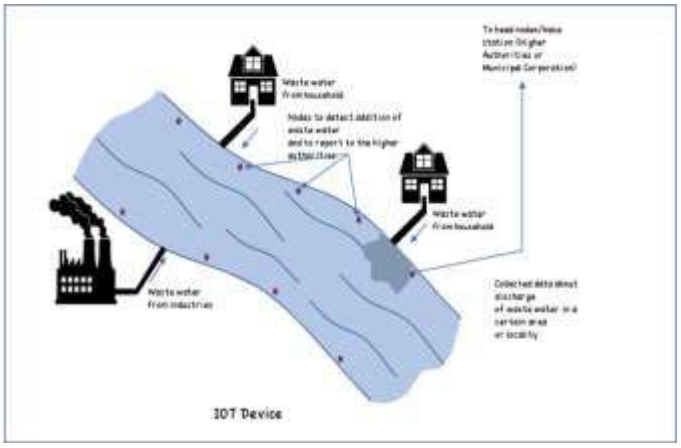

FIG 1: FLOW DIAGRAM

BLOCK DIAGRAM OF NODE

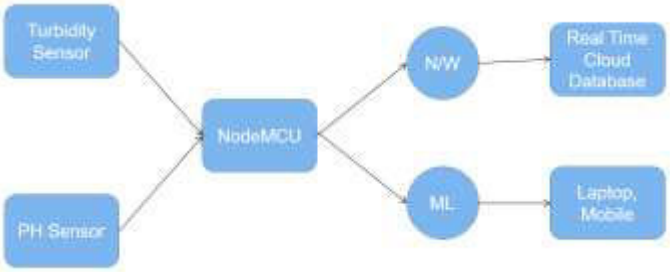

FIG 2: BLOCK DIAGRAM

We gift the speculation on real time observance of canal water quality that is IOT primarily based. Each and every block of the system performs specific task. This diagram include some sensors (temperature, pH, turbidity) that is connected to core controller. The core controller area unit accessing the device values and process them to transfer the information through net. The device information may be displayed on the server.

HARDWARE

1. PH SENSOR
2. TURBIDITY SENSOR
3. NODE MCU ESP 8266
4. CONNECTING WIRES
5. ZERO PCB

SOFTWARE

1. ARDUINO IDE
2. BLYNK APPLICATION
3. SPYDER IDE
4. HTML
5. JAVA SCRIPT
6. PHP

RESULT AND DISCUSSION

The period application of the system is shown higher than sensors square measure then supplied with the physical conditions to be measured.

The information from the cloud is then provided to a Machine learning model to predict the standing might not appear dangerous consistent with the period readings however supported the past, it's build up to AN undesirable scenario.

This combination of IoT and mil makes the system additional reliable for the operator to stay a check on outcomes.

SR. NO.	Nodes	PH LEVEL	TURBIDITY LEVEL
1	1	7	2.7
2	2	7.35	2.3
3	1	7.14	2.7
4	2	7.43	2.4
5	1	7.22	2.7
6	2	7.45	2.2
7	1	7.26	2.7
8	2	7.66	2.6
9	1	7.24	2.7
10	2	7.56	2.5

Algorithms	Accuracy Achieved
Decision Tree Classification algorithmic	56.67 %
Naïve Thomas Bayes Classifier algorithmic	63.75 %
Random Forest algorithmic	62.08 %
Logistic Regression	70.83 %

FIG 3: STRUCTURE

FIG 4: STRUCTURE

FIG 5: BLYNK APPLICATION

FIG 6: HTML PAGE

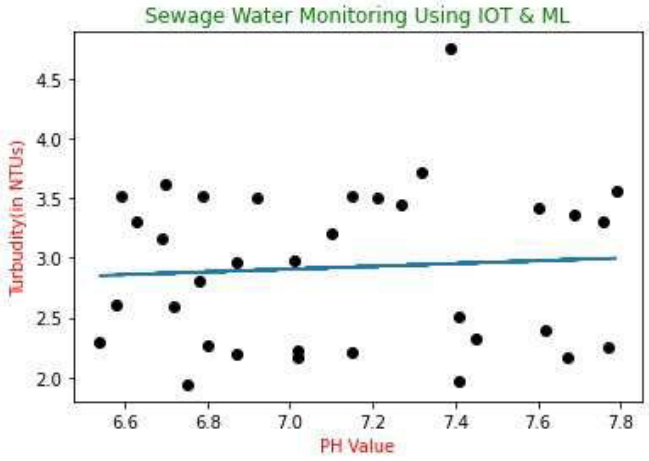

FIG 7: PH VS NTU GRAPH

CONCLUSION

This project is that the next huge step within the direction of safety. With some little and straightforward efforts, it will modify the best challenges against safety hazards by victimisation trendy technology. The mix of sensors comes along to bring out the foremost fruitful result and machine learning that is that the next smartest thing which will facilitate for future analysis and study. Compared to the opposite established comes, our projected model uses each IoT and mil that has ne'er been done before. This makes our model extremely economical. Monitoring of murkiness, pH scale & Temperature of water makes use of water detection device with several benefits. The system will have check on water quality mechanically, and it's value economical and doesn't need manual interference. Therefore the water quality testing is additional economical, convenient and quick. The system is versatile. Solely by exchange the corresponding sensors and dynamic the precise package programs, this method is accustomed sight alternative water quality parameters. The operation is simple. The system is utilize to observe hydrologic, pollution, industrial and agricultural production then on. By keeping the embedded devices within the surroundings for observance permits self-protection (i.e., sensible surroundings) to the environment. To implement this have to be compelled to deploy the device devices within the surroundings for assembling the information and analysis. By deploying device devices within the surroundings, we will bring the surroundings into reality i.e. it will communicate with alternative objects through network. Then the collected information and analysed results are going to be out there to the tip user through the Wi-Fi. The value-efficiency of our model is great as all the weather along cost but one thousand Bureau of Intelligence and Research. In Asian country the waste material staff aren't even provided correct jackets for safety therefore wearable devices like watch would are available in handy and can be terribly possible. The established technologies like sensible watches solely show pulse rate, steps taken, calories burnt and distance travelled and even {the cheapest the most value effective the most affordable} ones cost excess of 2000 Bureau of Intelligence and Research. Hence, our projected model has higher potency in each the output and also the value.

FUTURE SCOPE

- In future we can use IOT concept in this project.
- Detection of more parameters for most security purposes.
- Increasing parameters by addition of various sensors.
- By interfacing relays, we can control the supply of water.

REFRENCE

- Dr. Seema Verme, —Wireless Sensor Network application for water quality monitoring in India,| 2012 National Conference on Computing and Communication Systems (NCCCS). 978-1-4673-1953-9 © 2012 IEEE.
- Nikhil Kedia, Water Quality Monitoring for Rural Area- A Sensor Cloud Based Economical Project, in 1st International Conference on Next Generation Computing Technologies (NGCT-2015) Dehradun, India, 4-5 September 2015.978-1-4673-6809-4/15 © 2015 IEEE.
- Jyotirmoy Bhardwaj, Karunesh K Gupta, Rajiv Gupta, _Emerging Trends on Water Quality Measurement Sensor,, Department of Electrical & Electronics Engineering 978-1-4799-8187-8/15/ ©2015 IEEE.
- https://www.arduino.cc/reference/en/libraries/blynk/ Used for app development.

Smart Health Node

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***Abstract*— Indian Healthcare system currently is burdened with population and lack of workforce. With the current ratio of Doctor to Patient being 1800:1 the need for reliable alternatives in medical field is the need of the hour. The Smart Health-Node can lessen the burden the on the current situation. The main idea of this project is to create a solution for remote Patient Health Monitoring. A System in which we have two-way communication, which means a medical professional, is going to get the vital readings of the patient and also the doctor can send the required prescription to the patient. The block diagram describes the Hardware and software section. Hardware is designed using ESP 32 with Sensors, Power Management, display unit (LCD) and Distress Switch. Health monitoring sensors is connected with uC and displayed on LCD and sent to IoT gateway for local storage. Through gateway data will be sent to cloud for data storage, processing and analysis by medical experts.**

The results are almost similar to the actual products available in the market

Amazon AWS will be used as Cloud. Finally frontend GUI will be designed using MIT App Inventor.

Keywords*— *Internet of things, Remote Patient Health monitoring system, ESP32, AWS.

I. INTRODUCTION

According to definition, Health is defined as a physical, mental, and social well-being and not just lack of illness. The Indian healthcare system is broadly divided into two parts. One part of the healthcare system include flashy steel and glass structures delivering Best in Class Medicare facilities to the wealthy, rich and mostly urban India. On the other side we have the "other India" trying their best to live up to their recognition as health sub centres. With the rapid change being observed in healthcare sector, this spectrum is likely to widen further, making it even more difficult in the future. In the recent times Healthcare industry has distinguished its place as one of India's largest sector in terms of revenue and employment. One of the reasons for why the healthcare sector is growing at such a rapid speed in India is a result of to increasing coverage, services and also increasing expenditure by public as well private sectors. However, the public health care services are still abysmal. This is because the number of registered doctors in India is 10 whereas the population is around 1.3 billion people. This makes the doctor to people ratio 1:1800, meaning over every 1800 people we have only 1 Doctor.As per the claims of Medical Council of India, nearly half of the doctors in the country are unregistered doctors who don't hold a degree in allopathy. Only 58% of the Doctors in urban area and 18.8% of the doctors in rural area are qualified.

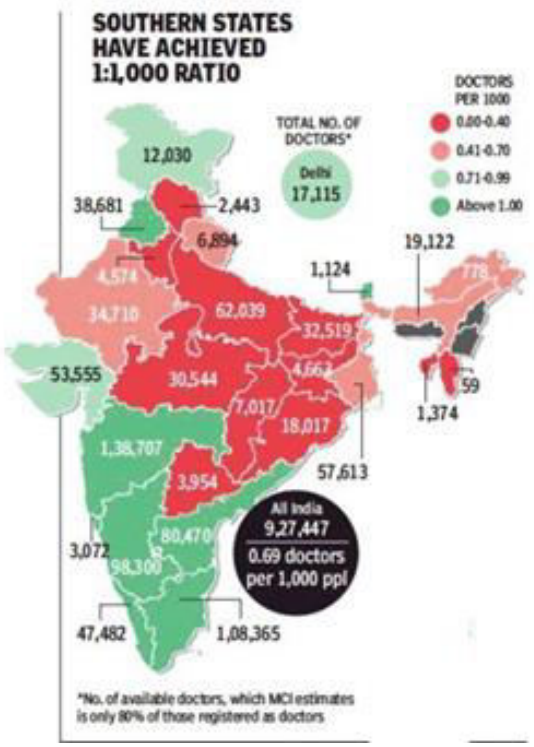


Fig1: Total No. of Doctors Available across India

Source: https://timesofindia.indiatimes.com/india/here-is-why-india-has-a-glut-and-acute-shortage-of-doctors/articleshow/72004397.cms

Two major health indicators of health in an average person are body temperature and Heart rate. Their average readings are given in the table below.

Health Parameter	Normal Reading	
	Avg Range	*Average reading*
Heart Rate	60-100 BPM	70
Body Temperature	36.5-37.2 °C	37
SpO2	94-99%	96

Health parameters of an average human being depend on various factors. Body temperature is nothing but the heat that is radiated from the body and it depends upon various factors such as ambient temperature, and a person's gender, and his or her eating habits. Different factors such as flu, or any other kind of illness may lead to a change in body temperature. Fever is the fundamental indicator in almost every illness. Pulse is nothing but the rate at which the heart beats. It is also called the heart rate, which is the number of times heart beats each minute (BPM). Eelevated heart rate for long period of time can be connected with diseases such as hypertension. Heart rate can help in predicting cardiovascular diseases. Similarly, Oxygen saturation (SpO2) is a measurement of how much oxygen your blood he most it can bring. Elements such as high altitudes can sometimes affect what is taken into consideration as normal for a given man or woman.

One of the most interesting applications for IoT is the field of Healthcare, giving to us the possibility for many medical applications such as remote health monitoring, fitness programs, etc. Smart Heath Node is an application of IoT in health care to enable monitoring of patients outside of conventional clinical settings, such as in the home or in a remote area, may increase access to care and decrease healthcare delivery costs.

II. Related Work

Some notable work done has been done in the field of medical science and IoT. The associated work with this field is mentioned below:

A. Ajgaonkar, S. Vichare [1]. designed Remote Structural Health Monitoring system which could monitor Well being monitoring through Wireless Sensor Network and cloud computing using IoT, but the device needed Constant updation and upgradation which makes it hard to be used for everyday life.. M. Pustiek, A. Beristain [2]. introduced wearable health monitoring devices which faced several challanges. The device worked perfectly fine but due to wrong positioning of devices the accuracy of data was reduced. Gregoski et al. [8] introduced a system which enabled heart rate monitoring with smartphone. The light from mobile and the camera were used to identify blood flow and calculated cardiac output. This worked well but it is not suitable if you want to measure heart rate continuously Trivedi et al. [9] implemented Arduino-based health parameter monitoring via. a mobile device. The sensor data collected are in the form of analog type values. They are sent to the board of Arduino Uno. For region that was small it worked really well but when it comes to covering large are Bluetooth is unable to do that. The Bluetooth device used a module which was unable to cover a wide area.

III. Methodology

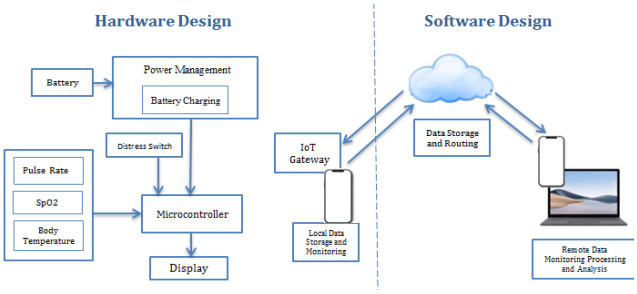


Fig2: Block Diagram

Remote Health Monitoring and displaying the data on mobile application are the two main ideas of the project. Therefore, the project is a two stage system, namely (1) Sensor Module and Data processing (Hardware) (2) App Interface and Data analysis.

The Sensors are connected to the microcontroller which is connected by a power source so to serve as a power source to sensors as well. The data collected by the sensors is sent to the uC ESP32. For the sensors to communicate with microcontroller we need to define different address buses because both the sensors work on same working frequency. This is done by programming the uC on aurdino uno application. After creating the separate address bus we will receive data on uC which we can display on the LCD. Now that we have got the data we need to send this data to a medical expert for analysis, but the data received is fluctuating as we take it, so for that problem we have a distress switch. A distress switch functions as a gate between the data received on the uC and the data that is being sent to the cloud. When the data received from uC is not fluctuating one can press the distress switch to send the data to the cloud. This in turn prevents from faulty or unnecessary data being sent on the cloud.

The app is created with the help of MIT app inventor. We receive the data from the uC in the form of a string so we have a key and a value pair wherein we have parameter name in the key and its value in the value parameter. With this the data is received by a medical professional for further analysis.

IV. Major Hardware Component

The major hardware components used in the system are outlined as follows:

A. *ESP 32*

ESP32 is one of the crucial studying tool inside the area of IOT. This tool gives a full Linux system on a small platform at a very low cost. In ESP32, gadgets, sensors and actuators are linked thru GPIO pins. ESP32 and IoT collectively shape a new generation for creativity within the healthcare zone. it can characteristic independently so it is referred to as as stand-on my own device. it could transmit statistics with different WiFi and Bluetooth tools via its SPI/SDIO, or I2C/UART interfaces..

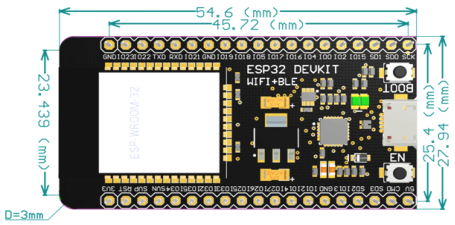


Fig3: ESP32

B. *Infrared temperature sensor MLX90614*

The MLX90614 is a noncontact Infrared (IR) digital Temperature Sensor that can be used to measure the temperature of a selected object in the variety of -70° C to 382.2°C. The sensor measures the temperature of the object without any physical touch with the aid of the use of IR rays and transmits the information to microcontroller the use of the I2C protocol. The crucial characteristic of MLX90614 is

that it's far a noncontact IR temperature sensor with absolute correctness. due to its absolute correctness and precision, it is also utilized in a huge variety of commercial, health care, and household packages like tracking of room temperature, measurement of frame temperature, and so forth..

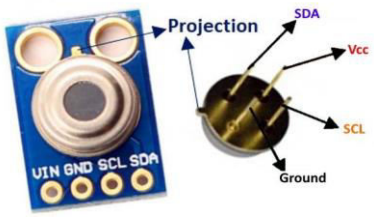


Fig4: MLX90614

C. *Heart-Rate Sensor MAX30102*

MAX30102 is a sensor that is combination of pulse oximeter and a heart rate monitoring. Pulse Oximeter is a device which is used to monitor a person's oxygen saturation quickly and easily.It uses light to workout oxygen saturation. It has internal LED, photodetector, optical element and low noise analog signal.

Fig5: MAX30102

D. *LCD Display*

LCD stands is also called as liquid crystal display. It produces visible images by using liquid crystal. It is a unique type which can only output individual ASCII characters with fixed size. It has the dimension 16×2. 16×2 represents 16 characters in a single row and the display has 2 rows.

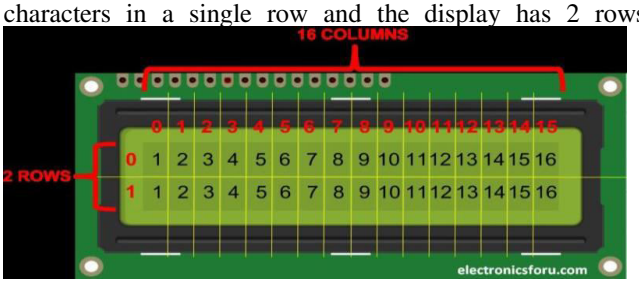


Fig6: LCD

V. Software Description

A. *Amazon AWS*

Amazon web offerings (AWS) is a secure cloud offerings platform, imparting compute electricity, database storage, content material delivery and other capability to help organizations scale and develop. Amazon has an extended records of the use of a decentralized IT infrastructure. This arrangement enabled our improvement to access compute and storage resources on-call for, and it has elevated general productivity and agility. in this class we can build IoT solution on AWS. we can have the opportunity to create an IoT utility that makes use of several IoT offerings. we're going to use AWS IoT software improvement package to programmatically talk inside manage far flung devices.

B. *MIT App Inventor*

MIT App Inventor is a well-designed interface builder. It permit users fast service and iteratively broaden projects that cope with real-global troubles. MIT App Inventor works over the internet. this means that the hardware you pick have to have the ability to connect to the internet. some of the forums, like Arduino Uno will want an Ethernet or shield to communicate, others are already internet-enabled: just like the ESP8266, Raspberri Pi with WiFi dongle. but even supposing one doesn't have a guard, it is easy to connect it over USB to your laptop or computer.

VI. Implementation

All the hardware and software components used to create this system are assembled in the implementation phase as shown in the below diagram. A snapshot of circuit diagram, AWS and mobile application interface is shown below.

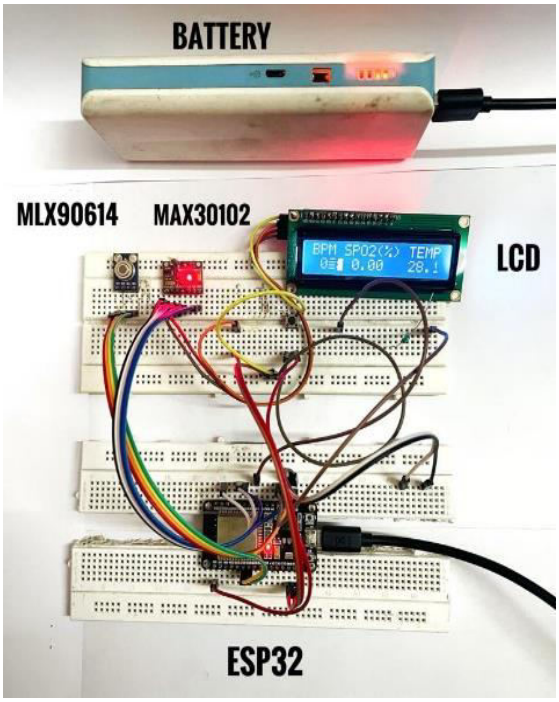


Fig7: Circuit Diagram

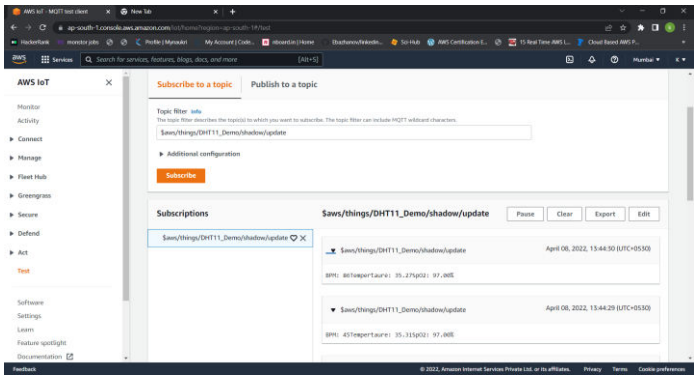


Fig8: AWS console

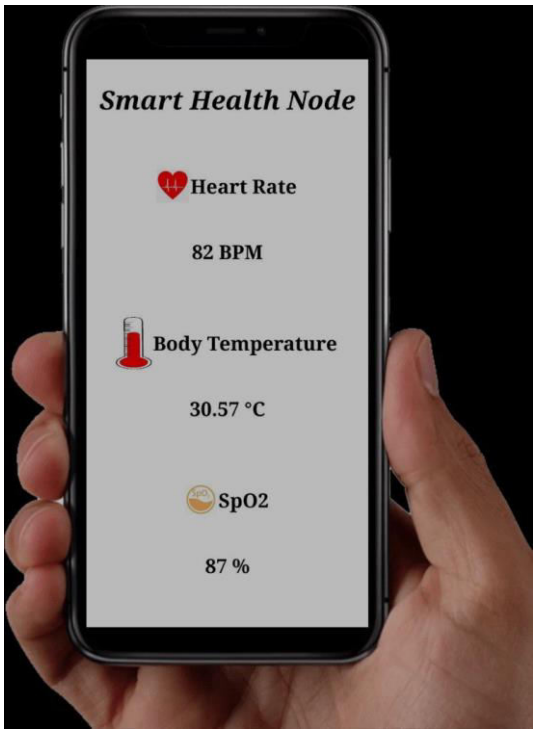
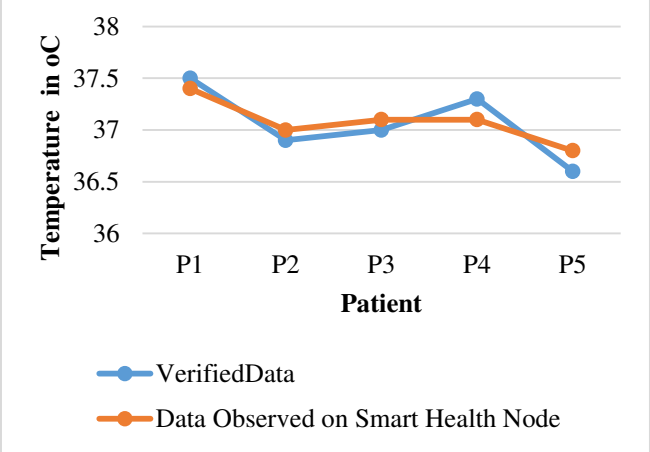


Fig9: MIT App Inventor Interface

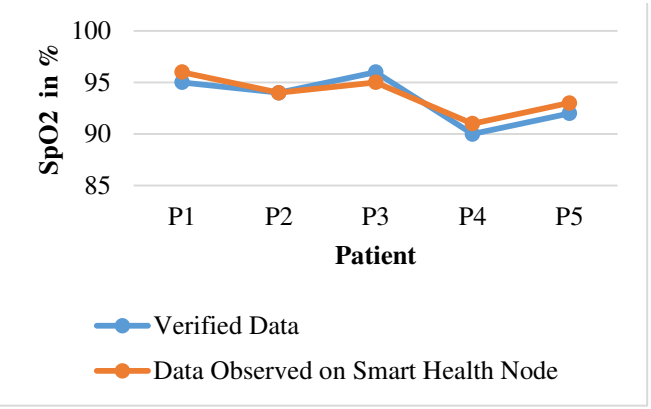
VII. Experimental Result Analysis

Under various subjects the developed system was tested under different conditions. We then calculated the actual value vs observed value cases manually. We can see the comparison between actual data and the data collected by the developed system in the following tables.



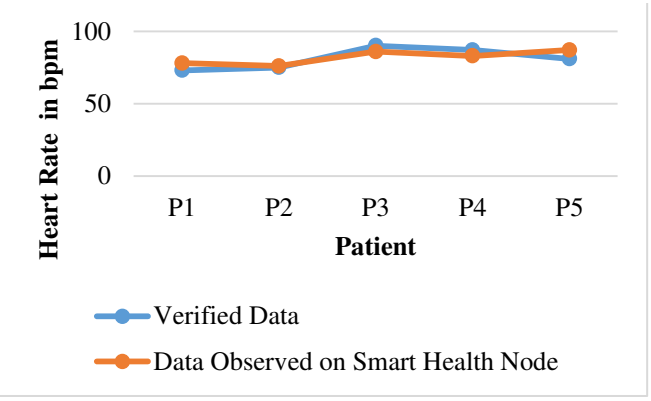
Patient	Temperature Measured on Doctor's Device (°C)	Temperature Measured on Smart Health Node (°C)	Error (%)
P1	37.5	37.4	**-0.3**
P2	36.9	37.0	**+0.3**
P3	37.0	37.1	**+0.3**
P4	37.3	37.1	**-0.6**
P5	36.6	36.8	**+0.6**

Table1: Comparison of Temperature between Actual and Observed Data



Patient	SpO2 Measured on Doctor's Device (%)	SpO2 Measured on Smart Health Node (%)	Error (%)
P1	**95**	**96**	**+1**
P2	**94**	**94**	**0**
P3	**96**	**95**	**-1**
P4	**90**	**91**	**+1**
P5	**92**	**93**	**+1**

Table2: Comparison of SpO2 between Actual and Observed Data



Patient	Heart Rate Measured on Doctor's Device (bpm)	Heart Rate Measured on Smart Health Node (bpm)	Error (%)
P1	**73**	**78**	**+6.8**
P2	**75**	**76**	**+1.3**
P3	**90**	**86**	**-4.4**
P4	**87**	**83**	**-4.5**
P5	**81**	**87**	**+7.4**

Table3: Comparison of Heart Rate between Actual and Observed Data

Conclusion

The proposed system "Smart Health Node" can successfully monitor the basic health parameter of patients like Spo2, body temperature and heart rate and display the data on mobile application via amazon AWS cloud in real

time. The data calculated and actual data that is measured with other device available in the market are approximately 95% similar .Medical professionals can view the data of patient in real time. The proposed system will be beneficial to the people in remote areas, and it can be of a great use in epidemics such as COVID when basic health parameters are needed to be data needs to be analysed in a short time.

REFERENCES

[1] A. Ajgaonkar, S. Vichare, R. Badgujar, M. Bansode, D. Karia and A. Bambole, "Remote Structural Health Monitoring," 2020 International Conference on Convergence to Digital World - Quo Vadis (ICCDW), 2020, pp. 1-5, doi: 10.1109/ICCDW45521.2020.9318730.

[2] M. Pustiek, A. Beristain, and A. Kos, "Challenges in Wearable Devices Based Pervasive Wellbeing Monitoring," in Proceedings – 2015 International Conference on Identification, Information, and Knowledge in the Internet of Things, IIKI 2015, 2016, pp. 236–243.

[3] Tamilselvi V, Sribalaji S, Vigneshwaran P, Vinu P, GeethaRamani J. IoT based health monitoring system. In: 2020 6th International conference on advanced computing and communication systems (ICACCS). IEEE; 2020. p. 386–9.

[4] Acharya AD, Patil SN. IoT based health care monitoring kit. In: 2020 Fourth international conference on computing methodologies and communication (ICCMC). IEEE; 2020. p. 363–8

[5] Banerjee S, Roy S. Design of a photo plethysmography based pulse rate detector. Int J Rec Trends Eng Res. 2016;2:302–6.

[6] Gregoski MJ, Mueller M, Vertegel A, Shaporev A, Jackson BB, Frenzel RM, Sprehn SM, Treiber FA. Development and validation of a smartphone heart rate acquisition application for health promotion and wellness telehealth applications. Int J Telemed Appl. 2012;2012:1–7.

[7] Oresko JJ, Jin Zhanpeng, Cheng Jun, Huang Shimeng, Sun Yuwen, Duschl H, Cheng AC. A wearable smartphone-based platform for real-time cardiovascular disease detection via electrocardiogram processing. IEEE Trans Inf Technol Biomed. 2010;14:734–40.

[8] Gregoski MJ, Mueller M, Vertegel A, Shaporev A, Jackson BB, Frenzel RM, Sprehn SM, Treiber FA. Development and validation of a smartphone heart rate acquisition application for health promotion and wellness telehealth applications. Int J Telemed Appl. 2012; 2012:1–7. https ://doi.org/10.1155/2012/696324.

[9] Trivedi S, Cheeran AN. Android based health parameter monitoring. In: 2017 International conference on intelligent computing and control systems (ICICCS). IEEE; 2017. p. 1145–9.

IOT based flood monitoring system using Node MCU

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***Abstract*—A flood takes place when water overflows from the river, lake, or from heavy rainfall, and it may take place at any time of the year. Flooding can be very dangerous. When floods occur in a place where humans stay, the water gets incorporated alongside objects like homes, automobiles, furnishings, or even people. It can wipe away property, bushes, and lots of large, heavy objects.**

A flood is a natural disaster that cannot be avoided. A flood is generated because of heavy rain or the overflow of water. It affected human lives and the economy badly. Flooding can be avoided if people can monitor real-time water levels and flood early warning so that they are aware before the flood comes. The objective of the project is to monitor the system by using Node MCU.

***Index Terms*—NodeMCU, Thing speak IOT platform,Ultrasonic sensor.**

I. INTRODUCTION

n recent years, flooding has become a disaster that happens naturally caused by heavy rain that influences human, economic, and social loss. When water levels abruptly increase in dams, river beds, etc. a lot of damage happens in nearby areas. It affects not only living beings but also the environment. Therefore, it is necessary to develop a system for monitoring the flood situation in the river bed.

To reduce human and monetary losses, there are some essential steps to be accompanied. One of the maximum and the preliminary steps is to alert humans before the prevalence of the disaster. There are some locations with early flood alert systems but the maximum of them aren't most efficient, as they can typically ship the statistics to best a few respective businesses with restricting distances So, in case of floods it's far taking more time for passing the message to the people dwelling within the close-by areas so that the humans could not store maximum in their assets as the water rises swiftly inside, much less time. Usually, flooding cannot be detected however early detections can be made i.e., an early alerting system with help of continuous monitoring may be used to reduce the losses confronted by the society.

As we all recognize Flood is one of the foremost properly known natural screw-ups. It causes a huge quantity of loss to our environment and living beings as well. So in these instances, it is very essential to get emergency alerts of the water stage situation in exclusive situations within the river mattress.

In our proposed system, the water stage can be monitored in real-time, the usage of a WI-FI module, no matter whether you are in a meeting, outdoors, in your private home, and so forth. You might be capable of seeing the whole lot in actual time. You can test the App at any time and discover approximately the water level if it's increasing or reducing. A different degree may be defined. Alert signals are generated automatically when the favored conditions are met.

II. LITERATUREVIEW

A.IoT Based Early Flood Monitoring, Detection, and Alarming System

In this paper author developed a system to detect the flow of water using Arduino Uno and the output of this system is displayed on LCD [1].

B. IoT Based Early Flood Detection and Avoidance

In this paper, the author developed a system to detect a flood and monitor the real-time data using Arduino and Blynk applications [2].

C. Smart IoT Flood Monitoring System

This author proposed a system in that way to upgrade the water level an easy way using a microcontroller and Internet application [3].

D. Cost Estimation of the cellular deployed IoT-enabled network for the flood detection

In this paper, the author developed a device that gives an error-free noticing of water amount in flood circumstances using wireless network [4].

E. A Literature survey on IoT based Flood Detection and Monitoring System Using Raspberry Pi

In this paper, the author developed a system to keep track of water level using different types of sensors like humidity and temperature sensor it is controlled by using Raspberry Pi[5].

III.PROPOSED METHADOLOGY

We proposed a system for monitoring the flood by using Node MCU (ESP8266). The objective of this project is to sense the water level reaches beyond the limit or not.

A. Hardware Used:

1. Ultrasonic Sensor :

It is used to determine the distance of the object. Ultrasonic sensors are also used as level sensors to detect, monitor, and regulate liquid levels.

At its core, the HC-SR04 Ultrasonic distance sensor consists of ultrasonic transducers. The one acts as a transmitter that converts an electric signal into 40 kHz ultrasonic sound pulses. The receiver listens for the transmitted pulses. If it receives them it produces an output pulse whose width can be used to decide the gap the heartbeat traveled.

VCC: VCC is the electricity delivery for the HC-SR04 Ultrasonic distance sensor which we join the VCC of Node MCU.

Trig (Trigger): Trig pin is used to cause the ultrasonic sound pulses.

Echo: Echo pin produces a pulse while the contemplated sign is received. The duration of the pulse is proportional to the time it took for the transmitted sign to be detected.

GND: GND of Ultrasonic sensor have to be linked to the floor of Node MCU.

2. Node MCU :

It is an open-source hardware and software, development board. Node MCU ESP8266 is one type of controller. It is a board that takes the input from the connected devices to it. This Node MCU act as a wi-fi module.Arduino IOT Cloud is the software used for programming.

Node MCU is an open-supply Lua-based firmware and development board specially targeted for IoT-based Applications. It includes firmware that runs at the ESP8266 Wi-Fi SoC from Espressif Systems, and hardware that is based on the ESP-12 module.

Power:

Micro-USB, three.3V, GND, Vin

Micro-USB: Node MCU may be powered through the USB port

3.3V: Regulated three.3V may be supplied to this pin to strength the board

GND: Ground pins

Vin: External Power Supply.

Control Pins:

EN, RST- The pin and the button reset the microcontroller.

Analog Pin:

A0- Used to degree analog voltage inside the range of zero-three.3V

GPIO Pins:

GPIO1 to GPIO16- NodeMCU has sixteen preferred cause enter-output pins on its board

SPI Pins:

SD1, CMD, SD0, CLK- NodeMCU has four pins available for SPI communication.

UART Pins:

TXD0, RXD0, TXD2, RXD2- NodeMCU has UART interfaces, UART0 (RXD0 & TXD0) and UART1 (RXD1 & TXD1). UART1 is used to add the firmware/application.

I2C Pins:

NodeMCU has I2C capability help however because of the inner capability of those pins, you have to find which pin is I2C.

3. Buzzer:

An audio signaling tool like a beeper or buzzer can be electromechanical or piezoelectric or mechanical type. The primary feature of this is to transform the signal from audio to sound.

It includes two pins specifically fantastic and bad. The tremendous terminal of that is represented with the '+' symbol or an extended terminal. This terminal is powered through 6Volts while the poor terminal is represented with the '-'symbol or quick terminal and it is connected to the GND terminal.

B. Software Used:

1. Thing speak :

Thing speak is an IoT platform. Which is allowed to monitor live data in the cloud. We can see the data to thing speak from our device. Whenever creating the channel on thing speak we got the channel id, and AIP keys i.e. Write AIP key and Read AIP key. Write AIP key has a 16-digit code that allows an application to write data to the channel. The read AIP key has a 16-digit code that allows an application to read data stored in the channel. We can see the output on things speak from anywhere.

Thing Speak has incorporated aid from the numerical computing software program MATLAB from Math Works, allowing Thing Speak customers to investigate and visualize uploaded records with the use of MATLAB without requiring the purchase of a MATLAB license from Math Works. Thing Speak has been the problem of articles in specialized "Maker" websites like Codeproject, and Channel.

C. Block Diagram:

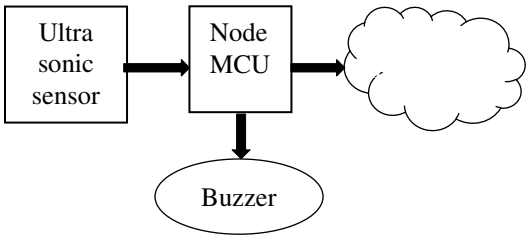

Fig.1. IOT Based Flood Monitoring System Using Node MCU

D. Working:

The above block diagram shows the working of IOT Based Flood Monitoring System Using Node MCU. The ultrasonic sensor is used to check the water level of the river. The water level is sensed by an ultrasonic sensor. The output of the ultrasonic sensor is given to the Node MCU for controlling and the controlled output is sent to the think speak IoT platform for monitoring graphically or alerting using the red led which is used to show the critical condition of flood and green led is used for normal condition. Whenever the ultrasonic sensor senses the water level if it reaches beyond the limit then it alerts people through a buzzer sound and also through an internet application that can operate from anywhere.

In this project, the objective is to experience the water tiers at river beds and check whether they are in normal circumstances or now not. If they attain past the restrict, then it signals the people thru LED indications in addition to via internet utility. Here we use an ultrasonic sensor to feel the river tiers and a Node MCU ESP8266 to technique those facts. The facts will be uploaded to the Thing Speak IoT cloud, the use of which the river ranges may be graphically monitored from anywhere in the world.

IV.RESULTS

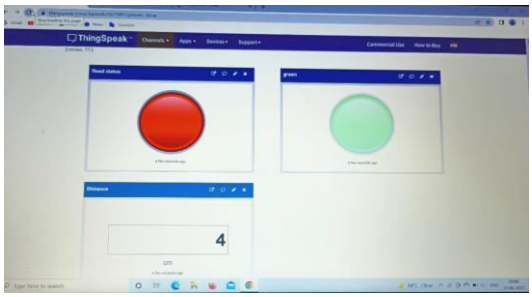

Fig.1.Result when critical condition of flood

When the water level reaches the limit 10cm distance level or less than the 10cm (10<=) then Red led is glow for critical condition.

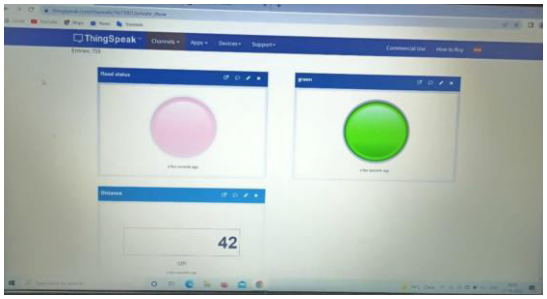

Fig.2. Result when normal condition of flood

When the water level reaches the limit greater than 10cm(10>) then Green led is glow for normal condition.

V. APPLICATIONS

- It can be used to predict floods .
- It has the ability to alert mobile users.
- Highly reliable and available real-time data.

CONCLUSION

In this project, we make use of an ultrasonic sensor to sense the water level and control it using the Node MCU. Using this system we can monitor

the flood situation and we can operate it from anywhere through internet applications.

ACKNOWLEDGEMENT

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REFERENCES

[1]Soubhagya P, Sreyasukumarran, Vishnu G.M, Peof. RashidaHameed, "IOT Based Early Flood Monitoring, Detection and Alarming System,"Ijariie-Issn, June 2020.

[2]M. ShoyebSayyad, PoojaSurve, NazimShaikh, MansiGharat, PriyaTambe, "IOT Based Early Flood Detection and Avoidance," Iconic research and engineering Journals, Jun 2020.

[3]ShahirahBintiZahir, N.Ali, F.Husin, Yasmin Abdul Wahab, "Smart IOT Flood Monitoring System,"International conference computer science and engineering, 2019.

[4]Neeraj Kumar, AlkaAgrawal, R.A.Khan, "Cost Estimation of cellular deployed IoT-enabled network for flood detection," Iran journal of computer science, 2019.

[5]Sheikh Haroonsafdar, Malashree, "A Literature survey on IOT based Flood Detection and Monitoring System Using Raspberry Pi," International journal of engineering trends and technology, Nov 2019.

[6]Ajim I. Pathan, Aishwaryakulkarni, Nikita L. Gaikwad, "An IoT and AI based Flood Monitoring and Rescue System," IJERT-ISSN, Sep 2020.

[7] Joni WelmanSimatupang, " Flood Early Warning Detection System Prototype Based on IoT Network ," Internetworking Indonesia Journal, May 2019.

IoT Based Hydrophonic System for Digital India

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Abstract— Over the years, traditional farming for harvesting with the use of soil takes a long time to decompose making it prone to diseases and expensive. Hydroponics system means growing plants without soil with better results, especially in areas with space and environment unsuitable. Commercial Hydroponics is the upcoming technology that grows plants through inert media instead of natural soil. This system has no adverse effects on the environment or the quality of crops. In contrast, it provides better nutrient value and controls the nutrients via nutrient solution. Its main aim is to save water, improve the quality of crops avoid the adverse effects of pesticides and factors affecting the quality of soil, and save the land. This is one of the types of agriculture that can be more productive if monitored and controlled efficiently. In this system, we are controlling all necessary things which are needed for the plants using IoT. This paper provides an overview of the cost-effective implementation of hydroponics for small farmers in India.

Keywords – Hydroponic farming, Internet of things, PCB, Smart hydroponic system.

I. INTRODUCTION

In Humans require air, food, water, and living space in order to survive. These things are not endless in nature and thus humans are dependent upon the optimization of land area and the preservation of biodiversity [1]. The human population is increasing and is predicted to expand from 7.0 billion to 9.5 billion people within the next 40 years (Sahara Forest Project, 2009) [2]. An ever-increasing demand for food species is implied, and it is estimated that food production will have to be doubled in order to compensate and provide the availability to all. The word "Hydroponic" defines as any means to grow plants via a medium that does not include the use of soil but involves inorganic nutrients or nutrient solution. Gericke who described methods of growing plants in liquid media (nutrient solution) introduced the term Hydroponics. Besides Gericke, many attempts were made to adopt the methods of soilless growing plants during the thirties technological progress was too inadequate due to insufficient knowledge about the nutrients and high cost involved in the process. Despite all, countries like USA and others were keen to adopt this technology so that growing plants indoors without the favorable soil required as well as controlling the nutrient is possible. One of the basic principles for vegetable production, both in soil and in hydroponic systems, is to provide all the nutrients the plant needs. Several chemical elements are essential for the growth and production of plants, in sixteen elements: carbon, hydrogen, oxygen, nitrogen, phosphorus, potassium, Sulphur, calcium, magnesium, manganese, iron, zinc, boron, copper, molybdenum, and chlorine. Among the elements mentioned above, there is a division according to their origin: organic, C, H, O, and minerals; broken down into macronutrients, N, P, K, Ca, Mg, S, and micronutrients, Mn, Fe, Br, Zn, Cu, Mo, Ni, Cl_2 In hydroponic crops, absorption is usually proportional to the concentration of nutrients in the solution near the roots, being much influenced by environmental factors such as salinity, oxygenation, temperature, pH and conductivity of a nutrient solution, light intensity, photoperiod and air humidity Besides these facts, the progress of Hydroponics is being encouraged in India commercially [04]. Leucrota Aggrotech is Goa's first indoor Hydroponics startup that produces 1.5-2 tons of leafy vegetables of good quality and pest free. Bit Mantis Innovation provides IOT solution GREEENSAGE i.e., a micro edition kit using hydroponics method for water usage and nutrient suitable for individual's convenience.

II. LITERATURE REVIEW

The idea of hydroponic cultivation is dated back to the history of the Hanging Gardens of Babylon. Modern hydroponics did not begin until the 17th century according to the High Times report on "The history of Hydroponics" [4]. In addition, following up on this report, the "Willow Tree Experiment" was a booster to inspire scientists to dig deeper into these methods, by splitting up roots from soil and water source [1]. This led to the growing use of techniques that required only nutrients to nurture crops. A duo of German scientists W. Knop and Julius von Sachs contributed greatly to this field by discovering that, the three main elements for nutrient solution formula are potassium, phosphorus, and nitrogen. The High Times magazine has also said that a major leap in the technology of hydroponics took place in the 1980s as an Israeli scientist from the Volcanic Institute of Ein Gedi discovered the aeroponics method, which transformed the desert into an immense oasis. In the 1920s, New Jersey Agricultural Experiment Station improved the existing ways and made sand & water hydroponics capable enough for large-scale crop production. According to NASA space mission reports, space hydroponics has been initiated in 2002 [2]. They have replicated the environmental ambience by implementing powerful LED lighting system, a greenhouse that will control these moisture, humidity and temperature automatically. Growing crops in low latitude areas of Mars, where the sunlight acquired is adequate, have successfully conducted a series of experiments. Now, this form of agriculture has also been introduced in India these viruses [3].

III. METHODOLOGY USED FOR HYDROPONICS

As shown in Fig. 3.1 the block diagram of the development and monitoring of hydroponic systems using IoT. In this system, we are monitoring and controlling the environment around the plants. All the sensors are interfaced to the ESP32; it is used to all the sensors are working synchronously. The DHT11 is used for sensing the temperature and humidity of the surrounding environment, while the pH sensor is used for sensing the pH level of nutrients and also shows the electrical conductivity of nutrients. In this system, there is sprinklers are used to control

the humidity and temperature around, the plants. Sprinklers are used for sprinkling the pH solution/water in response to the humidity. The submersible motor is used to fill the pH tank of plants. The pH value of the nutrient solution should be 5 to 6.5 so that the plant will not affect. LED Grow lights are used to produce lights (red and blue) it helps to grow the plants as fast as possible compared with soil plants. In addition, pest detection on plants and sprinklers will be used to sprinkle organic pesticides. The all-output data is interfaced with the ESP32 Wi-Fi module so that all the data is continuously monitored on the Web application; also data will be stored in a database [3].

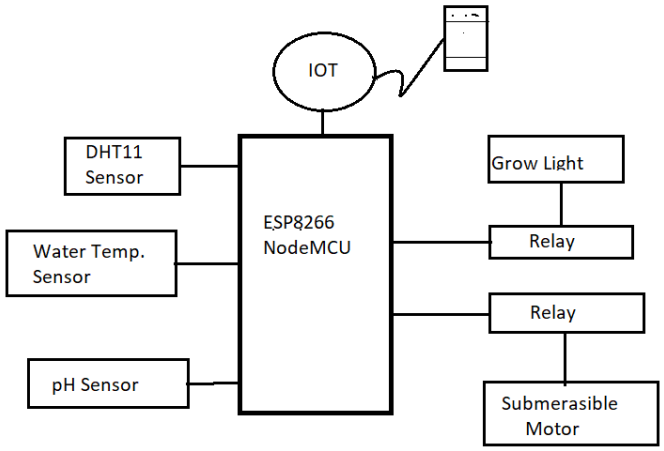

Fig. 3.1: Block Diagram of System

A) Setup

Fig.3.2 Hydroponic Farming Plant

Full the pipeline duo with clean water the water level should be about half an inch from the top of the windpipe duo. If germinating directly in the net pots. Place the net pots in the windpipe duo fill them with the soaked clay balls and ensure that at least ¾ is filled. Take a few seeds and sprinkle them evenly into each pot sprinkle water on each pot the idea here is to get all the seeds wet so that they germinate use the measuring stick included to measure the water level up to the marking on the measuring stick.

B) Nutrients:

Water is added to all nutrients and shakes well it then this liquid nutrient solution are given to windpipe duo as per the dosage mentioned below:

The duo holds 6 liters of water and the dosage for the tank is as-is; Nutrient 1-6 ml, iron chelate 2-6 ml, mono ammonium phosphate 3-12 ml, calcium nitrate 4-24 ml, potassium nitrate 5-36 ml.

Fig.3.3 Hydroponic Plant

IV. SYSTEM DESIGN AND REALIZATION

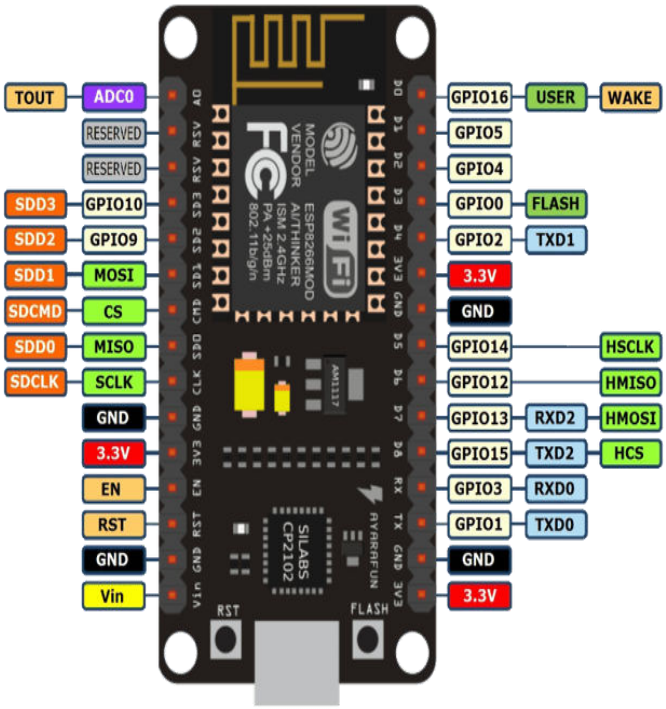

Fig. 4.1: Node MCU

The processor is based on ten silica Extensa diamond standard 106 micros and runs at 80 MHZ. It incorporates 64 kb boot instruction RAM. It supports WI-FI 802.11 and 32 b/g/n around 2.4 GHZ and other features including 16 GPIO, inter-integrated circuit, Serial peripheral interface,10-bit ADC, and interfaces with DMA. External QSPI flash memory is accessed through SPI and supports up to 16 MB and 512 KB to 4 MB is initially included in the module. It is a major development in terms of wireless communication with little circuitry and contains a board regulator that helps in providing 3.3 V consistent powers to the board. It supports APSD which makes it an ideal choice for VOIP applications and Bluetooth interfaces [4].

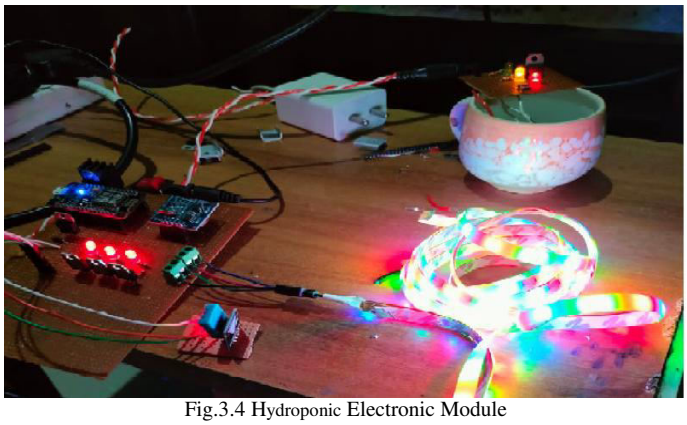

Fig.3.4 Hydroponic Electronic Module

The DHT11 is a relatively cost-efficient sensor for measuring temperature and humidity values. Four-Channel Relay Board (5V): This is used for switching AC/DC is used to high-level trigger with AC motor (220V) to operate the electricity devices

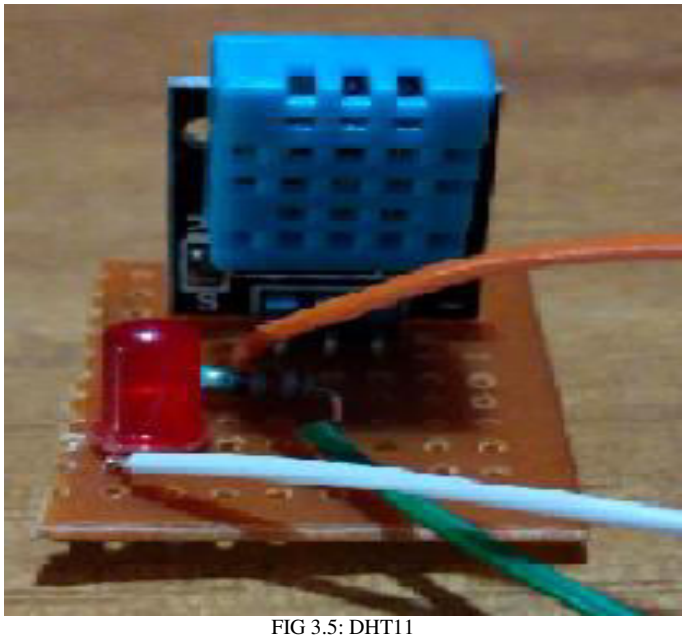

FIG 3.5: DHT11

ESP32 MICROCONTROLLER MODULE: ESP32 IS A series of low-cost, low-power systems on a chip microcontroller with integrated Wi-Fi and dual-mode Bluetooth. The following sensors and other peripherals are used to collect real-time data from the field. Ultrasonic Sensor Module (HC-SR04); This includes an ultrasonic transmitter, receiver, and circuit there are four pins measuring 5-700 cm used to detect the water level in the tank. Grow light (LED); this is an artificial light source used to keep plant growth at night by emitting electromagnetic. Solenoid Valve This device controls the opening and closing of the water flow. Water pump: The water pushers move forward from the tank to the pipe hydroponics pH sensors is one of the most essential tools that's typically used for water measurements. This type of sensor is able to measure the amount of alkalinity and acidity in water and other solutions [4].

TABLE 1: OBSERVATION OF PLANT PARAMETER

pH value (5.5-6.5)	Temperature (15-30ºC)	Humidity (30-60%)	Water Temperature (15-35ºC)	Status
6.25	29.2	70.08	28.5	Humidity high
6.22	14.5	35.5	28.56	Temperature low
6.00	30	36.0	29	All good
6.20	30.42	36.25	30.02	Water temp. high
7.02	29.05	34.5	30.5	Ph value high
5.80	31.22	34.25	29	All good

Observations suggest that parameters such as pH value should range between 5.5 and 6.5, the temperature should be between 15 and 30 degrees Celsius, humidity should be between 30 and 60%, and water temperature should be between 15 and 35 degrees Celsius for good plant growth.

V. CONCLUSION

By using IoT based hydroponic system, nutrients are provided to the plants through less water, for the figure of monitoring system nourishment all the sensor parameters are continuously monitored on mobile for better environmental control. It is observed that plant grows well by using this system without the use of soil. The rate of growing plants in a hydroponic system is greater than the soil.

REFERENCES

[1] Carlos A.P., “Camara Automated system developed to control pH and concentration of nutrient solution evaluated in hydroponic lettuce”, Department of Chemistry, State University of Londrina, Brazil,2012.

[2] Vijendra Sahara, Preet Jain, “Automated Hydroponic System using Psoc4 Prototyping Kit to Deliver Nutrients Solution Directly to Roots of Plants on Time Basis” Dept. of ECE, SVITS College, Indore, MP, India, 2015.

[3] Dimitriosious Sawas Hydroponics: A modern technology supporting the application of Floriculture and Landscape Architecture, Facility of Agricultural Technology, Greece, 2003.

[4] Tyler Baras “DIY Hydroponic Gardens” USA 2018

Smart Agricultural Field using IoT

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***Abstract*—Smart Agricultural Field is a combination of internet of things and machine learning to Keep record of the field conditions. It is the main factor to improve the yield of crops. Crop diseases are a threat to our food security, but their instant identification is still difficult in many parts of the world due to the lack of the proper infrastructure. This system includes the development of a system that can monitor temperature, humidity, moisture and rain status which may keep a watch on the crops in the agricultural field through sensors using Raspberry pi. As it is cost-efficient it can be easily accessible by the people. With the help of the ThingSpeak server and the mobile application, the results of the output of the sensors can be displayed anywhere anytime and can be checked by the ID owner.**

Keywords—temperature sensor, humidity sensor, rain status, raspberry pi 4

I INTRODUCTION

From last many years India has been not producing the crops as its original potential like it did before because of the different factors considering the industrial, residential and many other factors. As we know that 60% of the land is under cultivation. The use of technology in agriculture is on the growth, but a large part of agriculture, especially the agriculture field remains manual. It is known to everyone that output of the plant depends upon various conditions. The availability of an optimum quantity of water is highly imperative in this regard. While interacting with the farmers and the farm owners is has been discovered that the existing systems are very expensive and not even that accurate of the irrigation system that's why providing a platform to monitor the irrigation conditions, using soil moisture, temperature, and humidity readings will have an forever staying impact on the output and the growth of the plant. Even after all these systems, there are still some areas of problems that are causing problems to agriculture fields like crop disease and infections and change in the weather. This was the main factor behind selecting automated irrigation plus disease detection as a topic for our project. As there are there sensors used in the system, there values and the outputs can be displayed on the thingSpeak as well as virtuino mobile application. This will help the farm owners to know the details of their field by checking anywhere at any time on the server and will be more accessible to the farmers or the farm owners.

II LITERATURE SURVEY

Smart Irrigation System using Raspberry Pi [1] International Journal of Scientific & Engineering Research Volume 9, Issue 6, June-2018 ISSN 2229-5518 This project provides a novel approach to save water usage and make the irrigation system better. Raspberry pi is an important part of the system which handles the processing and working. In this proposed system they used many sensors like soil moisture of soil, flame detection sensor to detect fire and also the ultrasonic sensor to find the water level in the well. GSM module to notify the farmer about the current state of the farm. The paper describes the system and discusses in detail the information processing results of three weeks data based on the proposed algorithm. The system is fully functional and the prediction results are very encouraging.

Smart Watering System using IOT. Paper ID: IJERTCONV6IS15040 Published (First Online): 05-01-2019 The proposed system can be used to switch on/off the water pump according to the soil moisture levels there by automating the process of irrigation, which is one of the time consuming activities. The system uses information from the soil moisture sensor to irrigate soil which helps to prevent over irrigation or under irrigation of soil thereby avoiding crop damage. The farm owner can monitor the process online through a website. From this system it can be concluded that there can be considerable development in farming with the use of iot. The principle that used is very simple and easy to implement. It'll save the manpower and is time-efficient.

An IOT Based Smart Irrigation System Using Soil Moisture and Weather Prediction International Journal of Engineering Research & Technology (IJERT), Volume 8, Issue 07, 2020 The scarcity of clean water resources around the globe has generated a need for their optimum utilization. Internet of Things (IoT) solutions, based on the application specific sensors' data acquisition and intelligent processing, are bridging the gaps between the cyber and physical worlds. IoT based smart irrigation systems can help in achieving optimum water-resource utilization in the precision farming landscape. This paper presents an open-source technology based smart system to predict the irrigation requirements of a field using the sensing of ground parameter like soil moisture, soil temperature, and environmental conditions along with the weather forecast data from the Internet. The intelligence of the proposed system is based on a smart algorithm, which

considers sensed data along with the weather forecast parameters like precipitation, air temperature, humidity, and UV for the near future. The complete system has been developed and deployed on a pilot scale, where the sensor node data is wirelessly collected over the cloud using web-services and a web-based information visualization and decision support system provides real-time information insights based on the analysis of sensor data and weather forecast data.

III COMPONENTS

1. RASPBERRY PI

Raspberry pi 4 is the newest model, this newer model offers different RAM sizes. It is used in various projects as it has all the necessary wired and wireless communication systems. It comes with a Quad-core processor, it used mini HDMI. In total raspberry pi has 40 pins from which 28 pins are GPIO pins and the remaining are power pins. Refer figure 3.1

Fig. 3.1 Raspberry Pi 4

2. SOIL MOISTURE SENSOR:

The soil moisture sensor senses the amount of moisture in the soil. These sensors are pre-established at a specific area and depth in a field. Refer figure 3.2.

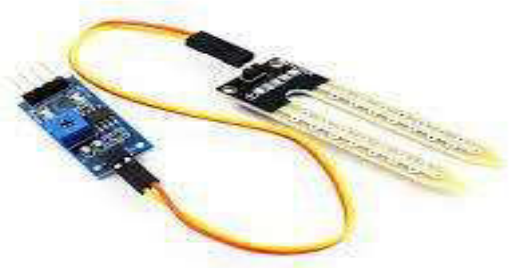

Fig. 3.2 Soil Moisture Sensor

3. TEMPERATURE AND HUMIDITY SENSOR

DHT 11 is a low cost temperature and humidity sensor. It is shown in fig 3.3. It uses thermistor to measure the temperature of surrounding atmosphere, captative humidity sensor is used to measure humidity in the surrounding atmosphere.

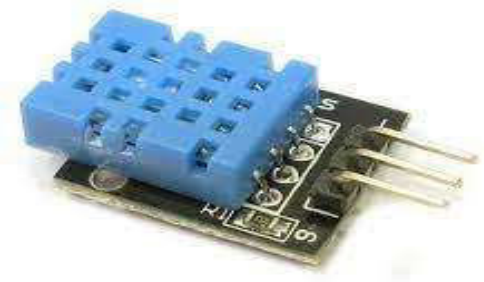

Fig. 3.3 DHT11

4. RAIN SENSOR

Rain sensor is a device that is switched on when rain falls on it. It has a sensing plate that has an exposed series of copper traces, they act like a potentiometer whose resistance varies in accordance with the amount of water on its plate. Refer fig 3.4

Fig. 3.4 Rain Sensor

1.

III SMART IRRIGATION

In the proposed system the automation of irrigation is done with the help of Internet of things. In the proposed system Raspberry pi 4 is used as the main processor and the temperature & humidity sensor is used to collect the information in analog form. A soil moisture sensor is used to detect the moisture of soil and depending on the moisture value the motor will be switched on and off to water the plants and , if the value of soil moisture is below the threshold value the motor will turn ON. If the moisture level is above the threshold the motor will turn OFF. A rain sensor is used to detect rain. The data of soil moisture, humidity, temperature and rain status is displayed on thingSpeaks. The data of thingspeak is taken on the virtuino 6 app.

IV. DISEASE DETECTION.

Disease detection in plant leaves is done with the help of machine learning. The convolution Neural Network is used. Here we have considered five fruit plant leaves and 16 different types of diseases. The disease detection will be done in three steps which will include selecting the image, image pre-processing and the CNN prediction. In the first step the input image will be provided from the dataset to process it and then the image will be processed by the gray scale and the edge histogram method. At last after the detection of the plant disease, the plants name, name of the disease and the execution time will be displayed on the screen.

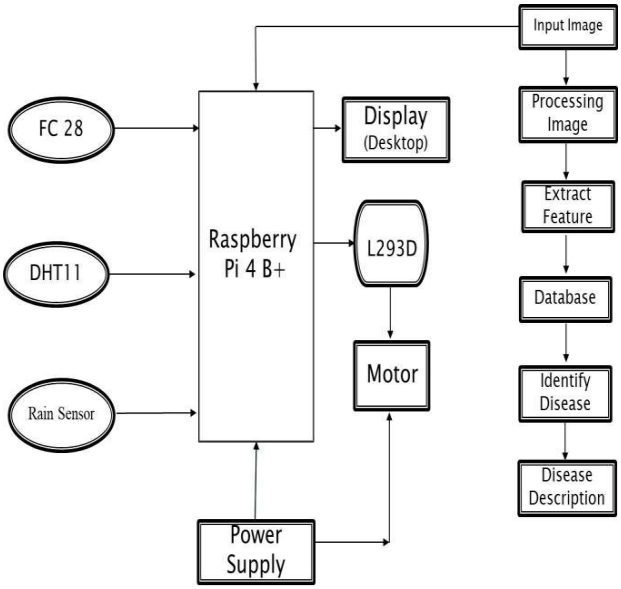

Fig 4.1 : Block diagram

V. METHODOLOGY

In this project, the controller that has been used for the IoT and ML part is raspberry pi 4. Firstly for the IoT part the first sensors i.e. soil moisture sensor has been interfaced with raspberry pi 4 to get the output in digital form as 1 and 0 that will be further passed on to the thingspeak and the mobile application created. Considering if the moisture level is low then the motor will be switched ON. Then the next sensor rain sensor's output will be also in digital form as of soil moisture and the data will be passed further. After that the last sensor DHT11 will record the value of temperature and humidity and display it on both the platforms of thingspeak and the mobile application. Secondly for the ML part CNN is used and will be processed in three steps.

Step 1: The user can select an image from the set provided by himself or from the readymade test sets.

Step 2: After the selection of images. The selected image will be Pre-processed by using an edge histogram that will process the directivity of the brightness of the leaf image.

Step 3: By considering the above steps the CNN prediction will be done and the output will be presented on the screen as the name of the plant and its disease.

VI. RESULT AND CONCLUSIONS

Agriculture is the sector which is an important part in the growth of our country. But this is behind in using new technologies of machine learning. Hence our farm owners should know all the new technologies. These techniques help in getting maximum yield of crops. This field is built using Raspberry pi 4 and various sensors. The system designed is a smart irrigation solution based on IOT and artificial intelligence which makes use of the soil moisture content and the moisture requirements of the crop to make the entire process of irrigation automatic. Its core benefit is its efficiency and economic feasibility. The automation of the watering system will also help in keeping the soil's moisture level high and the plants can be kept on the watch online.

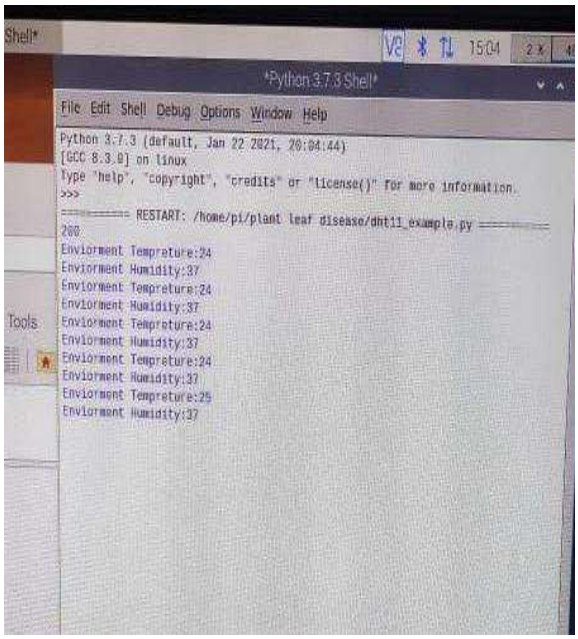

Fig 6.1 Result of temperature & humidity sensor

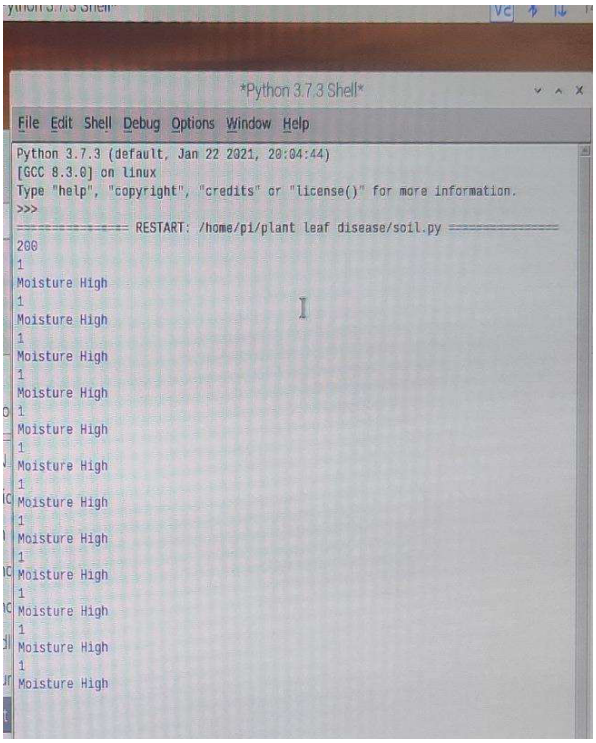

Fig 6.2 Soil moisture sensor

Fig 6.4 Results on Thingspeak

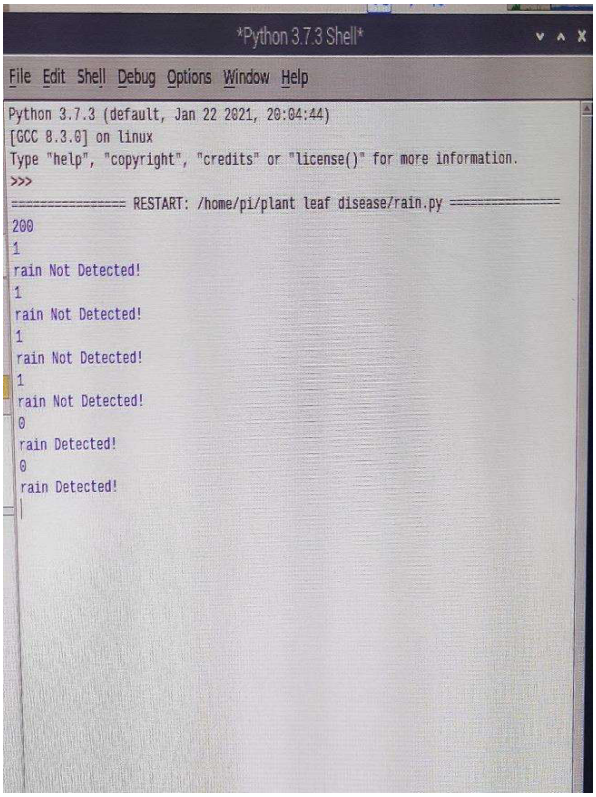

Fig 6.4 Results of Rain sensor

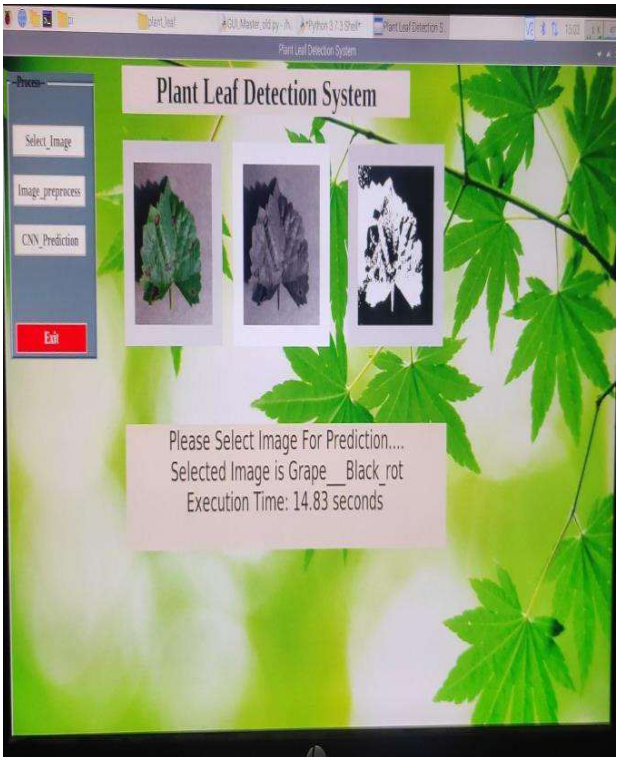

Fig 6.5 Disease detection

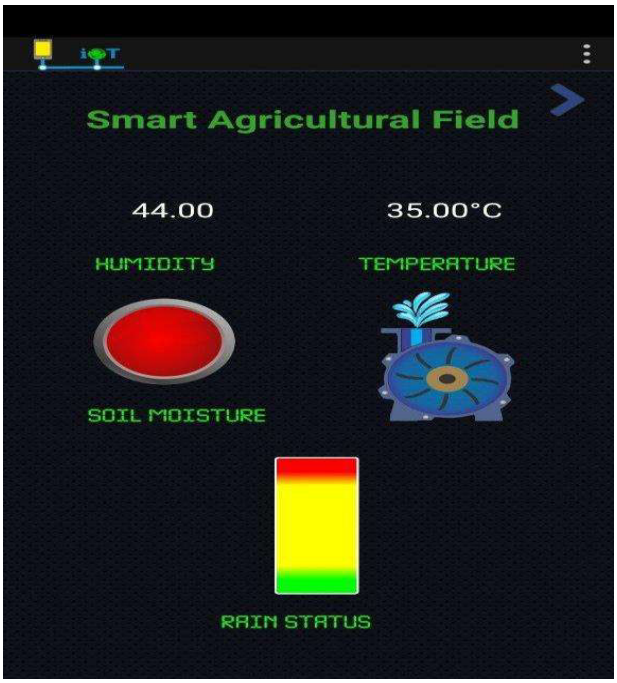

Fig 6.5 Results on Virtuno 6

VII. ACKNOWLEDGMENT

We express our sense of gratitude towards our Project Guide Dr. D.S.Mantri for his valuable guidance and suggestions at every step of study of this Project Stage-I, also his contribution to the solution of every problem at each stage-II, and making the project better by his ideas. We are thankful to Dr. D. D. Chaudhary Head of the Department of Electronics and Telecommunication and all the staff members who extended the preparatory steps of this Project. We are very much thankful to respected Principal Dr. M. S. Gaikwad for his support and for providing all facilities to complete the project. Finally, we want to thank all of our friends for their support & suggestions. Last but not least we want to express thanks to our family for giving us support and confidence at each and every stage of this project.

IX REFERENCES

[1] Dipashree B, Chaitra B S, Nivedita P S, Mr. Venkatesh P. “Smart Watering System using IOT”. Paper ID: IJERTCONV6IS15040 Published (First Online): 05-01-2019

[2] Mayank Sikarwar “IoT based smart irrigation system using raspberry pi”. Published in IJIREEICE on 5 May 2021

[3] Pravina B. Chikankar, Deepak Mehetre , Soumitra Das “An Automatic Irrigation System using ZigBee in Wireless Sensor Network” 2015 International Conference on Pervasive Computing (ICPC)- IEEE 2015.

[4] Venkata Naga Rohit Gunturi, “Micro Controller Based Automatic Plant Irrigation System” International

[5] Ranjitha B N , Harshith U, Bhagappa, Pushparani M K Paper ID:IJERTCONV7IS08032

V2X Communication for Autonomous Vehicles

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***Abstract*— With recent advances in machine learning and interest in expanding the "smart city", several technology firms and automobile manufacturers have begun investing billions of dollars in autonomous vehicle research and development. While many firms are hard at work constructing their own autonomous cars, it is critical to start thinking about how these vehicles will connect with one another and with other infrastructure. V2V communication services and applications are being mainly subjected to safety critical systems. V2V communication using Dedicated Short-Range Communication (DSRC) as Bluetooth is used to communicate between vehicles. Our proposed system provides connectivity and guidance to the vehicles. Communication between two vehicles is done wirelessly using Arduino microcontrollers via Bluetooth for respective cars. After successful communication between Bluetooth the alerts or indications are displayed on the LCD screen and the buzzer inside vehicle will turn to reduce noise pollution.**

Keywords— machine learning, smart city, autonomous vehicle, V2V communication, safety critical system, DSRC, noise pollution.

I. INTRODUCTION

Everyone nowadays requires the assurance of safer transportation. A car communication system might assist you in obtaining it. The primary motive for automobile communication systems is safety and reducing the high cost of traffic accidents. According to the World Health Organization (WHO), road accidents kill around 1.2 million people each year, accounting for one-fourth of all deaths caused by injury. In addition, over 50 million people are wounded in automobile accidents. If preventive measures are not implemented, road deaths are expected to rise from ninth position in 1990 to third place in 2020.

In many ways, today's automobiles are already networked gadgets. However, in the not-too-distant future, they will also interact directly with one another and with road infrastructure.

In the last few years, there has been tremendous interest in the development of vehicles capable of driving autonomously, from both the research community and industry. Autonomous cars offer significantly higher traffic safety and fuel economy, improved infrastructure use, and the freeing of drivers to undertake other duties. For these reasons, autonomous driving may usher in a paradigm change in the transportation of people and products

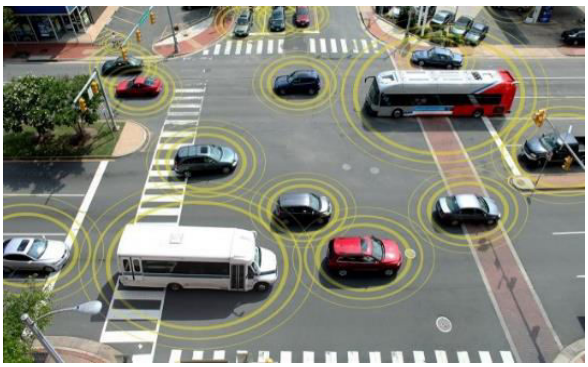

Fig. 1.V2V Communication.

There are several applications based on vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) communication. Although these applications may be implemented without the use of vehicle-to-everything (V2X) connectivity, V2X considerably increases the performance of these systems. V2X communication refers to the transmission of data from a vehicle to any entity that may impact the vehicle, and vice versa. It is a vehicular communication system that includes more specialized forms of communication such as V2I (Vehicle-to-Infrastructure), V2V (Vehicle-to-Vehicle), V2P (Vehicle-to-Pedestrian), V2D (Vehicle-to-Device), and V2G (Vehicle-to-Gas) (Vehicle-to-grid). The primary motivation for V2X is safety, although energy savings are also essential. For many years, researchers have been studying the use of V2X communication to autonomous driving, such as in the pioneering deployments of the PROMETHEUS effort in Europe and the PATH Automated Highway System in the United States. Several recent research efforts and successful field testing of V2X communication for safety and traffic efficiency have spurred a slew of current initiatives aimed at bringing V2X communication for autonomous driving closer to reality. The European R&D projects AutoNet2030, I-GAME, Adaptive and COMPANION are now working to advance cooperative autonomous driving. Bluetooth technology is the most effective and cost-effective approach to avert collisions between two automobiles. Everyone is familiar with Bluetooth technology, which has a long

communication range. We may notify automobiles to be aware of adjacent vehicles using Bluetooth technology, preventing accidents. Car communication networks will enable a variety of applications with varying features. Because these networks have not yet been established, a list of such applications is hypothetical and subject to change (However safety, which is the main purpose of these networks, will most probably remain the most important applications). Furthermore, several of these applications need the use of technologies that are not now accessible. Ultimately, we would prefer to outsource entire control of our vehicles to the vehicles themselves; The Obama administration's initiatives to advance vehicle-to-vehicle communications brought the technology one step closer to reality this week. The statement on February 3rd outlines a set of proposed guidelines that will be released for comment by the time current administration leaves office in 2017, with the intention that by 2020, automobiles will communicate with each other and alert drivers to roadside dangers ahead. This week, the National Highway Traffic Safety Administration announced a plan to have a plan. To put it simply, the initial generation of V2V systems would alert the driver but would not take control of the vehicle. Later versions would increase their ability to stop or steer around obstacles, ultimately integrating with self-driving automobiles. Here is a summary of V2V technologies and their ramifications.

II. LITERATURE SURVEY

Sohan Gyawali [1] proposed a survey about basic architecture, its characteristics, research challenges, routing protocols classifications and names of related algorithms, various bio-inspired approaches which are getting used these days in various scenario. DSRC based communication and cellular network based V2X communication these protocols use for the V2X communication. Challenges and solutions of the physical layer structure, synchronization, MBMS, resources allocation, security, heterogeneous, millimeter wave communication, massive MIMO, vehicular cloud or fog computing, SDN, mobile edge computing, network slicing and dynamic spectrum sharing. Also provide the solution on 3GPP discuss the downlink and uplink enhancement. As the latest technology improving author also describe about the 5G based wireless communication. 5G has increased network capacity, high speed and data security. So, this will provide high data rate connection between the vehicles and infrastructure and network that is V2I and V2N.

Ahmed Hussein [2] proposed an autonomous cooperative driving using various communication schemes. The vehicular communication system has vehicle, infrastructure and pedestrian are the nodes for the communication. V2I exchange the information between vehicles and infrastructure, V2P exchange information between vehicles and pedestrian and V2V exchange information between vehicle to other vehicles. Using two autonomous vehicle they performed the experiment. They use driverless golf-carts connected with multiple sensors and actuators provides them the fully autonomous driving and 360-degree vision for surrounding environment. Using the different communication scheme i.e., V2V, V2I and V2P share the information with each other and supervised the autonomous vehicle. The result of these experiment with the communication scheme has a better overall system performed. Here its prove that the high performance of the cooperative driving technique in real-world applications, emphasizing the significance and impact of V2X communications in autonomous cars. In the future, the model may be expanded to incorporate more than two vehicles and the vehicle following method in formation mode studied. Experimenting on many real-world scenarios and under various environmental conditions.

Yu. A. Vershinin [3] purposed the safety risks for vehicle-to-vehicle communication using dedicated short-range communication to determine safety awareness and to improvement in the technology. Author describes the attackers and the reason for attacks. The different types of attacks like Denial-of-service attack, Sybil attack, Reply attack, Privacy attack, Fake attack and Time attack. Using different solution these attacks are reduced to reduce denial of service attack the hash function is used. The modified RSA algorithm is designed to protect the transferring and receiving emergency alerts or messages.

III. MOTIVATION FOR V2X COMMUNICATIONS

The Machine learning and predictive technology have a significant impact on the vehicles and automotive industry. It increases the demand of latest technology and improvement in existing system. V2X provide road safety with surrounding awareness, traffic efficiency and power saving. So, this inspired to explore V2X communications. This section mainly highlights the DSRC based V2X communication.

A. DSRC based V2X communications

The dedicated short-range communication (DSRC) is a wireless communication technology designed to permit automobiles in the intelligent transportation system (ITS) to connection with other vehicles or infrastructure technology. The DSRC is open-source communication protocol for wireless communication. The DSRC is a short range around 200 to 400 meters which is a limited communication. Using DSRC vehicles can transfer the information or signals to the other vehicles, infrastructure and people. DSRC can communicate securely and at high speeds, without needing to connect to a cellular network. Most work on DSRC has focused on active safety crash avoidance using driver alerts based on sophisticated sensing and vehicle communications. The endured studies of DSRC generation are a concern of the Department of Transportation Joint Program Office, even though few energetic cars are DSRC compatible. Automakers had been hesitant to contain DSRC without assurances that different automakers will introduce it as well, due to the fact until an excessive majority of cars are the use of the identical generation, they won’t be capable of communicate.

IV. METHODOLOGY

The V2V system should contain the following parts:

- Vehicle On-Board Unit or Equipment (OBU or OBE)
- Communication Channel

The OBUs are the vehicle side of the same physical device as for the V2V communication. An OBU consist of Arduino

uno, nano, Bluetooth and I/O devices. An OBU is logically composed of a DSRC, an applications processor and interfaces to vehicle systems. OBUs provide the communications both between the vehicle and other nearby vehicles. The OBUs may regularly transmit status messages to other OBUs to support safety applications between vehicles. At intervals, the OBUs may also gather data to support public applications.

The communication device used in project is Bluetooth based on DSRC communication channel. Bluetooth is present on OBUs. In V2V architecture when a vehicle needs to give any indication to other vehicle then at that time Bluetooth is responsible for communication between vehicles.

Local and vehicle-to-vehicle safety applications have the highest priority; messages associated with various public and private network applications have lower priority. Entertainment messages will likely have the lowest priority.

V. PROPOSED BLOCK DIAGRAM

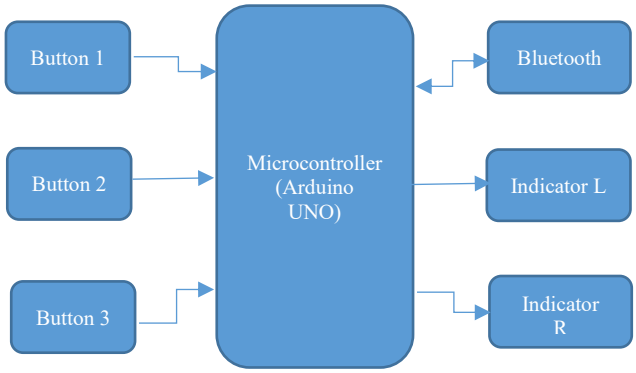

Figure 2 Block diagram of car 1

The block diagram of car 1 is shown in the figure 2 which is composed with Arduino UNO as microcontroller. Button 1, Button 2 and Button 3 as input device. 2 LED as Indicator L and Indicator R as output device. Bluetooth used as communication device.

When Button 1 or Button 2 is pressed then microcontroller will turn on the Indicator L or Indicator R according to input and also microcontroller will send Left or Right Indication depending on the button pressed through Bluetooth to another nearby Bluetooth of other car.

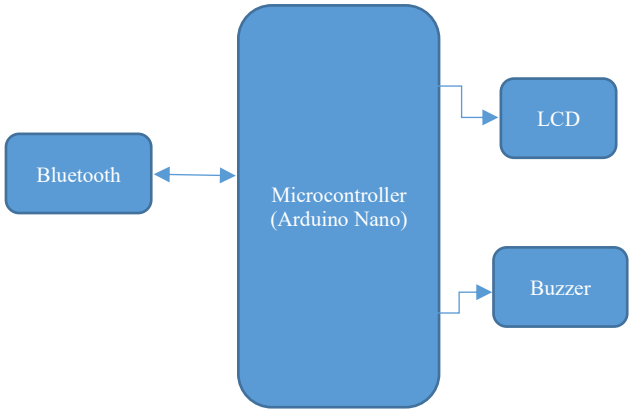

Figure 3 Block diagram of car 2

The block diagram of car 2 is shown in the figure 3 which is composed with LCD and Buzzer as output device. LCD used to display indication on screen and buzzer in the car for horning to reduce noise pollution. Bluetooth used as communication device.

When Bluetooth will receive signal from another car Bluetooth, according to signal microcontroller will process that signal and turn on the buzzer or display the information on the screen depend on the received signal.

VI. COMMUNICATION SCHEME

The V2X Communication System includes vehicles, infrastructure, pedestrians and peoples which will share the information with each other. They will share the information of indicators that is left and right indication, in vehicle horn in the silence zone, safety alerts, traffic signals and more. The V2X communication has different types such as vehicle to vehicle (V2V), vehicle to infrastructure (V2I) and vehicle to pedestrian (V2P). Each of these has different role in the V2X communication can be summarized as follows:

- V2V: In this type vehicle can share the information with the other vehicles. This interchange is finished

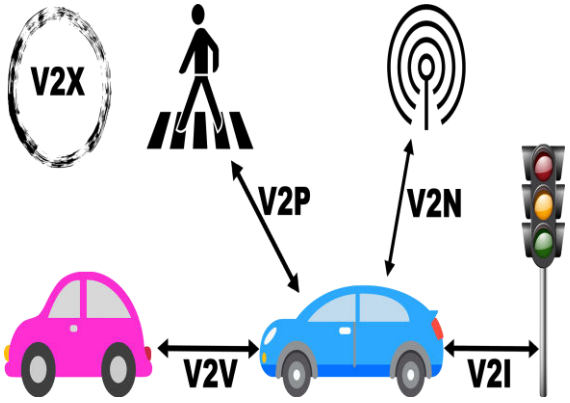

Fig. 4. Types of V2X Communication.

wireless via dedicated short-range communication (DSRC) frequencies. Since V2V communications were formed as a mesh network, every vehicle becomes a node that may capture, send, and convey signals. Since V2V is an integral a part of V2X and V2N, nodes additionally embody sensible traffic signals, road sensors, and different V2I components.

- V2I: In the vehicle to infrastructure communication vehicles exchange the information or signals between the vehicles and infrastructure. It's a bidirectional exchange of the information. The information from infrastructure such as data from sensors, roadside cameras and traffic lights will be provided to the vehicles. The vehicle-to-vehicle (V2V) and vehicle-to-infrastructure (V2I) technologies use dedicated short-range communication (DSRC) frequencies to transmit data. The purpose of V2I is to improve road safety and avoid accidents by providing drivers with real-time information about various road conditions. Furthermore, V2I and ITS technologies are critical to future autonomous cars that will rely on this vital data.

- V2P: In the vehicle to pedestrian the information is exchanged between the vehicle and pedestrian. The Vehicle to Pedestrian network allows a vehicle and a pedestrian to communicate directly. Other vulnerable road users, such as bicycles, may fall under the scope of V2P. If these pedestrians are close to the automobile vehicle, signals are sent. The alarms may warn drivers of approaching pedestrians or alert pedestrians to the presence of the vehicle. A robust V2P link cannot be established without smart road infrastructure (traffic lights, sensors, and cameras).
- V2I: One of the most recent automotive technology advances is the electrification of automobiles, which allows for new modes of communication. As cars grow less reliant on human intervention, we may expect safer, more efficient, and environmentally friendly rides, owing to V2N technology. The goal of Vehicle to Network is to transport data between vehicles and the management system. This procedure is made feasible by network infrastructure with high bandwidth, low latency, and great dependability. To pave the path for autonomous driving in the future of mobility, cars can receive broadcast notifications about traffic congestion or accidents further down the road.

VII. TEASTING AND RESULT

In V2X communication as the DSRC communication protocol is used so it mainly focuses on the short-range distance. Here Bluetooth is used for the short-range communication. So here prototype of cars is shown in the figure 5. The different scenario was tested using this system.

In Car 1 Arduino is connected with the Bluetooth. With two LED as right indicator and left indicator, three switches for turn on right indicator, left indicator and 3rd is for horn shown in figure 5.

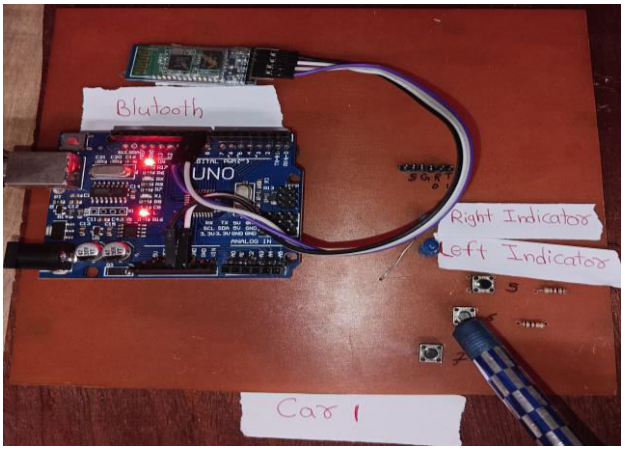

Fig. 5. Prototype of car 2

In car 2 Arduino is connected to Bluetooth and LCD display. Here LCD display shows the alerts on screen from another vehicle. And Bluetooth is used for communication purpose shown in figure 6.

V2V communication between two vehicles is done using the car 1 and car 2 model as shown in fig 5 and fig 6. Here we use DSRC for communication between two vehicles. Bluetooth is for dedicated short-range communication.

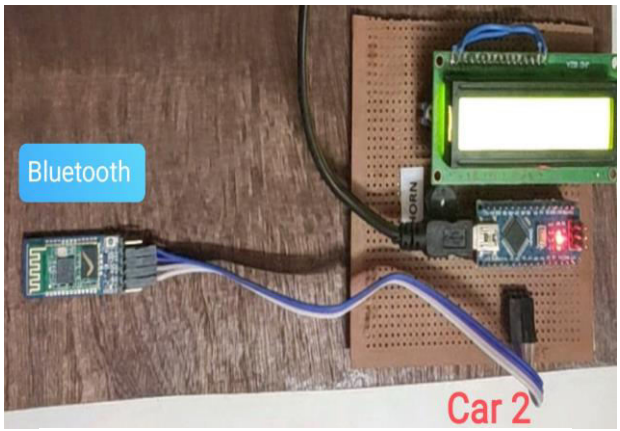

Fig. 6. Prototype of car 2

Figure 7 shows the output on car 2 after receiving the signal from car 1. When the left indicator of car 1 is pressed as shown in fig. 5. Car 2 receives the signal from car 1 using Bluetooth and it will display the output in the LCD screen of car 2 as shown in fig. 7.

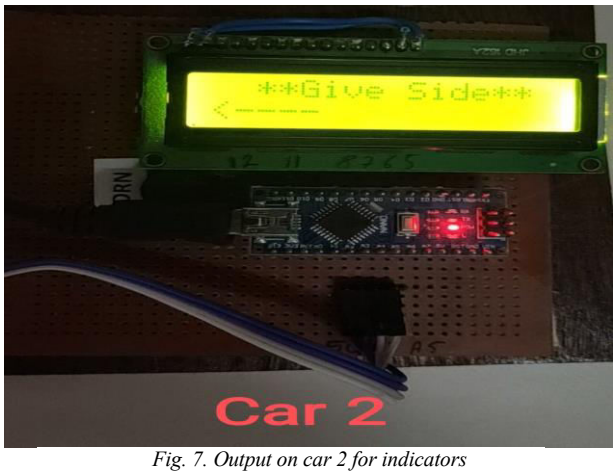

Fig. 7. Output on car 2 for indicators

Figure 8 shows the output on car 2 after receiving the signal from car 1. When horn is pressed from car 1 it will send the horn signal using Bluetooth to car 2 Bluetooth. Car 2 receives the signal from car 1 using Bluetooth and it will display the output in the LCD screen of car 2.

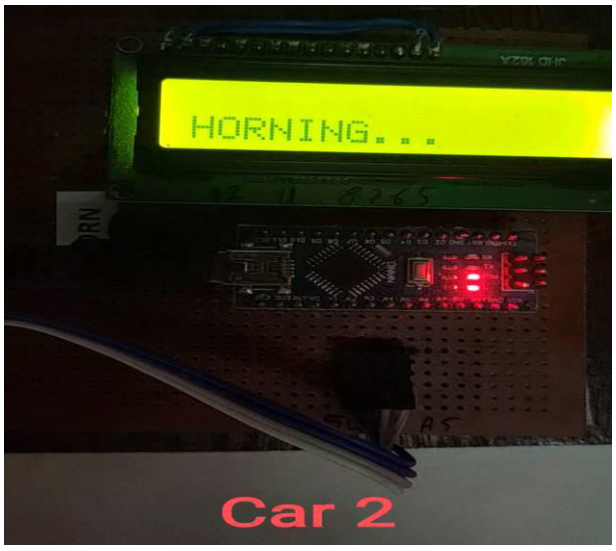

Fig. 8. Output on car 2 for horn

VIII. FUTURE SCOPE

The latest 5G network innovation in vehicular communication faces certain specialized challenges related to the prerequisites on the backhaul organize, millimetre wave communication and security issues. The large number of devices using the C-V2V network has recently caused network congestion; as a result, non-orthogonal multiple access (NOMA) is being studied for V2V communication. However, because to dependability and security concerns, NOMA methods cannot be directly used to C-V2V. Recently investigated how to increase the dependability of NOMA, which may be used for C-V2V or V2V communication. Additionally, these AVs will contribute to the formation of an Internet of Vehicles (IoV), which will create a large quantity of data. Artificial intelligence (AI), machine learning (ML), and deep learning (DL) approaches have recently been employed to enhance state and position estimation and reference. To learn and adjust these matrices online, many AI, ML, and DL frameworks have been developed. To improve the position accuracy of the AV, techniques such as artificial neural networks (ANNs), adaptive neuro-fuzzy inference system (ANFIS), deep inference for covariance estimation (DICE), long short-term memory (LSTM), recurrent neural networks (RNN), and reinforcement learning have been used. More information and debate on these AI, ML, and DL sensor fusion approaches for AV can be found in (and references therein). All of these issues should hopefully be resolved in the future, opening the way for AVs and subsequently IoVs.

IX. CONCLUSION

In V2X communication the vehicle exchanges the information between other vehicles and infrastructure. Using the different communication scheme and DSRC, the vehicles share the information to each other and also get awareness of surrounding environment. The DSRC technology examines the dependability of DSRC wireless communication.

In this project our prime objective is to provide road safety and to reduce vehicle accidents. By providing assistance or guidance in vehicle LCD display. Also, in-vehicle buzzer will reduce noise pollution.

REFERENCES

[1] Sohan Gyawali, Shengjie Xu, Yi Qian and Rose Qingyang Hu “Challenges and Solutions for Cellular Based V2X Communications”, IEEE Communications Surveys & Tutorials, Vol. 23, no. 1, pp. 222-255, Firstquarter 2021.

[2] Ahmed Hussein, Pablo Marín-Plaza, Fernando García and José María Armingol, "Autonomous cooperative driving using V2X communications in off-road environment", 2017 IEEE 20th International Conference on Intelligent Transportation Systems (ITSC).

[3] Yu. A. Vershinin, Yao Zhan, "Vehicle to Vehicle Communication: Dedicated Short Range Communication and Safety Awareness", 2020 Systems of Signals Generating and Processing in the Field of on Board Communications.

[4] Jiaqi Huang, Dongfeng Fang, Yi Qian, Rose Qingyang Hu, "Recent Advances and Challenges in Security and Privacy for V2X Communications", IEEE Open Journal of Vehicular Technology, vol. 1, pp. 244-266, Jun 2020.

[5] Tien Viet Nguyen, Patil Shailesh, Baghel Sudhir, Gulati Kapil, Libin Jiang, Zhibin Wu, "A comparison of cellular vehicle-to-everything and dedicated short range communication", 2017 IEEE Vehicular Networking Conference (VNC).

[6] R. Sabouni, and R. Hafez, "Performance of DSRC for V2V communications in urban and highway environments”, 25th IEEE Canadian Conference on Digital Object Identifier, pp. 1-5, April 2012.

[7] Vinita Jindal, and Punam Bedi, "Vehicular ad-hoc networks: Introduction, standards, routing protocols and challenges", IJCSI International Journal of Computer Science Issues, vol. 13, no. 2, March 2016.

[8] Albert Demba, Dietmar P. F. Moller "Vehicle-to-Vehicle Communication Technology",2018 IEEE International Conference on Electro/Information Technology (EIT), oct 2018.

[9] J. B. Kenney, “Dedicated Short-Range Communications (DSRC) Standards in the United States,” Proceedings of the IEEE, vol. 99, no. 7, pp. 1162-1182, July 2011.

[10] J. Harding, G. Powell, R. Yoon, J. Fikentscher, C. Doyle, D. Sade, M. Lukuc, J. Simons and J. Wang, “Vehicle-to-vehicle communications: Readiness of V2V technology for application”, U.S. Nat. Highway Traffic Safety Admin. (NHTSA), Washington, DC, USA, Aug. 2014.

[11] M. Muhammad, G. A. Safdar, “Survey on existing authentication issues for cellular-assisted V2X communication,” Vehicular Communications, 12, pp. 5065, 2018.

[12] H. Zhou, W. Xu, Y. Bi, J. Chen, Q. Yu and X. S. Shen, “Toward 5G Spectrum Sharing for Immersive-Experience-Driven Vehicular Communications,” IEEE Wireless Communications, vol. 24, no. 6, pp. 30-37, Dec. 2017.

[13] G. Karagiannis et al, “Vehicular Networking: A Survey Tutorial on Requirements, Architectures, Challenges, Standards and Solution”, IEEE Communications Surveys & Tutorials, Vol. 13, no. 4, Fourth Quarter 2011.

[14] Camps-Mur, Daniel, Andres Garcia-Saavedra, and Pablo Serrano. "Device-to-device communications with Wi-Fi Direct: overview and experimentation." Wireless Communications, IEEE 20.3 (2013): 96-104.

[15] Tientrakool, Patcharinee, Ya-Chi Ho, and Nicholas F. Maxemchuk. "Highway capacity benefits from using vehicle-to vehicle communication and sensors for collision avoidance." Vehicular Technology Conference (VTC Fall), 2011 IEEE. IEEE, 2011.

[16] J. Zaldivar, C. T. Calafate, J. C. Cano, P. Manzoni, “Providing Accident Detection in Vehicular Networks Through OBD-II Devices and Android-based Smartphones”, 5th IEEE Workshop On User Mobility and Vehicular Networks, 2011.

[17] H. J. Yun, S. K. Lee, O. C. Kwon, “Vehicle-generated Data Exchange Protocol for Remote OBD Inspection and Maintenance”, 6th International Conference on Computer Sciences and Convergence Information Technology, November 2011.

[18] A. Pereira, M. Alves, H. Macedo, “Vehicle Driving Analysis in Regards to Fuel Consumption using Fuzzy Logic and OBD-II Devices”, 8th Euro American Conference on Telematics and Information Systems, April 2016.

[19] J. E. Meseguer, C. T. Calafate, J. C. Cano, P. Manzoni, “DrivingStyles: A Smartphone Application to Assess Driver Behavior”, IEEE Symposium on Computers and Communications, July 2013.

[20] J. S. Jhou, S. H. Chen, W. D. Tsay, M. C. Lai, “The Implementation of OBD-II Vehicle Diagnosis System Integrated with Cloud Computation Technology”, 2nd International Conference on Robot, Vision and Signal Processing, December 2013.

A Literature Survey on Automated cargo tracking system

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***Abstract*—The automated asset tracking system is designed to track lost or lost property in public and elsewhere. As goods are transported by plane or train from one country to another, there is always a risk of theft or negligence of the goods or luggage in which the proposed system is considered. The automatic property tracking system works with an alarm where the alarm is set via the Arduino UNO board and GPS module. Also, the alarm goes off as soon as the bag is misplaced and goes out some distance. In addition, a map is created where we can track the location of the bag as it travels, as the symbols are lowered in a way that gives us the location of the bag as it moves from the desired location. In this way, the components are used as an Arduino board and GPS Module to track cargo and build a frontend or mobile system to monitor lost property.**

***Index Terms*—Arduino UNO, GPS module**

I. Introduction

On the road, various essential items such as mode of transport (i.e. airplane, ship,, smart goods, smart containers, smart trucks. Develop and understand intelligent resources: tracking, hearing, controlling, making independent decisions based on information provided by smart goods. Improving visibility, transparency of planning activities. Improving the efficiency of planning processes through the use of digital data, which is transmitted by ICT throughout the Green Logistics system. Implementing development strategies to improve product mobility, information, and finance locally (i.e. reducing GHG, noise, p pollution, etc.). Improving efficiency and sustainability of advanced decision-making activities Mobile Internet. U establishes both transport infrastructure and management strategies by transforming Digital Internet. model. Achieving greater efficiency. and global economic, environmental, and social sustainability through trucks, trains, boats, or pipelines), the use of occasional transportation. Tracking technology in the transport network however is used very little technology industry worldwide. A large amount of international industry is used this technology has limited power. Basic methods for all of these tracking systems often provide the customer access to tracking information instead of tracking handsent questions such as using the website or phone, e-mail, fax or engaging in building program links or integration with the tracking system. There is not even a tracking system available in between invoice and shipping. Customers have received their goods ordered by phone or by email to vendors and there is no real-time tracking technology available. This deficiency has an impact on the network and structures of relationships between manufacturers as well potential customers. Industries therefore need ideas, methods, tools and skills in order to systematically develop their real-time tracking technology in the transport network.

II. Literature Review

The transport network and supply chain is a complex combination of characters that they need co-ordination, collaboration and sharing of information for the purpose of expansion productivity and efficiency (Choi and Krause, 2006; Myerson, 2007). In daily life, millions of transport facilities are monitored and managed worldwide to the limit or a lack of control and knowledge of their status in the real-time environment (Martinez-Sala et al., 2009). Gaining tracking through the supply chain from the end is complex business and access to reliable data tracking is required. The word traceability can can be defined as the ability to trace the history, use or location of a business in ways of recorded identification (Bechini et al., 2007). The concept of tracking and tracing involves managing consecutive links between collections and operating units throughout the entire supply chain network. Growing complexity and uncertainty in between business-to-business relationships as well as business and customer can be overcome through implementation of Auto-ID enabled tracking and tracking solutions. Ensures supply chain visibility, speed, flexibility and safety (Urciuoli, 2010; Xu et al., 2011). A supply a chain network simultaneously carries a large number of goods that need a delivery system to reduce the cost associated with logistics and staff to process customers claims (Ko et al., 2011). An independent delivery tracking system contributes to the reduction of claim costs due to freight forwarding errors. There is a growing need for tracking

and tracking in the supply chain, by law demand grows harder, and there is a growing momentum of improvement standard systems to address such transportation needs (Kandel et al., 2011). To do so requirements, each step in the supply chain, such as transportation, packaging, distribution system, etc., should have its own information integrated within the tracking system (Ruiz-Garcia et al., 2010). Marking information requires implementation from the green application to it the sale of goods. Recent developments in transportation and supply chains allow worldwide monitoring transport and distribution of goods through sensory networks, Wireless or wireless devices and global navigation satellite (GNSS) - based tracking device.

III. WORKING

RFID is called Automatic Identification and Data Capture (AIDC). AIDC methods find things automatically, collect data about them, and record those data directly from computer programs with little or no intrusion. Arduino is an electronic platform for open source and is used for learning input. RFID uses automatically available and tracking power waves tags attached to items. Tags contain information stored electronically. Students of the mark hear the information on the mark. These are such tags read in different places and review information. We have developed a twodimensional prototype with two entries exit procedures. The most secure algorithm is used to generate RFID tags attached on a printed freight label with details of goods, location facing me. In the login process, the details of each passenger state stored on a website. With the help of the Internet, a database about assets are sent to the cloud via GPRS and stored on the system. Information contains four key elements including the name of authority, air / train number, type of goods and mobile number of authorization and unique unique ID number other. The same ID number is sent to the passenger via SMS to keep it personal. When the passenger puts the luggage on the conveyor, the student collects it tag data and records from the start of the trip. As the bag moves through the shipping sender, RFID keeps track of the goods to ensure that the goods would be brought to the right gate and run away. At the same time, the site processes information submitted by the RFID system and it gets the passenger information to know otherwise ID number and send the appropriate message. When a passenger cargo is loaded onto a plane, the passenger receives a message "Your load was successfully loaded. "We can use the same identity number when sending goods to the exit calculator.If I the load is lost and goes somewhere other than the one you want then the exit area will be scanned and the database will show its identity it should not have gotten to the point where it made the sound cry again texting. This ensures minimal use of time, safety loads and economics which is why it provides customer satisfaction.

CONCLUSION

The purpose of this program is to track lost property. In this case, property may contain hardware tracking system or we may simply say that a tracking device where we will be able to track assets. IoT allows objects to be heard and controlled by remote access point, which makes the integration of computers and the physical world improves financial profitability, accuracy and efficiency. In this case, existing hardware will be built and installed Arduino basic board with GPS module and alarm connected to it . In the event of an error, the buzzer may be alarmed as well. Map created that can be synced to track location of the fund.

ACKNOWLEDGMENT

It gives us great pleasure in presenting the preliminary project report on '**Automated cargo tracking system Using IoT, MFRC522 RFID and BLYNK App**'.

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REFERENCES

[1] Adelman, S. Kelley, C. (2007). What is the relationship between performance measurement and strategy? DM Review Online: Issue May 1st, 2007.

[2] Allen R., Helms S. Marilyn M. (2002) Employee perceptions of the relationship between strategy, rewards and organizational performance. Journal of Business Strategies: Issue Fall 2002.

[3] Altenburg, T., Schmitz, H. Stamm, A. (2006) Building knowledge-based competitive advantages in China and India: Lessons and consequences for other developing countries. In: Proceedings of the Global Development Network Annual Conference: Asian and other drivers of global change. St. Petersburg, 18-19 January, 2006. pp. 31 – 33.

[4] AAnsoff, H. I McDonell, E. (1990) Implanting strategic management. 2nd Ed. England, Prentice Hall.

[5] Barney, J. (1991) Firm resources and sustained competitive advantage. Journal of Management. Vol. 17, No. 1 pp. 99-120.

[6] Benbasat, I., and, Zmud, R., (1999), "Empirical research in information systems: The practice of relevance", MIS Quarterly, Vol. 23, No. 1, pp. 3–16.

[7] Bhabuta, L. (1998) Sustaining productivity and competitiveness by marshalling IT. In: Proceedings of the Information Technology Management for Productivity and Strategic Advantage, IFIP TC-8 Open Conference, Singapore, March.

[8] Biddle, J., (2004), "Global visibility: myth or reality?", Journal of Commerce, February 16th, 2004, pg. 1.

[9] Bodamer, D., (2002), "Department of Transportation keeps backup systems for GPS tracking technology", Civil Engineering, Vol. 72, No. 5, pg. 32

[10] Business Software Alliance (2007) Fifth Annual BSA and IDC Global Software Piracy Study Retrieved March 3rd, 2009, from http://www.bsa.org

[11] Cole, M. A., Elliot, R.R. J. Strobl, E. (2007) The environmental performance of firms: The role of foreign ownership, training and experience. Department of Economics, University of Birmingham in its series Discussion Papers: Number 07-08. Cooper, D. R. Schindler, P. S. (2003) Business research methods. 8th Ed. New York, Tata McGraw-Hill.

[12] D'Aveni, F. Bowman, C. (1995) The essence of competitive strategy. England, Prentice Hall.

[13] D'Aveni, R. (1995) Hypercompetitive rivalries: Competing in highly dynamic environments. New York, Free Press.

[14] Ericson, J. (2007) Could monopolies be healthy for the software industry? Pasadena, California.

[15] Galliers, R. D. Leidner, D. E. (2006) Strategic information management: Challenges and strategies in managing information systems. 3 rd Ed. Oxford, Elsevier Butterworth – Heinemann.

Self-Sanitizing Robotic Wheelie Bin

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***Abstract*— The year 2020 has witnessed unusual demands for COVID-19 preventions and appliances. As we can see generation of bio-medical waste during the treatment and diagnose of COVID-19 are in large proportion. The collection and disposal of bio-medical waste is the challenge during global pandemic across the world. In India, the biomedical waste is producing in large number of tonnes. Most today's systems, techniques, and technology, on the other hand, are ineffective for the current circumstances. We need to implement a system that includes latest technologies and applications to fulfil the need in the society. To do so, we have built a smart dustbin which is self-sanitizing and its robotic feature make a helping hand for Human. The proposed system aims to reduce health hazardous issues caused by decayed waste and minimizes infectious diseases to spread from person to person.**

1. INTRODUCTION

We are in the era where population is the major concern for the society. Due to rise in rapid population world has to deal with several circumstances. One of major concern is rise in waste generation that leads to spreading of many infectious diseases. In most Indian cities, the fundamental issue with the current waste management system is the unsanitary state of the dustbins. We need a proper Waste Management system that manages garbage waste and segregate them in a smarter way. In India, the concept of smart city is being initiated so it becomes necessary to install a system that serves Smart and highly efficient with respect to Waste Management.

In this pandemic circumstance, waste collection, handling, and management has become a dangerous responsibility for sanitation employees. We are taking every possible precaution to be safe but we have to work for the people who are trash collectors, cleaning personnel, and housemaids. So, it is necessary to have a system that performs a task without human interference. The smart waste management system presented in this project attempts to cleanse the trash garbage in the bin. The sanitization process will eliminate the microorganisms and keep humans free from becoming affected [1]. In this paper, we have tried to overwhelmed the boundaries and upgrade the existing system with latest technologies

2. LITERATURE SURVEY

III. The system consists of Arduino Mega 2560, Servo Motor MG995, an IR Proximity Sensor, GSM Module Sim 900A and 12V Lithium-ion rechargeable battery is demonstrated in [2]. The system is free from human involvement for carrying the process of segregation and collection of waste. The GSM technology is being used to inform the authorized person about dustbin full through SMS. The system needs some modification with the use of latest technology like AI, IOT etc., to make it more precise and efficient system.

IV. The Researchers in [3] developed a system for monitoring the level of bins. When bins get filled completely, it will move automatically to the garbage disposal area, dispose the waste and come back to its place. The bin can move to particular areas for collecting garbage using 2-axis robot. Rain sensor is also used for closing the lid of bin, when rain is sensed. The system consists of various sensors and devices like IR sensor, Gas sensor, Arduino, WIFI Module, DC Gear Motor and so on.

V. The System comprises Ultrasonic sensor, Load cell HX11, Momentary switch, Node MCU. The mechanism prevents communal bins from overflowing by alerting the collection team when the bin is entirely full. The shortest path algorithm is used by the researchers in [4] to identify the shortest path between the bins that need to be gathered.

VI. Arduino UNO, Raspberry pi, solar panel, a servo motors, ultrasonic sensor, RFID tags, an RFID reader, geared motor are all included in the system. For waste monitoring, the system makes use of a cloud-based technology. [5]. It checks the garbage level inside the bin and update the information on database. The RFID reader scans the tags and extracts information from them.

VII. Researchers in [6] explained about the system that serves its purpose by getting a command by user's voice. The system is operated through a smart phone. The system comprises of Bluetooth device, Arduino-Uno, Motors driver and DC motors. The other sections include

LEDs and Ultrasonic sensor that are connected to the Micro-controller. The system needs proper connectivity and voice should be compatible to make robot work. The system is tough for old and a low pitch people too.

VIII. The System consists of ultrasonic sensor, relay, WIFI module, Arduino, GSM module, rainfall sensor, DTH 11. The Arduino interfaced with ultrasonic sensor to monitor level of waste present in the dustbin. The purpose of this document is to keep track of the waste in our surroundings and to monitor it. Through the GSM module, the dustbin alerts and sends a notification to the Municipal Corporation. As a result, these models require a lot of technology to manage and monitor the system, making them more expensive [7]

IX. Table 2.1 gives a quick overview of the systems discussed abovee

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3. PROPOSED SYSTEM

Fig 3.1 shows the complete working process of proposed system.

The Self-Sanitizing Robotic Wheelie Bin procedure is divided into three stages. They are as follows: -

Automatic sanitization process:

A square-shaped container will be used for disposing of waste. Firstly, with the help of PIR Sensor, the system will detect the presence of Human and calculate the distance between the person and the bin. After calculation, the lid of the bin will open automatically. When the waste is thrown inside the bin, the Proximity sensor will detect the waste within the bin and the sanitization process will take place immediately.

Waste Level Monitoring:

The Ultra Sonic sensor is placed at the top of the bin facing downward to detect the level of waste present in the bin. As the waste is thrown inside the bin, the level of waste is monitored by ultrasonic sensor and indicated with the help of LEDs. There are three LEDs (i.e., Red, Blue and Green) which will glow as per the waste inside the bin increases accordingly.

Changing the position of bin using android app:

The system also includes the robotic section that provides movement to the system from one place to another. This portion comprises of Bluetooth device, dc motors, Arduino UNO, motor driver. By downloading the Android software "BT Voice Control for Arduino" from the Google Play store, the system may be readily connected through Bluetooth. After the installation of app, we search for nearby robot and interconnect them, after which we can send voice command for the movement of the bin. The basic commands are right, left,

4. WORKING MODEL

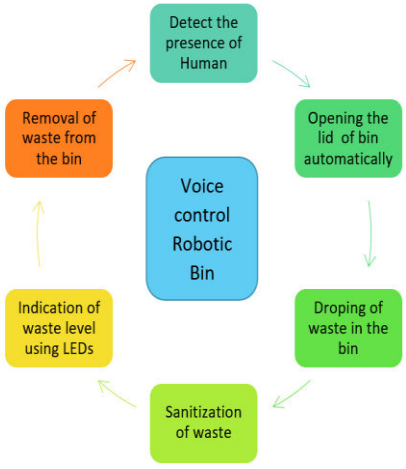

Fig.1 Working Model

5. METHODOLOGY

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6. CONCLUSION

We are in the World where every individual are cautions about their health and hygiene. As we have seen in recent time, unpredictable hazardous infectious disease spread all over the global drastically. The speed of disease is due to the improper waste management system, lack of resources in the society. The existing system are not fulfilling the present need like self-sanitizing, smarter handling process and many more. To overcome the limitations, we have built a system that removes all the barriers that hamper the progress of the nation. The proposed system is a smart, automatic which will help people to keep their surrounding clean effortlessly and safely. The aim of these system is to fulfil the present requirements arises after covid pandemic across globe. The system is self-sanitizing, preventing infectious illnesses from spreading among individuals. The technology can also monitor the amount of garbage in the bin. The Robotic Wheelie Bin provides dynamic mobility feature that will reduce the human efforts to collect garbage at different positions. The system aims to get a safe and clean environment for wildlife and mankind.

REFERENCES

1) Sharma, P., Kumar, P., Nigam, R., & Singh, K. (2020, December). Automatic Waste Segregating and Self Sanitizing Dustbin. In 2020 2nd International Conference on Advances in Computing, Communication Control and Networking (ICACCCN) (pp. 368-372). IEEE.

2) Jayson, M., Hiremath, S., & Lakshmi, H. R. (2018, February). SmrtBin-Automatic waste segregation and collection. In 2018 Second international conference on advances in electronics, computers and communications (ICAECC) (pp. 1-4). IEEE.

3) Sreejith, S., Ramya, R., Roja, R., & Kumar, A. S. (2019, March). Smart Bin for Waste Management System. In 2019 5th International Conference on Advanced Computing & Communication Systems (ICACCS) (pp. 1079-1082). IEEE.

4) Mithinti, S., Kumar, A., Bokadia, S., Agarwal, S., Malhotra, I., & Arivazhagan, N. (2019, May). IoT Based Smart Bin for Smart City Application. In 2019 International Conference on Intelligent Computing and Control Systems (ICCS) (pp. 1468-1472). IEEE.

5) Tripathi, A., Pandey, C., Narwal, A., & Negi, D. (2018, February). Cloud Based Smart Dustbin System for Metro Station. In 2018 3rd International Conference On Internet of Things: Smart Innovation and Usages (IoT-SIU) (pp. 1-4). IEEE.

6) Ayush, A., Kumar, A., Jha, A., Sarkar, N., Moharana, S. C., & Das, H. (2019, May). Voice Controlled Automatic Dustbin with Garbage Level Sensing. In 2019 International Conference on Intelligent Computing and Controlled Systems (ICCS) (pp. 450-453). IEEE.

7) Hussain, M. A., Nikhil, K., & Kalyan, K. Y. P. (2019, December). IOT Based Smart Dustbin Monitoring with Tracking System Using ATMega 2560 Microcontroller. In *2019 Fifteenth International Conference on Information Processing (ICINPRO)* (pp. 1-6). IEEE.

8) Navghane, S. S., Killedar, M. S., & Rohokale, V. M. (2016). IoT based smart garbage and waste collection bin. *International Journal of Advanced Research in Electronics and Communication Engineering (IJARECE)*, *5*(5), 1576-1578.

9) Akila, V., Gayathri, B., Avila, J., Thenmozhi, K., Amirtharaja, R., & Praveenkumar, P. (2021, January). BIOBIN for Safe handling and disposing of Biomedical waste during COVID'19. In *2021 International Conference on Computer Communication and Informatics (ICCCI)* (pp. 1-4). IEEE.

10) Rajapandian, B., Madhanamohan, K., Tamilselvi, T., & Prithiga, R. Smart Dustbin. *International Journal of Engineering and Advanced Technology (IJEAT), ISSN*, 2249-8958.

"EXHAUST GAS FILTRATION USING AQUA SILENCER"

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***Abstract*—Air pollution is most important from the public health of view, because every individual person breaths approximately 22000 times a day, inhaling about 15 to 22 kg of air daily. Polluted air causes physical ill effect decides undesirable aesthetical physiological effects. Air pollution can be defined as addition to our atmosphere of any material, which will have a dexterous effect on life upon our planet. The main pollutants contribute by automobile are carbon monoxide (CO), unburned hydrocarbon (UBHC), oxides of nitrogen (NOx) and Lead. Automobiles are not the only sources of air pollution, other sources such as electric power generating stations, industrial and domestic fuel consumption, refuse burning, industrial processing etc. also contribute heavily to contamination of our environment so it is imperative that serious attempts should be made to conserve of our environment from degradation. An Aqua Silencer is an attempt, in this direction. it is mainly dealing with control of emission and noise. An Aqua Silencer is fitted to the exhaust pipe of engine. Sound produced under water is less hearable than it produced in atmosphere. This mainly because of small sprockets in water molecules, which lowers its amplitude thus, lowers the sound level. Because of this property water is used in this silencer and hence its name Aqua Silencer. The noise and smoke level is considerable less than the conventional silencer, it is cheaper, no need of catalytic converter and easy to install.**

Keywords— aqua silencer, exhaust, emission, air pollution, noise, gas filtration

I. INTRODUCTION

Trees act like nature's lungs. They take in CO2 gases from the air and then use those gases for energy during thephotosynthesis process. A byproduct of photosynthesis is oxygen. Over the course of a year, one tree can absorb up to 13 pounds of CO2 gases. The loss of trees in cities has had devastating results. Heavy levels of CO2 gases in cities create thick smog and affect the natural ecosystem of the land. These concentrated levels of CO2 gases create a hostile environment for trees and plants, making it difficult for them to grow properly.

A customize silencer System is designed to replace conventional single unit engine silencers on board structures. With its lightweight and slender design, it offers a minimal 'footprint' while optimizing the entire exhaust system for low noise and reduced backpressure. It is used to control the noise and emission in IC engines.

The reason why we go for customize silencer is, in today life the air pollution causes physical ill effects to the human beings and also the environment. The main contribution of the air pollution is automobile releasing the gases like carbon dioxide and unburnt Hydrocarbon.

In order to avoid this type of gases we are introducing this customize silencer. It is fitted to the exhaust pipe of the engine. Sound produced under water is less hearable than it produced in atmosphere. This mainly because of small sprockets in water molecules, which lowers its amplitude thus, lowers the sound level. The emission can be controlled by using the activated charcoal layer and it is highly porous and possesses extra free valences so it has high absorption capacity. So it absorbs the gases from the engine and releases much less portion to the environment.

II. DESIGN AND WORKING PRINCIPLE

Basically an aqua silencer consists of a slotted plate which is installed at the end of the exhaust pipe. The slotted plate assembly is filling by water and scrubber. When engine exhaust entersfrom side of water and scrubber areas it will rub by scrubber and wash by water in this procedure solid partial of carbon is mixed with water and suspended in bottom. Some particle which is not dissolve in water is further cleaned by charcoal layer which absorb active carbon and sulphur dioxide. Further gas is passing through felt filter for final cleaning purpose. A small opening is at the opposite side of inlet of the container to remove the exhaust gases & a drain plug is provided at the bottom of the container for periodically cleaning of container.

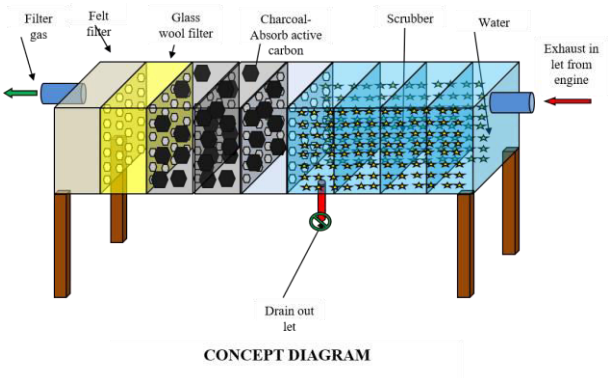


Figure 1

A. *ABSORPTION BY WATER*

1) REACTIONS

a) $NO2 + 2H2O \rightarrow HNO2 + 2HNO3$ (Diluted)

From the oxides of Nitrogen, Nitrogen will be absorbed to a larger extent by water.

b) $Ca(OH)2 + 2HNO3 \longrightarrow Ca(No3)2 + 2H2O$

$Ca(OH)2 + 2HNO2 \rightarrow Ca(NO2)2 + 2H2O$

Reaction due to addition of lime water

c) $Ca(OH) + CO2 \longrightarrow CaCO3 + H2O$

$CaCO3 + H2O + CO2 \rightarrow Ca(HCO3)2$

Calcium carbonate will precipitate, when the carbon-di-oxide present in the exhaust gas and comes in contact with the limewater. The calcium carbonate when further exposed to carbon-di-oxide, calciumbi-carbonate will be precipitated.

d) $Ca(OH)2 + SO2 \rightarrow CaSO3 + H2O$

The sulfur-di-oxide present in the Diesel Exhaust also reacts with the limewater. But the small trace of sulfur-di-oxide makes it little difficult to measure the magnitude of the chemical reaction, accurately. This equation gives the chemical reaction and calcium sulphite willprecipitate.

e) $CaCO3 + SO2 + H2O \rightarrow CaSO3 + CO2 + H2O$

From calcium carbonate, calcium sulphite will precipitate and CO2will be by-product. Because of the small percentage and SO2 presence, the liberation of Carbon dioxide is very less. But the liberated CO2will again combine with CaCO3 to form calcium bicarbonate.

B. *EFFECT OF DISSOLVED GASES ON WATER*

The water is a best absorbing medium to use in silencer fordissolve toxic gases in water and reduce it completely. After these gases dissolved in water they form acids, carbonates, bicarbonates etc.

1) Effect of dissolved SO2:

When SOx is mixed in water, it form SO2, SO3, SO4, H2SO4 i.e. sulphur Acid (H2SO3), it forms Hydrogen Sulphide which causes carious egg smell, acidify and corrosion of metals.

2) Effect of dissolved CO2:

The dissolved carbon dioxide forms Carbonates and Bicarbonates at lower and higher PH. This levels in between 40-400 mg/lit. When carbon dioxide mixes with water it form Carbonic acid and it is corrosive to metals and also causes greenhouse effect.

3) Effect of dissolved NOx:

The NOx in exhaust gas under goes Oxidation to form Nitrate, Nitrite, Nitric acid, ammonia. This synthesis of protein and amino acids is affected by Nitrogen. Nitrate usually occurs in trace quantities in exhaust gas.

C. *ABSORPTION BY ACTIVATED CHARCOAL*

Because of its high surface area, activated carbon has the ability to selectively adsorb and retain certain types of molecules on the internal surfaces of tiny pores and interstices of its granules. The selectivity and capacity for adsorption depend on the method of carbon production or activation, and can be very high for removal of agents and chlorinated hydrocarbons.

III. LITERATURE REVIEW

1) ***Aqua Silencer by Harshit Saraswat, BTech Mechanical.Poornima University Jaipur, Rajasthan, India.***

An aqua silencer has more efficiency to reduce emission gases from engine. The emission gases controlled by lime water, charcoal layer and perforated tube. The perforated tube back pressure always remains constant and sound level of exhaust reduced. It is pollution free and smokeless

2) ***A Review on Design and Development of Aqua Silencer, Vikas Kachare1, Venkatesh Kannan2, Prashant Taware3 and Pratik Ghayal4 University of Mumbai,Department of Mechanical Engineering Lokmanya Tilak College of Engineering, Navi-Mumbai, India***

In this review paper the complete focus was given on the study about the use of aqua silencer enhances the reduction of noise and toxic emission and all the various applications. There is tremendous progress in the field of reduction of toxic emission but still there is scope of further advancement in this field. By using perforated plates the fuel consumption remains same as conventional system. By using water as a medium the sound can be lowered and also by using activated charcoal in water we can control the toxic emission to a greater level. In aqua silencer the water contamination is found to be negligible. It gives smokeless and pollution free emission and also it is less expensive. It can be used for vehicles and also can be used in industries.

3) ***Design and Development of Aqua SilencerAkhil Anil Kumar1, Anoop N1, Aquib Jawed P.P1, Bijoy E1, Midhun T.V1, Mohammed Shiyas.N.P1, Ranjith Krishna P.T2 1 Graduate Student, 2Assistant Professor Department of Mechanical Engineering, AWH Engineering College Calicut, Kerala, India***

It has been experimentally observed that the aqua silencer is successfully effective in reducing emission of gases from the engine exhaust. By using water as a medium, the sound levels have been reduced and by using activated charcoal in water, it produces almost pollution-free and smokeless emission and is also cheap considering long term use. The aqua silencer's performance is almost equivalent to the conventional silencer. It can be widely used in industrial engines and with a little improvisation, in heavy weight vehicles. This project analyzed the smoke content of the exhaust gas before and after treatment and it was found that there is a considerable reduction in the emission as pointed out by the test results

4) ***Reduction in Emissions and Noise using AQUA-SILENCER1Prof H.A Khande, 2Karansingh K.Naglot, 3Shubham B.Lutade, 4Akshay K.Pardeshi, 5Ruthuja***

S.Patil Mechanical Engineering Department Smt. Kashibai Navale College of Engineering, Pune.

The aqua silencer is more effective in the reduction of emission gases from the engine exhaust using perforated tube and charcoal. By using water as a medium the sound can be lowered and also by using activated charcoal in water we can control the exhaust emission to a greater level. The water contamination is found to be negligible in aqua silencer. It is smokeless and pollution free emission and also it is very cheap. It can be also used both for two wheelers and four wheelers and also can be used in industries

*5) **"Review Paper On Design And Development of Aqua Silencer" 1Omkar Mali,Pravin Shinde, Shivanand Patil, Akash Masal, Arunkumar Ravi,Prof. P.V.Kadam, Prof.N.V.Hargude Students, PVPIT Budhgaon.Maharashtra, India.67Professors, Mechanical Dept. P.V.P.I.T.Budhgaon, Maharashtra, India.***

The activated charcoal layer filters this harmful nitrous and sulfur content produced from the engine. Sound produced under water is less audible than it produced in atmosphere. This is mainly because of small sprockets in water molecules, which lowers its amplitude thus, sound level decreases. Due to this lime water is required in this silencer and hence its name Aqua Silencer. Serious attempts should be made to reduce these pollutants and save our environment

IV. EXPERIMENTATION

Photograph 1

Photograph 2

A Pollution Under Control (PUC) test was doneon Honda Activa moped with the Aqua Silencer at nearest Government Of Maharashtra authorised PUC testing center. Different readings were taken varying the water, charcoal and Scrubber quantities.

V. RESULTS AND OUTCOMES

Following graphs shows the variation in carbon content with varying quantity of water, scrubbers and activated charcoal

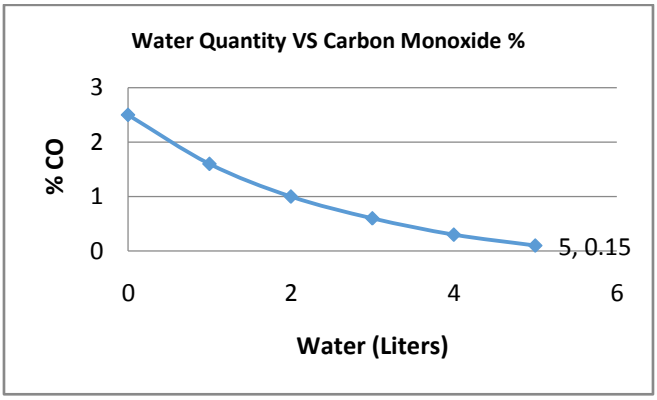


Figure 2

With the increasing water quantity there is significant decrease in percentage of carbon monoxide

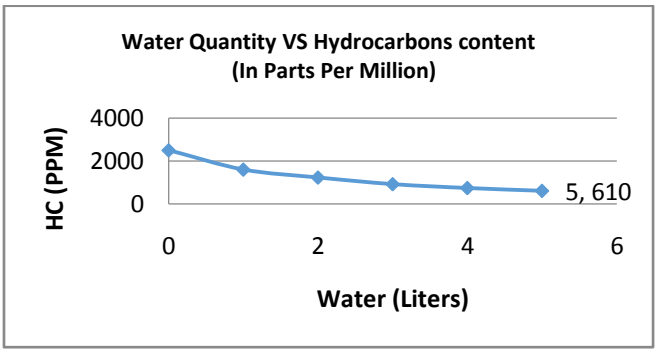


Figure 3

With increasing water quantity there is significant decrease in hydrocarbon content

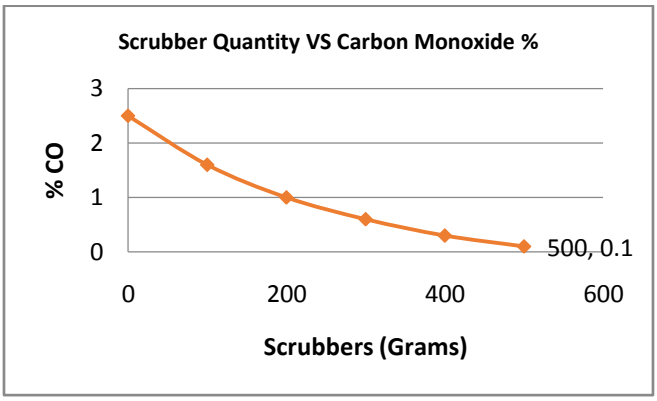


Figure 4

With increasing scrubber quantity there is significant decrease in percentage of carbon monoxide

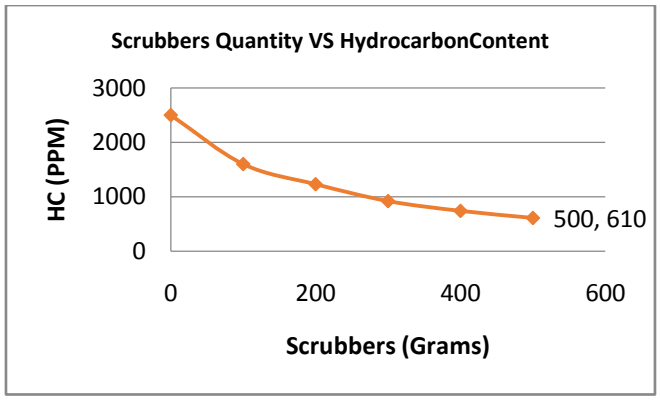


Figure 5

With increasing scrubber quantity there is significant decrease in hydrocarbon content

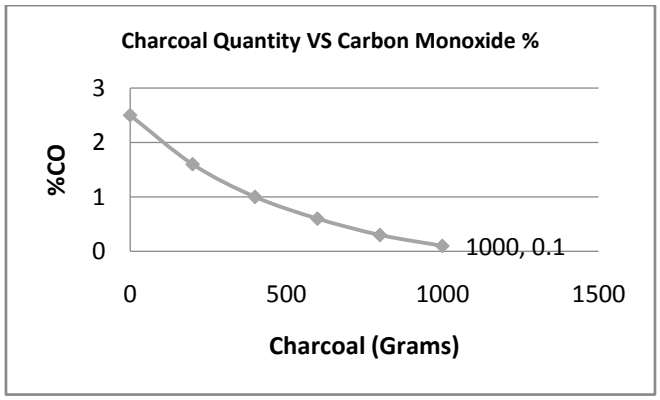


Figure 6

With increase in charcoal quantity there is significant decrease in percentage of carbon monoxide

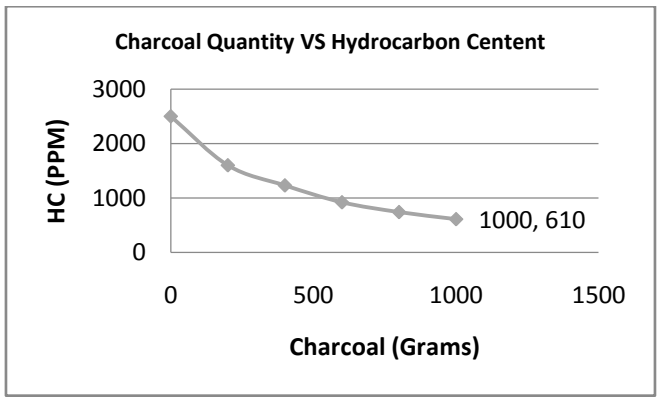
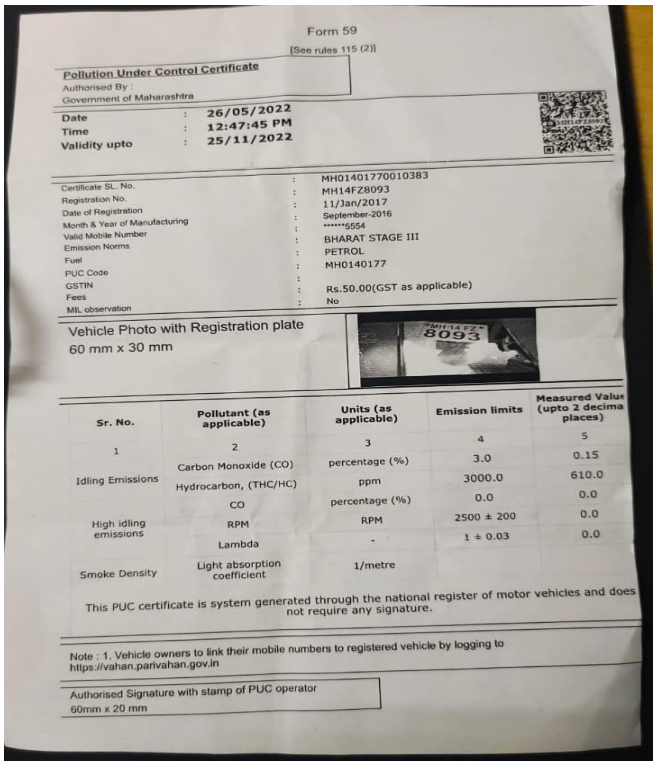


Figure 7

Wirth increase in charcoal quantity there is significant decrease in hydrocarbon content


Form 59
[See rules 115 (2)]

Pollution Under Control Certificate
Authorised By : Government of Maharashtra

Date : 26/05/2022
Time : 12:47:45 PM
Validity upto : 25/11/2022

Certificate SL. No.	MH01401770010383
Registration No.	MH14FZ8093
Date of Registration	11/Jan/2017
Month & Year of Manufacturing	September-2016
Valid Mobile Number	******5554
Emission Norms	BHARAT STAGE III
Fuel	PETROL
PUC Code	MH0140177
GSTIN	
Fees	Rs.50.00(GST as applicable)
MIL observation	No

Vehicle Photo with Registration plate
60 mm x 30 mm

Sr. No.	Pollutant (as applicable)	Units (as applicable)	Emission limits	Measured Value (upto 2 decimal places)
1	2	3	4	5
Idling Emissions	Carbon Monoxide (CO)	percentage (%)	3.0	0.15
	Hydrocarbon, (THC/HC)	ppm	3000.0	610.0
High idling emissions	CO	percentage (%)	0.0	0.0
	RPM	RPM	2500 ± 200	0.0
	Lambda	-	1 ± 0.03	0.0
Smoke Density	Light absorption coefficient	1/metre		

This PUC certificate is system generated through the national register of motor vehicles and does not require any signature.

Note : 1. Vehicle owners to link their mobile numbers to registered vehicle by logging to https://vahan.parivahan.gov.in

Authorised Signature with stamp of PUC operator
60mm x 20 mm

Photograph 3

Photograph 3 Shows the PUC certificate of the test done

VI. CONCLUSION AND DISCUSSION

1. The aqua silencer is more effective in the reduction of emission gases from the engine.
2. By using perforated tube the backpressure will remain constant and the sound level is reduced..
3. By using perforated tube the fuel remains same as conventional system.
4. By using water as a medium the sound can be lowered and also by using activated charcoal in water we can control the exhaust emission to a greater level.
5. It gives is smokeless and pollution free emission. It can be also used both for two wheelers and four wheelers and also can be used in industries.

VII. REFERENCES

[1]Keval I. Patel, Mr. SwastikR. Gajjar "Design And Development Of Aqua Silencer For Two Stroke Petrol Engine"IJIRST–International Journal for Innovative Research in Science & Technology| Vol. 1, Issue 1, June 2014| ISSN(online): 2349-6010.

[2] Sharad R. Mahajan "Air Pollution from I.C. Engines & its Control" International Journal of Inventive Engineering and Sciences (IJIES), October 2013.

[3] Yogesh V.Morankar, Prof. M. R. Khodke, "Noise Reduction Of A Diesel Engine: A Review," International Journal of Engineering Research & Technology (IJERT)ISSN: 2278-0181, Vol. 3 Issue 5, May – 2014.

[4] S.*, PatilSnehal S., NandrekarAmruta A., Abhijeet S. Kabule, “Use Of Aqueous Ammonia In Silencer For Removal Of Co2, So2 And Nox From Exhaust Gases Of I.C. Engines” RawaleSudarshan International Journal of Engineering Science and Innovative Technology (IJESIT)Volume 2, Issue 5, September 20.

[5] Patel Praful M, GajjarSwastik R., “A Literature Review On Design And Development Of Industrial Generator Silencer” IJSRD - International Journal for Scientific Research & Development| Vol. 3, Issue 01, 2015

[6] JuhiSharaf; “Exhaust Emissions And Its Control Technology For An Internal Combustion Engine” International Journal of Engineering Research and Applications, Vol. 3, Issue 4, Jul-Aug 2013

Performance Analysis Of Solar Based Mini Seed Driller

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Abstract—**Today's world is marching towards the rapid growth of all sectors including the agriculture field. Agricultural sector is changing the social as well as economic environment of the population due to globalization. Agriculture has been the backbone of the Indian economy and it will remain as it is for a long time. Agriculture is demographically the broadest economic sector and plays very important role in the overall socio-economic fabric of India. In India most of the people are living in rural area and they are still dependent on the agriculture field but they are using old technique (conventional method). The conventional method is less efficient and time consuming. To meet the future food demand, the farmers have to implement the new technique which will not affect the soil texture but will increase the crop production. To overcome the drawbacks of conventional method we developing the seed sowing machine, this can perform different operations. The comparison between traditional sowing method and the proposed machine which can perform multiple operations.The main purpose of our machine is to automate the process of digging and seed sowing at proper distance and depth.**

I. Introduction

In the current generation most of the countries do not have sufficient skilled man power in the agriculture sector and it affects the growth of developing countries. Soit's a times to automate the agriculture sector to overcome this problem by using upgraded technology for cultivation activity. The basic operation of sowing machine is to sow the seed in the row at the required depth and maintain the distance between two seeds. The eliminator is used to charge the 12V battery which is utilised by the dc motor. We have fixed the distance between two seeds and can be changed by changing the wheelsize or number of the teeth on sprocket. By using this innovative project of seed sowing machine we can save time required for sowing process and it also reduce the labourers cost.

This machine control the seed depth and proper utilization of the seeds to reduce the wastage of seeds.Seed sowing machine is a device which helps in the sowing of seeds in the desired position hence assisting the farmers in saving time and money. So considering these points related to spraying and seed sowing an attempt is made to design and fabricate such equipment which will able to perform both the operations more efficiently and also will result in low cost. Decrease the operational cost by using new mechanism. Work reliably under different working conditions. Decrease the cost of the machine. Decrease labor cost by advancing the spraying method. The machine can be operated in the small farming land (1 acre). Making such a machine which can be able to perform both the operation.

II. Literature Survey

MANUAL BROADCASTING SYSTEM:

A field is initially prepared with a plough to a series of linear cuts known as furrows. The field is then seeded by throwing the seeds over the field. The result is a field planted roughly in rows but having a large number of plants. Many projects are undertaken to overcome the drawbacks ofbroadcasting system. Some of those projects are given below.

Drawbacks of manual broadcasting system are no control over the depth of seed placement.

1. No uniformity in the distribution of seed placement.
2. Loss of seeds.

3. Time required for sowing is more.

CONVENTIONAL SEED SOWING MACHINE :

Another method of sowing the seeds is with the help of a simple device consisting of bamboo tube. This bamboo tube with a funnel on it is attached to a plough. When the plough moves overthe field, the tube attached to it leaves the seeds and kept in the funnel at proper depth as well as spacing. The plough keeps making furrows in the soil in which the seeds are dropped by the seed drill. Drawbacks of this system are no proper germination of seeds. Wastage of seeds. No control over the depth of seed placement.

SOLAR POWERED SEED SOWING MACHINE:-

In this system the basic objective of sowing operation is to put the seed and fertilizer in rows at desired depth and spacing, cover the seeds with soil and provide proper compaction over the seed. This system uses solar panel which is made up of photovoltaic (PV) cells, which turns sunlight into electricity. The main disadvantage of this project was this system is not automatic.

Mahesh R. Pundkar[1] stated that the seed sowing machine is a key component of agriculture field. high precision pneumatic planters have been developed for many verities of crops, for a wide range of seed sizes, resulting to uniform seeds distribution along the travel path , in seed spacing**.**

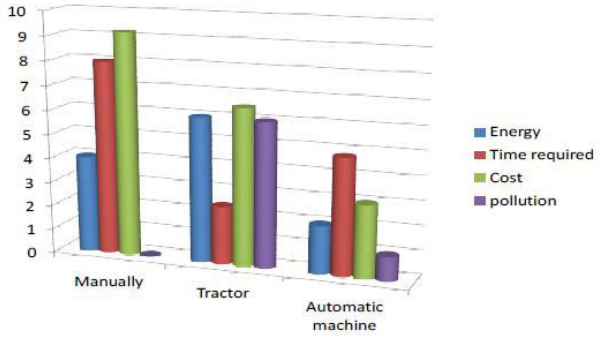
P.P. Shelke[2] concludes that bullock drawn planters are becoming necessity for sowing as the skilled workers for sowing are almost diminishing. Planting distance and plant population are crucial factors in maximizing the yields of crops**.**

Singh (1971) revealed that by using a seed drill for wheat crop there was an increase in yield by 13.025 percent when compared with the conventional method, it also revealed that by using a seed drill for wheat crop**,** a saving of 69.96 per cent in man-hours and 55.17 percent in huliock hours was achieved when compared, with the conventional method.

Umed Ali Soomro at al.in Pakistan has evaluated three sowing methods and seed rate in a four replicated RCBD method and concluded that drilling method of sowing at seed rate 125 kg/ha is optimal for yield and quality of wheat grains, because the said sowing method and seed rate distribute seed uniformly and desired depth which provide appropriate depth for seed germination and crop establishment**.**

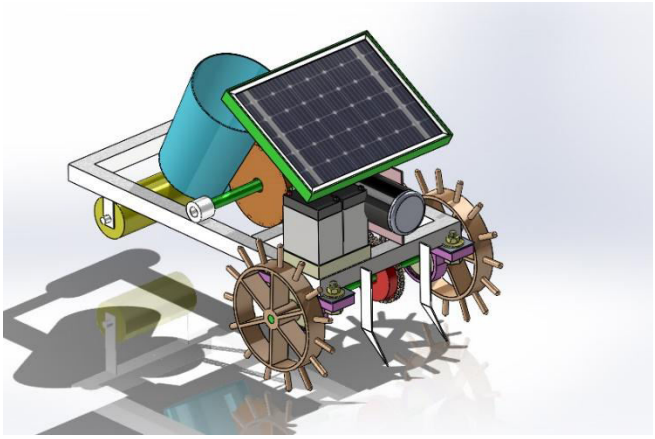
D. Ramesh and H. P. Girish Kumar presented review provide brief information about the various types of innovations done in seed sowing equipment. The basic objective of sowing operation is to put the seed and seed in rows at desired depth and seed to seed spacing, cover the seeds with soil and provide proper compaction over the seed. The recommended row to row spacing, seed rate, seed to seed spacing and depth of seed placement vary from crop to crop and for different agro-climatic conditions to achieve optimum yields. Seed sowing devices play a wide role in the agriculture field.

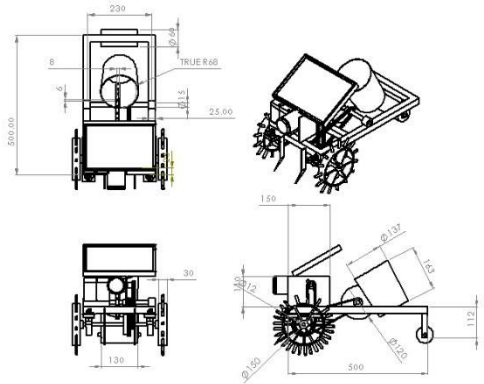
Pranil V. Sawalakhe and et. al., are investigated the today's era is marching towards the rapid growth of all sectors including the agricultural sector. To meet the future food demands, the farmers have to implement the new techniques which will not affect the soil texture but will increase the overall crop production. This Paper deals with the various sowing methods used in India for seed sowing and seed placement.



III. CAD MODEL

The entire model has been designed with the help of designing software solid works.





IV.CONSTRUCTION

Frame :-

The frame is usually made of mild steel. It is strong enough to withstand all types of loads in working condition. All other parts are fitted to the frame. Frame is helping the supporting of the

various light load support. Frame shows the good aesthetic loop. every machine should have required the good frame design. Frame material should have high strength because frame balancing of other machine load.

Shaft:-

A shaft is rotating machine element which is used to transmit power from one place to another. The power is delivered to the shaft by some tangential force and the resultant torque (or twisting moment) set up within the shaft a set up within the shaft permits the power to various machines linked up to the shaft. In order to transfer the power from one shaft to another, the various members such as pulleys, gears etc., are mounted on it.

Battery:-

The battery is an electrochemical converting chemical energy into electrical energy. The main purpose of the battery is to provide a supply of current for operating the cranking motor and other electrical units.

Specification,

1. Voltage 12v
2. Current 32 Ah

DC Motor:-

Almost every mechanical movement that we see around us is accomplished by an electric motor. Electric machines are a means of converting energy. Motors take electrical energy and produce mechanical energy.

Chain Drive:

We know that in belt and rope drives that slipping may occur. In order to avoid slipping, steel chains are used. The chains are made up of rigid links which are hinged together in order to provide the necessary flexibility for warping around the driving and driven wheels

Solar:-

Size of Solar plate -Length *Width*Height=25.4*25.4*2.5

Type of Solar plate -Polycrystalline

Power- 3Watt 9v

Cutting: -

Cutting is the separation or opening of a physical object, into two or more portions, through the application of an acutely directed force.

Implements commonly used for cutting are the knife and saw, or in medicine and science the scalpel and microtome. However, any sufficiently sharp object is capable of cutting if it has a hardness sufficiently larger than the object being cut, and ifit is applied with sufficient force. Even liquids can be used to cut things when applied with sufficient force.

Welding: -

Welding is a fabrication or sculpturalprocess that joins materials, usually metals or thermoplastics, by using high heat to melt the parts together and allowing them to cool causing fusion. Welding is distinct from lower temperature metal-joining techniques such as brazing and soldering, which do not melt the base metal.

V.METHODOLOGY

Initially required size sprocket is placed on the shaft for achieving required pitch and initiates the seed sowing sequence. The rollers is provided to plain the soil after sowing seeds. Depending on the pitch, the machine then moves through the distance specified in the pitch. The distance is fixed by using specially designed seed picker. When the machine covers the respective distance the machine stops to sow the seed. When the machine stops the seed sowing mechanism sow the seed at specified pitch. Seed sowing mechanism is responsible for sowing the seeds at a particular pitch. It consists of hopper in which seeds are added and a small plough which digs the field. When the machine stops at a particular pitch the seed from the hopper is sowed into the field. The machine will run using 12 v batteries.

VI. CALCULATION

1)Power transmitted by shaft:-

$$P = \frac{2\pi NT}{60}$$

Where, N→ Rpm of motor shaft

T →Torque transmitted

2)Dia. of sprocket:$\frac{Perip\ hery}{\pi}$

3)No. of teeth (pinion), N1

4)No. of teeth (sprocket), N2

5)Torque transmitted:-

T = Force × radius of wheel

6)Linear velocity v for wheel:-

$$V = \frac{\pi DN}{60}$$

7)Design of chain pin failure:-

$$T = F \times radius\ of\ sprocket$$

8)Stress = $\frac{force}{area \times 2}$

VII. EXPERIMENT AND RESULT

In this experiment the basic objective of sowing operation is to put the seed in rows at desired depth and spacing, cover the seeds with soil and provide proper compaction over the seed.

depth vs speed –

When battery is fully charged then after sowing seed on 0cm depth then machine will give speed of 3m/s. Likewise if we increase the depth to 1cm then speed will reduce to 2.6m/s as shown in figure 1.

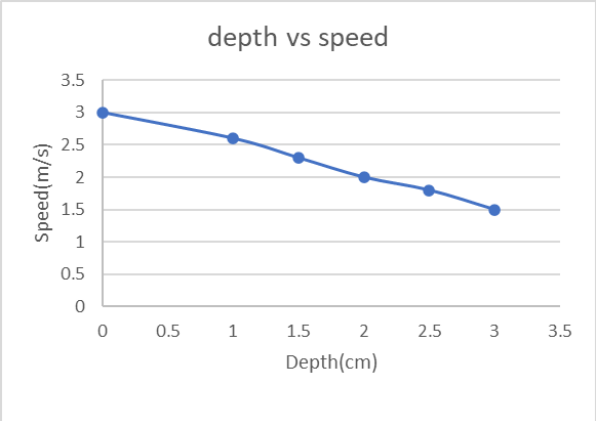


Fig1

depth vs energy-

When the battery is fully charged then after sowing seed on 0cm depth energy consumed by machine will be 9.64J.Likewise if we increase the depth to 1cm then energy consumed will increase to 11.25J as shown in figure 2.

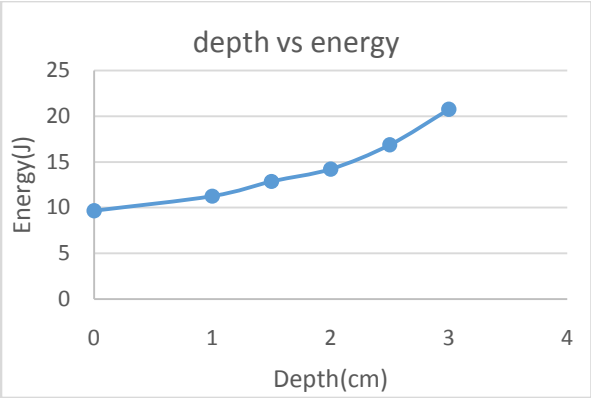


Fig 2

speed vs energy-

When battery is fully charged then after sowing seed with speed of 3m/s energy consumed by machine will be 9.64J. Likewise if we decrease the speed to 2.6m/s then energy consumed will increase to 11.25J as shown in figure 3.

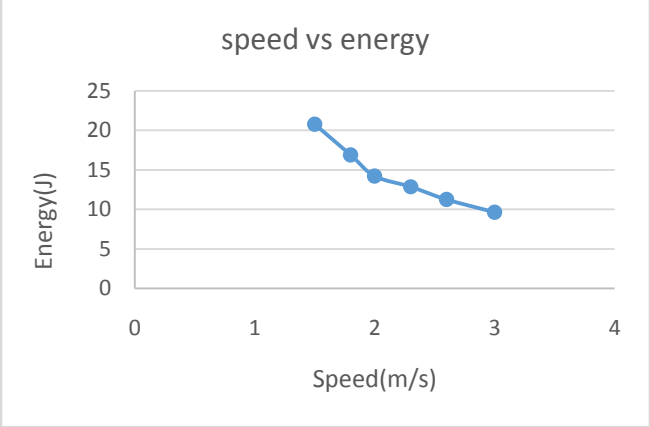


Fig 3

VIII. CONCLUSION

In each complete rotation of rotating Wheel there is seeds falls from this seed drum and seed plantation process taken place smoothly and without wastage of seeds. The sowing disc is rotate in the seed chamber; the seeds are falls in the seed chamber through seed storage tank. The seed buckets are collect the seeds from the chamber and it sow in the ground as required depth with the help of plough. Here the wastage of seeds is also being reduced to a greater extent. This system has been developed for the sowing of seeds in an automatic way. Here with the help of a robot the seeds are been dispensed in the soil in a proper sequence hereby reducing the wastage of seeds The planting process of the onion crop only has been implemented by using this Seed Sowing V robot autonomously. This robot will help the farmers to do the farming process efficiently. The project can be enhanced to any other kinds of crop such as fruits, paddy, sugarcane etc. The robot can be designed with spiked nail wheel instead of normal wheel. Hence, it can be applicable to the real time agricultural field.

VII. FEASIBILITY STUDY

Comparisons between seed Sowing Method

Sr. No	Parameter	Manual	Tractor	Seed Plantation Machine
1	Man power	More	Moderate	No
2	Time required	More	Less	Less
3	Sowing technique	Manually	Manually	Automatically
4	Distance between seed	Not fixed	Not fixed	Fixed
5	Wastage of seed	Moderate	More	Less
6	Required energy	High	Very High	Less
7	Pollution	No	More	No
8	Alarm and display	No	No	Yes

ACKNOWLEDGMENT

In preparing this project number of hands helped me directly and indirectly. Therefore, it becomes my duty to express my gratitude towards them.

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If it will fail in my duty if I won't acknowledge a great sense of gratitude to our **HOD Prof S.M.Gaikwa**d and Principal **Dr. M.S.Gaikwad** and the entire staff members in mechanical engineering department for their cooperation.

REFERENCES

1. **Mahesh R. Pundkar,-** Int J Eng Soc Sci, 2015
2. **P.P. Shelke**"Design and Implementation of Multi seed Sowing Machine" , International Journal Of Mechanical Engineering And Robotics Research, Vol.2, No.4, ISSN: 2278, 2013.
3. **Singh (1971)**"Solar Energy Utilisation", 2016, Fifth Edition
4. **Umed Ali Soomro**, "Solar Operated Seed Sowing Machine", International Journal of Advanced Agriculture Sciences and Technology 2015, Volume 4, Issue 1,PP.67-71, 2015.
5. **D. Ramesh and H. P. Girish Kumar,**"Development of Agriculture Seeding Equipment", International Journal of Informative & Futuristic Research, 2014, Volume -1 Issue -10, J, Pp-133-138
6. **Prof. Pranil V. Sawalakhe :-**"Solar Powered Seed Sowing Machine",Global Journals of Advanced Research in Mechanical Engineering, Vol-2, Issue-4, PP.712-717, 2015
7. **Dransfield P S, Willatt T and Willis A H (1965)**, "Soil to Implement Reaction Experienced with Simple Tines at Various Angle Attack", Journal of Agriculture Engineering Research, Vol. 9, No. 3, pp. 220-224.
8. **Gupta V K, Vig A C and Ranjodh Singh (1970),** "Influence of Spacing, Time of Sowing and Nitrogen Fertilization on the Yield of Wheat", Indian Journal of Agronomy, Vol. 15, pp. 251-253.
9. **Iqbal N, Akbar N, Ali M, Sattar M and Ali L (2005),** "Effect of Seed Rate and Row Spacing on Yield and Yield Components of Wheat", Journal of Agricultural Research, Vol. 48, No. 2.
10. **Malik A U, Ahmad Alias M, Bukhsh H A and Hussain I (2009),** "Effect of Seed Rates Sown on Different Dates on Wheat Under Agro-Ecological Conditions of Dera Ghazi Khan", The Journal of Animal & Plant Sciences, Vol. 19, No. 3, pp. 126-129.
11. **Mohammed Jamil Rajput, ShamsuddinTunio, Mushtaque Ahmed Rajput andFazal Karim Rajput (2008),** "Effect of Rowand Plant Spacing on Yield and YieldComponents in Soyabean", PakistanJournal of Agriculture Research, Vol. 5, No. 2.

12. **Sharma K C and Mahendra Singh(2008**), "Response of Dwarf Wheat toRow Direction and Row Spacing", Indian Journal of Agronomy, Vol. 16, pp. 396-399.
13. **Siemens J C, Weher J A and Thornborn(1965**), "Mechanics of Soil Influence by Tillage", Transaction of ASAE, Vol. 8, No. 1, pp. 1-7.
14. **Srivastava N S (2004**), "Research onEfficient Utilization of Animal Energy Under All India Co-Ordinated ResearchProject on Efficient Utilization of Animal Energy with Enhanced SystemEfficiency", Agriculture Engg. Today, Vol. 22, Nos. 1-2, pp. 15-44.
15. **Umed Ali Soomro, Mujeeb Ur Rahman, Ejaz Ali Odhano, Shereen Gul and Abdul Qadir Tareen (2009),** "Effects of SowingMethod and Seed Rate on Growth andYield of Wheat", World Journal of Agricultural Sciences, Vol. 5, No. 2, pp. 159-162.
16. **Uttam S K and Das S K (2009),** "RowSpacing, N and Mulching on Yield, RUEand Nutrient Uptake of Rainfed Wheat", Madras Agricultural Journal, 534-537.

Smishing Identifier

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***Abstract*—With increase in digital technology & due to wide expansion of internet cyber attacks & cyber crimes are increasing day by day. Sending Phishing SMS is the common type of attack that most of the black hat & gray hat hackers use. So to reduce or prevent this issue we have implemented in our project named The Smishing identifier. In the field of Cyber Security, phishing is a cyber attack that can be performed by using malicious URLs or phishing URLs which are intentionally made to compromise devices or privacy of victims by sending it to victims and tricking the victim to click the link by using the Social Engineering methods. After clicking the link, your device may get infected by some sort of malware or your personal information may get compromised or any cyber crime may occur like your full account access by using CSRF attack. In this phishing category the same technique of attack is performed by sending phishing SMS to the victim called Smishing. We can identify Smishing attacks by scanning the URLs received with the SMS. If the URL contains a malicious code then after scanning it will detect the URL as a phishing URL. In Smishing Identifier we have used Google's Safe Browsing Server API which helps in identification of fake URLs.**

***Index Terms*—Smishing, Phishing SMS, Mobile security, Mitigation, Cyber Awareness, Malware Scanning, Malicious links, Cyber Security**

I. Introduction

Today SMS technology is less used for communication but more used by scammers and cyber criminals to compromise peoples bank accounts or devices. The Smishing Identifier is our project, which is helpful in identification of this cyber attack or scams because this type of scams or attacks are done using Social Engineering techniques by sending a URL to victim and tricking them to click on the URL but Smishing Identifier can identify such types of URLs that causes a damage and helps to stay aware of such types of attacks or scams.

Basically, people who do not have the technical knowledge and aren't aware of cyber security become the victim of black hat hackers or fraudsters. People who do not know about phishing, scamming and think each and every link with HTTPS and without HTTPS are safe to click are not able to survive for much time in the world of the internet. Lots of people do not know about technical terms like how the URL works, what is internet protocol and how to check if the link is safe to click. Infected links which are created by cyber criminals to bypass the detection security helps in victimizing targeted people & attacker gets benefit from it. This type of Infected links are hard to detect because it requires lots of research, time and team work which is mainly done by malware researchers but everyone doesn't have that knowledge and time to do research and identify the difference in safe and unsafe URLs.

II. Existing System

As a section of literature survey, we have investigated some research papers on phishing SMS identification. We found some following research papers on different techniques to identify the phishing SMS but that have some limitations on identification of phishing SMS.

A. A Novel Approach to Detect Spam and Smishing SMS using Machine Learning Techniques

This paper is published by Anil Kumar Jain, Sumit Kumar Yadav, Neelam Choudhary. They proposed the machine learning techniques which are used to identify phishing SMS. [6]

B. SMS Phishing and Mitigation Approaches

This paper is published by Sandhya Mishra and Devpriya Soni. They proposed different approaches to mitigate the threat of phishing SMS. [3]

C. Review on Mobile SMS Spam Filtering Techniques

This paper is published by Shafi'i Muhammad Abdulhamid, Muhammad Shafie Abd Latiff, Haruna Chiroma, Oluwafemi Osho, Gaddafi Abdul-Salaam, Adamu I. Abubakar, and Tutut Herawan. They proposed a review on mobile SMS spam filtering techniques. [1]

III. Proposed System

A. Objective Of The Work

Objective of Smishing Identifier is to help both types of people who know how to identify phishing URLs and who don't. Identifying such phishing links accurately and faster also helps to spread awareness of such cyber attacks techniques and prevents scams to occur. Our objective is to identify the phishing SMS accurately with the help of Google's Safe Browsing API.

B. Project Scope

The main purpose of the Smishing Identifier project is to protect the end user from the phishing attack techniques, social engineering and scams causing via specially crafted SMS and malware links. The Smishing Identifier in the user's smart phone will automatically tell you if a message containing a link is phishing or not.

IV. Requirements

Before the implementation of Smishing Identifier, as per the rule of SDLC we have analyzed and gathered some functional as well as software requirements as follows.

A. Functional Requirements

- Sending HTTP Requests
- User Interface
- URL Extraction
- Checking For Masked URL
- File System

B. Software Requirements

- Visual Studio Code IDE
- Flutter Framework
- Dart Compiler
- Google's Safe Browsing Server API

C. Hardware Requirements

- Minimum Intel i3 64-bit processor computer
- Minimum 4GB RAM computer
- Smartphone
- USB cable

V. System Design

A. System Architecture

The following system architecture design is a whole visualization of what the different layers and modules are in Smishing Identifier and also which are the methods and how the flow of data can happen inside the application.

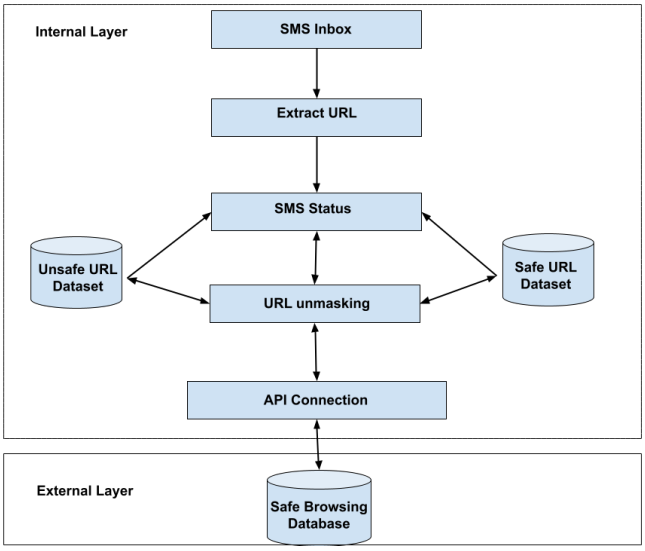

Fig. 1. System Architecture

The above "Fig. 1", shows the internal layer and external layer which contain many different stages. In the internal layer, their main application logic is working from SMS Inbox to API connection. In the SMS Inbox it contains all received SMS. Extract URL stage, URL unmasking are the stages responsible for doing processes related to URL or on URL. Final status is shown in the SMS status stage which takes results from either URL Datasets or either URL unmasking which takes the final result response from Safe Browsing Database using API connection; that part belongs to an external layer which is already made by Google. For making the connection with an external layer i.e - external database API connection is an important part of that.

B. Data Flow Diagram

The following data flow diagram describes the flow of input data from start to end, after the starting of execution of identification inside the application.

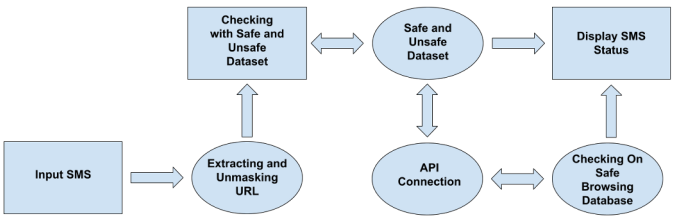

Fig. 2. Data Flow

The above "Fig. 2", shows the flow of input data i.e - SMS from start to end, processing in each stage. After the input of data, the first operation to perform on SMS is extracting only the URL from unnecessary text along with unmasking the same URL. The next stage checks whether the URL is already inside the local dataset of unsafe or safe, if it is then

it will go to the next stage and display the status unsafe or safe as per the result. If URL is not already inside the unsafe or safe dataset then the final stage is making HTTP request to Google's Safe Browsing Server through the API connection, if the response got empty then it means we did not found that URL inside the Google's database i.e - The URL is safe. If the response is not empty and there is a threat type mentioned then it means we found that URL inside the Google's database i.e - The URL is unsafe. Finally, as per the response, we update the local dataset and display the status.

VI. Algorithm Details

There are four main algorithms like URL Extraction, Redirection Checking, Checking Local Dataset of URL, Making HTTP Request. These algorithms are doing the work of identification of Smishing SMS.

A. URL Extraction

This algorithm is used to extract the only URL from unnecessary text contained in SMS for further identification.

B. Redirection Checking

This algorithm is used to check if the URL is masked or not. If it is masked URL then this method returns the actual URL. This algorithm is used because for further API requesting it is necessary that the URL is unmasked or that will return false value.

C. Checking Local Dataset

In this algorithm we are checking if the URL is inside our any of the locally stored data set. If found then return result status according to that, if not found then return for further check i.e - For making HTTP Request. This algorithm is helpful for avoiding network requests again and again.

D. Making HTTP Request

In this algorithm we are taking the help of Google Safe Browsing Database which contains the large set of unsafe URLs and its information. We are connecting via the API key and by making HTTP request we are checking our URL with Google's Database whether it is safe or unsafe.

VII. Specification

A. Advantages

- **URL Verification -** Reduces the manually checking URL efforts; it will automatically identify whether the input URL is malicious/phishing or safe with the help of a safe browsing database.
- **Overcome Phishing Attack -** Using this technology we can overcome the phishing attack and malware distribution.
- **Overcome Data-breach Problem -** Data breaches happen due to security vulnerability in application or system or social engineering. The social engineering attack is mostly done with the help of phishing attacks. This will be overcome with the help of this technology and indirectly the data breach problem.
- **Saves Time and Efforts -** Automatically checking for URL whether it is safe or unsafe will take less time then manually checking for the same URL.

B. Application

- User's Safety from Smishing attack.
- Spreading Cyber-Security Awareness.
- Helpful in to protect user's identity and credentials.

VIII. Result

A. Home Screen/ Index Screen

The following "Fig. 3", shows the home screen of Smishing Identifier, it default opens with inbox screen which contains all received SMS.

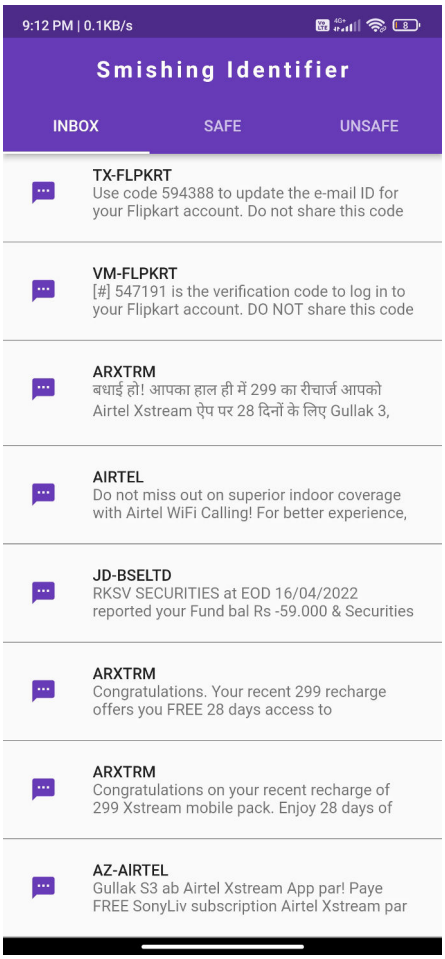

Fig. 3. Home Screen/ Index Screen

B. Result Status 1

The following "Fig. 4", shows the SMS is safe, this result is generated after clicking on SMS from inbox.

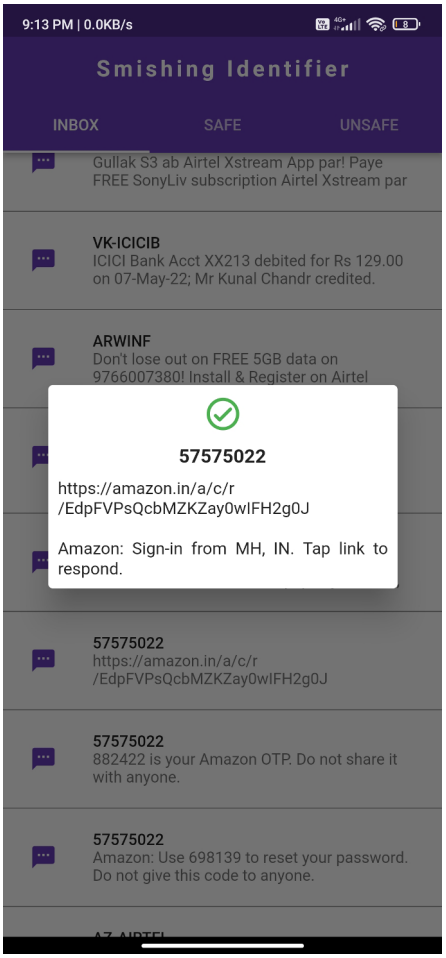

Fig. 4. Result Status as Safe

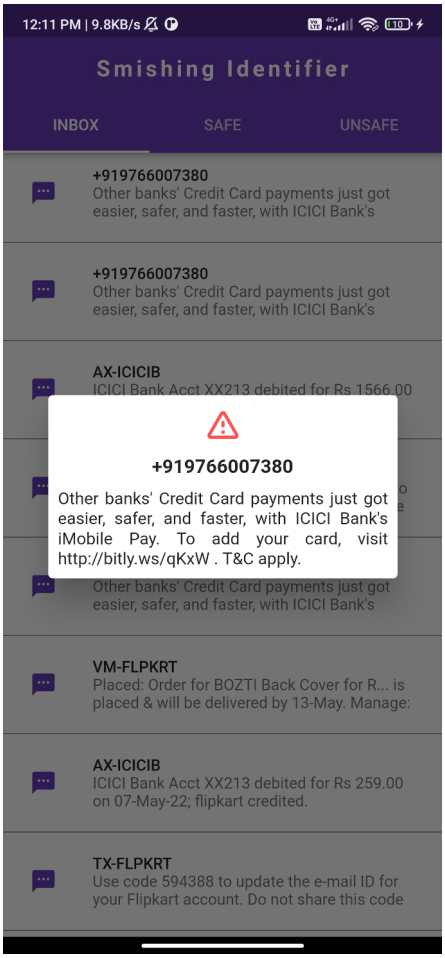

Fig. 5. Result Status as Unsafe

C. Result Status 2

The following "Fig. 5", shows the SMS is unsafe or SMS phishing, this result is generated after clicking on SMS from inbox.

IX. Conclusion

Smishing Identifier technology is useful in enhancing the user's safety and security in daily usage of the internet likewise it is also helpful in increasing awareness about Cyber Security importance and the awareness about Cyber attacks. The increasing usage of technology and internet, as it is important to understand the usefulness of the internet like this it is also important to understand the threats of the internet and due to the workload it is hard to check for all the threats to normal people whose work is not researching security. In this condition Smishing Identifier saves much of the time of manually verifying the URL. In future the Smishing Identifier can be helpful in overcoming the mostly used cyber attack technique by cybercriminals called Social Engineering. Social Engineering mainly depends upon vishing, phishing and smishing that's why the Smishing Identifier makes the limited attack area in social engineering technique and also indirectly overcome the data breaches problem in companies.

References

[1] S.M. Abdulhamid, O. Osho, M.S. Abd Latiff, H. Chiroma, T. Herawan, G. Abdul-Salaam, A.I. Abubakar "A Review on Mobile SMS Spam Filtering Techniques", Vol. 5, February 2017.

[2] Jae Woong Joo, Seo Yeon Moon, Saurabh Singh, Jong Hyuk Park "S-Detector: an enhanced security model for detecting Smishing attack for mobile computing", Vol. 66, September 2017.
[3] Sandhya Mishra, Devpriya Soni "SMS Phishing and Mitigation Approaches", September 2019.
[4] Sandhya Mishra, Devpriya Soni "A Content-Based Approach for Detecting Smishing in Mobile Environment", February 2019.
[5] Gunikhan Sonowal "Detecting Phishing SMS Based on Multiple Correlation Algorithms", November 2020.
[6] Aniket Kumar Jain, Sumit Kumar Yadav, Neelam Choudhary "A Novel Approach to Detect Spam and Phishing SMS using Machine Learning Techniques", Vol. 12, January 2020.
[7] Sandhya Mishra, Devpriya Soni "Smishing Detector: A security model to detect smishing through SMS content analysis and URL behavior analysis", March 2020
[8] Sandhya Mishra, Devpriya Soni "DSmishSMS-A System to Detect Phishing SMS", July 2021.

Prevention of data leakage via SQL injection on a cloud based web application

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***Abstract*—It is a noteworthy fact that now a days using a various techniques, the access to sensitive information or data is being performed. As the web based application are being used frequently in current scenario, they are seems to became a target for many attackers to access the sensitive data. One of the most hazardous threat in the world of web application is the SQL injection attacks. There is a great need to use different security systems to get control on the SQL injection problems. A SQL injection attack occurs in the database layer of application. When an attacker or hacker accomplish to insert malicious code or queries in any web based application that interacts with the database query successfully then it is known as SQL injection attack. The goal of this project is to prevent the SQL injection while performing a query. It can be done by implementing a secure and online method to store and protect all the personal and sensitive data stored on a database on cloud. Encryption of card data is another key function of this system. The method to do so is known as AES encryption. It can be accessed from any location as it works online. To prevent the unauthorized access to the database, encryption technique will be used in this system. It also secures the user data by storing it in a secure form.**

***Index Terms*—AES, SQL injection, Database, Encryption, Decryption**

I. Introduction

Cloud Computing is referred as a complicated term which can be simplified by replacing the term cloud with 'service'. The set of computing resources offering service is regarded as cloud computing. These resources are provided to the users for payment based transactions on its usage and are managed by the service providers. Recently Cloud computing has come out to become one of the efficient framework for organizations or web based applications that are in need of enhancing and renovate their IT infrastructures.

Today everyone has needs databases to store any type of data, due to the speed of database and cost. The one big advantage of using database is that it can do various actions by itself, saves resources and works for hours [2]. Database applications acts as an integral part of many software systems. Examples of those systems are online shopping store, railway reservation system, banking system, even critical systems such as air traffic control, health care like that. With the help of Database Management System these applications are used to access and process pivotal data [3]. Due to the presence of security attacks in applications, sensitive information may be leaked. SQL injection is one of the main attack methods that exploits a vulnerability in websites [2]. By injecting the SQL queries, important databases are completely available to the hacker. A SQL Injection vulnerability poses a serious security threat to any type of web applications [6]. Structured Query Language (SQL) is used for relational databases by MSSQL, MySQL, Oracle, etc. SQL Injection attack is a technique that sends malicious messages to the database trying to find unauthorized channels for gaining access. The method used for execution of this attack is "Gray Box". Most of the web application developers do not have enough knowledge for implementing security policies, so there is a need to use security equipment which protects web applications from security attacks [9].

As per the OWASP organization, SQL injection attack has been first top 10 vulnerabilities in 2013 and 2017. SQL injection attack is one of the most important type among all the injection attacks. Structured Query Language is a standard database programming language for accessing and manipulating data in database. Developers normally construct SQL statements by concatenating strings from web page which is submitted by users. There are various types of encoding methods for constructing SQL statements because of the wide variety of SQL languages, so there is risk of being attacked through constructing SQL statements on web applications. At the time of SQL injection attack, the attacker inserts malicious code into the request parameters, cause of this the server executes these illegal queries, as a result there is data leakage and database damage. There is necessity to provide a SQL injection detection architecture which can detect all types of SQL injection attack. But building a large model to detect all

types of attacks is also a challenge because of the complexity of attack representations [5]. In this project we are using Advanced Encryption Standard (AES) encryption technique, so the transaction and confidential details of users can be made secured [8]. AES works on block cipher technique. This technology works on different size of blocks it may be 128 bits, 192 bits and 256 bits and supporting 3 different key lengths 128, 192 and 266 bits. The aim of this project is to implement an encrypted web applications that enables users to shop for goods and services online [1].

II. RELATED WORK

In this paper the author has provide a safe transaction for the clients. By using AES technique, both the transaction and user data can be encrypted. To preserve privacy of the websites clients, the system encrypts users log in credentials. The transaction number and the Banks PIN is encrypted by this device. It is less dangerous when getting hacked because of the SQL Injection Prevention technologies used [1].

In this paper the author has given the various methods to prevent SQL injection attacks. The methods are SQL-DOM,SQLrand, AMNESIA, Tainting ,SQLCHECK, SQL-GUARD, CANDID. In this paper, the types of SQL injection attacks and the impacts of SQLIA are also explained [2]. In this paper, they propose a code-based analysis approach to detect the presence of possible SQL Injection Attacks (SQLIA) in a query before submitting it to a DBMS, as an alternative solutions. The objective of this approach is to identify the non-malicious user inputs which are mainly consist of either set of alphabets or set of numbers or combination of the both. In particular, this approach analyses the user input by assigning complex number to each input element. It has two part input Clustering and safe (non-malicious) input identification. This propose model serves as a powerful basis to develop a input checker to automatically detect and prevent the SQLIA [3]. In this paper, first they give the latest attacks of SQL Injection and also present the SQL injection attack discussed about the impact of SQLIA and the different types of SQL injection. They also give a way to detect and prevent SQLIA in ASP.NET application [4].

In this paper, they proposed an adaptive deep forest-based method, ADF, to detect the SQL injection attacks. Firstly, they improve the structure of deep forest. The input of each layer is the concatenation of the raw feature vector and the average of previous outputs, which can effectively solve the problem of the continuous degradation of raw features caused by the increasing number of deep forest layers. Then, we introduce the AdaBoost algorithm with adaptive ability into the deep forest model, which can use error rate of each level in the deep forest to update the weights of features [5]. They proposed framework of SQLI Investigation Architecture (SIA). This SIA framework is intended to detect SQLi attacks on the Internet and to collect artifacts or non-artifacts for forensic investigations. The SIA framework is designed to prosecute cybercriminals based on the auditing records and will help prevent SQLI attacks in their early and late stages. If an aggressor used a set of SQL statements to export data from a vulnerable database server, the attack might have violated criminal law. This could lead to an investigation of a possible data breach. The proposed SIA framework involves three phases : prelusion detection, incident investigation, and aftermath forensics. These phases can be described as a step-by-step process from start to end [6].

They have developed a secure system for authentication access apply SQL INJECTION attack to check its security. In other word we could say that their system is not getting any wild character from text box. In proposed model pattern locking is worked as ascii character checking, token creation and checking of their threshold value. This would make sure that only valid queries should be passed to database server [7].

In this paper an attempt has been made to develop an online shop that allows users to check for different cloths for women's available at the online store and can purchase cloths online. The project consists of list of cloths displayed in various materials and designs. The user may browse through these products as per categories. If the user likes a product, he/she can add it to his/her shopping cart. Once user wishes to checkout he must register on the site first. Once the user makes a successful transaction admin will get report of his bought products. The objective of this project is to develop a secure path for transaction done by the user. Using AES (Advanced Encryption Standard) encryption technique, the transaction and user account details can be made secured. AES encryption is also used to encrypt the user's card and password information while transaction [8]. In this paper, we will test security systems which are implemented in government network of Kosovo (Firewalls, IPS). In order to compare the functioning of these devices, we will test a web application attack without these protective devices in place (locally). Then, we will compare the results obtained with the results performed when the same application is protected with these security systems and the attack is performed from Internet (outside the local network) [9].

This project presented a novel highly automated approach for protecting Web applications from SQLIAs. Their approach consists of identifying trusted data sources and marking data coming from these sources as trusted, using dynamic tainting to track trusted data at runtime, and allowing only trusted data to form the relevant parts of queries such as SQL keywords and operators. Unlike previous approaches based on dynamic tainting, their technique is based on positive tainting, which explicitly identifies trusted (rather than untrusted) data in a program. This way, they eliminate the problem that may result from the incomplete identification of all untrusted data sources [10].

This paper is published by Shafi'i Muhammad Abdulhamid, Muhammad Shafie Abd Latiff, Haruna Chiroma, Oluwafemi Osho, Gaddafi Abdul-Salaam, Adamu I. Abubakar, and Tutut Herawan. They proposed a review on mobile SMS spam filtering techniques. [1]

III. Proposed System

A. Problem statement

Prevention of data leakage via SQL injection on a cloud based web applications.

B. Architecture

Following figure shows the architecture of our proposed system of web application:

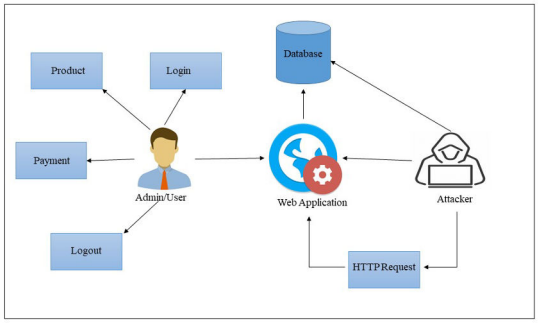

Fig. 1. System Architecture

The system provides the secure path for the transactions which are done by the users. The users account details and the transaction data of user can be made secured by using AES technology. In this cloud based web application user can check for the different products available at the application and can buy them online. The project consist of list of products displayed in various categories. If the user likes the product, he/she can add it to the shopping cart. The user must register on the site if he/she wishes to checkout. Using the same id and password user then can log in again to the application. User can pay through a card. After successful transaction, admin will get the report of bought products.

IV. AES Algorithm

The data and attributes of the query are encoded by AES (Advanced Encryption Standard) algorithm needs less storage and this process is quick. As soon as the query is received at server end, it gets decrypted with the similar key and gets transformed into different tokens which are kept in the other dynamic table. Here the algorithm implies that, when the attacker fires a query with malicious code, first the token will be generated from that query and also it will be encrypted and both the token and encrypted data will be send to the server. Now the encrpted query which is fired by the attacker stored in the database will be decrypted and its token will be generated which will be compared with the original token of the users. If the both token are equal then the query will be send to the database server to access the data. Else the system will block the query and error message will be send to the user.

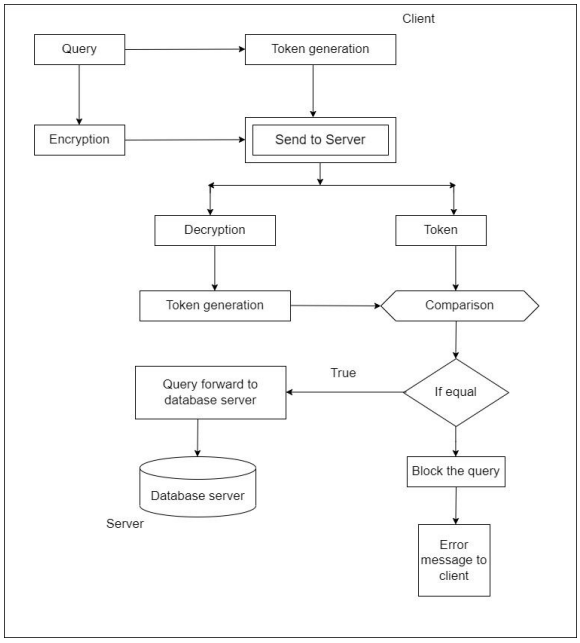

Fig. 2. AES Algorithm

V. Requirements

A. Software Requirements

1) Operating System : Windows.
2) Programming Language : Python, HTML, Bootstrap
3) IDE : Pycharm

B. Hardware Requirements

1) Smartphone, Computer

VI. Specification

A. Advantages

1) Secure the users sensitive data from leakage via SQL Injection.
2) Users receive timely, cost effective, and personalized shopping services.
3) The efforts of user to go personally to the shop for shopping will be minimized.

B. Applications

1) Enable user to choose their desire product
2) Enable user to choose suitable time to make an order

VII. Conclusion

Now a day's web application has become major and necessary component of online activity, which provides the comfort of corporate and personal operations. However, SQL injection attacks provides a major threat to web applications. In this system we have tried to address the problem of SQLIA on web applications by implementing Advanced Encryption Standard (AES) technique which will encrypt the highly sensitive data and also prevent it from leakage by detecting the malicious SQL queries.

REFERENCES

[1] Shreya Chowdhury, Miran Ahmad, Aakansh Nandi, Aadish Jain, and Prof. Mohandas Pawar, Prevention of Data Leakage via SQL Injection, July 2021 International Journal of Innovative Research in Technology, Volume 8 Issue 2, ISSN: 2349-6002

[2] Hanan Alsobhi, Reem Alshareef, SQL Injection Countermeasures methods, 2020 International Conference on Computing and Information Technology, University of Tabuk, Kingdom of Saudi Arabia, Volume: 01, Issue: ICCIT - 1441, Page No.: 401-404, 9th 10th Sep. 2020

[3] Angshuman Jana, Dipendu Maity, Code-based Analysis Approach Code-based Analysis SQL Injection Attacks, 11th ICCCNT 2020, July 1-3, 2020 – IIT- Kharagpur, IEEE – 49239

[4] Mohammad Abu Kausar, Mohammad Nasar, Aiman Movaid, SQL Injection Detection and Prevention Techniques in ASP.NET Web Application, September 2019, Volume-8 Issue-3, International Journal of Recent Technology and Engineering (IJRTE), ISSN: 2277-3878

[5] QI LI, WEISHI LI, JUNFENG WANG, AND MINGYU CHENG, A SQL Injection Detection Method Based on Adaptive Deep Forest. October 1, 2019, Digital Object Identifier 10.1109/ACCESS.2019-45386 Volume 7, IEEEACCESS

[6] Da-Yu Kao Chung-Jui Lai Ching-Wei Su A Framework for SQL Injection Investigations: Detection, Investigaton, and Forensics 2018 IEEE International Conference on Systems, Man, and Cybernetic

[7] Joshi Padma N, Dr. N. Ravishankar, Dr. M. B. Raju, N.CH. Ravi, Encountering SQL Injection in Web Applications, Proceedings of the Second International Conference on Computing Methodologies and Communication (ICCMC 2018) IEEE, Conference Record 42656; IEEE Xplore ISBN:978-1-5386-3452-3

[8] Karan Ray, Nitish Pol, Suraj Singh Guided by Prof. Suvarna Aranjo, Detecting Data Leaks via SQL Injection Prevention on an E-Commerce, International Journal of Scientific Engineering Research Volume 9, Issue 3, March-2018 ISSN 2229-5518

[9] Arianit Maraj, Ermir Rogova, Genc Jakupi, Xheladin Grajqevci, Testing Techniques and Analysis of SQL Injection Attacks, 2017 2nd International Conference on Knowledge Engineering and Applications

[10] Mr. C. Suresh Kumar, M. Keerthana, B.Akilandes-wari, T.Karishma, Detecting data leaks via SQL injection prevention, Proceedings of the International Confer-ence on Intelligent Computing Systems (ICICS 2017 – Dec 15th – 16th 2017) organized by sona College of Technology, Salem, Tamilnadu, India Elsevier's SSRN eLibrary- Journal of Information Systems eBusiness Network – ISSN: 1556-5068

AR Based Navigation System For Universities

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***Abstract*—Augmented reality (AR) has continued to grow in popularity in recent years, and the revolution shows no signs of slowing down. From Pokemon Go to future surgeon education. Today, augmented reality is beginning to have an impact on a variety of industries in our society. AR, in essence, allows us to combine the digital and physical worlds. An augmented reality navigation system is one that navigates users using augmented reality technology. The university campus is made up of numerous buildings and rooms, each with its own name and usage. Aside from that, because the campus is large, moving from one building to another will take some time. An ordinary map does not appear to be useful because GPS does not work accurately indoors. A navigation application is being developed using AR technology to assist students, visitors, and other university stakeholders in their easy walk through the university campus. It will display the user's desired destination lab, classroom, auditorium, or seminar hall. Even if this is the user's first visit to the University campus, he or she can confidently walk through it. It will save an individual's time and allow them to arrive at their destination on time.**

Keywords—Augmented Reality (AR),Global Positioning System (GPS).

I. Introduction

The university Campus is made up of numerous buildings, rooms, and laboratories, each with its own name and usage. Aside from that, because the campus is large, moving from one building to another will take some time. An ordinary map does not appear to be useful because GPS does not work accurately indoors [3]. It may take some time to determine the user's current location. Finding a destination inside a building is difficult because the passages are nearly identical. Asking other people in the area for directions will be difficult because the route to the destination has many turning points. Another challenge was remembering all of the directories correctly [3]. A campus map only shows the name of a building on campus. It lacks the nitty gritty lecture room, laboratory, and so on that would make locating the destination easier. Indoor positioning can be obtained using a variety of methods, including Bluetooth Low Energy (BLE) sensors, inertial sensors, computer vision, QR codes, and RFID [5]. These are expensive to implement and still do not provide accurate location information [2]. The AR Navigation System is inexpensive and does not require any additional devices. AR systems are defined as those that combine real and virtual information, interact in real time, and are registered in three dimensions. The system is simple to use. This system will show users inside the campus building routes using Augmented Reality. This application directs the user from his current location to the exact location on campus that he searches for [4]. Applications include Destination lists from which users can choose the location they wish to visit. It saves the user from having to walk all over campus looking for a destination [4]. It will also save paper because we can add posters and other image contents as 3D models to the campus, while also making the walls look nice and saving space. The primary goal of this application is to guide users around campus using a simple mobile application. The use of augmented reality would make finding a specific location easier and more interactive for users. This would make navigating the campus area easier for users. It would help to clarify the various academic and administrative buildings on campus/Department. This will help provide more information about laboratories as well as information about the various resources available in those laboratories. The app can also be used to find rooms in hospitals, offices in companies, and other locations for navigation.

II. Relevant Work

We conducted research and held discussions with visitors and students, and based on our findings, we discovered that they face numerous challenges when attempting to visit a required campus location. As a result, our primary goal is to guide users to their desired destinations. WiFi and Bluetooth are the strategies used to address the issue of indoor localization. Later research revealed that Bluetooth-based arrangements can achieve a median error of 1.5 m, whereas WiFi-based product device-compatible approaches are detailed to have achieved 2 m. Despite the fact that such precision is adequate for indoor routes, it has been pointed out that the received signal strength (RSS) method they use is incredibly powerless in the presence of interferences [1] [6]. Furthermore, due to the large number and complexity of the devices, these approaches are difficult to deploy and manage. They also do not provide device orientation data. Existing methods are costly to maintain and do not provide what the user requires. They are also costly to maintain and do not fully meet the requirements. As a result, AR is becoming popular for localization because it does not require any additional devices for navigation and provides precise indoor location. It is inexpensive and simple to use. The owner setup and visitor Navigation Application are the two phases of AR navigation [2]. The floor plan and destination of the indoor buildings are provided to the system by the owner. To get to his or her desired location, the user must first scan the surrounding environment and

determine his or her current location. The user can then select destinations from a list of destinations within the specific building. After selecting the destination, the user will be guided there using 3D objects. It saves the user time and eliminates the need for the user to walk to a destination.

III. TECHNOLOGY USED

Augmented Reality (AR) is a digital media that allows you to overlay virtual content on top of the physical world, making it appear as if the content is physically present [2]. In other words, the virtual and real worlds are combined to provide the user with a more immersive experience. AR allows 3D virtual models, images, and other content to be added to the real world. We can use AR to place virtual 3D objects in real-world paths and use them for navigation where GPS and other technologies are ineffective. Augmented reality is used in our proposed system to display arrows, marks, or directions that appear on the floor and can be viewed by the user via his phone. For this, we make use of the following software development kits :

- Unity
- ARway

A. Software

1) Unity (2020.1.17f1): The engine can be used to create games in three dimensions, two dimensions, virtual reality, and augmented reality, as well as simulations and other experiences. Outside of video games, the engine has been used in film, automotive, architecture engineering, and construction [4] [5].

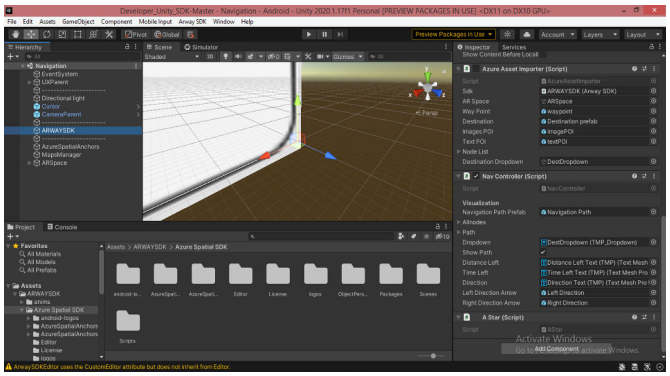

Fig. 1. Showing the working platform of unity 3D.

2) Azure Spatial Anchors: Microsoft Azure Spatial Anchors enable you to create cross-platform mixed reality applications with spatial context. "Anchors" are a common frame of reference across augmented reality (AR) platforms for allowing multiple users to place digital content in the same physical location, where it can be seen on different devices in the same position and orientation relative to the environment. You can add anchor persistence and permissions to Azure Spatial Anchors and then connect anchors in your application so that your users can find nearby content.

3) ARway kit: ARway Kit includes built-in support for Microsoft's Azure Spatial Anchors. This enables developers to use Azure Spatial Anchors to create highly scalable and location persistent AR experiences with ARwayKit. Later, ARway Web Studio allows developers to visualize and validate the map data, as well as add content (3D models, images, text, etc.) to the map corresponding to the map points and update them in real-time!

4) Visual Studio: Microsoft Visual Studio is a Microsoft integrated development environment. It's used to create computer programmes, websites, web applications, web services, and mobile apps [4] .

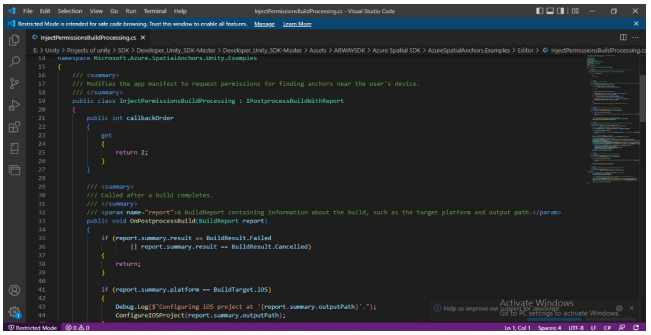

Fig. 2. Showing the working of Visual Studio.

B. Hardware

TABLE I. HARDWARE USED

Hardware	Specification	
	Operating System	***RAM***
Smartphone	Android 7 Nougat	4 GB
Computer	Windows 8 (64-bit)	4 GB

IV. SYSTEM DESIGN

[7]Using AR technology we can "infuse" physical objects into the real world. AR strives to mix the real world with the physical world in such a way that both physical and abstract objects are visible to the user in the same space.The user needs a smartphone with a good camera and which supports ARCore to run the application on their phone. The working flow of the system is shown in Fig. 3. Upon opening the android application the user gets to see a map list from there he/she selects a map as per their requirement. Then the user localizes the surrounding environment. Upon localization the drop-down menu of destination is listed out for the user to select where he/she wants to go. Fig. 4. (a) shows the Dropdown menu showing different destinations available for users to select from. After choosing the desired destination from the drop down menu application changes to the navigation view which displays a live feed from the backend camera. The user receives the output based on their request and the app shows the path from the user's current location to the desired destination by displaying augmented arrows on the screen to lead the user to the desired destination [4]. Fig. 4. (b) Shows the waypoints which show directions. If the user wants to change the destination in between he or she can do that. The application is easy to use.

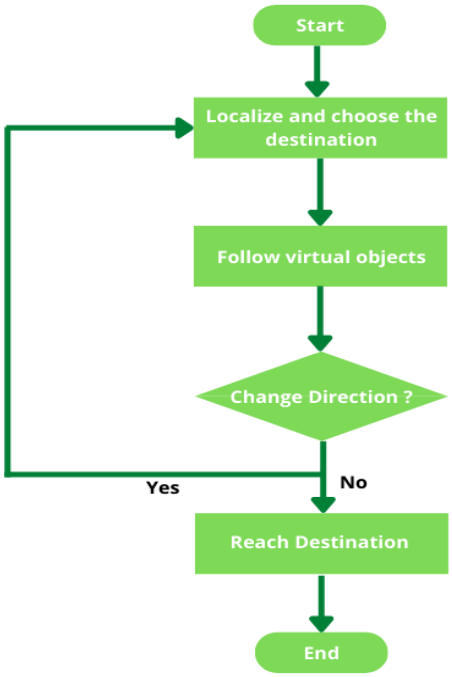

Fig. 3. System Workflow

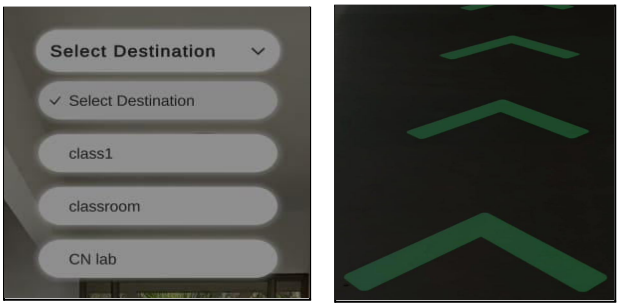

Fig. 4. (a) Select Destination Menu (b) Waypoints

The navigation instructions this way pop up on the screen when users come to an intersection point. It even shows how far the destination is from the user and how it will take a long time to reach there. Fig. 6. shows the text pop up and distance. With this user can confidently walk through the University campus even if he or she is visiting the campus for the first time. It will save an individual's time and help reach the destination on time. The System works to provide accurate location to user to his/her preferred destination using augmented arrows and texts. In this Application we can even add virtual contents like text, images and videos in the real world and view them on camera. This will help us to save paper and save space. Using this we can add posters , images and information about classrooms, laboratories etc. This application gives real-world views from the user's perspective. In future voice commands can also be added in the system to provide means of moving and assisting [7]. Even Anime characters can also be used to guide users.

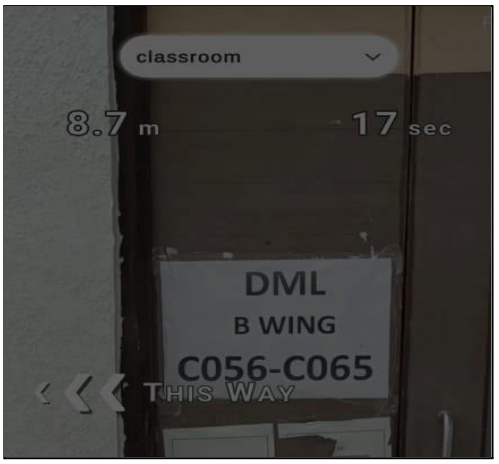

Fig. 5. Pop-up text , distance and time shown

V. RESULT

The application works by guiding the user to the desired destination in college /department using augmented arrows and texts [4].Fig. 7. shows the system working. The system is divided into three phases :

1) Mapping Scene: The Admin Create Spatial Anchors and Capture Point Cloud maps by scanning your surrounding environment. ARway.

2) Web Studio: The admin can create and edit maps, adding floor plans for navigation along with overlaying 3D assets, waypoints, destinations, text, and pictures for user navigation.

3) Navigation Scene: The user localizes the surrounding environment. In Localization the app Look for Spatial Anchors created near his/her surroundings and Localize content to them and show direction by displaying arrows.

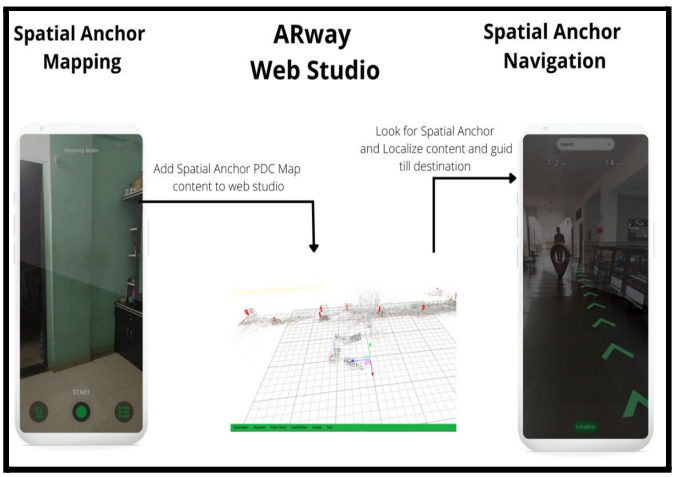

Fig. 6. Working of the System

The Application interface is shown in Fig. 7. (a) It shows the drop down menu which appears after localization. Fig. 7. (b) shows how the user will be guided towards the destination.

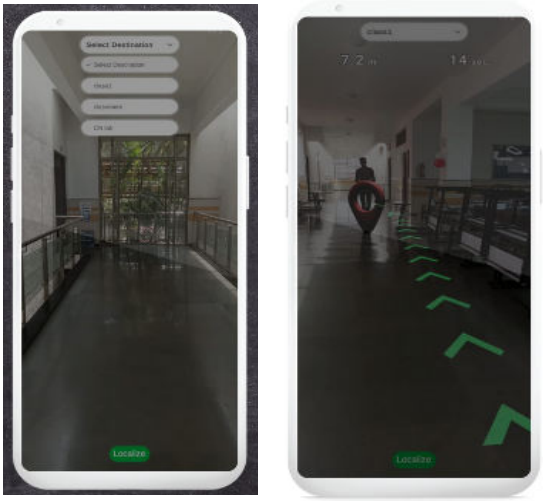

Fig. 7. (a) Application Interface (b) Showing destination

VI. Conclusion

The proposed system has been designed and developed using the methods described above. The main idea of this application is to assist students, staff and guests in an unfamiliar environment within the university's indoor structure. The user can select the desired destination within the internal structure, and the application uses AR to display the driving route that can be displayed on the user's smartphone. This keeps the user interacting with the application and directing them to their desired destination. This application is easy to use and does not require any additional devices. This system allows users to easily navigate campus grounds. It will reduce confusion about the various academic and administrative buildings of the campus / Department. This app helps to provide more information about the lab and the resources that exist in that lab. This application is user friendly [1][2].

Acknowledgment

We would like to express our heartfelt gratitude to Prof. Dr. G.M. Phade, our mini project guide, for her keen interest and encouragement in our project. We would also like to thank Aaradhya Electronics Pvt Ltd. for sponsoring our Mini Project. Finally, we would like to thank our family and friends for always being there for us.

References

[1] B. Huang, J. Hsu, E. Chu and H. Wu, “Arbin:Augmented reality based indoor navigation system,” Sensors, pp. 1-20, October 2020.

[2] A. Martin, J. Cheriyan, J. Ganesh, J. Sebastian and J. V, “Indoor navigation using augmented reality,” EAI Endorsed Transactions on Creative Technologies, vol. 8, issue 26,pp. 1-6, February 2021.

[3] L.W. Fai and L. Audah, “In campus location finder using mobile application services,” AIP Conf. Proc. 1883, pp. 020022-1–020022-10, September 2017.

[4] Y. R, M. P. M, N. H and A. D N, “Campus navigation using augmented reality,” International Journal of Engineering Technology Research & Management *IJETRM,* vol. 4, issue. 8, pp. 130-136, August 2020.

[5] Y. Tao and A. Ganz, “Simulation framework for evaluation of indoor navigation systems,” IEEE Access, vol. 8, pp. 20028-20042, January 2020.

[6] W. Zhao, L. Xu, B.Qi, J Hu, T. Wang and T. Runge, “Vivid:Augmented vision-based indoor navigation system with edge computing,” IEEE Access, vol. 8, pp. 42909-42923, March 2020.

[7] M. K. Sharma, S. Chachaundiya and V, “Augmented reality navigation,” International Journal of Engineering Research & Technology *IJERT,* vol. 9, issue 06, pp. 670-675, June 2020.

DRY HANDWASHING MACHINE BY FOG DISINFECTION TO SAVE WATER

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Abstract: This paper proposes a practical, low-cost circuit for the operation and control of a final control element (valve). The circuit presented in the paper uses an Infrared (IR) proximity sensor for object detection for triggering and 555 timer IC for precise time monitoring. The proposed system is intended to be used in soap and sanitizer dispensers installed at public places in this case in the university premises to assess the effectiveness. It may be proved very effective in mitigating the risk of the spread of Covid- 19 due to the soap and sanitizer dispensers used at public places and the time monitoring capability of the proposed design allows the end-user to ensure the World Health Organization (WHO) guidelines for hand hygiene. Finally, theoretical concepts are validated using experimental results presented in the paper.

KEYWORDS *Infrared (IR) sensor module, 555 monostable multivibrator, DC relay module, Final Control Element (FCE)*

I. INTRODUCTION

Touchless and contactless sanitization procedures are important in the context of the Covid-19 pandemic epidemic. Frequent hand sanitization has become increasingly important. Referred to in [1]. But regular hand sanitization is essential. in public settings, there is a possibility of unintended consequences. The final pieces are assembled by hand, resulting in direct human touch. Dispensers of soap and sanitizer, for example [1].Currently implemented solutions in public spaces sanitization and disinfection must be carried out through direct or indirect contact with a substance. with the end-users Unnecessary contact adds to the danger a possible danger of spreading disease. This is how it is now. In order for dispensers such as soap and disinfectant to function properly, they require substantial resources alterations and upgrades to the design Existing solutions should be used to solve the issues outlined above designs. The advancements in the architecture of electrical circuits have made a significant contribution to humanitarian aid exploration of the natural phenomena and investigation enhancing the quality of life for humans. Advances in technology in recent years development of electrical devices based on semiconductors development and manufacturing of integrated circuits technological advances have made electrical circuit design a very simple process for automation and robotics, cost-effective and efficient applications. Proved new-age ICs and sensors. capable of being used in a variety of applications, like as The ultimate stage of the process. Because of this, a cost-effective and accurate circuit can be built using ICs and components. hand sanitization and disinfection sensors is a device for cleaning surfaces. Designing an efficient controller is the focus of this paper. The solenoid valve can be operated using the low-cost circuitry elements that are available. Chances of success Infection transmission can be inhibited significantly by employing the sensors in close range Additional details are included in the paper's design.aiding in the WHO's time-monitoring requirements.A list of hand-washing guidelines. A little tweak to the design. The user can use the design in a variety of ways with this circuit. drying machines, cut-off switches, and smart devices PIR (Passive Infrared) detection light When it comes to thermal welding, precise time measurement is critical.

II. PROJECT PROCESS MODELING

We are using waterfall model for our project

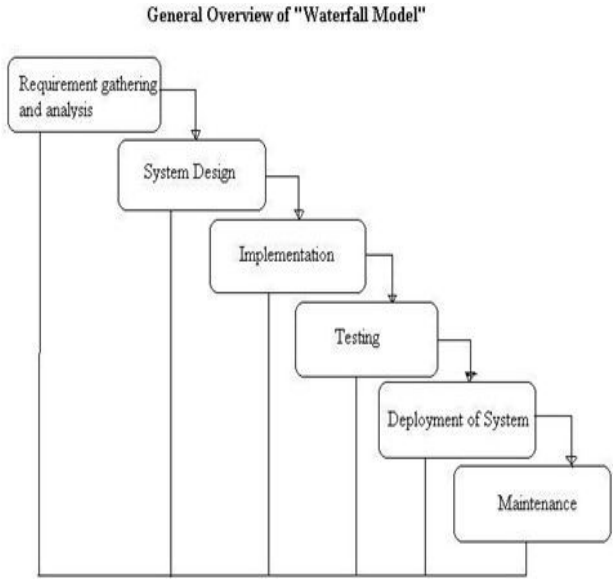


Fig. 1. Waterfall Model

The Waterfall Model was first Process Model to be introduced. It is also referred to as a linear-sequential life cycle model. It is very simple to understand and use. In a waterfall model, each phase must be completed fully before the next phase can begin. This type of model is basically used for the for the project which is small and

there are no uncertain requirements. In this model the testing starts only after the development is complete. In waterfall model phases do not overlap.

A.Phases In Waterfall Model

- Information Gathering: In this we gather the information required to our system.
- Design: After gathering the information required we design the model based upon that information.
- Implementation: In this phase we actually implement the system using the design done in design phase.
- Testing: In this phase we perform the unit as well as integration testing to check whether system is working as per our requirement or not.
- Deployment: After testing the system we deploy the system in the market
- Maintenance: According to user feedback maintenance will be done

B.Block Dioagram

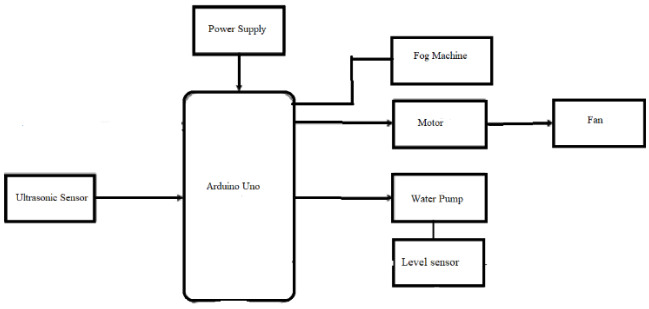


Fig. 2. Block Diadgram

III. METHODOLOGY AND WORKING

The three major elements of the complete system are the IR sensor module, Relay sensor module, and the 555 timer module. The relay actuates the valve whenever IR sensor detects the object, and simultaneously 555 timer triggers the LED to glow for the stipulated time period, after the completion of one given cycle the system resets itself to the idle state.

WORKING

Since the start of COVID pandemic it is been suggested to wash your hands multiple number of times per day. But can we afford to waste such huge amount of water. The problems that would be created by wastage of water would create a greater problem than the pandemic itself. To help solve this system we here design a system that provides handwashing while consuming over 95% less water.

Disinfecting our hands from time to time is a very important factor in fighting the pandemic. But does it actually require so much water to disinfect your hands. Additionally many people actually end up over washing their hands (over 15- 20 seconds with full tap released). Disinfection actually just requires that water reaches every millimeter of your hand along with a disinfectant or soap and it should be just enough to kill any infection or help it slide out of your hand. When we turn on a tap only 10 30%water actually touches our skin and rest just flows over this first layer of water.

Our machine goes ahead another level to enable even more water saving using a fog based system. The machine is integrated with a tank below it. The tank is filled with water along with any safe herbal disinfectant liquid if required. When the user rubs soap on his/her hands and inserts it into the system, this automatically triggers a water fogging system that converts water in the tank to fog and drives it in the handwash chamber.

Now Fog has the ability to reach all corners of the hand in less than 5 seconds as it is in gaseous state (water vapor). After 5- 15 seconds of water fog exposure the soap on users hand is washed down with the fog. This requires less than 95% of water that would be required in traditional tap based hand washing. The machine consists of a fan to drive in air that is needed to drive the fog into handwash chamber.

The handwash machine is driven by a Atmega based controller system that allows for manual settings. These settings include the time for which the machine must drive the fog for each user. Thus our proposed machine allows for handwashing for disinfection at the same time while saving lots of water.

- **Arduino Uno**

The Arduino Uno is an open-source microcontroller board based on the Microchip ATmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to vari- ous expansion boards (shields) and other circuits. The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is

programmable with the Ar- duino IDE (Integrated Development Environment), via a type B USB cable.[4] It can be powered by the USB cable or by an external 9-volt battery, though it accepts

voltages between 7 and 20 volts. It is similar to the Arduino Nano and Leonardo.

The hardware reference design is distributed under a Creative Commons Attribution Share-Alike 2.5 license and is available on the Arduino website. Layout and produc- tion files for some versions of the hardware are also available.

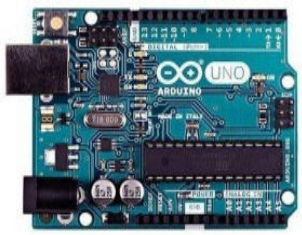
Arduino Uno specifications:

Recommended Input Voltage: 7-12V Input Voltage Limits: 6-20V

Analog Input Pins: 6 (A0-A5)

Digital I/O Pins: 14 (Out of which 6 provide PWM output) Why Arduino uno?

Simple connection to computer. The Arduino Uno board has a USB port and can therefore easily be connected to a computer. Easy wiring. All the pins on the AT-mega328P microcontroller are connected to headers on the side. Simplified programming language.



3.3.1.1 Arduino Uno

- **Ultrasonic Sensor**

What is a Ultrasonic Sensor?

An ultrasonic sensor is an instrument that measures the distance to an object using ultrasonic sound waves. An ultrasonic sensor uses a transducer to send and receive ultrasonic pulses that relay back information about an object's proximity. High-frequency sound waves reflect from boundaries to produce distinct echo patterns.

Ultrasonic Sensor specifications:

max. input voltage: 20Vrms

operating temperature: -20 C to +85 C

range: 0.2 to 6m •nominal frequency: 40kHz

sensitivity: -67dB min.

sound pressure: 112dB min

3.3.1.2 Ultrasonic sensor

- **LED**

What is a LED ?

A light-emitting diode (LED) is a semiconductor light source that emits light when current flows through it. Electrons in the semiconductor recombine with electron holes, releasing energy in the form of photons. The color of the light (corresponding to the energy of the photons) is determined by the energy required for electrons to cross the band gap of the semiconductor.[5] White light is obtained by using multiple semiconductors or a layer of light-emitting phosphor on the semiconductor device.

LEDs have many advantages over incandescent light sources, including lower power consumption, longer lifetime, improved physical robustness, smaller size, and faster switching. In exchange for these generally favorable attributes, disadvantages of LEDs include electrical limitations to low voltage and generally to DC (not AC) power, inability to provide steady illumination from a pulsing DC or an AC electrical supply source, and lesser maximum operating temperature and storage temperature. In contrast to LEDs, incandescent lamps can be made to intrinsically run at virtually any supply voltage, can utilize either AC or DC current interchangeably, and will provide steady illumination when powered by AC or pulsing DC even at a frequency as low as 50 Hz. LEDs usually need electronic support components to function, while an incandescent bulb can and usually does operate directly from an unregulated DC or AC power source.

Figure 3.3.1.4 LED

3.3.1.5 Battery

It is an electric battery that supplies a nominal voltage of 9 Volts, actually 7.2 to 9.6 volts, depending on technology. Batteries of various sizes and capacities are manufactured; a very common size is known as PP3, introduced for early transistor radios. The PP3 has a rectangular prism shape with rounded edges and two polarized snap connectors on the top. This type is commonly used for many applications including household uses such as smoke and gas detectors, clocks, and toys.

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Figure 3.3.1.5 Battery

- **Motor**

What is Motor?

A DC motor is an electrical machine that converts electrical energy into mechani- cal energy. In a DC motor, the input electrical energy is the direct current which is transformed into the mechanical rotation. When kept in a magnetic field, a current- carrying conductor gains torque and develops a tendency to move. In short, when electric fields and magnetic fields interact, a mechanical force arises. This is the principle on which the DC motors work.

- **Fog Machine**

A fog machine, fog generator, or smoke machine is a device that emits a dense vapor that appears similar to fog or smoke. This artificial fog is most commonly used in professional entertainment applications, but smaller, more affordable fog machines are becoming common for personal use. Fog machines can also be found in use in a variety of industrial, training, and some military applications. Typically, fog is created by vaporizing proprietary water and glycol-based or glycerin-based fluids or through the atomization of mineral oil. This fluid (often referred to colloquially as *fog juice*) vaporizes or atomizes inside the fog machine. Upon exiting the fog machine and mixing with cooler outside air the vapor condenses, resulting in a thick visible fog.

Fig. 3.3.1.7 Fog machine

II LITERATURE REVIEW

Hall, in his article, mentions that "Bathrooms have a lot of high touch surfaces, door handles, faucets, stall doors. So fomite transfer risk in

this environment can be high" [5]. Visontay explained the importance of sensor taps and the installation of touchless fixtures in the washrooms [6]. Liang highlighted the probability of virus spread from the office space and emphasized to follow hand sanitization in office spaces using touchless dispensers [7]. Green et al. emphasized the importance of handwashing for the employees working in the food industry [8]. Faivre [9] has done a comprehensive study and listed out the crucial locations for the placement of contact-less hand sanitizer dispensers at home and workplaces. Simon [10] has highlighted the necessity of a rechargeable touch-less hand motion-based sanitizer dispenser. B4-Brands

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Sr. No.	Method	Main principles and working	Attack covered	Conclusion	Author and Year of publication
1	Solar power based intelligent system for hand wash cum dryer to conflict the outbreak of COVID 19 .	It is a simple and effective hand washing technology, it can enhance people's lives. It would also improve the grooming of hands of individuals.	Print and replay attacks	The technique used in these research should be extended to tracking to educate and inspire the general population	k. Rajkumar Hafttom Sibhat Reda Kibrom Tesfay Medhanye Meles(2021)
2	Design of novel time monitored touchless operation using 555 timer for automatic dispenser	The three major elements of the complete system are the IR sensor module, relay sensor, and the 555 timer module. the relay actuates the valve whenever IR sensor detects the object, and simultaneously 555 timer triggers the completion of one given cycle the system resets itself to the idle state.	Print and replay attacks	It is very effective for building the time monitored touchless soap and sanitizer dispenser application.	Jeet Vora Jaineel Purani Vipin Shukla (2020)
3	Hand washing detection using wrist wearable inertial sensor	It is neural network based method which is use for hand washing detection but additionally leverage the distributions of the penultimate layer outputs of the network to detect NULL activities.	Print and replay attacks	it is very effective in the real world where people performs a wide range of activities.	Md Abu Sayeed Mondol John A. Stankovic [2020]

Table 3.1: Comparison of Proposed methods and techniques for Print and Replay attacks

RESULT

Fig.Project implementation

IV CONCLUSION

Implementing of Contactless Automatic Hand sanitizer Dispenser for Sanitation is efficient and the cost price is minimized. It works like the normal contactless automatic machine. The human gets the limited sanitizer liquid for sanitation in hand, to wash the hands and to protect themselves from the corona disease. This system can be utilized i high populated areas. The economic cost seminar, it will be better quality when cons the life of the system and the seminar. Th goal of this seminar was to use current ac technologies to develop an Automatic sanitizing machine to improve hygiene and the infectious viruses entering our body. Ch temperature and heart rate of the person.

REFERENCES

[1] B. Allegranzi and D. Pittet, "Role of hand hygiene in healthcareassociated infection prevention," J. Hosp. Infect., vol. 73, no. 4, pp. 305–315, 2009, doi: 10.1016/j.jhin.2009.04.019.

[2] I. C. Programme, "Hand Hygiene : Why , How & When ?," no. August, 2009.

[3] Z. F. Udwadia and R. S. Raju, "ScienceDirect How to protect the protectors : 10 lessons to learn for doctors fighting the COVID-19 Coronavirus," Med. J. Armed
Forces India, no. April, pp. 1–5, 2020, doi: 10.1016/j.mjafi.2020.03.009.

[4] L. S. J. Jeffrey Kidwell, A. D. D. H. E. Reed, Homeworth; Patrick M. Ryan, and A. Canton; E. Allen Womack, Jr., "MANUAL ARC WELDING SPEED PACER," 1995.

[5]"The Bathroom Habit that Dangerously Spreads the Coronavirus." https://www.msn.com/en-in/health/familyhealth/the-bathroom-habitthat-dangerously-spreads-the-coronavirus/ar-BB13T3p1 (accessed Jul. 29, 2020).

[6]"Sensor taps and no door handles: Covid-19 shows it's time to rethink public toilets | Society | The Guardian." https://www.theguardian.com/society/2020/may/04/s ensor-taps-doorhandles-covid-19-rethink-public-toiletsbathroom-design (accessed Jul. 29, 2020).
[7]"Covid-19: The ways viruses can spread in offices

[7] BBC Worklife." https://www.bbc.com/worklife/article/20200324-covid19-the-waysviruses-can-spread-in-offices (accessed Jul. 29, 2020).

117

[8] L. R. Green et al., "Food worker hand washing practices: An observation study," J. Food Prot., vol. 69, no. 10, pp. 2417–2423, 2006, doi: 10.4315/0362- 028X-69.10.2417.

[9]"The Importance of Hand Sanitizer Placement in the Workplace." https://info.debgroup.com/blog/the - importance-of-hand-sanitizerplacement-in-the-workplace (accessed Aug. 05, 2020). [1o]
"Automatic touch-free sanitizer dispenser to the rescue- The New Indian Express." https://www.newindianexpress.com/cities/thiruvananthapuram/2020/ may/07/automatic-touch-freesanitiser-dispenser-to-the- rescue2140005.html (accessed Aug. 08, 2020).

[11]"1000 mL Eco-Flex Automatic Soap & Sanitizer Dispenser." https://b4brands.com/product/1000-ml-ecoflex- automatic-soapsanitizer-dispenser-9415/ (accessed Aug. 05, 2020).

[12]P. Ajmera, "A Review Paper on Infrared sensor," Int.
J. Eng. Res. Technol., vol. 5, no. 23, pp. 1–3, 2018.
[13] "Detect and Prevent Accident," vol. 8, no. 5, pp. 578–583, 2017.

[13] B. Mustapha, A. Zayegh, and R. K. Begg, "Ultrasonic and infrared sensors performance in a wireless obstacle detection system," Proc. - 1st Int. Conf. Artif. Intell. Model. Simulation, AIMS 2013, pp. 487– 492, 2014 doi: 10.1109/AIMS.2013.89.

[14] R. Parab and S. Prajapati, "IoT based relay operation," Int. J. Eng. Adv. Technol., vol. 9, no. 1, pp. 6515–6520, 2019, doi: 10.35940/ijeat.A1415.109119.

Disinfection cloth through Ultraviolet radiation

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***Abstract*—This invention discloses a disinfection cloth through ultraviolet radiation. The current pandemic era tout importance of personal hygiene and health. We need to washcloth as well as sterilize cloth (hygiene wash) hence We produce one concept to use UV lights for sterilizing cloth.**

The washing machine is the most important home appliance to use washing cloth. For this project, we are putting an ultraviolet germicidal lamp in the washing machine.

This method can eliminate various bacteria and fungi left on the washing to ensure human health, thereby being suitable for drum-type washing machines or impeller-type washing machines. Using this method we saved human work, water, and electricity.

The washing machine operates in Three primary cycles. These are the wash cycle rinse cycle and Spin. Wash program is most important in the washing machine a basic principle of wash program Wash the cloth with detergent then drain the water and take new water for wash this process called rinse and then we need to remove water from a cloth this process called Spin. These three cycles work one after another.

Keywords—Wash Cycle, Rinse Cycle, Spin cycle, Sterilize

I. INTRODUCTION

The current pandemic situation in the world where demands for sanitized and hygiene goods/products are top priority in life. As you focus on these sanitization measures, it's also important to pay attention to sanitizing your clothes and keeping them germ-free as they are prone to attract germs, allergens, and dirt.

The washing machine was invented by Jacob Christian Schaffer in 1767 and came as a savior for women who had to work vigorously to wash all the clothes of their family using their hands.

A. Importance of Washing Machine with UV:

A washing machine is a huge time saver over hand washing. You do not have to sit and monitor the washing process. You can load your clothes into the machine, start the cycle, and walk away. The current situation of the world that we're living in demands making sanitization and hygiene the top priority in life. It's more important than ever to ensure you and your surroundings remain clean and sanitized. As you focus on these sanitization measures, it's also important to pay attention to sanitizing your clothes and keeping them germ-free as they are prone to attract germs, allergens, and dirt. UVC clothes washing is the most effective for the person who closely works with the bacterially infected person like doctors, Nurse, Lab technicians, medical dispensers / Suppliers, and Newburn babies. All mentioned person needs to use hygiene clothes for their daily life.

Figure1: Washing device with UV

B. More about UV:

UVC radiation has been shown to destroy the outer protein coating of the SARS-Coronavirus. UVC radiation may also be effective in inactivating the SARS-CoV-2 virus, which is the virus that causes Coronavirus Disease 2019 (COVID-19).

Direct exposure: UVC radiation can only inactivate a virus if the virus is directly exposed to the radiation. Therefore, the inactivation of viruses on surfaces may not be effective due to the blocking of the UV radiation by soil, such as dust, or other contaminants such as bodily fluids.

Dose and duration: Many of the UVC lamps sold for home use are of low dose, so it may take longer exposure to a given surface area to potentially provide effective inactivation of a bacteria or virus.[4]

C. UV LED:

It is a structure that looks like a lamp, It has a UV lamp that generates a photochemical reaction that disinfects your clothes. The UV light is strong enough to eliminate/prevent bacteria reproduction on your clothing.

Figure 2: UV LED

Our UVC LEDs are rated as 275 nm (270 - 280 nm) wavelength and they are available in a few different power levels and styles. Choosing from a single, chip-on-board, strip, to complete the light source module depends upon applications.

D. Typical Optical and Electrical Characteristics of UV:

The curve showing light output vs current is important to find the expected relationship between current and output, and the linear trend (or deviation) between the highest and lowest-rated forward currents. This information allows design engineers to control power with current, which is essential to meet end-of-life requirements.

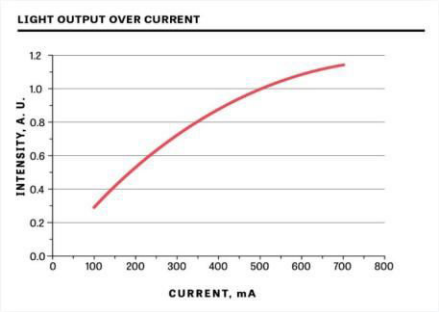

Figure 3: Graph: Light Vs Current

The typical radiation pattern shows how useful the power emitted will be for a defined application. The ability to focus light depends on its emission pattern, and the irradiance on a surface or in a product such as a water reactor is highly dependent on the way light is being emitted. For instance, sapphire-based UVC LEDs are typically associated with butterfly radiation patterns with side lobes that augment the etendue and can make it more difficult to steer the light, while aluminum nitride-based UVC LEDs have a Lambertian emission pattern which reduces the etendue.[3]

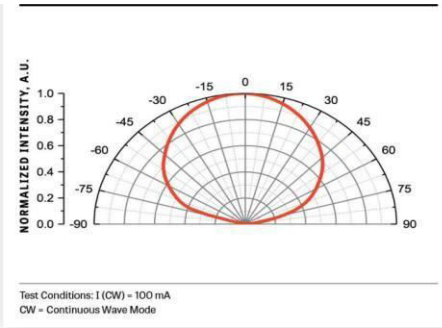

Figure 4: Radiation Pattern UVC

E. UV ray's spectrum:

UV radiation was discovered in 1801 when the German physicist Johann Wilhelm Ritter observed that invisible rays just beyond the violet end of the visible spectrum darkened silver chloride-soaked paper more quickly than violet light itself. He called them "(de-)oxidizing rays"

The electromagnetic spectrum of ultraviolet radiation (UVR), defined most broadly as 10–400 nanometres, can be subdivided into several ranges recommended by the ISO standard ISO-21348.[8]

TABLE I

electromagnetic spectrum UV radiation	UV wavelength description		
	Name	*Wavelength*	*Description*
1	UV - A	315 - 400	Longwave UV, Blacklight, Not absorbed by OZON layer, Soft UV
2	UV - B	280 - 315	Medium-wave UV, mostly absorbed by the ozone layer, Intermediate UV
3	UV - C	100 - 280	Short wave UV, Germicidal UV, completely absorbed by the OZON layer and atmosphere, Hard UV

II. UTILIZATION OF UV

The uses for UV light include a broad range of applications in commercial, industrial, and healthcare settings. UV technology allows lighting engineers to replicate UVC radiation which provides highly effective disinfection properties. UV lamps provide germicidal effectiveness in many applications along with a host of other purposes and use in a wide range of industries worldwide. Some of the most common uses of UV light include:

A. Air Disinfection

There needs to be sufficient contact of the air with the UV light, making this type of disinfection more effective on still or stagnant air than on moving air. To improve the efficacy of air disinfection, many facilities choose to install UV disinfection lights at the upper level of the room, so as the air naturally circulates, it will be cleaner. Facilities can also choose to install UV lamps near coils and drain pans of cooling systems such as air conditioners and refrigeration devices, which can prevent bacteria from growing in those cool.

B. Water Disinfection & Wastewater Treatment:

Facilities can also use UV light to disinfect water and even for wastewater treatment. Because UV disinfection is a physical process and does not require adding any chemicals to the water to clean it, this can be a very safe and effective option. UV light can reduce the incidence of parasites such as cryptosporidium or giardia, which can be resistant even to chemical disinfection. While UV light is not used as a sole disinfection protocol, it has become quite common in many metropolitan areas as part of the wastewater treatment process.[8]

C. Surface Disinfection:

UV light can destroy active viruses and other pathogens on a surface in just a matter of seconds. In this case, UV in healthcare facilities, can be much more efficient and effective than other cleaning and disinfecting options.

D. Equipment Disinfection:

In addition to stationary surfaces like countertops, tables, and floors, UV light is a popular disinfection solution for equipment. For example, laboratories that risk contamination may use UV to disinfect goggles, glassware,

or other laboratory instruments. As with other applications, UV light has the benefit of being effective but also dry and simple, unlike washing or bleaching, which can leave residue and moisture behind.

E. Food & Beverage Disinfection:

The use of UV light in food and beverage disinfection combines the effectiveness of UV light on surfaces as well as liquids. UV disinfection is effective in food manufacturing facilities when used to disinfect things like conveyor belts that are otherwise difficult to clean thoroughly. When the right products are used, these types of surfaces can be disinfected without shortening the life of the equipment.

III. FEATURES

The following features are available on this device:

1. Selectable water level
2. Selectable UV exposure
3. Error indication – Pressure sensor error, intake valve error, lid open error
4. Child lock
5. Memory Backup

A. Selectable water level:

A small load of laundry requires a small amount of water. And a large load requires more amount of water. We divide laundry into 4 quantities and provide 4 water levels. As per laundry quantity select desired water level. Here we consider a 6 kg washing machine. The below table shows a detailed laundry quantity and water and water level selection. [5]

TABLE II

Water level VS cloth load	**Cloth weight Vs water quantity**		
	Cloth weight in kg	***Water quantity***	***Water level***
1	0 to 1	20 L	Minimum
2	1 to 2.5	35 L	Low
3	2.5 to 4	45 L	Medium
4	4 to 6	60 L	High

B. Selectable UV exposure:

We provide a selection of UV operations based on our requirements. We can select or remove this operation as per desire. We introduce UV radiation application with a wash cycle, with rinse cycle means with water. We can select UV application only Spin means without water. This is useful to Sanitize different clothes with different UV exposure methods in one machine for more effectiveness. For example, regular cloth wash with water and sanitize with UV, for baby cloth, wash the cloth two times and sanitize cloth with UV, for masks no need of water we sanitize cloth using only UV.

C. Error indication:

The washing machine is one of the most used domestic appliances in any home. However, it may develop an internal problem at any time and display an error code. The error code indicates a technical fault, and to prevent any further damage the washing machine will either fail to start or abort the wash cycle.

Door open error is most important in the washing machine, for safety reasons, the door cannot be opened when the temperature or speed is too high. Pressure sensor failure error is required to control the overflow of water and water level selection. There are a few possibilities why your washing machine won't drain. that might happen. washing machine before any work or diagnosis can be done.[6]

D. Child lock:

The Child-Lock function is a safety feature that protects children from accidentally getting hurt when the washing machine is powered on. This function also protects the elderly and the frail. This function is to prevent injury and malfunction of the product due to inappropriate operations or actions by children.

F. Memory Backup

This washing machine comes with a memory backup feature that saves your programs in case there is a power failure during your laundry session.[5]

IV. WORKING METHODOLOGY

To sterilize the cloth, we are using UV – C, Short wave UV, and Germicidal UV, it is Hard UV hence it is useful to kill the bacteria 99.99%. to disinfect cloth here we are using UV – C LED operates on 12 v, radiate power is 2mw. To achieve 99% result UV – C LED ON for 1 hour.

In the washing program cycle, there are three-part of the cycle, Wash Rinse, and Spin. UV works on Wash cycle with detergent for 20-25 min, Rinse cycle process divided into two-part rinse 1 and rinse 2 with clean water, UV works during Rinse process for half hours 15 min for rinse 1 and 15 min for rinse2. The final cycle is the Spin cycle, During the Spin cloth starts to dry with UV exposure for 10-15 min. During the whole program cycle, UV sanitizes the cloth with water + detergent, with water and only dry cloth.

UV radiation is harmful. Hence, we require some precautions during the operating of UV function. If the door is open while UV operation is running, then it is harmful. However, we use some logic there, If the door opens at any condition of UV operation then the machine stops the current operation and indicates the error.

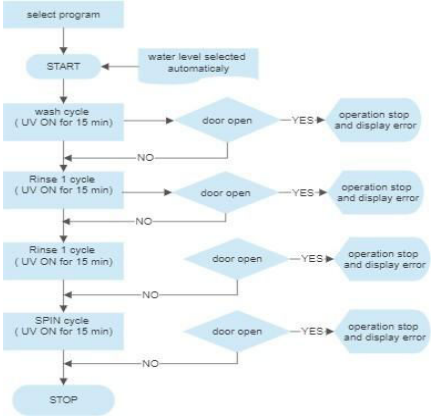

Figure 5: flow chart of UV operation

V. COMPARISON OF WASHING METHOD

TABLE II

Observations of different wash methods	**Washing methods**	
	Washing method	***observations***
1	Hand Wash	The traditional method of cleaning cloth is by hand, and it is time-consuming and requires more human work
2	Washing machine	A washing machine is a huge time saver over hand washing. But it is not sufficient to clean and sanitize the cloth
3	Wash the cloth with hot water	The heaters function is also effective in killing bacterial growth. The heater consumes more time and electricity for heating the water
4	Wash the cloth with steam	Steam washers are also said to be more energy-efficient compared to regular washers
5	Wash the cloth with UV	UV sterilization devices can disinfect better than other cleaning methods

VI. RESULT

The most important requirement of consumers is energy-saving and water-saving. They require a feature that cleans and sterilizes clothes with low energy and low usage of water. Next to energy and water efficiency, the survey showed a preference for features that added to user convenience.

UV sterilization devices can disinfect better than traditional cleaning methods and prevent the spread of infectious diseases more efficiently. This solution comes with low energy and low water usage as well as convenience

VII. CONCLUSION

To sterilize the cloth, we are using UV – C, Short wave UV, and Germicidal UV, completely absorbed by the OZON layer and atmosphere, it is Hard UV hence it is useful to kill the bacteria 99.99%. to disinfect cloth here we are using UV – C LED operates on 12 v, radiate power is 2mw. To achieve 99% result UV – C LED operates for 1 hour.

UVC clothes washing are most effective for people who closely work with a bacterially infected person like doctors, Nurse, Lab technicians, Medical dispensers / Suppliers, and Newborn babies. All mentioned person need to use hygiene clothes for their daily life.

VIII. REFERENCESRENCES

[1] Handbook of UV Degradation and Stabilization, Third Edition, Copyright © 2020 ChemTec Publishing. Published by Elsevier Inc. All rights reserved.

[2] https://www.komachine.com/en/companies/sunkyung/products/129060-hygienic-clothes-sterilizer-sk-uv01281

[3] UV Radiation: Properties, Effects, and Applications Hardcover, Publisher : Nova Science Publishers Inc; UK ed. edition (1 September 2014)

[4] https://www.fda.gov/medical-devices/coronavirus-covid-19-and-medical-devices/uv-lights-and-lamps-ultraviolet-c-radiation-disinfection-and-coronavirus

[5] The user manual of the Whirlpool washing machine.

[6] The user manual for Samsung and LG washing machine

[7] Water Its Purification and Use in the Industries – E-BOOK

[8] https://en.wikipedia.org/wiki/Ultraviolet

[9] https://www.intl-lighttech.com/applications/uvc-leds

Detecting Driver Drowsiness based on Eye Aspect Ratio Technique

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***Keywords*—Accident, Drowsiness, Raspberry Pi, Eye Aspect Ratio**

***Abstract* - Day and night many people drive on the highway. Many of them have to travel long distances due to which they lack sleep. Lack of sleep or drowsiness is dangerous because it leads to many accidents. To avoid this our project provides a solution by continuously detecting the driver's facial landmarks and alerting the driver if any drowsiness occurs. This will prevent accidents among drivers who sleep while driving**

INTRODUCTION

Whenever a person is feeling tired or sleepy it is called drowsiness. There are many consequences if a person falls asleep at inappropriate times. Many pieces of research show that more accidents are caused by drowsiness rather than alcohol consumption. Drowsiness is something that not only affects the person but also the people around them.

Our project aims at developing an alert system that provides a solution to this problem before it's too late. This is accomplished by developing a real-time system that detects whether or not a person is drowsy. If the person is drowsy then it sends an alert.

Literature Survey

Vehicle-based, psychological and behavioural measurements can be used to detect drowsiness of the driver using different algorithms.

In 2020 Jabbar [2] using the Conventional Neural Network (CNN) technique tried to detect drowsiness. It is one of the ML algorithms. The paper uses a camera to capture the facial landmarks and then passes them to the CNN algorithm. Various data sets were used for the detection with or without glasses, dim light etc.

Using a field-programmable gate array(FGPA) a low intrusive drowsiness system was developed by Vitable et al.[1]. The main focus of this system is the eye pupils. These are detected by the IR sensor which is embedded in the car. The driver's eyes are easily found using this effect and make it easy for analyzing drowsiness.

A technique was introduced using wavelet networking by Jemai et al.[3]. Wavelet network classifier(WNS) and Fast Wavelet Transform(FWT). Through regression technique heart rate and electrocardiogram are extracted for detection of drowsiness.

Using a neuro-fuzzy system, Arenezhad et al.[4] proposed a drowsiness detection system that is based on vehicle steering. It uses a support vector machine and particle swarm optimization algorithm. To solve the problem of drowsiness Mutya et al[5] developed a system using a steering wheel algorithm.

Based on EAR drowsiness can be detected[5]. From the images, the system detects the location of the eyes for calculation. Further in future, this system will detect yawning and distraction of drivers.

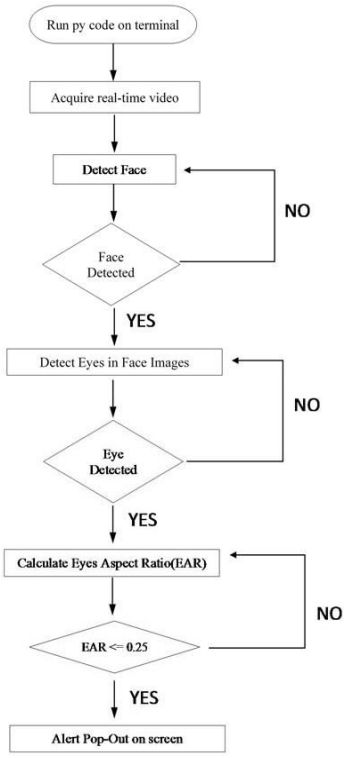
R. Marimuthu et al. [6] developed a system that whenever the driver falls asleep then eye detection takes place. By image processing, an alert is sent to the driver. It also has a control system that stops the car whenever an alert rings.

Jemai et al. [7] added a technique for a drowsy warning systems the usage of wavelet networking. That network tracks eyes with the assist of classifying algorithms like Wavelet network Classifier (WNC) that is based on speedy Wavelet transform (FWT), which specially leads to

binary manner choice (aware or no longer). The physiological factors are heartbeat charge and electrocardiogram that is again and again extracted thru wavelet transformation with regression approach for fatigue detection, designed through Babaeian et al. [9]. This principle worked on coronary heart rate records category through a wavelet network that can locate an average manner of drowsiness alert device.

METHODOLOGY

Many criteria are used and optimized in this project to increase the effectiveness of the system we are using. Road-users connection and a stand-alone mobile application are the first criteria to be used. Fig 1 shows the proposed flowchart used to avoid accidents by detecting drowsiness



Block diagram of the proposed system.

A. Eyes Aspect Ratio (EAR)

Eye blink movement is dominantly required in drowsiness detection systems. By using the OpenCV platform and Dlib library we can calculate EAR. This is done by a camera that detects the blink detection movement. Dlib is an open-source library. It is cross-platform software used for Neural network-based prediction. OpenCV using the EAR formula returns eye coordinates.

$$EAR = \frac{|P_2 - P_6| + |P_3 - P_5|}{2|P_1 - P_4|} \quad (1)$$

In equation (1), in the numerator part, we distance between vertical eye landmarks and the denominator contains the distance between horizontal eye landmarks. As shown in Fig 2 it contains *P1, P2, P3, P4, P5* and *P6.* These are 2D facial landmark locations. As there are two sets of vertical points and only one set of horizontal points, the denominator is weighted appropriately. The value of EAR is constant whenever the eyes are open and it rapidly falls to zero whenever there is a blinking movement. So in our project, we have kept the value of EAR to be <= 0.25

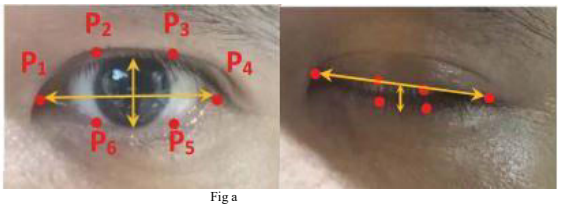


Fig a

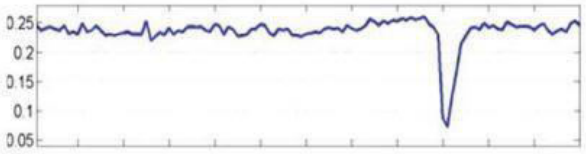


Fig 2.(a) The 6 (x,y) co-ordinate labelling and (b) EAR overtime

By installing a camera in front of the driver we can identify actions such as blinking, yawning, eye and head pose by capturing real-time images. To detect drowsiness we further process the captured real-time images. By the application of image processing we monitor the Eye Aspect Ratio (EAR). Using Dlib based pre-trained neural networks the captured images are processed. Starting at the left corner of the eye, every eye is represented by 6(x,y) coordinates.

B. Python Programming for our project

```
1  from scipy.spatial import distance
2  from imutils import face_utils
3  import imutils
4  import dlib
5  import cv2
```

Fig 3 Installed packages

In the above figure, for our simulation, we require these basic packages. In order to calculate the Euclidean distance between facial landmarks, we need to install SciPy so that we can work in computer vision, image processing and machine learning. To make working with OpenCV easier we use the imutils package for computer vision and image processing,

For facial landmark prediction we use the dlib library. In Fig 4 We use a code that contains the combination of numerator and denominator that we mentioned above in equation 1.

```
def eye_aspect_ratio(eye):
    A = distance.euclidean(eye[1], eye[5])
    B = distance.euclidean(eye[2], eye[4])
    C = distance.euclidean(eye[0], eye[3])
    ear = (A + B) / (2.0 * C)
    return ear
```

Fig 4. Python function for EAR calculation

```
thresh = 0.25
frame_check = 20
detect = dlib.get_frontal_face_detector()
predict = dlib.shape_predictor("models/shape_pr
```

When we want to locate facial landmarks of a person such as a nose, eyes, jaw line, or mouth we use the pre-trained Dlib library. Using the shape detection problem we can detect the facial landmarks whenever an image is given as an input. The shape predictor tries to locate the facial structures along with the shape of our interest. The object of interest is normally specified by an ROI.

```
ret, frame=cap.read()
frame = imutils.resize(frame, width=450)
gray = cv2.cvtColor(frame, cv2.COLOR_BGR2GRAY)
subjects = detect(gray, 0)
for subject in subjects:
    shape = predict(gray, subject)
    shape = face_utils.shape_to_np(shape) #converting to NumPy Array
    leftEye = shape[lStart:lEnd]
    rightEye = shape[rStart:rEnd]
    leftEAR = eye_aspect_ratio(leftEye)
    rightEAR = eye_aspect_ratio(rightEye)
    ear = (leftEAR + rightEAR) / 2.0
    leftEyeHull = cv2.convexHull(leftEye)
    rightEyeHull = cv2.convexHull(rightEye)
    cv2.drawContours(frame, [leftEyeHull], -1, (0, 255, 0), 1)
    cv2.drawContours(frame, [rightEyeHull], -1, (0, 255, 0), 1)
    if ear < thresh:
        flag += 1
```

Fig 6. Python BGR to grey and NumPy setup code

In Fig 6. We convert an original image from BGR to RGB with code “COLOR_BGR2GRAY”. In BGR each pixel has three values, one each for the red, green, and blue components of the pixel scalar. We can convert BGR and GRAY images to binary easily. To detect landmarks of a face we use binary form. The code“face_utils.shape_to_np(shape) to detect faces using Dlib. Using the code “left EAR = eye_aspect_ratio(left eye)” and “right EAR = eye_aspect ratio (right eye)” we extract (x,y) coordinates of both left and right eye. We use the NumPy library to slice the array to get the (x,y) coordinates. After getting the coordinates we compute the EAR value.

RESULTS AND ANALYSIS

For our experiments, initial process is shown in Fig. 7 (a) and (b) . From figure it is clear we can calculate EAR from both left and right eyes. The aspect ratio of eyes goes to zero when eyes are closed and when eyes are open the aspect ratio of eyes is a whole number ‘x’ which is greater than zero. As soon as the system detects that the eyes are closed it pops an alert to the driver as seen in Fig. 7 b

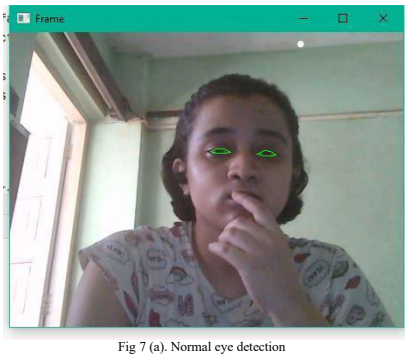


Fig 7 (a). Normal eye detection

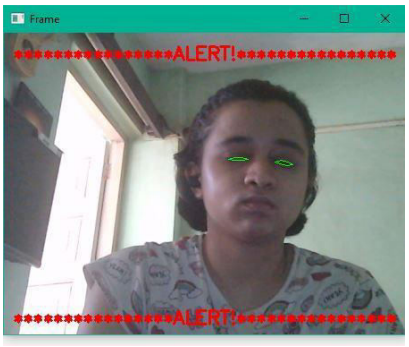


Fig (b). Pop- notification

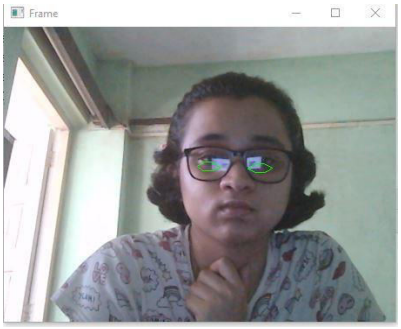


Fig 8. Eye detection wearing spectacles

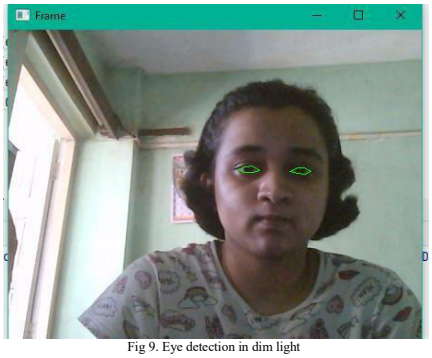


Fig 9. Eye detection in dim light

For image-based processing, the lighting in our surroundings is very important. In Fig 9. We try detecting eyes in dim light. We can use cameras efficiently during the evening as

they achieve their maximum capability then. Analysts developed LEDs (Light Emitting Diode). These work less efficiently during the day as compared to the evening.

For when there is more light during the day we use a charge-coupled gadget (CCD) or a web camera. During the night we use an infrared LED. Whenever the driver enters a tunnel or is under something shaded or dark, the light may dim around them. In such a situation our system will work and detect eyes and we can give an alert based on the calculations.

Whenever the driver is not paying attention at a certain moment then it is called a microsleep condition. This happens whenever a person is tired and this may lead to something dangerous. The system performs certain actions whenever it detects that the driver is in a microsleep condition.

Using PyCharm we can calculate the ratio of eyes for image processing. We have shown the summary of eye detection in the following table :

Results of eye detection

EXPERIMENT SETUP	NO. OF TESTS	DETECTED	UNDETECTED
Initial	10	10	0
Wearing spectacles	10	9	1
Dim light	10	9	1
Microsleep condition	10	9	1

CONCLUSION

This project is based on Eye Aspect Ration and it proposes a detection system for whenever a person is drowsy. Starting from the left eye in a clockwise direction each eye is labelled with 6(x,y) coordinates. The distance between the coordinates is related. Thus Eye Aspect Ratio (EAR) is derived from it. As per the performed experiment, the detection of eyes is carried out successfully but our system can still be further improved by detecting other activities such as yawning and distraction.

FUTURE WORK

In the coming future, we can integrate our project with Uber and Ola, also with local taxi drivers for their as well as passengers' safety. We can use this project in regions where such incidents happen regularly. We can also use this project in different domains such as airways, waterways and railways.

ACKNOWLEDGEMENT

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REFERENCES

[1]. Saravanaraj Sathasivam, Abd Kadir Mahamad, Sharifah Saon, Azmi Sidek “Drowsiness Detection System using Eye Aspect Ratio Technique” IEEE Student Conference on Research and Development,2020

[2] Sanam Narejo, Saima SIRAJ SOOMRO, Bushra Naz, Aqsa Noreen, Nadia Memon, “Development Of Vehicle Driver Drowsiness Detection System Using Eye Aspect Ratio”, Jaee, 2020

[3]Sukrit Mehta, Sharad Dadhich, Sahil Gumber, Arpita Jadhav Bhatt “Real-Time Driver Drowsiness Detection System Using Eye Aspect Ratio And Eye Closure Ratio”,2020

[4]Ajay S., Azariah John K. R. Subhashini, Joshua Thomas3” Drowsiness Detection Using Eye Blink And Facial Features Image Analysis”, Medico-Legal Update, October-December 2020

[5]Chisty [1], Jasmeen Gill [2] Research Scholar,” Drowsiness Detection System Using Eye Aspect Ratio Technique”, International Journal Of Computer Science Trends And Technology (Ijcst), 2019

[6]Ramanathan Marimuthu, A. Suresh, M. Alamelu And S. Kanagaraj,” Driver Fatigue Detection Using Image Processing And Accident Prevention”, International Journal Of Pure And Applied Mathematics, 2021

[7]Elena Magán, M. Paz Sesmero, Juan Manuel Alonso-Weber And Araceli Sanchis,” Driver Drowsiness Detection By Applying Deep Learning Techniques To Sequences Of Images”, Mdpi,2022

[8]Tejasweeni Musale And Pansambal, B.H,” Driver Drowsiness Detection Technique Using Raspberry Pi ”, International Journal Of Development Research,2019

[9]1dr.S.Priyadarsini, 2chahakagarwal.D, 3deshiya Narayan.M,” Driver Drowsiness Detection System Using Raspberry Pi”, Ijsdr,2020

[10]Ashish Nair, Vaijanath Patane, Prof. S.Y.Sawant, Umesh Patil, ”Raspberry Pi Based Drowsiness Detection System”, Ijmetmr,2019

IOT BASED SMART ENERGY GRID CONTROLAND POWER MONITORING

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Abstract- In recent scenario energy holds prime signification because of inequality between demand and power generation. Using Wi-Fi module entire system will be controller. Internet of thing (IOT) is internally related to computing tricks transferring the data under the network with no any help of a human to human and human to computer interrelation. The load to the consumer is to consume then the supply will continuously flow or provides. This project describes regularly with regular monthly payment of the bill. When the electricity bill is paid the digitalization of load energy usage readings over the internet. The proposed system design eliminates the involvement of human in electricity maintenance. The user can monitor energy consumption in watts from a webpage by providing a channel ID for the load. The webpage utilizes the THINGSPEAK analytics to analyze the energy usage statics. Wi-Fi unit performs IOT operation by sending energy data of the load to the webpage which can be power management by knowing energy usage time to time. This proposed system utilizes an Arduino microcontroller. The unit which is generated can be displayed front end mobile using TCP client app and can be further modified on the webpage through the Wi-Fi module.

Keywords- IOT, ARDUINO, Grid, Wi-Fi, TCPClient app

1. INTRODUCTION

Energy generation companies supply electricity to all the household via intermediate Controlled power transmission hubs known as electricity grid. Sometime problems arise due to failure of the electricity grid leading to black out of an entire area which was getting supply from that particular grid. The project aims to

solve tacking various other issues which a smart system can deal with to avoid unnecessary losses to the energy procedures.

2. NEED OF PROJECT

IOT smart energy grid is based on AT mega family controller which controls the various activities of the system. The system communicates over internet by using Wi-Fi technology. A bulb is used in this project to demonstrate as a valid consumer and a bulb to demonstrate n invalid consumer. The foremost thing that this project facilitates is reconnection of transmission line of active grid. If an energy grid becomes faulty and there is another grid thus facilitating an interrupted electricity supply to that particular region whose energy grid went OFF. And this information of which grid is active updated over IOT Geeko webpage where the authorities can login and can be the updates. Apart from monitoring the grid, this project has the advance capabilities of monitoring energy consumption and even detects theft of electricity. The amount of electricity consumed and the estimated cost of the usage gets updated on the IOT Gecko webpage along with the energy grid information. Theft conditions are simulated in the system using two switches.

Switching one each time will simulate a theft condition and also will notify the authorities over the IOT interface. In this way, the smart energy grid project makes sure that the electricity supply is continues and helps in maintaining a updated record of consumption and theft information which is quite a valuable information for the energy producing companies. After successful implementation of the energy producing companies. After successful implementation of the project following issues may be resolved.

Avoid the possibility of hacking the system, and basically, taking free electricity. To prevent meter tempering. Real-time models and design methods describing reliable interworking of heterogeneous system. To reduce the human efforts, and to cut the power automatically if the bill is not paid.

3. OBJECTIVES

1. Industrial data transmission, storage and distribution processing.
2. Remote monitoring and automation of the substation.
3. near-real-time visualization and profiling from the smart grid.
4. Overall digitalization of the power engineering enterprises.

4. LITERATURE SURVEY

General -Sometimes problems arise due to failure of electricity grid leading to black out of an entire area which was getting supply from that particular grid. The project aims to solve this

problem using IOT as the means of communication and also tackling various other issues which a smart system can deal with to avoid unnecessary losses to the energy procedures.

4.1. Caimine landi, pietro merola, giacomo lanniello, present a paper title "ARM-based energy management system using smart meter and web server", 2011.

In this paper they described such as a low cost real-time ARM-based energy management system is proposed. It is conceived as part of a distributed system that measures the main power system quantities and give the possibility to manage the whole power plant. An integrated Web Server allow to collect the statistics of power consumptions, power quality and is able to interface devices for load displacement. The device is characterized by easy access to the information and the combination of a smart meter and data communication capability allow local and remote access. In this way it is possible to manage the power consumption of the power system leading to an overall reduction in consumption and costs.

4.2. "B. S. Koay, S. S. Cheah, Y. H. Sng, P. H. Chong, P. Shum, Y. C. Tong, X. Y. Wang, Y. X. Zuo and H. W. Kuek", "Design and implementation of Bluetooth energy meetr", 2012.

In this paper they described such as Presently electronics energy measurement is continuously replacing existing technology of electro-mechanical meters especially in China and India. By the year 2004, digital meter has start replacing electromechanical meters in Singapore. A wireless digital energy meter would definitely offer greater convenience to the meter reading task. Bluetooth technology is chosen as a possible wireless solution to this issue. In this paper, we present the design and implementation issues of a Bluetooth-enabled energy meter. The energy reader can collect the energy consumption reading from the energy meter wirelessly based on Bluetooth.

5. DESIGN OF PROJECT

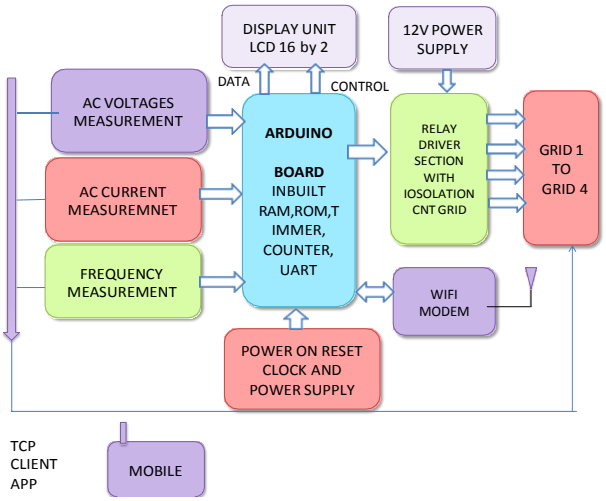


Fig. 5.1: Block Diagram of System

6. PROPOSED WORK

The existing Smart Home and Energy Management system have looked more into controlling the appliances and also managing the hazards for electrical faults. In none of the research, system has been developed towards

energy conservation by monitoring the environmental conditions and accordingly controlling the appliance and grid usage accordingly.

So with the upcoming of Machine to Machine communication called IoT, we here have developed an IoT Based Energy Management System where sensors like current, voltage and frequency sensor employed and reading sensed are sent to Arduino Microcontroller. Based on sensed reading, the Arduino microcontroller is programmed to control the grid usage accordingly. In addition to controlling the appliance usage, the amount of current drawn by each grid is computed using Sensor which are sent wirelessly using Wifi module to mobile. total power consumption of each grid is computed periodically and same may be plotted as graph. The graphical information on power consumption versus time for all grid may be possible.

Load demand and requirement may suffer from time to time, it may take hazardous condition in distribution system. To overcome from this problem load shading is implemented by switching on grid for a unic time. Time may be equal for every grid or in multiple of each other. As per the requirement and scheduled task.

7. SPECIFICATION OF PROJECT

Hardware specification:

1. ATmega328P AVR board
2. Current Transformer Sensor
3. Voltage Transformer Sensor
4. Signal Conditioning block if voltage and current
5. ESP8266 Wi-Fi Module
6. Relay driver section to change over grid.
7. LCD's and signal conditioning component
8. Load (lamp)

Software Specifications:

1. IOT TCP Client app
2. Arduino compiler.
3. Protel software for PCB layout
4. Orcad for circuit diagram.

8. RESULT

Switching one each time will simulate a theft condition and also will notify the authorities over the IOT interface. In this way, the smart energy grid project makes sure that the electricity supply is continues and helps in maintaining a updated record of consumption and theft information which is quite a valuable information for the energy producing companies.

9. APPLICATION

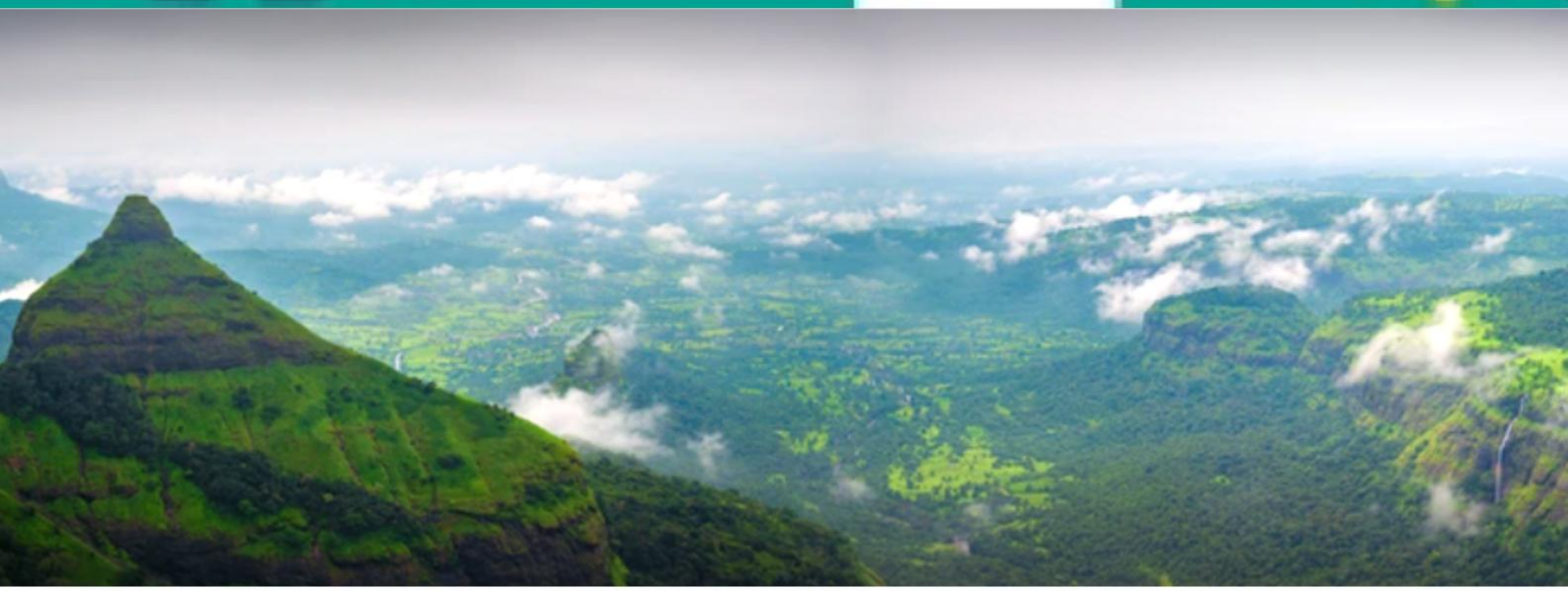
- Society
- industry

10. REFERENCES

[1]Caimine landi, pietro merola, giacomo lanniello, present a paper title “ARM-based energy management system using smart meter and web server”, 2011.

[2].Ben abdallah; garrab, A.;bouallegue; "A new AMR approach for energy saving in Smart Gridsusing Smart Meter and partial Power Line Communication" , 2012.

[3]. "B. S. Koay, S. S. Cheah, Y. H. Sng, P. H. Chong, P. Shum, Y. C. Tong, X. Y. Wang, Y. X. Zuo and H. W. Kuek" , "Design and implementation of Bluetooth energy meter", 2012.



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