



Student Projects Technical Record

Released on the occasion of

Science & Engineering Fair of Selected Projects

at

Shikshakara Sadana, K G Road Bangalore

on

26th, 27th & 28th February 2018

Organised by

Agastya International Foundation

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Synopsys

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FOREWORD

In a world where recent events suggest that we may be entering a period of greater uncertainties, it is disturbing that India's educational system is not (in general) internationally competitive. In an age where the state of the economy is driven more and more by knowledge and skill, it is clear that the future of our country will depend crucially on education at all levels – from elementary schools to research universities. It is equally clear that the question is not one of talent or innate abilities of our country men, as more and more Indians begin to win top jobs in US business and industry, government and academia. Indian talent is almost universally acknowledged, as demonstrated by the multiplying number of R&D centres being set up in India by an increasing number of multinational companies.

So what is the real problem?

There are many problems ranging from poor talent management to an inadequate teaching system in most schools and colleges where there is little effort to make contact with the real world in general rather than only prescribed text books. This big handicap in the early stages of education prevents young children from developing an attitude that is conducive to understand science or developed technology.

It is therefore heartening that the Agastya Foundation has embarked on a remarkable programme called Anveshana that is pursuing a rather unusual path in tackling this problem. Thus they have engineering students from the universities with a certain amount of knowledge of basic principles and experience with applying that knowledge in tackling real world problems. Anveshana has brought together such a group of young people in the BE courses to mentor students in disadvantaged schools.

This is a programme where both sides are learning. This is an excellent idea that calls for some hard thinking and the ability to come up with solutions involving what has come to be known as frugal innovation. Such a programme encourages reasoning, upgrades skills and equips both sides with physical and intellectual tools that gives the students a far truer understanding of the nature of science

and technology. Even more importantly, perhaps, the programme generates a degree of self-confidence that one can think up and pursue successfully options that successfully tackle problems at hand. The projects selected come from a variety of subjects – beginning with such daily needs as water and energy, and going on towards such contemporary technologies as robotics and rockets.

I want to congratulate Agastya Foundation for this innovative programme that they have now been running for nearly twenty years, and the way that its success in Bangalore and its neighborhood is now being repeated in the far corners of this country is attracting financial and intellectual support from a wide variety of sources. I wish Agastya even greater success in coming years.

Roddam Narasimha, FRS

DST Year-of-Science Professor

Engineering Mechanics Unit

Jawaharlal Nehru Centre for Advanced Scientific Research

ABOUT AGASTYA

ABOUT AGASTYA INTERNATIONAL FOUNDATION

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Introduction

Founded in April 1999, Agastya is a charitable education trust that runs the world's largest mobile hands-on science education program for economically disadvantaged children and teachers. By making practical, hands-on science education accessible to rural government schools, Agastya aims to transform and stimulate the thinking of underprivileged children and teachers.

Agastya Vision:

**Creatively skilled rural India..
Entrepreneurially-enabled..
Improving the environment
to..
Sustain it for future
Generations....**

Mission of Agastya

Infuse and propagate a creative tempter in disadvantaged rural children and teachers through:

- **Experiential, hands-on science education**
- **Teacher training and education**
- **Scalable, sustainable and environment-friendly methods**
- **Art and Ecology**

Agastya's mission to unlock the creative potential of poor children and teachers across India is being achieved through:

- 100 + Mobile Labs which take hand-on science education and digital literacy to the village doorstep.
- 45 Science Centers catering as science resource hubs for surrounding schools and communities.
- 105 + Lab in a Box sets which nurtures a high impact and participatory learning experience for students and teachers.
- 245 Operation Vasantha Centres, community run program to provide remedial classes for students and drop-outs.
- 172- Acre Creativity Lab campus in Andhra Pradesh (2 hours from Bangalore) which houses science, art, astronomy

Agastya has reached over 5 million children and 200,000 teachers in 14 states, and is supported by scientists and educators in the country.

The Prime Minister's National Knowledge Commission (has recommended the Agastya model for nationwide dissemination, <http://knowledgecommission.gov.in/downloads/recommendations/PMLetterM&S.pdf>) and the Clinton Global Initiative has commended Agastya for its long term "commitment to action."



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How Agastya International Foundation has positively affected the lives of disadvantaged children:

Rote-based, didactic and uninspiring education in India has deprived over 250 million disadvantaged children of the tools to overcome poverty. Instead, it has produced education apathy, a high dropout rate and youth that lack skills and confidence, creative-thinking and problem-solving abilities. Most schools do not have labs. Opportunities for participative, hands-on learning that sparks curiosity, and stimulates and empowers children and teachers are almost non-existent. Teacher training is divorced from the realities of the school classroom. Seeing little value in education, rural parents prefer to send their children to work in farms, thus perpetuating a cycle of poverty. Operating one of the largest hands-on science education programs in the world, Agastya offers disadvantaged

children access to dynamic hands-on education that makes learning fun, awakens curiosity, encourages questioning, enhances understanding, and fosters creative-thinking, problem-solving and communication skills.

Agastya's vision of 'a creative India' - 'tinkerers, creators, and solution-seekers ...humane, anchored and connected' – is being achieved through its mission to spark the creative temper among millions of disadvantaged children. Using experiential and hands-on, child-centric learning, teacher education and scalable methods, Agastya aims to bring about a shift in five vital behaviors - 'Yes to Why,' 'Looking to Observing,' 'Passiveness to Exploring,' 'Text-book to Hands-on,' and 'Fear to Confidence'

Agastya Creativity Lab at Gudivanka Village, Kuppam, Andhra Pradesh, India

Agastya's unique 172 acre 'Creativity Lab' is at Gudivanka Village, Kuppam, Andhra Pradesh, India. The Campus or "factory of ideas", boasts several labs dedicated to hands-on learning activities in science, maths, ecology, media and art. Over the years, the Campus has played host to esteemed educators, scholars, researchers, academicians and dignitaries from various domains. In addition to subject specific labs, the Campus houses a Discovery Center which houses life size interactive models, Center for Creative Teaching (CCT) which prepares Agastya instructors and rural Govt. Teachers, an Art Lab, a Media Lab, an open air Ecolab and a Robotics Lab. The latest developments include 'Guru-Gruha' Astronomy center, 'VisionWorks' model-making workshop, Library and IT Centre, Performing Arts Centre and an Innovation Hub.



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Third Party Impact Studies:

MHRD study on 2048 children from 256 schools

- 70% + children and teachers welcome Agastya & demand increase in interventions
- Enriches and fills gap in the curriculum
- Increases interest in Science; Gives insight into Scientific methods
- Promotes concept retention and development
- Increase in Creativity, Problem-solving and Leadership skills among Young Instructor Leaders (YIL's)

Best Practices Foundation study of 1348 children in Karnataka

- Provides professional development for teachers
- 100% increase in Awareness of alternative learning methods
- 100% increase in Motivation to study science
- 50% to 100% leap in Curiosity

Achievements and Recognitions

- Received humanitarian prize money from former President of India, Dr. A.P.J. Abdul Kalam.
- Agastya partners with Dr. Kalam in Darbhanga, Bihar through the Mobile Lab program
- Featured on "Amazing Indians", Times Now News Channel
- Agastya wins Google Impact Awards in India for the revolutionary TechLaBike project.
- Agastya's 'commitment to action' was recognized by the Clinton Global Initiative in 2008
- The Prime Minister's National Knowledge Commission recommended the Agastya model for India-wide scale-up
- Agastya nominated to list of 100 Global Innovators in April, 2013 by Rockefeller Foundation

Looking Forward...

Increase in college admissions, participation in science projects and competitions; demand for school labs and hands-on learning, and national interest in Agastya programs indicate that Agastya is positively impacting the lives of disadvantaged children.



"The lesson we derive out of the Agastya experience is that innovative and student friendly solutions are needed to enable scientific learning in the youth, especially those in rural and remote regions of the nations of the world."

*– Former President of India,
Dr. Abdul Kalam*

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By clicking on the following links you can

Watch the Agastya Mobile Lab in action: <http://www.youtube.com/watch?v=v7B0tf61jFc>

Like us on FaceBook – <https://www.facebook.com/Agastya.Foundation>

Follow us on Twitter – www.twitter.com/AgastyaSparks

ABOUT SYNOPSYS

Corporate Background

Synopsys, Inc. (NASDAQ:SNPS) provides products and services that accelerate innovation in the global electronics market. As a leader in electronic design automation (EDA) and semiconductor intellectual property (IP), Synopsys' comprehensive integrated portfolio of system-level, IP, implementation, verification, manufacturing, optical and field-programmable gate array (FPGA) solutions help address the key challenges designers face such as power and yield management, system-to-silicon verification and time-to-results. These technology leading solutions help give Synopsys customers a competitive edge in quickly bringing the best products to market while reducing costs and schedule risk. For more than 25 years, Synopsys has been at the heart of accelerating electronics innovation with engineers around the world having used Synopsys technology to successfully design and create billions of chips and systems. The company is headquartered in Mountain View, California, and has approximately 90 offices located throughout North America, Europe, Japan, Asia and India.

- See more at:

<http://www.synopsys.com/Company/AboutSynopsys/Pages/About.aspx#sthash.GSEbLS7b.dpuf>

ABOUT ANVESHANA

Anveshana Program is structured around the concept of **mentoring**, “catch them young” and “Facilitate the inquisitive minds”.

“Mentoring is a process for the informal transmission of knowledge, social capital, and the psychosocial support perceived by the recipient as relevant to work, career, or professional development; mentoring entails informal communication, usually face-to-face and during a sustained period of time, between a person who is perceived to have greater relevant knowledge, wisdom, or experience (the mentor) and a person who is perceived to have less (the protégé)” (source: <http://en.wikipedia.org/wiki/Mentorship>).

The program looks at Involving school students to provide an opportunity to work with engineering students to find solutions for the encountered social problems.

The program envisaged to bring together students from various underprivileged schools and Engineering colleges in respective locations in and around Delhi NCR – in a collaborative platform (Anveshana).

Engineering colleges will participate as teams with 2 members. The teams will select 2 students from nearby underprivileged schools (Govt. and Govt. aided schools) to **mentor** them to design and build models or projects around an identified social problem. In the process school children would directly get the opportunity to work together with more qualified under-graduates, and a chance to ‘learn’ the basic principles (along with hands-on skills on diverse products and interesting processes). The interaction with Juries and dignitaries would be a life-time experience for them to cherish. The school students thus will be exposed to entire planning, designing and building process of the models and in turn will get educated in the scientific and engineering concepts behind the models in Anveshana-2016. (www.anveshana.org)

Process of Anveshana (Engineering Fair & Competition):

- Initial Screening of Engineering College Teams: Concept synopsis based on social problems and related Engineering solutions are invited from engineering college teams for prescreening by the jury.
- Screening, selection of Synopsis and identifying mentees: Once selected the teams are asked to contact local schools with underprivileged status and to form school

student teams to plan, design and make the models, while collaborating and mentoring the high school students.

- Model Creation and Quality Check by Agastya team: Students will create knowledge networks between them, their peers and with external resource persons to create conceptual and methodological framework to create the models. Here, Agastya teams along with assigned senior resource persons (senior educators, engineers etc.) will visit the colleges to assist the teams conceptually and in the making of the models while providing inputs including scientific and technological inputs. One of the main reasons for these visits is to assure the quality of the collaboration and teaching-mentoring-learning outcomes.
- Conceptual- Technological advice from Agastya: Agastya will also help the teams to establish links between prominent institutions like Indian Institute of Science, Institution of Engineers, Indian Institute Technology etc. –in case they need any technological or conceptual inputs.
- Anveshana Fair begins: The models thus made will be exhibited in Anveshana Engineering fair where the teams would be presenting the same in front of an expert Jury for Judgment. During the fair, students display their research projects, working models and present their findings orally and through written journals to the Jury (mostly a team of scientists and educators). The judging process involves series of interactions on the concepts, methodology and objectives of the projects done by the students.
- Delegates attending the fair: After the judging process students from various schools and delegates representing various institutions are also expected to attend the fair. Delegates attending the event will include scientists and educators from large number of institutions across Hyderabad.
- Valedictory: Prizes will be awarded at a valedictory function –towards the end of the fair.

ANVESHANA MILESTONES

2011 - 12 Anveshana launched in Bangalore

2012 - 13 Anveshana 2nd Edition in Bangalore

2013 - 14 Anveshana 3rd Edition in Bangalore
Anveshana Launched in Hyderabad

2014 - 15 Anveshana 4th Edition in Bangalore
Anveshana 2nd Edition in Hyderabad

2015 - 16 Anveshana 5th Edition in Bangalore
Anveshana 3rd Edition in Hyderabad
Anveshana Launched in NCR-Delhi

2016 - 17 Anveshana 6th Edition in Bangalore
Anveshana 4th Edition in Hyderabad
Anveshana 2nd Edition in NCR-Delhi

2017 – 18 Anveshana 7th Edition in Bangalore
Anveshana 5th Edition in Hyderabad
Anveshana 3rd Edition in NCR-Delhi

PROJECT SCREENING COMMITTEE

MG Subramanian

MG Subramanian is an Advisor to Agastya International Foundation. He enjoys going around project sites-namely colleges where Anveshana's projects are in progress interacting with young mentors and younger mentees pointing out the immense opportunities to teach and learn, to wonder and innovate.

He is an engineer from IIT Madras and a PGDM from IIM Calcutta with a long experience in manufacturing, product, business development and Human resources development. He acknowledges the value of a mentorship and attributes all his successes in life to his mentors .He says Anveshana's success is inevitable!

Dr. H. G. Nagendra

Dr. H. G. Nagendra is Professor and Head at the Department of Biotechnology, Sir MVIT, Bangalore. He holds a doctorate degree in Biophysics from IISc, Bangalore, and was a recipient of the BOYSCAST Post-doctoral Fellowship (DST) from Cambridge University, UK. He has 16 years of teaching and 20 years of research experience, and has authored 26 international publications in various journals. His research interests include protein bioinformatics and structural biology of neurodegenerative peptides. He has made more than 54 presentations at various conferences / seminars as an invited speaker, and has conducted more than 32 conferences / seminars / workshops.

Dr. M Govindappa

Name:	Dr M Govindappa
Qualification	MSc, MPhil, PhD, PDF (USA)
Research Publications	06 National 52 International
PhD guidance	03 students awarded (6 students pursuing)
Guided for	BE, M.Tech and MSc students for their academic project work
Membership	For various biotechnology bodies
Reviewers	For various journals
Editor for	International Journal of Multidisciplinary Research

INVITATION



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Presents



An initiative to bridge the gap between schools and engineering colleges
to develop innovation and creativity through mentoring

27th Feb 2018	INVITATION SCIENCE & ENGINEERING FAIR 2018 Welcome Address: 10.30 AM Sri. Ramji Raghavan <i>Chairman, Agastya International Foundation</i> Inauguration, Followed by Speech: 10.40 AM Dr. Shalini Rajaneesh, IAS <i>Principal Secretary, Primary & Secondary Education Dept. Govt. of Karnataka</i> Anveshana 17 Book Launch, Followed by Speech: 10.50 AM Dr. V.K. Aatre <i>Scientist & Former Head of DRDO</i> Keynote Address: 11.00 AM Sri. Anil Sharma <i>Senior Manager, Human Resources, Synopsys, Bengaluru</i> Members of the Jury Panel: Prof R.M. Vasagam <i>Former Senior Scientist-ISRO, Former VC, Anna University</i> Dr. A. Maulishree <i>CEO -ICT Skills Development Society Dept. of IT, BT and S&T, Govt. of Karnataka</i> Sri. B.U. Chandrashekar <i>Principal R&D Engineer Synopsys India</i>
28th Feb 2018 Contact: 94495 96365 / 7 www.anveshana.org	Welcome Address: 4.00 PM Sri. K. Thiagarajan <i>Chief of Operations, Agastya International Foundation</i> 100 Times Curious Book Launch: 4.10 PM Smt. Sabitha Mahesh <i>Executive Assistant to the Managing Director, Synopsys India</i> Keynote Address: 4.20 PM Sri. Karthikeyan Natarajan <i>Senior VP & Global Head - Integrated Engineering Solutions, Tech Mahindra, Bengaluru</i> Awarding Winners Followed by Speech: 4.30 PM Sri. Mukesh B.A <i>Director, Finance, Synopsys India Bengaluru</i> Vote of Thanks: 4.40 PM Jahnvi J <i>R&D Engineer Synopsys India</i>

Venue: Shikshakara Sadana, Opp Kaveri Bhavan, K.G. Road, Bengaluru - 560 009.



PROGRAM CHART – BANGALORE

26th February 2018

3 pm to 4 pm	Student Registration (full team should be present)	By Hamsa and Team
4 pm to 4.30 pm	Briefing about Agastya & Anveshana	By Mr. Suresh
4.30 pm to 5 pm	Students Project Stall set up	Support by Dilip, Muniraju, Bhaskar, Zabbi and Team
5:00 PM	Tea/snacks & break	Shikshakara Sadana by Adigas
7.30 pm	Dinner for participants	At Adigas Hotel

27th February 2018

8 am to 8.45 am	Breakfast for participants	At Adigas Hotel
10.30 am to 11.30 am	Inaugural Function	
11 am to 1 pm	a) Model Judging Process Begins b) Schools students Visit	By Jury Panel visiting and interacting each team in their respective stalls
		Open to School Students & Visitors - Students from various schools visit and interact with the project teams
1 pm to 1.30 pm	Lunch for participants	Shikshakara Sadana by Adigas
1.30 pm to 4.30 pm	a) Models Judging continues b) Schools students Visit continues	By Jury Panel visiting and interacting each team in their respective stalls
		Open to School Students & Visitors- Students from various schools visit and interact with the project teams
4.30 pm	Tea/Snack Break	Shikshakara Sadana by Adigas
7.30 pm	Dinner for participants	At Adigas Hotel

28th February 2018		
8 am to 8.45 am	Breakfast	At Adigas Hotel
10 am to 1 pm	Anveshana Fair - Schools students Visit	Open to School Students & Visitors - Students from various schools visit and interact with the project teams
1 pm to 1.30 pm	Lunch for participants	Shikshakara Sadana by Adigas
1.30 pm to 3.45 pm	Anveshana Fair - Schools students Visit	Open to School Students & Visitors - Students from various schools visit and interact with the project teams
4 pm to 5 pm	Valedictory Function	
5:00 PM	Tea/Snack Break	Shikshakara Sadana by Adigas

PROJECTS EXHIBITED IN THE FAIR

S.N	PROJECT CODE	PROJECT TITLE	COLLEGE NAME/SCHOOL NAME
1	AS-B-U-01	FREE BREEZE HYGIENIC AIRCOOLER	HIRASUGAR INSTITUTE OF TECHNOLOGY, NIDASOSHI, BELGAUM
			GOVT KANNADA BOYS HIGH SCHOOL, NIDASOSHI
2	AS-B-WM-02	NATURAL COMPOSITE INSULATORS	HIRASUGAR INSTITUTE OF TECHNOLOGY, NIDASOSHI, BELGAUM
			MOORAJI DESAI RESIDENTIONAL SCHOOL, NIDASOSHI
3	AS-B-WM-03	DIGESTBIN FOR KITCHEN WASTE	SIR M . VISVESVARAYA INSTITUTE OF TECHNOLOGY, BANGALORE
			SRI JAGADHGURU PANDITHARADHYA PROWDASHALE
4	AS-B-WM-04	SMART AUTOMATED WASTE SEGREGATING DUSTBIN	SRI VENKATESHWARA COLLEGE OF ENGINEERING, BANGALORE
			SRI JAGADGURU PANDITHARADHYA SCHOOL, HUNASAMARANAHALLI
5	AS-B-FIN-05	SMART BANK LOCKER SYSTEM	MANGALORE INSTITUTE OF TECHNOLOGY AND ENGINEERING, MANGALORE
			GOVT HIGH SCHOOL, KUKKEHALLI
6	AS-B-TK&TS-06	FLEXIBRICKS FOR GREEN BUILDING	ACHARYA INSTITUTE OF TECHNOLOGY, BANGALORE
			GOVT HIGH SCHOOL, CHIKKABANAVARA
7	AS-B-TK&TS-07	DETECTION AND REMOVAL OF PHOSPHATE USING MC AND WIRELESS ACCESSIBLE SENSOR	CHANNABASAVESHWARA INSTITUTE OF TECHNOLOGY, TUMKUR
			GOVT HIGH SCHOOL KYTASANDRA, TUMKUR
8	AS-B-N&F-08	ARECA SPRAY SYSTEM BY DRONE	SHRI DHARMASTHALA MANJUNATHESHWARA INSTITUTE OF TECHNOLOGY, UJJIRE, D.K
			SDM HIGH SCHOOL, UJJIRE
9	AS-B-G-09	EMERGENCY FIRST-AID DRONE	BGS INSTITUTE OF TECHNOLOGY, MANDYA
			B.G.S RURAL ENGLISH MEDIUM HIGH SCHOOL, ADHICHUNCHANAGIRI
10	AS-B-G-10	TREE CLIMBING CYCLE	HIRASUGAR INSTITUTE OF TECHNOLOGY, NIDASOSHI, BELGAUM
			MOORAJI DESAI RESIDENTIONAL SCHOOL, NIDASOSHI
11	AS-B-N&F-11	OMEGA LUTEIN ENRICHED NUTRIEGG	SIR M . VISVESVARAYA INSTITUTE OF TECHNOLOGY, BANGALORE

			SRI JAGADHGURU PANDITHARADHYA HIGH SCHOOL
12	AS-B-G-12	ULTRASONIC NAVIGATION PROJECT	PROUDADEVARAYA INSTITUTE OF TECHNOLOGY, HOSPET, BELLARY
			TUNGABADRA HIGH SCHOOL HULIGI
13	AS-B-G-13	FOG CAMERA VISSION IN VEHICLES	SHRI DHARMASTHALA MANJUNATHESHWARA COLLEGE OF ENGINEERING AND TECHNOLOGY, DHARWAD
			GHS NARENDRA
14	AS-B-G-14	AUTOMATICALLY OPERATED IOT BASED WEARABLE SAFETY DEVICE FOR GIRL AND WOMEN	SRI VENKATESHWARA COLLEGE OF ENGINEERING, BANGALORE
			SRI JAGADGURU PANDITHARADHYA HIGH SCHOOL, HUNASAMARANAHALLI
15	AS-B-G-15	LOCOMOTIVE HORNING	VIJAYA VITTALA INSTITUTE OF TECHNOLOGY, BANGALORE
			GHS JAKKURU
16	AS-B-G-16	SMART BOOK IN RURAL EDUCATION	PESIT BANGALORE SOUTH CAMPUS, BANGALORE
			SRI A TIMMAIAH REDDY GOVT HIGH SCHOOL
17	AS-B-G-17	NON-INVASIVE GLUCOMETER USING SALIVA	JAIN COLLEGE OF ENGINEERING, BELAGAVI
			SANGOLLI RAYANNA MEMORIAL RESIDENTIAL SCHOOL, NANDGAD
18	AS-B-G-18	BI MODE SPY COPTER	SHRIDEVI INSTITUTE OF ENGINEERING AND TECHNOLOGY, TUMKUR
			SARVODAYA BOYS SCHOOL
19	AS-B-G-19	FABRICTN OF OIL SKIMMING MACHINE	AKSHAYA INSTITUTE OF TECHNOLOGY, TUMKUR
			MARUTHI VIDYA KENDRA, BELAGUMBA, TUMKUR
20	AS-B-TK&TS-20	REINFORCED INTERLOCKING MUD BRICKS	SHRI DHARMASTHALA MANJUNATHESHWARA INSTITUTE OF TECHNOLOGY, UJJIRE, D.K
			SDM ENGLISH MEDIUM SCHOOL, UJJIRE
21	AS-B-TK&TS-21	ADIHA- PARTNER OF RUBBER FARMER	SHRI DHARMASTHALA MANJUNATHESHWARA INSTITUTE OF TECHNOLOGY, UJJIRE, D.K
			SDM HIGH SCHOOL, UJJIRE
22	AS-B-U-22	ELECTROSTATIC PRECIPITATION	AGM RURAL COLLEGE OF ENGINEERING & TECHNOLOGY, DHARWAD
			LION'S SCHOOL, HAVERI
			J M J SCHOOL, SHIGGAON
23	AS-B-U-23	REGENERATIVE BRAKING SYSTEM	BEARYS INSTITUTE OF TECHNOLOGY, MANGALORE
			BEARYS PUBLIC SCHOOL, MANGALORE
24	AS-B-U-24	NANO ENGINEERED WATER	DAYANANDA SAGAR COLLEGE OF ENGINEERING, BANGALORE
			BALDWIN GIRLS'S HIGH SCHOOL

25	AS-B-U-26	WIRELESS SENSING NETWORK MONITORING FOR WATER POLLUTION IN LAKES AND RIVERS	MANGALORE INSTITUTE OF TECHNOLOGY AND ENGINEERING,MANGALORE
			LITTLE FLOWER ENGLISH MEDIUM SCHOOL, RANGANPALKE
26	AS-B-U-27	HYBRID ADSORPTION COOLING	NAGARJUNA COLLEGE OF ENGINEERING AND TECHNOLOGY,DEVANAHALLI.
			NAGARJUNA VIDHYANIKETAN
27	AS-B-U-28	WIND LENS	P E S COLLEGE OF ENGINEERING,MANDYA
			SANTHOM PUBLIC SCHOOL, MANDYA
			ABHINAVA BHARATHI VIDYA KENDRA, MANDYA
28	AS-B-U-29	ADVANCE CONTROL INDUCTION MOTOR	P E S COLLEGE OF ENGINEERING, MANDYA
			ROSSELLO'S CENTRAL SCHOOL
			VISHWA PRAGNA HIGH SCHOOL
29	AS-B-U-30	DRIVER EYE	SAHRDAYA COLLEGE OF ENGINEERING AND TECHNOLOGY, KERALA
			ST.SEBASTIAN H.S, CHENGAL
30	AS-B-U-31	MOVABLE ROAD DIVIDER FOR ORGANIZED VEHICULAR TRAFFIC CONTROL WITH MONITORING OVER INTERNET OF THINGS (IOT)	SCHOOL OF ENGINEERING AND TECHNOLOGY, JAIN UNIVERSITY, RAMANAGAR
			RYAN INTERNATIONAL SCHOOL, BANNERUGATTA
			CARMEL HIGH SCHOOL BASAVESWARANAGAR
31	AS-B-WM-32	MICROBIAL FUEL CELLS	AKSHAYA INSTITUTE OF TECHNOLOGY, TUMKUR
			MARUTHI VIDYAKENDRA
32	AS-B-WM-33	USE OF WASTE RUBBER AS A AGGREGATES	AMRUTA INSTITUTE OF ENGINEERING AND MANAGEMENT SCIENCES, BIDADI, RAMANAGARA
			BLOOSOM INTERNATIONAL SCHOOL, RAMANAGARA
33	AS-B-WM-34	BIO WASTE INTO ACTIVATED CHARCOAL	BASAVESHWAR ENGINEERING COLLEGE (AUTONOMOUS) BAGALKOT
			VIVEKANANDA GOVT. SCHOOL
34	AS-B-TK&TS-35	PLASTIC BOOTLE BRICKS	SHRI JAGADGURU BALAGANGADHARANATHA SWAMIJI INSTITUTE OF TECHNOLOGY,KENGERI,BANGALORE
			SHREE JNANKSHI VIDYANIKETAN PUBLIC SCHOOL
35	AS-B-SP-36	BOREWELL-CHILD RESCUE ROBOT	SRI SAI RAM COLLEGE OF ENGINEERING,ANEKAL,BANGALORE
			SARASWATHI VIDYA MANDIR

36	AS-B-F&N-37	SEMI-AUTOMATED HONEY EXTRACTOR	CANARA ENGINEERING COLLEGE,BHANTAWAL,D.K
			CANARA HIGH SCHOOL, URVA
37	AS-B-G-38	MAGLEV TRAIN AND AUTOMATION	BEARYS INSTITUTE OF TECHNOLOGY,MANGALORE
			BEARYS PUBLIC SCHOOL, MANGLORE
38	AS-B-G-39	DESIGN OF EMBROIDERY STAND	BMS COLLEGE OF ENGINEERING,BANGALORE
			SHRI JAGADGURU BALAGANGADHARANATHA SWAMIJI INSTITUTE OF TECHNOLOGY, KENGERI
			SWARGARANI SCHOOL AND PU COLLEGE
39	AS-B-G-40	ADVANCED CANE FOR BLIND	GIRIJABAI SAIL INSTITUTE OF TECHNOLOGY. MAJALI. KARWAR, UTTARAKANNADA
			BP PUBLIC SCHOOL
40	AS-B-G-41	RAILWAY ACCIDENT CONTROL BY RADAR/PHOTO ELECTRIC TECHNOLOGIES	JAWAHARLAL NEHRU NATIONAL COLLEGE OF ENGINEERING, SHIMOGA
			NATIONAL PUBLIC SCHOOL, SHIVAMOGGA
41	AS-B-G-42	SMART SPECS FOR DISABLED	P E S COLLEGE OF ENGINEERING, MANDYA
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43	AS-B-G-44	LEADING STICK	SAMBHRAM INSTITUTE OF TECHNOLOGY, BANGALORE
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44	AS-B-G-45	SMART FUEL GAUGE	VIDYA VIKAS INSTITUTE OF ENGINEERING & TECHNOLOGY, MYSORE
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45	AS-B-G-46	DIGITAL BRAILLE AUDIO LEARNING DEVICE	VIDYA VIKAS INSTITUTE OF ENGINEERING & TECHNOLOGY,MYSORE
			SUPREME PUBLIC SCHOOL,MYSURU

1. FREE BREEZE HYGIENIC AIR COOLER

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COLLEGE STUDENTS	SAVITRI S HULLANNAVAR, ASHWINI N KALAL
SCHOOL STUDENTS	SUDHARSHAN S PADMANNAVAR, SHRIDHAR S DANGI, 7 TH STANDARD, KHPB SCHOOL, NIDASOSHI

ABSTRACT:

Global climatic conditions not uniform throughout globe. It varies from place to place, climatic conditions play vital role in the appearance, life style, mindset, intelligence of living person in that area. We can see statistics of the rank holders of SSLC, PUC etc. Toppers are mostly from cool climatic area. (But genetically some are intelligent)

To keep the climatic condition cool, architects are putting their efforts with their logical designs. Common man expects room cooler with the features to cool, with lower cost (initial and running cost) easy to maintain and repair themselves. Nowadays many air conditioner; air cooler companies are available, which will not fulfil the need of the common man.

HYPOTHESIS:

In this project we assume room temperature above 25°C. The evaporative cooling system (clay pot technology) works at higher temperature. This project holds good for hot areas like Raichur, Gulbarga, and Vijayapura etc. where ambient temperature is around 35°C.

METHOD:

The air coolers available in the market blow wet air from its outlet with the help of fan. But the temperature of the wet air is same as room temperature. In our model, the temperature of air blown is reduced to 17°C, with the help of two clay pots as evaporative coolers and a copper tube to radiate the heat. Small low powered, Solar/Battery operated fans are used to blow the air. With this model room temperature can be maintained at 20°C. In addition to this, to purify the air and improve its hygiene, at the inlet of the fans Tulsi [*Ocimum tenuiflorum*] and Davana [*Artemisia pallens*] medicinal plants are used.

ADVANTAGES:

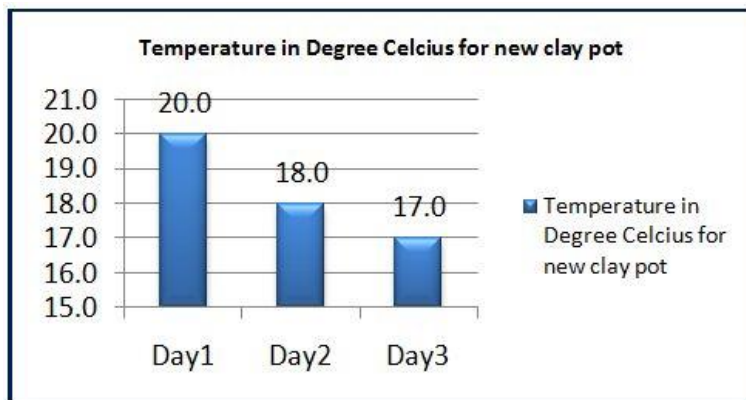
- Room temperature is maintained approximately at 20°C.
- Inactivates some of the air born or transmitted micro organisms (UV at air inlet).
- Spiritual freshness, because of holy medicines, It is widely used in ayurveda in the treatment of mental disorders, nervous problems , measles, infections, diabetes, depression, cough, cold, high blood pressure.
- Easy to maintain and repair.
- Low cost.

EXPERIMENT/ OBSERVATION:

- In this project we used a pair clay pots, a copper radiator, fans, electronic circuit, solar panel, battery for energy storage, UV tube, a cabinet for housing the whole assembly, Medicinal plants etc. are used.
- Assembly allows an ambient air from the backside, rushing into the device through cabinet gaps. The air with room temperature and containing infectious organisms, foul smells etc.
- The air first enters medicinal plants to add natural perfume, medicinal values as mentioned above.
- Later the air passes below the UV tube, where interaction of ultraviolet rays kills harmful bacteria, organisms etc.
- The hygienic air, with existing room temperature, then passes through the radiator chamber where it exchanges heat.
- As the clay pot water temperature is around 17°C, water from the pot reaches copper tube radiator and cools the ambient temperature carrying hygienic air to 18°C.
- Two fans are mounted at the device back end to push the air inside. Two fans are mounted behind the radiator to blow the hygienic cool air outside the cooler.
- This process continues, until the room reaches temperature near 18°C and forever.
- Depending upon the ambient temperature, room size, door and window openings the cooling rate varies.

OBSERVATION:

1. Newly purchased clay pots, after filling with water will not lead to low temperature directly.
2. They take a fixed duration for getting ready to retain an average temperature of about 17°C.
3. In over observation clay pots took 3 days to reach a minimum temperature of 17°C.



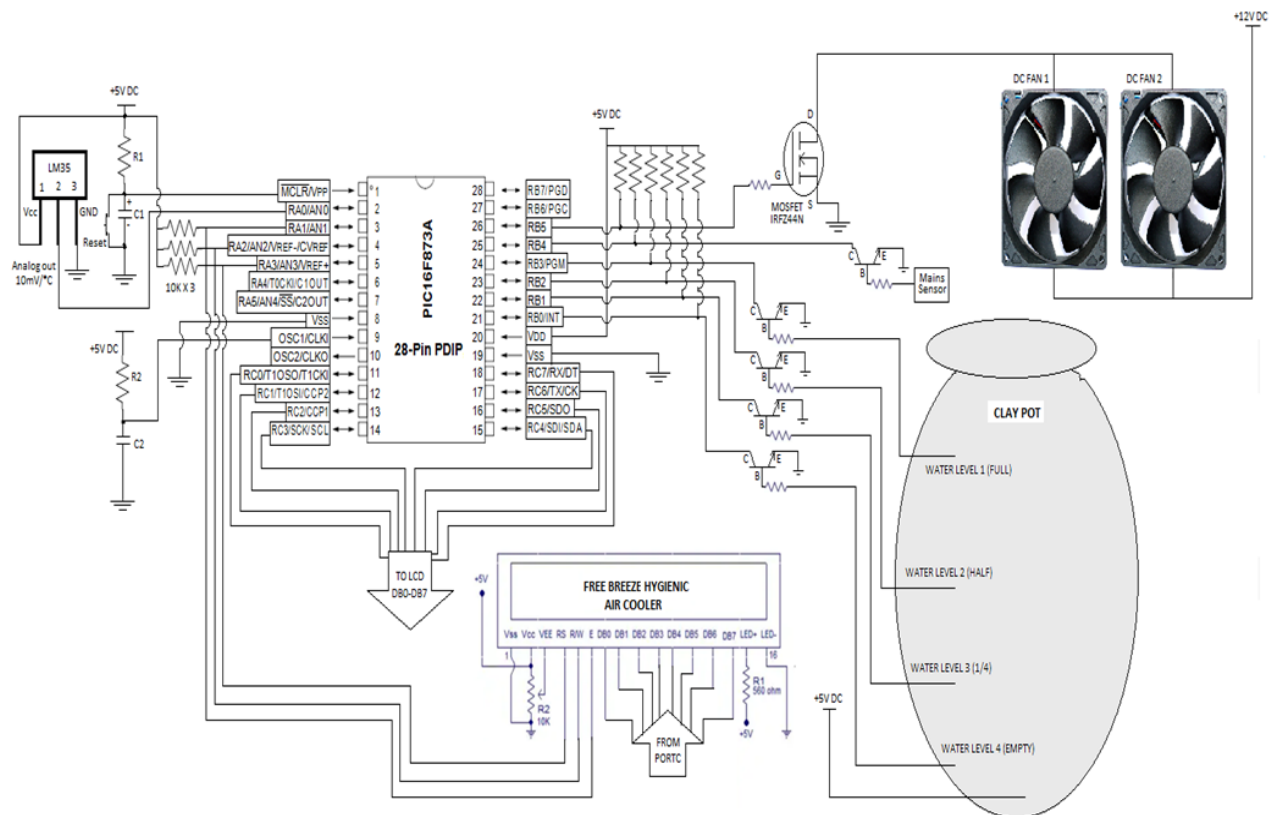
SUMMARY:

Free breeze hygienic air cooler is an innovative product, it is very different from other coolers. Easy to maintain and repair by him/herself. In this project we used clay pots for maintaining the room temperature at 17°C and holy medicines for room freshness, It is widely used in Ayurveda in the treatment of mental disorders, nervous problems , measles, infections, diabetes, depression, cough, cold, high blood pressure. Totally it is eco-friendly, there is no side effect.

MODEL:



CIRCUIT DIAGRAM:



COST OF THE PROJECT

S. NO	PARTICULARS	QUANTITY	COST IN Rs
1	SOLAR PANEL	1	1000
2	CABINET	1	1500
3	ELECTRONIC CIRCUIT	1	750
4	BATTERY	1	850
5	UV TUBES WITH CIRCUIT	1	1000
6	MISCELLANEUOS		1500
		Total	6600

2. NATURAL COMPOSITE INSULATORS

COLLEGE	HIRASUGAR INSTITUTE OF TECHNOLOGY
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COLLEGE STUDENTS	RAGHAVENDRA G PASTE, VINAYKUMAR B B PATIL
SCHOOL STUDENTS	SADASHIV HOSALI, SHREYAS BELAVI, 9 th STD, MORARJI DESAI RESIDENTIAL SCHOOL.

ABSTRACT:

Thermal Insulation is the reduction of heat transfer (the transfer of thermal energy between objects of differing temperature) between objects in thermal contact or in range of radioactive influence. Thermal insulation can be achieved with specially engineered methods or processes, as well as with suitable object shapes and materials. Heat flow is an inevitable consequence of contact between objects of differing temperature. Thermal insulation provides a region of insulation in which thermal conduction is reduced or thermal radiation is reflected rather than absorbed by the lower-temperature body.

HYPOTHESIS:

FIBRE REINFORCEMENT:

Reinforcement usually adds rigidity and greatly impedes crack propagation. Thin fibers can have very high strength, and provided they are mechanically well attached to the matrix they can greatly improve the composite's overall properties.

Fiber-reinforced composite materials can be divided into two main categories normally referred to as short fiber-reinforced materials and continuous fiber-reinforced materials. Continuous reinforced materials will often constitute a layered or laminated structure. The woven and continuous fiber styles are typically available in a variety of forms, being pre-impregnated with the given matrix (resin), dry, uni-directional tapes of various widths, plain weave, and harness satins, braided, and stitched.

HEMP:

Hibiscus cannabinus, is a plant in the Malvaceae family also called Deccan hemp and Java jute. Hibiscus cannabinus is in the genus Hibiscus and is probably native to southern Asia, though its exact origin is unknown. The name also applies to the fiber obtained from this plant. Kenaf is one of the allied fibers of jute and shows similar characteristics.



Hemp Fibers

CHARACTERISTICS OF HEMP:

It is an annual or biennial herbaceous plant (rarely a short-lived perennial) growing to 1.5-3.5 m tall with a woody base. The stems are 1–2 cm diameter, often but not always branched. The leaves are 10–15 cm long, variable in shape, with leaves near the base of the stems being deeply lobed with 3-7 lobes, while leaves near the top of the stem are shallowly lobed or unlobed lanceolate.

PARTICLE BOARD:

Particleboard is a composite panel product consisting of cellulosic particles of various sizes that are bonded together with a synthetic resin or binder under heat and pressure. Particle geometry, resin levels, board density and manufacturing processes may be modified to produce products suitable for specific end uses. At the time of manufacture, additives can be incorporated to impart specific performance enhancements including greater dimensional stability, increased fire retardancy and moisture resistance.

COMPONENTS:

Deccan Hemp Kenaf:

Kenaf (*Hibiscus cannabinus*), is a plant in the Malvaceae family also called **Deccan hemp** and **Java jute**. *Hibiscus cannabinus* is in the genus *Hibiscus* and is probably native to southern Asia, though its exact origin is unknown. The name also applies to the fibre obtained from this plant. Kenaf is one of the allied fibres of jute and shows similar characteristics.



Extracted Deccan Hemp fibers

Ammonia:

Ammonia is a compound of nitrogen and hydrogen with the formula NH_3 . The simplest pnictogen hydride, ammonia is a colorless gas with a characteristic pungent smell. It contributes significantly

to the nutritional needs of terrestrial organisms by serving as a precursor to food and fertilizers. Ammonia, either directly or indirectly, is also a building block for the synthesis of many pharmaceutical products or is used in many commercial cleaning products.

White Portland cement:

White Portland cement differs physically from gray cement only in terms of its color. Its setting behavior and strength development are essentially the same as that expected in gray cement, and it meets standard specifications such as ASTM C 150 and EN 197. In practice, because much white cement is used in pre-cast concrete products, it is commonly made to a high-early strength specification such as ASTM C 150 Type III.

Standard Epoxy Resin:

Epoxy is either any of the basic components or the cured end products of **epoxy resins**, as well as a colloquial name for the epoxide functional group. Epoxy resins, also known as **polyepoxides**, are a class of reactive prepolymers and polymers which contain epoxide groups.

METHODOLOGY:

For the preparation of the Particleboard the following materials used are Extracted fibers of Deccan Hemp, Liquid Ammonia, White cement, Standard Epoxy Resin. Reinforcement usually adds rigidity and greatly impedes crack propagation. Deccan hemp is used as reinforcement.

Extraction of Fibers:

- Firstly, the extraction of fibers from Deccan Hemp stem, later the fibers is finely extracted.
- The extracted fibers are soaked for 3 days into a mixture of water and Liquid Ammonia in the ratio 4:1 respectively and later dried to natural.

Mixture:

- Cement and Epoxy Resin mixture is prepared as a binding material in the best proportion. The paste of standard epoxy resin and white cement holds the Hemp fibers tightly and hardens the total process later.

Preparation of Particleboard:

- Now the dried fibers and mixture of White cement & Std. Epoxy Resin are taken in a required proportion and mixed together and particleboard is prepared considering

Testing:

- The Bending and Compression Tests are being carried out considering all data.

EXPERIMENT:

-  **Extracted Hemp Fibers:** The fibers are finely extracted from Deccan hemp stem. Later mixed into the mixture of Water and Liquid Ammonia in 4:1 ratio respectively.



- ✚ **Mixture of Hemp fibers, white cement & Std. Epoxy resin:** The complete mixture is put into a container of standard scale in equal proportion.



- ✚ **Mixture allowed for pressing:** The mixture which is prepared and put in a container later allowed for drying and weights are being placed on it for pressing. As a result, mixture settles completely in the container.



SUMMARY:

It can be concluded from proposed project that “Production of Thermal Insulation Particleboard” is having standard strength. It can bear heavy load up to 30kN. As results are mentioned from conducted experiments.

In future there is a lot of scope to develop thermal insulation particle boards on the availability of natural fibers. Utilization of natural fibers like Deccan hemp for the preparation of particle boards may results than the other particleboards available in the market. Availability of raw material, cost of processing and handling are the major factors to be considered correctly for the better results.

GROUP PHOTO:



3. DIGESTBIN FOR KITCHEN WASTE

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SCHOOL STUDENTS	APPU, LAVANYA, SRI JAGADHGURU PANDITHARADHYA PROWDASHALE

ABSTRACT:

Municipal Solid Waste consists of organic and inorganic waste, 45% of this total waste is organic. Every individual household produces around 1 kg of biodegradable waste which can be converted into compost which can be used as a fertilizer for plant growth. The Bio digester helps in converting the biodegradable waste into compost at our home by providing optimal conditions for microbial decomposition of organic matter. The aerobic conditions provided improves digestion of organic content thereby reducing the offensive odour which traditionally results from anaerobic digestion. The Bio digester provides ready to use compost enriched in nutrients for plant growth. It also combats space constraints and allows faster formation of compost within 3-4 weeks. The Bio digester is environment friendly and cost effective.

INTRODUCTION:

A harmonious and balanced relationship between human and nature on the earth is vital for the survival of life and sustainable growth. With advent of time, human directly or indirectly interfered with the natural environment for its comfort. One of the causes for pollution of air, water and soil is the way municipal solid waste is being managed.

Approximately, 4500 metric tons of waste is generated in Bengaluru, out of which only 30% waste is collected by BBMP and rest is getting dumped. With the inadequate space for landfills, there is a huge pressure on the civic administrators to clear the garbage that is piling on roads. The two major Bengaluru South-catering landfills that have closed now are Bingipura (near Electronics City) and Laxmipura (off Bannerghatta Road). The S Bingipura quarry pit area - close to Electronic city - is overloaded with over 50,000 tons of garbage. This has left groundwater of surrounding villages contaminated.

The key problems of Municipal Solid Waste (MSW) include mixing of waste, collection and storage of waste, transportation, indiscriminate burning and illegal disposal of waste. The MSW consists of organic and inorganic waste materials, 45% of this total waste is organic. Every individual household produces around 1-3 kg of biodegradable waste which can be converted into manure.

The DigestBin helps in the conversion of everyday kitchen waste generated into rich manure/compost in a short time period of 3-4 weeks. The advantages also combat space constraints faced by landfills and allow for faster formation of compost within 3-4 weeks of digestion while landfills need over 2-3 months to accomplish the same result. The DigestBin is

similar to a dustbin at every home. Out of all the waste being generated, 70% is getting dumped. With the increasing "lack" of space, the waste accumulation is spreading to the towns and cities. This accumulation is further leading to spreading diseases among humans and animals and also increased contamination leading to air, water pollution.

Hence, this is an on-site solution to the ever increasing problem of wet waste. Finding a solution at the source (kitchen from every home) can reduce the burden on the landfills and avoid other unscientific methods of management of these wastes.

INNOVATION:

1. A DigestBin designed with the right conditions of temperature, Ph, blender and shredder for faster degradation of organic matter to compost.
2. A powder formulation of Carbon, Nitrogen and other minerals to provide the right nutrient for the microbes to degrade the organic matter in an aerobic method
3. DigestBin can be scaled up to handle larger quantity of waste and different type of wet / organic waste.

AIM OF THIS PROJECT:

The main aim of this project is to provide feasible Biodigester for easy conversion of kitchen waste produced in every home into compost beneficial for gardening.

PRINCIPLE:

Keeping these factors in mind, the Digest BIN is designed such that it provides a one-point solution. Composting is an age-old practice. The process of composting happens with the help of various parameters like Temperature, pH, nutrients, type of organic matter, aeration, moisture, particle size and so on.

This DigestBin will provide all the right parameters and hasten the process of degradation of the organic matter to give enriched compost which can be used for various other purposes.

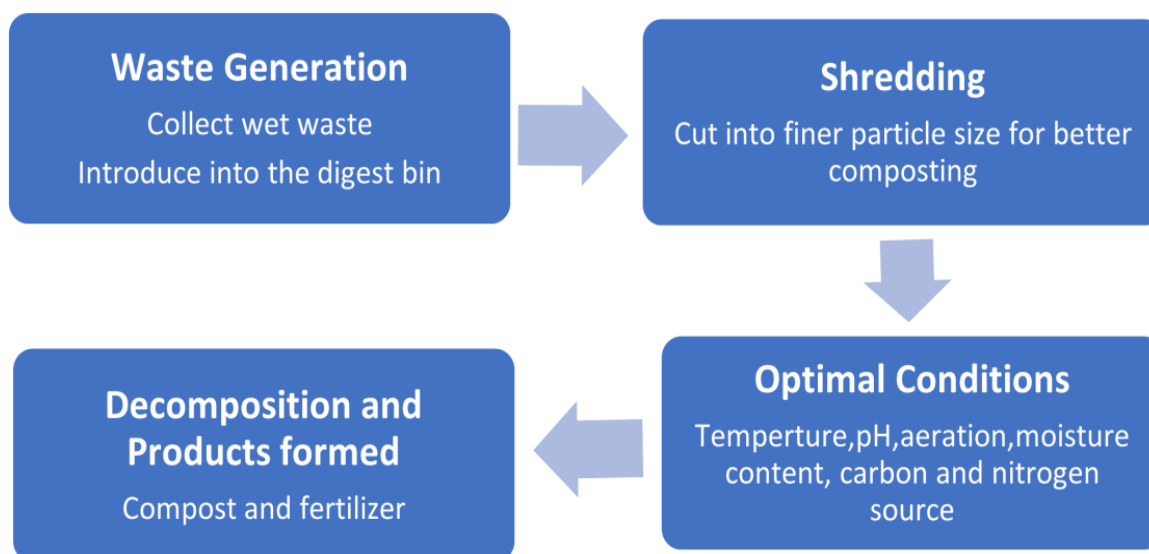
SIZE OF THE MODEL:

- 3-5 kg capacity
- The dimensions of the digest bin is 27*27*38 (approx.)

COST:

- INR 10,000- INR 15,000

METHODOLOGY:

**BUSINESS PLAN:**

- This small model of 3-5 kg capacity can be scaled up to larger quantity of waste. Also, this model can be used for other types of wet waste like market waste, flower waste etc.
- After the successful validation of the DigestBin, civic administrators will be contacted for scale up possibilities and further large scale production.

SUMMARY:

The Digest bin is economical and easy to use. The compost is completely made of natural organic wastes from kitchen with added supplements containing leaf powder, coffee grounds and good microbes that enrich the growth of the plants.

4. AUTOMATED WASTE SEGREGATOR AND IOT BASED WASTE MANAGEMENT USING SMART DUSTBIN

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SCHOOL STUDENTS	CHARANJITH, SRINIVASA - SRI JAGADGURU PANDITHARADHYA SCHOOL, HUNASAMARANAHALI

ABSTRACT:

Rapid increase in volume and types of solid and hazardous waste as a result of continuous economic growth, urbanization and industrialization, is becoming a burgeoning problem for national and local governments to ensure effective and sustainable management of waste. It is estimated that the total amount of municipal solid waste generated globally is increasing 7% annually since 2003 (Global Waste Management Market Report 2007). The segregation, handling, transport and disposal of waste are to be properly managed so as to minimize the risks to the health and safety of patients, the public, and the environment. The economic value of waste is best realized when it is segregated. Currently there is no such system of segregation of dry, wet and metallic wastes at a household level. This paper proposes an Automated Waste Segregator (AWS) which is a cheap, easy to use solution for a segregation system at households, so that it can be sent directly for processing. It is designed to sort the refuse into metallic waste, wet waste and dry waste. The AWS employs parallel resonant impedance sensing mechanism to identify metallic items, and capacitive sensors to distinguish between wet and dry waste. Experimental results show that the segregation of waste into metallic, wet and dry waste has been successfully implemented using the AWS.

Smart dustbin concept implementation is done with the help of IoT concept. The Internet of Things (IoT) is a concept in which surrounding objects are connected through wired and wireless networks without user intervention. Objects communicate and exchange information. In this system multiple dustbins are located throughout the city or the Campus, these dustbins are provided with a sensor which helps in tracking the level and weight of the garbage bins and a unique ID will be provided for every dustbin in the city so that it is easy to identify which garbage bin is full. When the level and weight of the bin reaches the threshold limit, the device will transmit the reading along with the unique ID provided. Once the bins are full, it displays the direction of the nearby bins on LCD display also generate the voice messages if the user place the waste on the floor. The status of the bin is accessed by the concerned authorities from their place with the help of Internet and an immediate action will be taken to replace overflowing bins with the empty bins

KEYWORDS:

AUTOMATED WASTE SEGREGATOR: —Automation, waste segregation, metal detection, capacitive sensing, inductive sensing.

SMART DUSTBIN: motor-driver, 16*2 LCD Display, Aurdino UNO, Load cell, Playback IC, Speaker, IR Sensors, Smell Sensors, Bread Board, Power Supply and Raspberry pi.

INTRODUCTION:

In recent times, garbage disposal has become a huge cause for concern in the world. A voluminous amount of waste that is generated is disposed by means which have an adverse effect on the environment. The common method of disposal of the waste is by unplanned and uncontrolled open dumping at the landfill sites. This method is injurious to human health, plant and animal life. This harmful method of waste disposal can generate liquid leachate which contaminate surface and ground waters; can harbor disease vectors which spread harmful diseases; can degrade aesthetic value of the natural environment and it is an unavailing use of land resources.

In India, rag pickers play an important role in the recycling of urban solid waste. Rag pickers and conservancy staff have higher morbidity due to infections of skin, respiratory, gastrointestinal tract and multisystem allergic disorders, in addition to a high prevalence of bites of rodents, dogs and other vermin. Dependency on the rag-pickers can be diminished if segregation takes place at the source of municipal waste generation.

The economic value of the waste generated is not realized unless it is recycled completely. Several advancements in technology has also allowed the refuse to be processed into useful entities such as Waste to Energy, where the waste can be used to generate synthetic gas (syngas) made up of carbon monoxide and hydrogen. The gas is then burnt to produce electricity and steam; Waste to Fuel, where the waste can be utilized to generate bio fuels. When the waste is segregated into basic streams such as wet, dry and metallic, the waste has a higher potential of recovery, and consequently, recycled and reused. The wet waste fraction is often converted either into compost or methane-gas or both. Compost can replace demand for chemical fertilizers, and biogas can be used as a source of energy. The metallic waste could be reused or recycled.

Even though there are large scale industrial waste segregators present, it is always much better to segregate the waste at the source itself. The benefits of doing so are that a higher quality of the material is retained for recycling which means that more value could be recovered from the waste. The occupational hazard for waste workers is reduced. Also, the segregated waste could be directly sent to the recycling and processing plant instead of sending it to the segregation plant then to the recycling plant. Currently there is no system of segregation of dry, wet and metallic wastes at a household level. The purpose of this project is the realization of a compact, low cost and user-friendly segregation system for urban households to streamline the waste management process.

Here we have figured out a new model called smart dustbin for the municipal dustbins which intimates the center of municipality for immediate cleaning of dustbin. Once the dustbin is full immediate message is sent to the truck driver to collect the waste. In order to prevent unwanted waste accumulation.

IMPLEMENTATION:

AUTOMATED WASTE SEGREGATOR

Figure 1 shows a diagram of the AWS. An upper enclosure ensures waste does not fall out of the sensing area. Inside the enclosure is an infra-red (IR) proximity sensor module. When the waste is dumped in by pushing the flap, the IR proximity sensor module gets activated and brings the micro controller MSP430G2553 out of low power mode. The object slides over the incline to fall on the inductance coil which is used to sense any metal object. If the object is metallic a change in parallel resonant impedance of the metal detection system is observed. The object continues and drops into the capacitive sensing module. Here, a decision is made if the waste is wet or dry based on its relative permittivity. Two DC geared motors are used to perform the final segregation based on the identification. One motor moves a circular base to get the corresponding container under the collapsible base. This collapsible base is controlled by the second motor. The process flow analysis is given in Figure 3. The individual modules are explained here as follows.

A. Entry System and Initialization

The waste is dumped into the AWS by pushing it through a flap. This flap comes in the proximity of the IR proximity sensor which marks the entry of the waste. The sensor sends an interrupt to the microcontroller which comes out of the low power mode. It then initializes the sensor modules. The initialization of all modules ensures that any dynamic changes in the environment do not affect the sensing. The sensor modules establish a base count by averaging many samples, while the waste slides over the first incline. An average of 100 counts is taken to establish a base count for the LDC1000. The object takes 240 milliseconds to slide down the incline while 100 samples take 200 milliseconds. Once, an average for the metal detection system is established the LDC100 is switched to threshold mode and the capacitive sensing module initializes its base value by averaging 15 samples. Thus, averages of all base count values are set.

B. Metal Detection System

The object moves over the incline and falls on the inductive coil. The inductive coil is a part of a parallel inductance and capacitance (LC) circuit. As shown in Figure 2 the circuit is connected to the LDC1000 inductance to digital convertor. This measures the parallel resonance impedance of a parallel LC circuit and returns data as a proximity value. This data changes whenever another metallic object is introduced in the vicinity of the coil. When an alternating current is passed through a coil it generates a magnetic field. When a metallic object is introduced in the vicinity of the coil, eddy currents are induced on its surface. The eddy currents are a function of the distance, size, surface area and composition of the target. This generates a magnetic field which opposes the original magnetic field which is generated by the coil. The inductive coupling between the coil and the object creates a mutual inductance effect on the coil which decreases the parallel resonant impedance of the circuit which in turn is reflected by an increase in the proximity count value. Magnetic fields do not affect the metal detection system. It can detect any conducting material irrespective of its magnetic properties. An average of base count is set up by using LDC1000 in data ready mode which generates an interrupt every time the proximity value is ready to be read. After a base count is established the LDC1000 is switched to threshold mode which generates an interrupt once the proximity data crosses a set threshold. Hence, the object is inferred as metallic.

The waste continues down the second incline towards the apex. If the type of garbage is not metallic then the capacitive sensing module continues to sense the object, else the sensing module is stopped and the actuators are activated.

C. Capacitive sensing module

A base count value is established once the LDC1000 has been switched to the threshold mode. Pin Oscillator method determines a count value for each pair of capacitive plates. Three pairs of copper plates are placed along the walls of the structure which are inclined to each other at an angle of 45°. This arrangement is made to ensure that waste of all sizes can be sensed. The area of each pair of plates increases as it moves away from the apex of the structure. The sensitivity of the plate decreases with its increase in area, hence smaller plates would accurately sense objects of smaller size. Even though the sensitivity of the larger plate is decreased, it is designed to detect larger objects which will yield a change sufficient to be identified. The principle of working for the pin oscillator method in the microcontroller is shown as in Figure 4. The microcontroller uses two timers. One timer is used to control a fixed time window, while the second timer uses the output of the Schmitt trigger as clock. The input of the Schmitt trigger is connected to a resistor and a plate of the capacitor. The other plate of the capacitor is connected to ground. The second terminal of the resistor is connected to a multiplexer output which supplies the rail voltages alternately based on the output of the Schmitt trigger. As a result, the capacitor charges and discharges and the Schmitt trigger toggles which generates a train of pulses at the output. These pulses are applied to the second timer as a clock input. This process continues till the first timer counting window is complete. The count value in the second timer is the capacitive count value. When an object is introduced between the plates, the capacitance increases and thus the capacitor takes a longer time to charge and discharge. Hence the count value stored in the second timer is lower than the base count value. The difference between the two count values is used to identify whether the waste is dry or wet. The property used for segregation of waste is the relative dielectric constant. Once a dielectric is introduced between the plates of the capacitor the capacitance increases. Wet waste has a higher relative dielectric constant than that of dry waste because of the moisture, oil and fat[8], content present in kitchen waste. If the change in the capacitive count is greater than threshold then the type of garbage is inferred as wet waste else it is dry waste. Since the capacitance value of the plates is different, the change observed for the same object by the different plates is different. Hence different threshold levels are assigned for each pair of capacitors. Thus, the type of waste is identified as either wet or dry and the actuators are activated.

D. Segregation Module

To achieve the segregation, two DC geared motors are used. They are cheaper as compared to the stepper motor and provide a solution suitable for this application. The containers are placed on a circular base which is mounted on the axle of a DC geared motor. The circular base rotates as the axle of the DC geared motor rotates. If the container corresponding to the type of garbage is not under the flap then the motor is rotated clockwise or anticlockwise according to the Table 1. An IR sensor module is positioned under the circular base such that it generates an interrupt when the required container positions itself under the flap. This interrupt is used to stop the motor by the microcontroller. To avoid overshooting of the container due to the momentum of the base, the DC

motor is rotated at lower speeds by using pulse width modulation (PWM) which is generated from the microcontroller's timer. Once the required container is positioned under the flap, a second DC geared motor lowers the collapsible flap by rotating the motor clockwise by 45° it then waits for 2 seconds to ensure that the waste falls down and finally raises the flap back to the initial position by rotating the motor anti clockwise by 45°. PWM is used to rotate the motor. Thus, the segregation is complete and the detected garbage type is stored to determine the direction of rotation for the next iteration. After this the microcontroller is put to low power mode until the entry

SMART DUSTBIN

The smart dustbin model takes the fundamental process activities of Project Plan, specification, Analysis, Design, development, validation and evolution and represents them as separate process phases. Using a waterfall model as a project development methodology

The Specific system models, system architecture and detailed design of the project, to implement process aurdino tool with java language for developing the modules in windows platform. In the smart dustbin hardware contains motor-driver, 16*2 LCD Display, Aurdino UNO, Load cell, Playback IC, Speaker, IR Sensors, Bread Board, Power Supply and Raspberry pi. In the smart dustbin IR sensors will continuously monitor the status of the bin. If the bin reaches more than certain weight, the weight sensors will trigger the message to the concerned authority. Also, when certain threshold level is reached, the level sensors will trigger the message to the concern authority. Here when the bin is filled it will give the user the details of the empty bins which are nearby with the help of LCD display, these dustbins will generate voice messages with the help of playback IC and speaker.

RESULT:

The reading for change in the capacitive count value for different non-metallic objects is shown in Table 3. The experiment has been conducted for large volume of the dry waste objects, and a minimum quantity of one object each for wet waste objects. This is done to consider the worst-case scenario. The change of capacitive count value is greater for wet waste. The threshold is set at 30 for the smallest plates as the change in count value for dry waste fall well beneath this value. The change observed in the capacitive count value for onion peel is low as it has low relative dielectric constant. However, a piece of onion gives a significant change. The system is designed to detect both. The change for potato peel and carrot peel is very high. The dielectric constant of these objects is amongst the lowest in kitchen waste. Ceramic is detected as wet waste because of a higher relative dielectric constant. It is also the highest among dry waste. However, ceramic waste is very rarely generated at home. Other objects like glass and wood have intermediate relative dielectric constant and thus are detected as dry waste. Figure 5 shows the plot of change in the capacitive count value for various objects. Plate1 represents the smallest pair of plates which is positioned at the apex of the structure. Plate2 represents the intermediate pair of plates. Paper, dry cloth and plastic bags are objects that belong to dry waste. Onion peel and dried lemon are wet waste. proximity count for various diameters of aluminum balls made with foil paper is shown in Figure 6. As the size increases the change in proximity count increases, thus bigger metallic objects can be detected easily. The size of various objects and their corresponding proximity count value is

available in Table 2. This shows that the sensing is independent of the composition of a conducting material. A plot of the proximity count for various objects is shown in Figure 7. The threshold is set at 150 to make sure that there are no false triggers occurring due to noise, The smart dustbin is designed based on water fall model, Figure 8,9,10 ,11 gives the case, sequence diagram and the complete working of smart dustbin follows the pattern showed in flowchart.

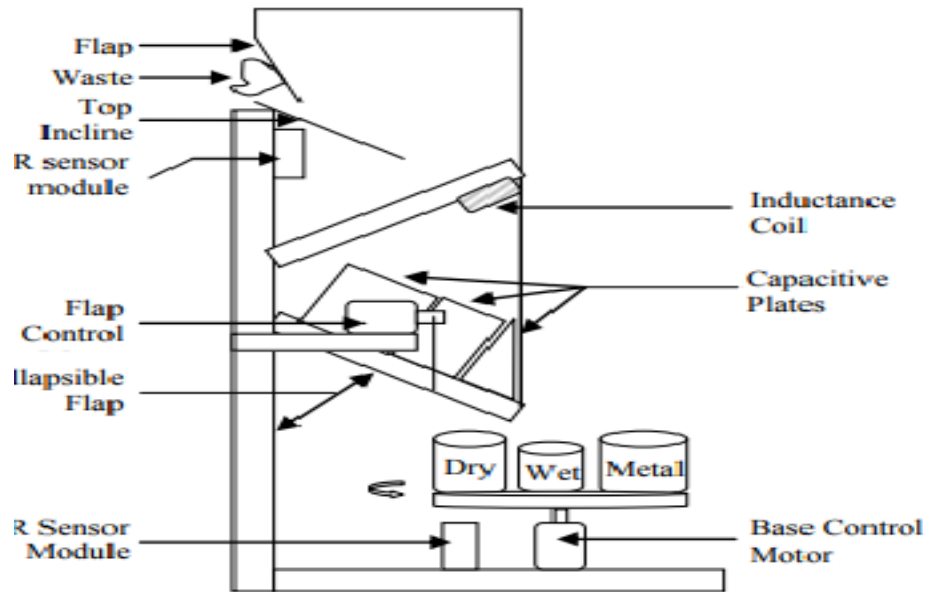


Figure 1: Automated Waste Segregator

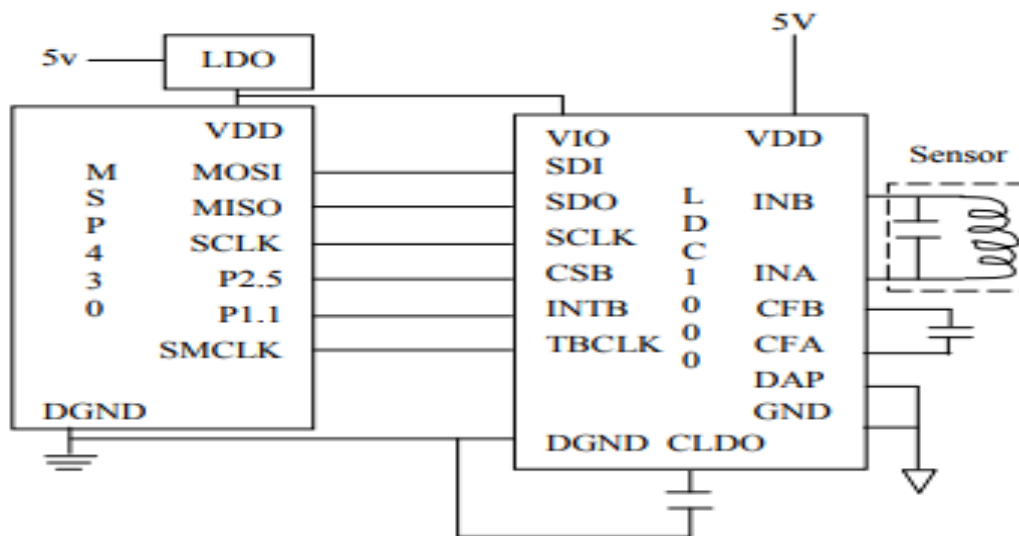


Figure 2: Interfacing LDC1000 with the Microcontroller

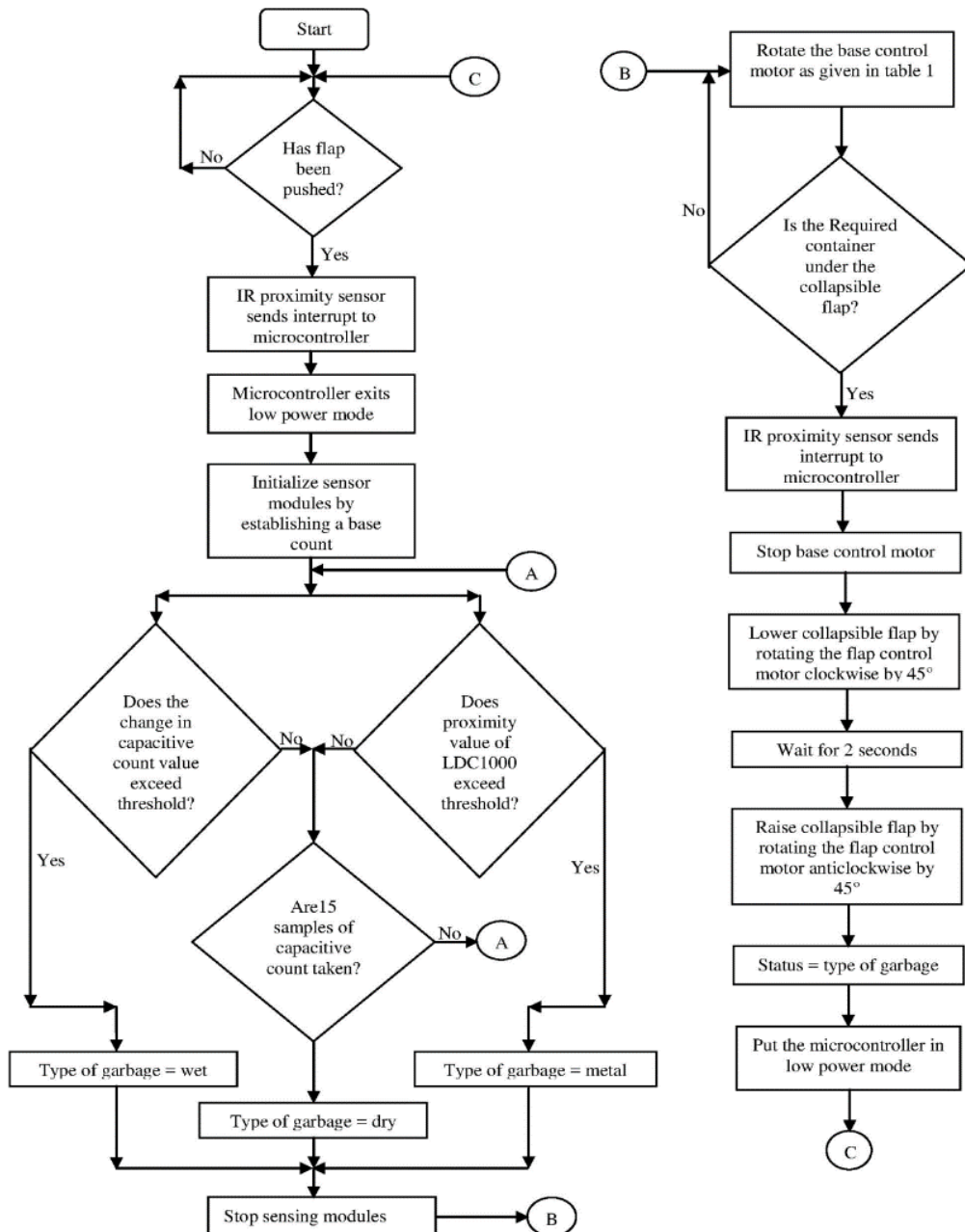


Figure 3: Process flow of the Automated Waste Segregator

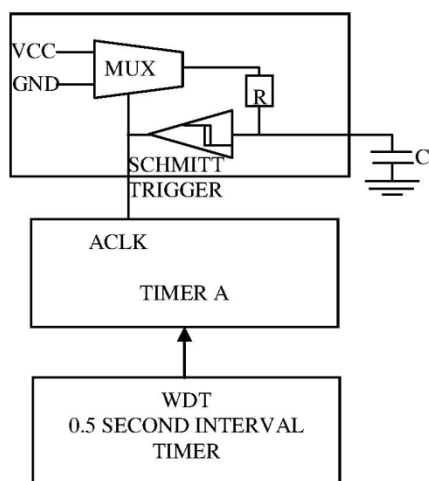


Figure 4: Working of the pin oscillator method

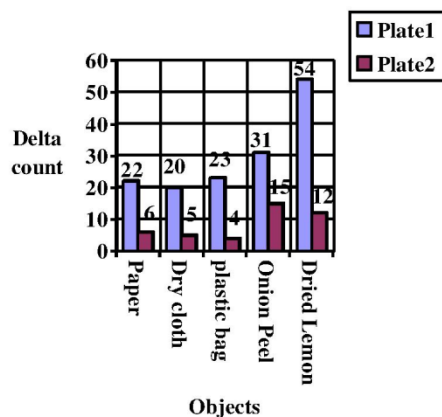


Figure 5: Plot of change in capacitive count measurement for the corresponding object

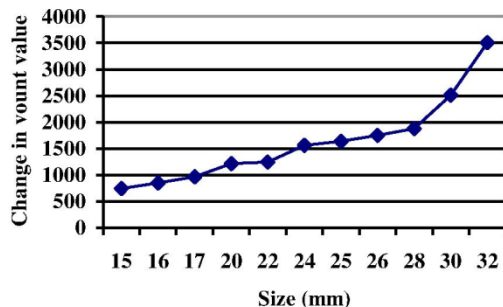


Figure 6: Proximity count value v/s metallic object size

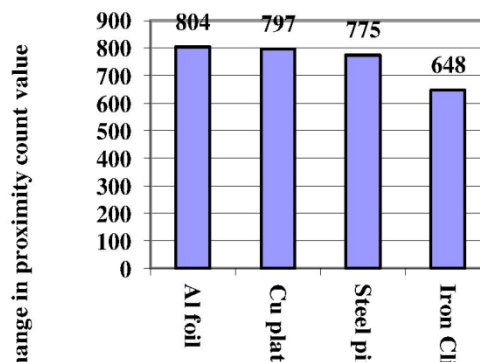


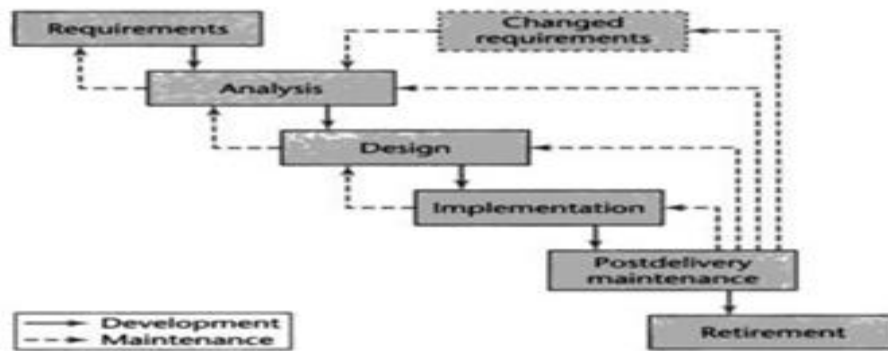
Figure 7: Change in proximity count value plotted for metal objects

Table 1: Look up table for the rotation of the base control motor

Type of Waste	Status of bin	Direction of Rotation of motor
Dry	Dry	No rotation
Dry	Wet	Clockwise
Dry	Metal	Anticlockwise
Wet	Dry	Anticlockwise
Wet	Wet	No rotation
Wet	Metal	Clockwise
Metal	Dry	Clockwise
Metal	Wet	Anticlockwise
Metal	Metal	No Rotation

Table 2: Proximity count values for different metal objects

Metallic Object	Metal	Dimensions (cm)	Change in count
Foil	Aluminium	1.7	804
Plates	Copper	2*3	797
Staple Pins	Stainless Steel	5*1	775
Paper clips	Iron	3*2	648



The Schematic Representation of Waterfall Model.

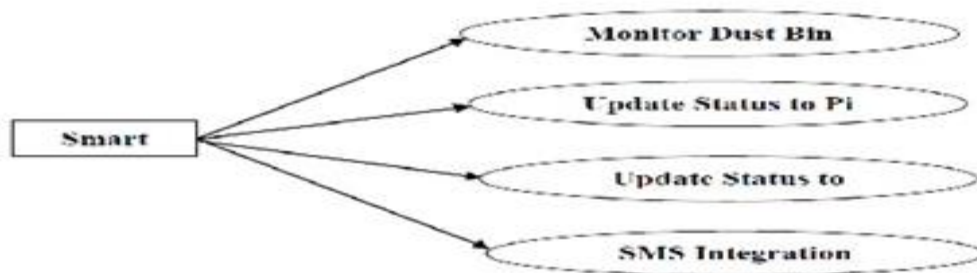


Fig 7: use case diagram

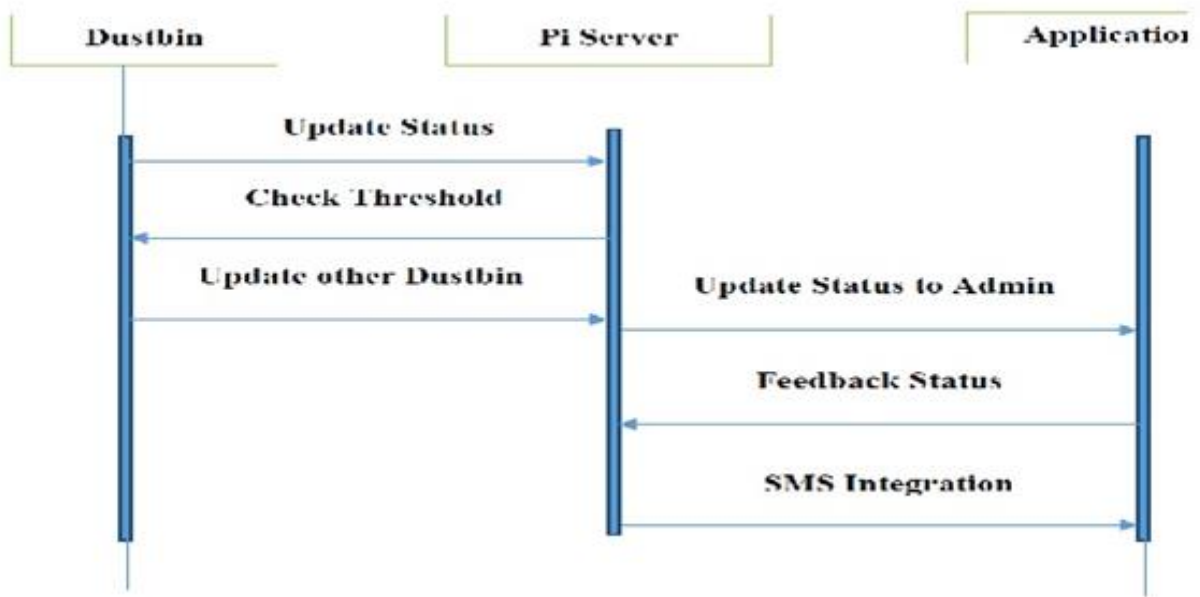


Fig 8: Sequence diagram

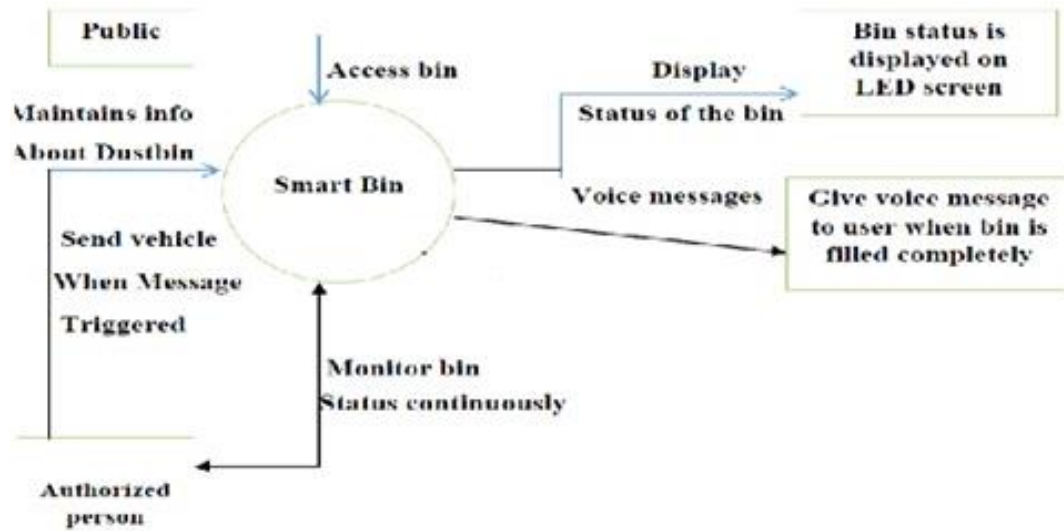


Fig 9: context level diagram

Flow chart of working

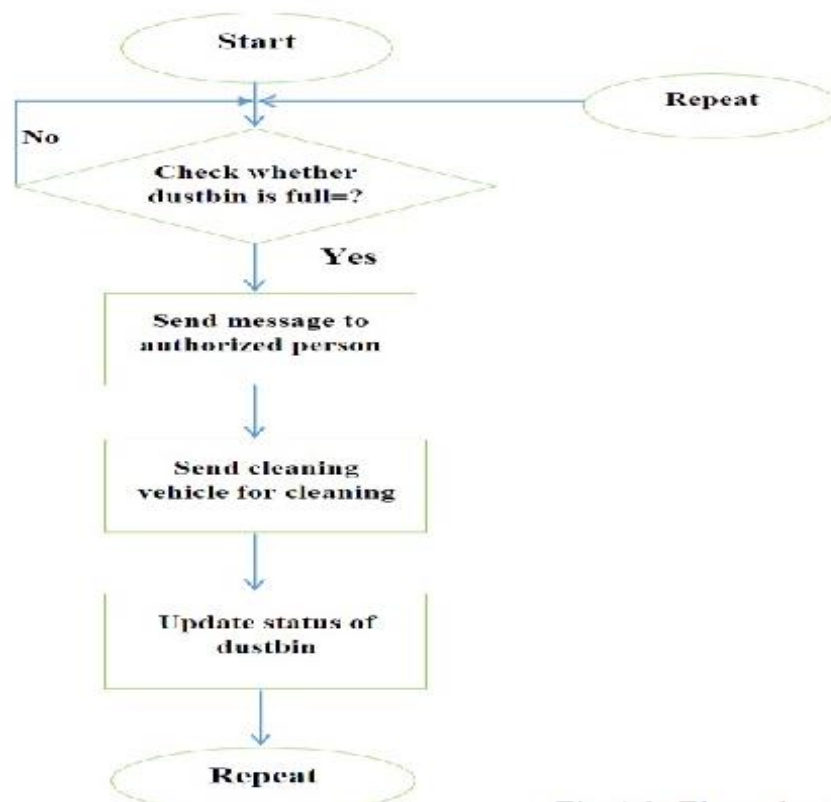


Fig 10: flowchart

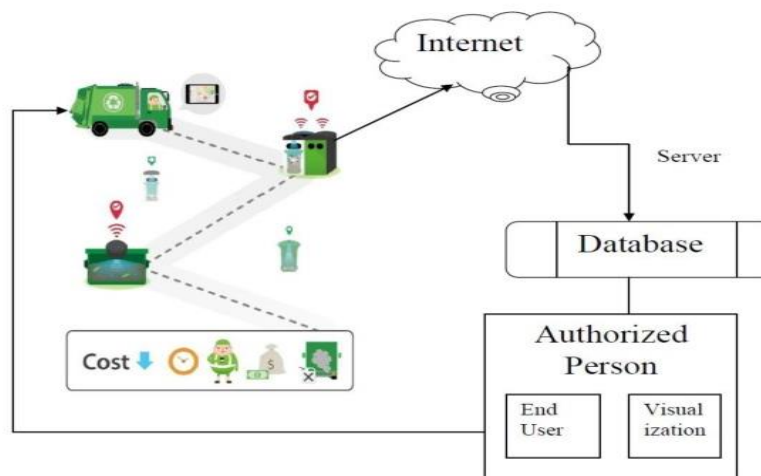


Fig11: System architecture

CONCLUSION:

Automated Waste Segregator has been successfully implemented for the segregation of waste into metallic, dry and wet waste at a domestic level. However, it cannot segregate ceramic into dry waste because of its higher relative dielectric constant when compared to other dry wastes. Noise can be eliminated in the sensing module to increase accuracy and overall efficiency. The system can segregate only one type of waste at a time with an assigned priority for metal, wet and dry waste. Thus, improvements can be made to segregate mixed type of waste by the use of buffer spaces. Since, the time for sensing metal objects is low the entire sensing module can be placed along a single platform where the object is stable to ensure better results.

This implementation of smart garbage Bin indicator receptacle, gives a solution for unsanitary environmental condition in a city. This implementation of Smart Garbage collection bin using internet, IR sensor, and raspberry pi. This system assures to send mail notification and status on dashboard of dustbins when the garbage level reaches its maximum. If the dustbin is not cleaned in specific time, then the record is sent to the higher authority who can take appropriate action against the concerned contractor.

This system also helps to monitor the fake reports and hence can reduce the corruption in the overall management system. This reduces the total number of trips of garbage collection vehicle and hence reduces the overall expenditure associated with the garbage collection. It ultimate helps to keep cleanness in the society.

5. SMART BANK LOCKER SYSTEM

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SCHOOL STUDENTS	SUDEEP NAIK, LOKESH NAIK, 9 TH STD. GOVT.HIGHSCHOOL, KUKKEHALLI.

ABSTRACT:

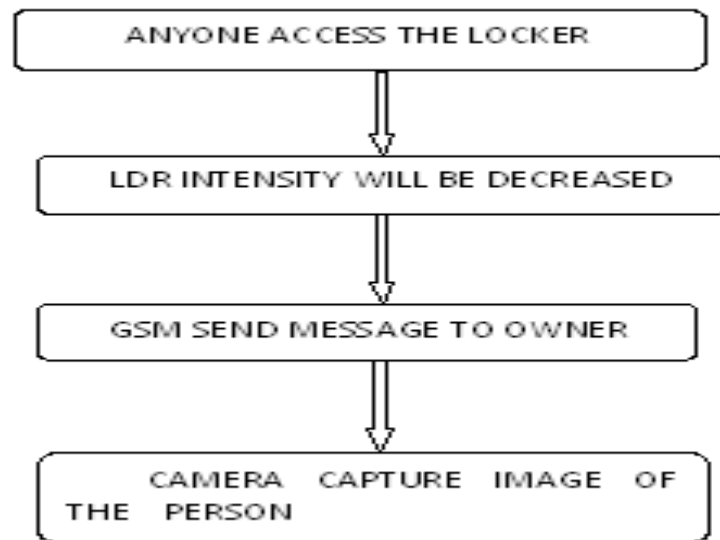
In today's modern world, security plays an important rule. Every Person has precious accessories like gold, document or cash. The main goal of this project is to design and implement highly reliable smart bank locker system based on LDR (Light dependent register), GSM Technology (Global system for mobile communication), and camera application. This can be organized in bank, offices (treasury), schools and homes. In this system only authentic person can access the locker and collect the important documents, jewelry or money from the lockers .In this security system GSM, LDR and camera application is used. The benefit of our project is that if anyone opens the locker, automatically GSM will send a message to the owner with visual detection of the person. The main advantage of using GSM Technology and LDR is highly secure and reliable locker system than any other locker system. By using this system only authorized person can access the locker.

HYPOTHESIS:

In present world the locker system involves manual locker in most f the bank. Whenever the user uses the locker, user should be assisted by the bank employee. It leads to waste of time for both the customer and employee. Lack of security and the waiting time of the customer are the major drawbacks of such manual locker systems. The person accomplishing the customer can be any employee who is free at the instant of time it should be noted. Hence, time is wasted. This can be overcome with a automatic locker system. There are many techniques in which the proposed technology can be implemented.

In this proposed method we used GSM technology, LDR, camera application. If anyone tries to access the locker then intensity value of LDR is increased. Because this resistor depends on a light. In dark light its intensity value will be very high. Suppose any one opens the locker its intensity value will be gradually decreased. By the time GSM will send a message to the owner. In addition to this camera will be placed inside the locker it will capture the image of the person. This will be helpful at the time of investigation. It is fully automated system. It is very easy to use, and no special training and equipment needed.

METHODS:

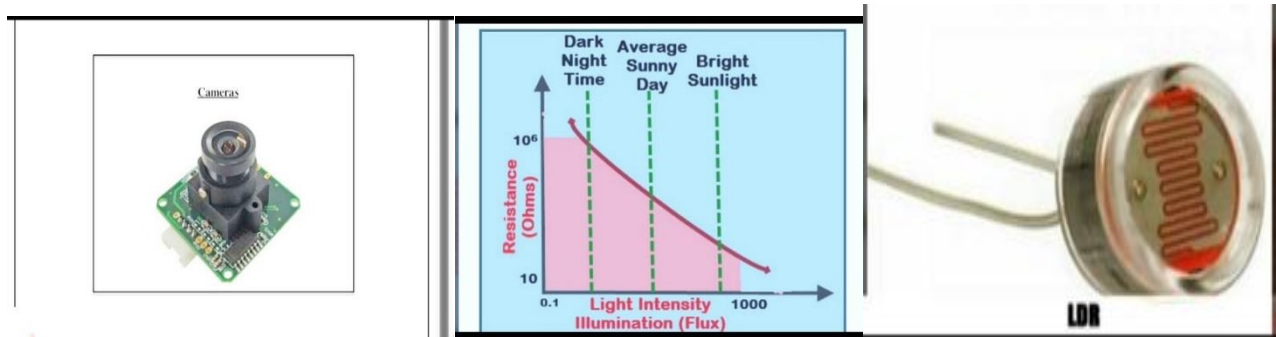


In existing locker system there is only alarm system and cc tv camera is provided it is not that much secure. So in our project we are implementing a bank locker system using GSM technology, LDR and camera application. The working method of this locker system is, if anyone tries to open the locker then threshold value of LDR is increased because this resistor is depends on the light.

WORKING PRINCIPLE OF LDR:

This LDR is also called a photo resistor or photoconductor. This device is mostly used in light varying sensor circuit, and light and dark activated switching circuits. This resistor is completely depends on light. In dark light its intensity value will be very high, but in day light its intensity value gradually

decreased. So if anyone accesses the locker its intensity will be decreased. When the intensity value of LDR is decreased, automatically GSM will send message to the owner.



WORKING PRINCIPLE OF GSM (GLOBAL SYSTEM FOR MOBILE COMMUNICATION):

GSM is a cellular network which means that mobile phones connect to it by searching for cells in the immediate vicinity. GSM networks operate in four different frequency ranges. Most GSM network is in the 900MHz or 1800MHz bands. GSM pioneered a low cost, to the network carrier, alternative to voice call, the short message service which now supported on other mobile standards as well.

In addition to this camera will be placed inside the locker, it will capture the image of the person. It will be helpful at the time of investigation. If owner open locker also he will get the same message but he can neglect it. If a person in the image known to the owner the owner can permit them to open the locker, if not he can take a immediate action about it.

EXPERIMENTS:

In this present age, safety has become an essential issue for most the people especially in the rural and urban areas. Some people will try to cheat or steal the property which may endanger the safety of the money in the bank, house and offices. So in this project we are implementing a bank locker system using GSM technology, LDR and camera application.

The system works by sensing the intensity of light in its environment. The sensor that can be use to detect light is an LDR. The LDR gives out an analog voltage when connected to Vcc (5V), which varies in magnitude in direct proportion to the input light intensity on it. That is the greater the intensity of the light, the grater the corresponding voltage from the LDR will be.

Since the LDR give out analog voltage, it is connected to the analog input pin on the Arduino. The Arduino it's built in ADC, then converts the analog voltage into a digital value. When there is

sufficient light in its environment or on its surface, the converted digital values read from the LDR through the Arduino.

There are different kinds of GSM modules available in the market. A GSM module is basically a GSM modem connected to a PCB with different types of output taken from the board-say TTL output. For our project of connecting GSM modem to Arduino and hence send and receive message using Arduino its always good to choose an Arduino compatible GSM module- that is GSM module with TTL output provision.

SUMMARY:

It can be concluded here that the system has been successfully implemented and the aim is achieved without any deviation. A step by step approach is used in designing the microcontroller based system for providing the security to the locker system. This project is mainly aimed at reducing banker's work load. Time is considerably saved by this automated bank locker system as there is no need for any authentication by the bank employee. We can also reduce larceny in banks by providing full security to it. This system can be applied mainly in banks, homes, jewelry shop, and offices. No need to remember any passwords, or bring any identification cards.

PHOTO:



6. FLEXI BRICK FOR GREEN BUILDINGS

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SCHOOL STUDENTS	SUHAIL QHUREASHI, GANESH M, 9 TH STD, GOVT. HIGH SCHOOL, CHIKKABANAVRA

ABSTRACT:

Brick is building materials used to make the walls, pavements, and masonry construction. We can call brick has the building block or prerequisite for any structural applications. Around 5000 BC earliest brick were dried brick, which were composed of clay or mud, then later around 3000 BC fired brick rose up which made adverse change in the brick industry, as the days spent many countries like china, Europe bought up with the new type of brick which are made up of ceramics and other different advanced aggregates, till this present era there are enormous types of bricks on size, forming methods, origin, quality, textures and materials. Usually bricks include clay soil, sand, lime water and concrete materials. Initially procurement of all the aggregates' takes place, then they are tempered, after tempering moulding process takes place, after moulding they are removed and dried, then they are fired in kiln, then they are sorted from kiln.

In India every year 240-260 billion of bricks are produced and per capita usage is 215, around 99% of bricks produced in India are hand moulded, as per CPCB (Central Pollution Control Board), there is around usage of 18 tons of coal per 100000 bricks in the process of firing, 3rdlargest consumption of fuel in Indian industry sector, which in deed causes significant air pollution and considerable health problems.

So to overcome such crises we are trying up with a new type of brick for green buildings, according to IGBC, green building is defined as one which uses less water, optimises energy efficiency, conserves natural resources, generates less waste and provide good healthier spaces for occupants. Green buildings are characterised by efficient management of energy, analyses of life cycle cost and benefits of material and methods. For the same to develop brick we make use of saw dust, waste paper and binder, which overcomes all the drawbacks related to moulding, tempering and firing.

HYPOTHESIS:

Bricks are usually obtained by moulding clay in the rectangular blocks of uniform size, the drying and burning this block. As bricks are uniform size, they can be properly arranged, light in weight and hence usually bricks ate retained by stones.

The compositions of all the bricks will have alumina, silica, lime, oxides of iron, magnesia in certain amount as per the strength required. There are several manufacturing processes involved preparing of aggregates, moulding, drying, and burning. Aggregates are those which are the essential credentials for preparing bricks which involve unsoling, digging, cleaning, weathering, blending, tempering. Further on accumulating these bricks need to be moulded in the mould box which involve several steps like hand moulding, ground moulding, table moulding, machine moulding bricks.

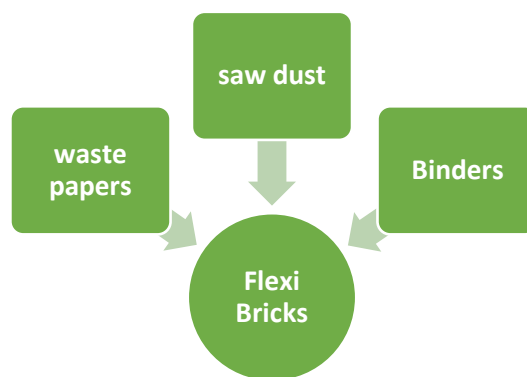
After this brick are moulded in these methods they need to be dried, drying is process of evicting the wet part of the brick by drying, if it is dried under the sun, there may be chance of formation of crack there are several steps in the drying that are artificial drying, by circulation of air, formation of drying yard, period of frying, preparation of screens. Then after they are dried they need to be heat treated for improving the qualities of the brick, this is very important operation in the manufacturing of bricks to impart hardness strength, and make them dense and durable burning of bricks is done either in clamps or kilns. Clamps are temporary structures whereas the kilns are permeant structures adopted to manufacture in large scale.

Further bricks are classified as unburnt brick and burnt brick, unburnt brick is those which are which are dried with help of heat received from the sun after the process of moulding. These bricks are can only be used in the constructions of temporary and cheap structures, such bricks cannot be used in place at heavy rains. Burnt bricks are used in the construction works and they may be classified as first-class brick, second class brick, third class brick, and fourth class brick.

There are several good qualities: Brick should be table moulded, well burnt in kilns, copper colour, free from cracks with sharp edges, it should in uniform shape and size, when broken should be bright homogenous and compact free from voids, should not absorb water more than 20% by weight, should be low thermal conductivity, and sound proof, should not break when its line from height of one metre, should not have crushing test below 55kg/cm^2 .

METHODOLOGY:

Materials and methods: The details regarding the methods and properties of materials used in this study.



Properties of Materials:

Saw dust

Sawdust it is also called as the wood dust which is usually obtained from sawing, milling, and other wood work processes. There are several types of woods pinewood, teakwood, Oakwood, and deodar wood, etc these woods are available in plenty, inexpensive, maintained free, durable, Farley hard, weather resistance, straight grain, and easily available, light in weight, portable, good glowing quality.

Paper

There are many types of paper available namely bank paper, banana paper, cotton paper, injection paper, leather paper, sand paper, wax paper and many more in this work we usually use the paper that is made up of bamboo wood that is usually used in making newspaper, notebooks, the same by product of paperwork's we use here in. These paper bits have high bursting strength, high crushing property, they have high endurance, high gram mage, they are high puncture resistance and so on

Binder

Binders is a material used to produce cohesion or bind the aggregates together, thereby imparting high strength, there are mainly two types of binders organic binder and inorganic binder, organic binder includes Dextrin, Molassess, cereal binder, linseed oil, resins and in organic binder includes clay, Portland cement, sodium silicate. We make use of the polyester which is nomenclature as benzene 1, 4 dicarboxylic which is unsaturated resin formed by reaction of the of dibasic organics acids it is more convenient because it has the adequate resistance to water, weathering, and ageing, low cost, shrinkages 4-8% during curing.



Material and tools used respectively



Finished product

EXPERIMENT:

For this brick we conduct the following tests

1. **Absorption:** A good should not absorb not more than 20 percent of weight of dry brick.
2. **Compressive strength:** crushing or compressive strength of brick is found out by placing it in compression testing machine. It is pressed till it breaks. Minimum crushing strength of brick is bricks. 35kg/cm² and for superior bricks, it may vary from 70 to 140 Kg/cm².
3. **Hardness:** No impression is left on the surface the brick is treated to be sufficiently hard.
4. **Shape and size:** It should be standard size and shape with sharp edges.
5. **Soundness:** The brick should give clear ringing sound struck each other.
6. **Structure:** The structure should be homogeneous, compact and free from any defects. For all this tests we conduct three trails, and for different proportions.



Bricks is being tested under CTM



Finished product

Comparison between flexi bricks and normal clay brick

Flexi bricks	Normal Clay Bricks
Sawdust 30-40% by weight Waste paper pieces 30-60% Binder 50-40%	Silica (sand) – 50% to 60% Alumina (clay) – 20% to 30% Lime – 2 to 5% Iron oxide – _ 7% Magnesia – less than 1%

Summary:

Based on the experimental study, following conclusions can be drawn regarding the strength behavior of flexi brick. The study was conducted to find the optimum mix percentage of flexi brick. However the brick specimen of size 190x90x90mm. However the specimens have been tested for seven mix proportions. The mechanical properties such as compressive strength were studied for different mix proportions. From the results it was inferred that, among the proportions maximum

optimized compressive strength is obtained for optimal mix percentage of sawdust (30-40%), waste paper pieces (30-60%), binder (50-40%).

Merits & Demerits of flexi bricks

Merit of flexi bricks

- 1- Flexi brick are light weight, therefore, transportation is easy.
- 2- Flexi bricks are uniform in shape and size in comparison to burnt clay brick; in this brick work no requirement of mortar.
- 3- Flexi brick are environment friendly as:
It is a green building product; it uses sawdust and waste paper which is waste product of wood.
There is no requirement of heat treatment; this reduces the cost of fuel investment,
And help in keeping the environment clean.

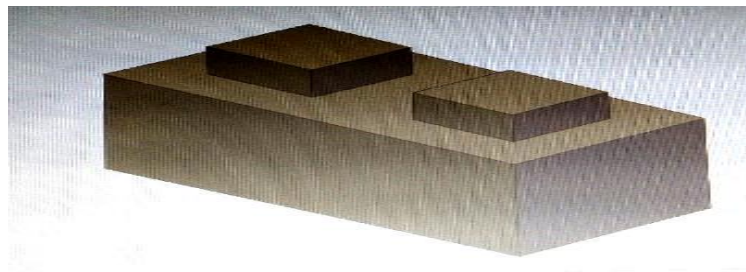
Demerits of flexi brick

- 1-Mechanical bonding strength is weak so this can be improved by adding suitable additives.
- 2-These bricks usually sink on curing, so there must some shrinkage allowances must be left.
Flexi brick get fired at some temperatures.

Applications

- 1-It is mainly used in green buildings because they are biodegradable material.
- 2-It is flexi brick so it can be easily assembled or disassembled and it is easily portable.
- 3-This bricks can be used as fire bricks and it can be replaced in some woodworks.

*In future we are going to develop interlocking systems in this bricks, which reduces the cost of motor



Finished product

COST:

Saw dust and paper pieces are waste products of woodworks and paper mill respectively they are free of cost

1. Adhesive Binder 215/- per kg.
2. Resins and hardener 147/- per kg.
3. Wood mould box 150/-
4. Rammers -350/-

- 5. Measuring tools 50/-
- 6. Safety measures 30/-

Total cost = 5000/-



7. DETECTION AND REMOVAL OF PHOSPHATE USING MICROCONTROLLER BY WIRELESS SENSOR

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ABSTRACT

Water purification can be done in different methods. This process is based on naturally available product. By using these peels reliable absorbents of toxic heavy metals, dyes etc. various Nano particles can be purified.

Preparation of adsorbent:

Peels was obtained from local fruits and vegetables markets, washed under water for several times followed by double distilled water to remove the colour pigment present in the peels. After thorough washing peels was cut in the small pieces and dried under sunlight for 8-10 days to remove all the moisture content present.

The dried peels were powdered and mix with the activated carbon then binded with the natural binder to form globules which are arranged in the form of candles. From these adsorbent heavy metals, chemical, dyes and pesticides where removed from impure water

HYPOTHESIS

Water is one of the fundamental needs for our daily life. Purification of water through conventional methods is carried out till date...but through this model we can get purified water which is portable water by using natural available substance for the purification process. The model involves the use of fruits and vegetables peels that are natural sources which eliminate the unwanted toxic materials and heavy metals from water and makes it useful for domestic purpose and for mainly drinking

METHOD

Materials used in preparing the various components are as follows.

3 FILTERS:

- First filter contains different types of fruits peels.
- Second filter contains different types of vegetable peels.
- Third filter contain mixture of vegetables and fruits peels. This helps to remove the toxic materials of impure water.

IMPURE WATER SAMPLE

In this unit the water to be purified is given as the input.

MEMBRANE FILTER

The water is sent to the membrane filter which is made up of thin sheets that contains minute pores which removes impurities from water.

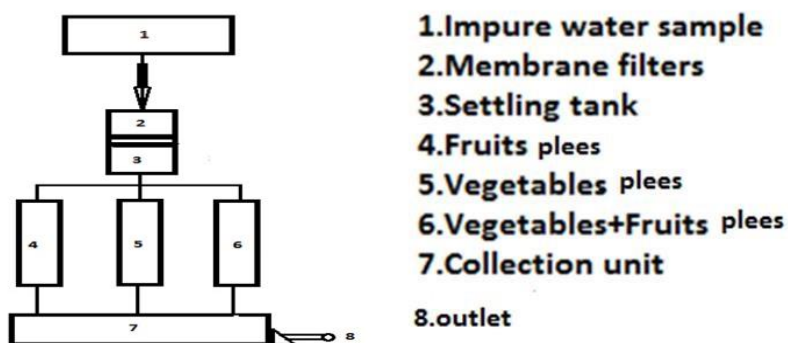
SETTLING TANK

All the heavy impurities such as sand and salt settle down leaving behind pure water.

COLLECTING TANK

The water that has passed through all the components of the purifier gets collected in this unit which is utilized for drinking

EXPERIMENT SETUP



SUMMARY:

The water sample is collected from different sources. This sample is checked for various types of impurities by using natural process water must be purified. This is done by pent purifier.

COST:

Production cost approximately Rs.5000/-

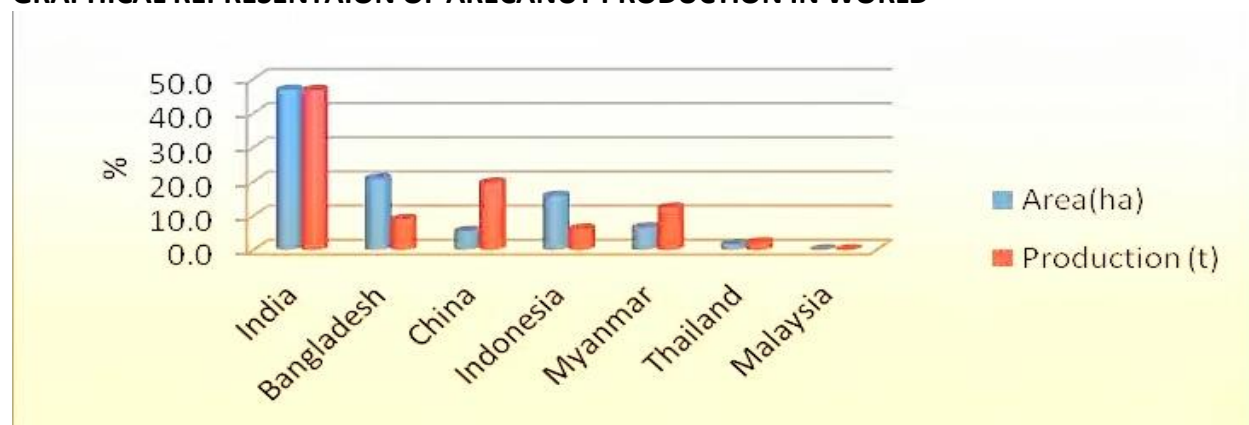
8. ARECA SPRAYING SYSTEM BY DRONE

COLLEGE	SDMIT, UJIRE
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COLLEGE STUDENTS	RANNA P N,MADAN GOUDA
SCHOOL STUDENTS	ATUL PAI,SATHVIK G BHAT 9 TH STD - SDM HIGH SCHOOL, UJIRE

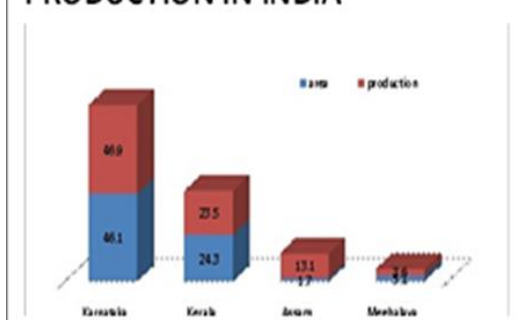
ABSTRACT:

The main source of the Indian economy is agriculture. It also affected by other major biological factors but can be controlled by human being with the help of using fertilizers & pesticides to increasing the productivity. Pesticide exposure affects the human health in various ways and causes health problem includes neurological and skin diseases. According to the survey conducted by WHO (world health organization), It is estimated that every year about 3 million workers are affected by poisoning from pesticides.

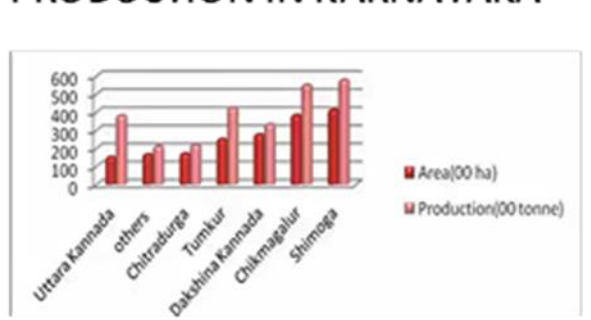
GRAPHICAL REPRESENTATION OF ARECANUT PRODUCTION IN WORLD



PRODUCTION IN INDIA



PRODUCTION IN KARNATAKA

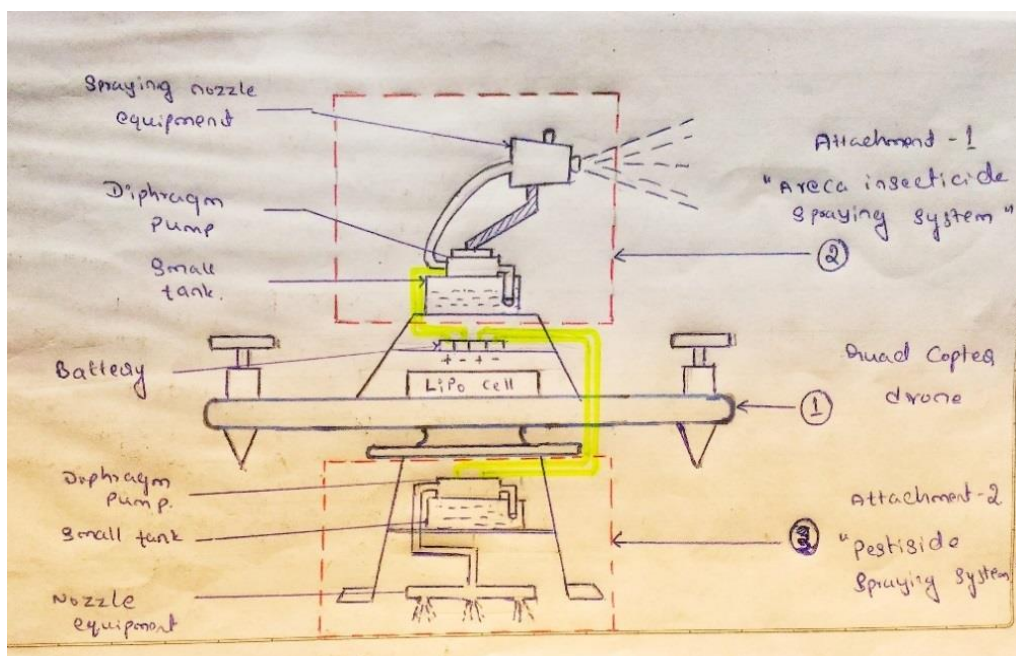


INTRODUCTION:

“Areca insecticide spraying system by drone” is a purely agriculture project based model. The project aims to overcome the ill effects of the pesticides on human beings and also used to spray pesticide over large areas in short interval of time comparing to conventional spraying by using an automated aerial drone based pesticide sprayer. This device is basically a combination of spraying mechanism on quad copter frame.



2D – Picture of insecticides spraying system by quad copter drone:



- 1) Quad copter drone
- 2) Areca insecticides spraying system attachment -1
- 3) Pesticide spraying system attachment -2 for ground level grow plants

WORKING PRINCIPLE:

Attachment - 1

“Areca insecticide spraying system by quad copter drone”

Using a image processing fundamental we are planning to install the sensor to detect the trees when turned the drone ON. Propeller starts rotating and the drone must go on fly upward towards shoot. After attaining the certain height the sensor will identify the position of the nozzle of the sprayer. And a small pump of suitable size is kept inside with an ejector to spray the areca nut. It is powered by the servo motor.

1. Quad copter drone
2. Insecticide spraying system attachment

Attachment - 2

Along with areca insecticide spraying system we have attached a new attachment. Pesticide spraying to all ground level grows plants by quad copter drone.

1. Quad copter drone
2. Pesticide spraying system attachment

SPECIFICATION:

- 1) Emax XA22212 12V DC 1400K Brushless motor



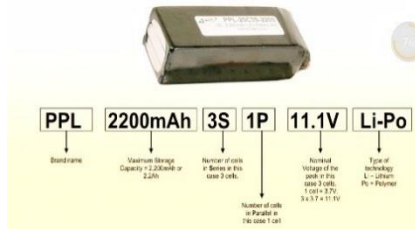
- 2) Quad copter frame – 4 axis strong frame



- 3) Propeller



4) Battery - LiPo battery



5) Remote control



6) IR sensor



7) Servo motor



BENIFITS:

- Drone sprayer, it can hasten the pesticides spraying process.
- By this sprayer we can work large area in short interval of time.
- Better safety to the worker.
- To development of the agro-based system.

BUSINESS PLAN:

- Marketing to the agriculture trusts.

- By providing system with reasonable price to cover local district and state areca nut growers.

CONCLUSION:

- This method can be used in all situations; especially in the places where workers are hard to find & It is based on Unmanned aerial vehicles are responsible for spraying chemicals on crops.
- One can hasten the pesticide spraying process and cover large area in short time.
- It has many advantages that include hastening the spraying process of pesticide there by reducing the casualties due to pesticide exposures.

TOTAL COST OF PROJECT: Rs.40,000

TEAM MEMBERS:



9. EMERGENCY FIRST AID DRONE-OCTOCOPTER

COLLEGE	BGS INSTITUTE OF TECHNOLOGY
GUIDE	NAVEEN. K. B
COLLEGE STUDENTS	KUSHWANTH R, MADAN S
SCHOOL STUDENTS	GAGAN C.G & VINAY GOWDA N.V, 9 TH STD, BGD RURAL ENGLISH MEDIUM HIGH SCHOOL

ABSTRACT:

In case of emergency like accidents, 'drones' are the fastest and best means to deliver first-aid kit to the location of the accident. Due to high traffic in cities, ambulance cannot reach the accident site in time. So, with the help of drone, we can deliver the first-aid kit to the injured person so that the person gets initial treatment. With thermal sensors, drones can quickly discover the location of lost persons, and are particularly useful at night or in challenging terrain. The search and rescue mission is a battle against time, particularly in harsh conditions, and drones become a powerful tool because of the ease of deployment. Besides locating victims, a drone could potentially be used to "drop in supplies" to an unreachable location. For example, a drone might be utilized to lower a walkie talkie, GPS locator, medical supplies or water to a stranded victim before rescue crews are able to extract them.

An Octocopter can achieve vertical flight in a stable manner and be used to monitor or collect data in a specific region such as loading a mass. Technological advances have reduced the cost and increase the performance of the low power microcontrollers that allowed the general public to develop their own quadcopter. The goal of this project is to build, modify, and improve an existing Drone to obtain stable flight, gather and store GPS data and perform auto commands, such as auto-landing. The Octocopter contains a frame, motors, electronic speed controllers, Ardcopter control board, Batteries, transceiver and, a GPS module. Individual components were tested and verified to work properly. Calibration and tuning of the controller and the drone itself was done to obtain proper stabilization on each axis the software tool. Currently, the octocopter can properly stabilize itself, determine its GPS location to reach the destination.

HYPOTHESIS:

The drone works in two modes, manual mode and the other automatic mode. When in manual mode the drone is controlled by the joystick manually. In automatic mode joystick is not required. As the drone has its own controlling board and GPS module, once the GPS location of the destination is uploaded into the drone and commanded to leave, it takes off and lands in the destination location. The mission planner software is used to upload the location to the drone.

The drone's current location will be displayed in the maps of mission planner software, and in the same map we point the route for the drone by pointing (marking) the waypoints in the map. Once the route is set, this route data is uploaded to the drone through the transceiver mounted on the drone as well as one connected to the laptop or desktop. As the drone receives this data, it is stored on the Ardcopter board, and the location data including the height in which the drone has to travel. Then when the drone is instructed to leave, it will automatically take-off and reach the destination through the same route as specified and delivers the first aid kit.

METHOD:

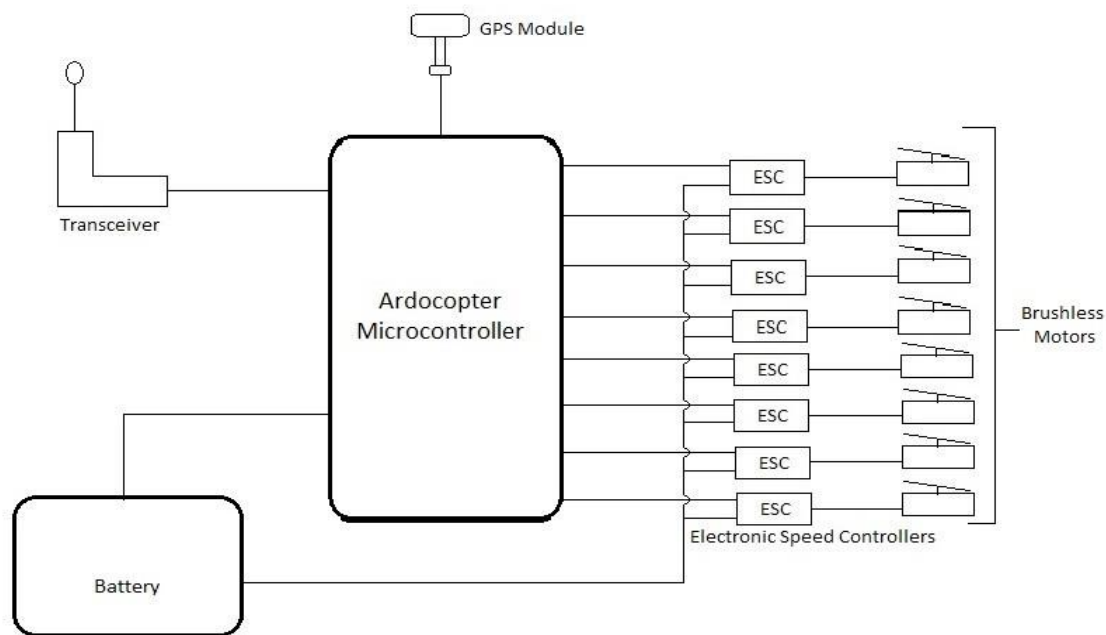


Fig.1 – Basic block diagram of the various components of the Octocopter.

As the figure shows the connections of various components, it contains a Microcontroller (Specifically Ardcopter), 8 electronic speed controllers, 8 Brushless DC motors, Battery, a GPS module which has built-in barometer and a Transceiver. The power is mainly supplied to Microcontroller to drive all operations and to 8 ESCs to power 8 brushless motors individually. The ardcopter takes the input of the GPS location from the GPS module and the flight instructions data from the transceiver. As the data is fetched, it mainly controls the individual electronic speed controllers for hovering.

The motors are arranged in such a way that all alternating motors rotate in opposite direction, i.e., if one motor runs in clock wise direction then the adjacent motor will run in the counter clock wise direction and all the alternating motors run in same direction, so among 8 motors 4 run clock wise and remaining 4 in counter clock wise direction. This is done to achieve the stability, if all the motors run in same direction then the rotational force of all the motors will be in same direction which will lead to rotation of the drone itself.



Fig.2 – Emergency First Aid Drone (Octocopter)

APPLICATIONS:

- By implanting the proposed system, there are various emergency health facilities can be provided.
- When medical facility is inaccessible easily, by the drone it's easy to deliver to remote location.
- Usually in cities due to the traffic, fast access of first aid in case of accident is not possible by any other means. In such situation, drone can easily deliver first aid.
- Cheapest mean of emergency first aid drone compared to other means.
- During natural calamities like floods, earthquakes, etc. Octocopter will be most reliable.

SUMMARY:

Drone works based on Real-time navigation system, i.e., if any accidents occur we will receive GPS location coordinates of the accident place which is received by the server, the server then loads this location data automatically (wireless) to the drone. Once the drone gets the location data, it will autonomously fly to the accident area and deliver first-aid kit to the location. So that, it will save some extra time to the injured person in mean time ambulance reaches the location.

By the help of remotely operated drones, it is very fast and safer. After a natural or man-made disaster, a drone provides a quick means to gather information, navigate debris with a portable and useful technology that doesn't drown out cries for help, and that can be deployed by teams that are working in a specific area. Equipped with high definition cameras and radars, drones can give rescuers access to a higher field of view without the need for wasting resources on

manned helicopters. And, because of their small size, they can provide a close-up view of areas where larger aerial vehicles would prove unsafe or inefficient.

Not just limiting to this, it may be having various uses like Wildlife monitoring and Forest-land Management, Precision Agriculture, Geographic Mapping, Autonomous Shipping and Delivery System, etc.



Kushwanth R and Madan S



GAGAN C.G.



VINAY GOWDA N.V.

10. TREE CLIMBING CYCLE

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GUIDE	Prof. JAGADEESH A
COLLEGE STUDENTS	VITTHAL S KALAL, VASIFALI MULLA
SCHOOL STUDENTS	VINAYAK GARBAGUDI, MOUNESH BADIGERM, 9 th STD, MORARJI DESAI RESIDENTIAL SCHOOL

ABSTRACT:

From centuries humans have been climbing trees and various jobs. These things we have inherited from our ancestors. Evidently, this skill has evolved from the need of protection from animals or collecting food from trees. In the present world climbing poles is used in other fields of technology as well. With time the needs have increased. The requirement carry load on and off the trees and poles has shifted man's focus on building Machines to do the job. It is very necessary to fulfil the needs of farmer for their livelihood and this is our small effort to reach them. This model is designed and prepared in such a way to climb the tree coconut trees freely and comfort by pedalling. It is consuming no conventional energy sources to move up and ergonomically design for better life and ease of handling.

HYPOTHESIS:

Background:

India is agricultural based country where 70 % of the population is dependent on this sector and it contributes maximum GDP to the growth of countries economic. The country is covered with 7500km of coastal area where the maximum families are dependent on coconut trees to fulfil their daily needs.

As a part of the country it's our objective is to provide a contribution to the nation in the name of providing a device to help the families of the farmers to climb the tree without much effort and to avoid dangerous diseases to the farmers like skin infections etc.

Coconut tree is one of the most useful plants in the world. It is grown in more than 100 countries of the world. In India is the third largest coconut producing country having an area of about 1.78 million hectares? Annual production is about 7562 million coconuts with an average of 5295 nuts per hectare. In Karnataka's coastal areas large number of coconut are grown. Our project aims to design and develop a machine to climb coconut tree accounting many factors such as stability, safety of the workers, safety of the tree and many more. It is our small effort to overcome problems which are facing by the coconut farmers.

METHODOLOGY:

- Tree climbing cycle works exactly as bicycle with special attachment to climb tree in vertical direction.

- It also makes negligible vibrations. Applying various technically proved methods.
- Model prepared as per the design to meet the desire requirements.
- It is quick and approximate evaluation aimed at producing a few variables alternatives.
- During concept screening stage rough initial concepts are evaluated relative to a common reference concept using the concept screening.
- It is more careful analysis of these relatively few concepts in order to choose the single concept most likely lead to product success.

SCHEMATIC DIAGRAM:

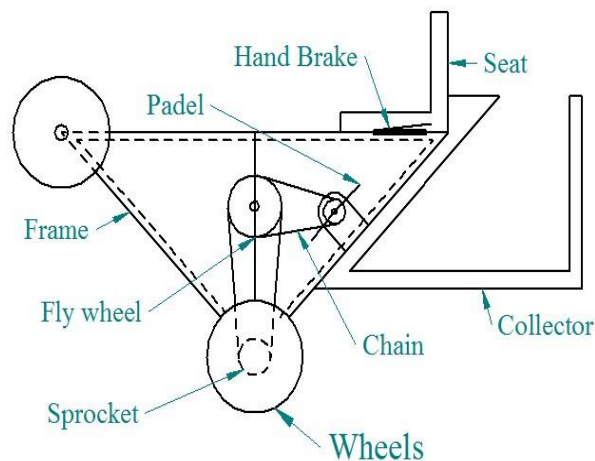


Fig.i Tree climbing cycle

EXPERIMENT:

Cycle frame: A bicycle frame is the main component of a bicycle, onto which wheels and other components are fitted. The modern and most common frame design for an upright bicycle is based on the safety bicycle, and consists of two triangles: a main triangle and a paired rear triangle. This is known as the diamond frame.[1] Frames are required to be strong, stiff and light, which they do by combining different materials and shapes.

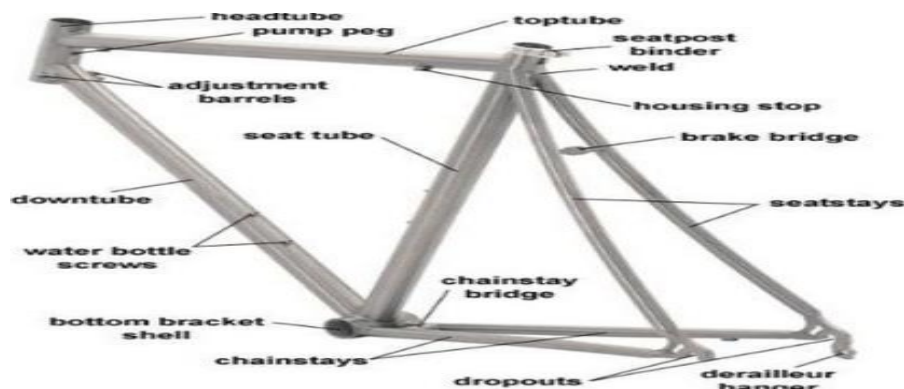


Fig.01 cycle frame

Cycle flywheel:

A flywheel is a mechanical device specifically designed to efficiently store rotational energy. Flywheels resist changes in rotational speed by their moment of inertia. The amount of energy stored in a flywheel is proportional to the square of its rotational speed. The way to change a flywheel's stored energy is by increasing or decreasing its rotational speed applying a torque aligned with its axis of symmetry.



Fig.2 cycle flywheel

Cycle pedal:

The bicycle pedal is the part of a bicycle that the rider pushes with their foot to propel the bicycle. It provides the connection between the cyclist's foot or shoe and the crank allowing the leg to turn the bottom bracket spindle and propel the bicycle's wheel



Fig.3 cycle pedal

RATCHET AND PAWL MECHANISM

1. This mechanism is used to produce intermittent circular motion from an oscillating or reciprocating member.
2. Figure shows the details of pawl and ratchet mechanism.
3. Wheel 4 is given intermittent circular motion by means of arm 2 and driving pawl 3.
4. A second pawl 5 prevents 4 from turning backward when 2 are rotated clockwise in preparation for another stroke.

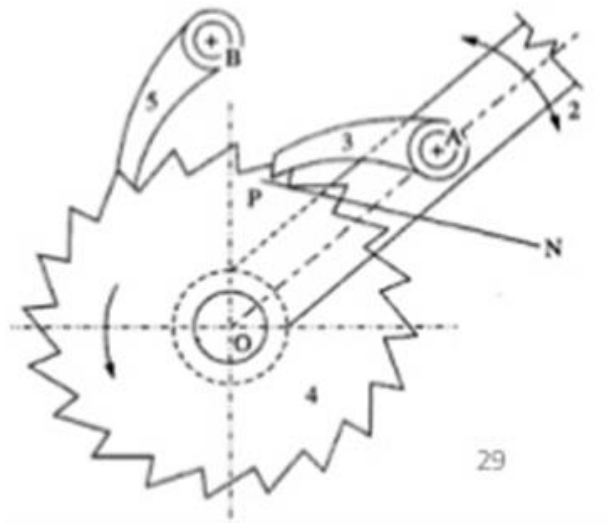


Fig.4 Ratchet and Pawl mechanism

Cycle gears:

The line of action PN of the driving pawl and tooth must pass between centres O and A in order to have pawl 3 remain in c Gears are used for transmitting power from one part of a machine to another. ... Similarly, in a cycle, bike, car, gears transmit power from the crankshaft (the rotating axle that takes power from the engine) to the driveshaft running under the cycle that ultimately powers the wheels

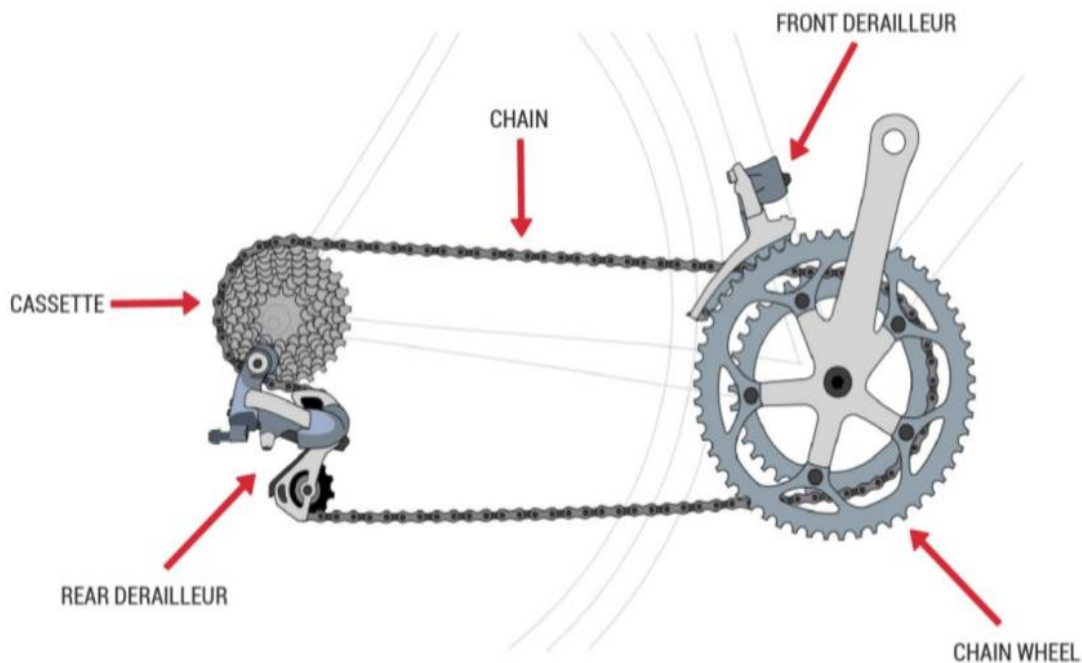


Fig.5 cycle gears

SUMMARY: There is a urgent need of best alternative for tree climbing device, here is our small project may help the needy masses and to help them to lead livelihood life. It is very hard to learn the necessary skills to climb coconut trees. In addition to fear, soft skin on the palms of hands and soles of feet made climbing difficult. During the initial climbing the skin of palm , chest and foot skin may be disturbed, by using our project these all problems can overcome and it is easy climbing with less effort and with help of chain and sprocket mechanism , lifting is comfort by shifting centre of gravity to the neutral axis , user friendly , ergonomically design. This tree climbing cycle works exactly as bicycle with special attachment to climb tree in vertical direction

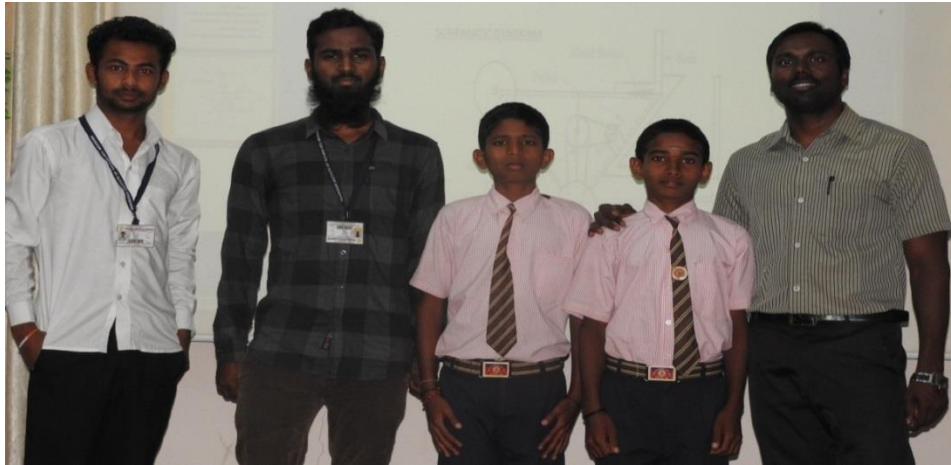


Fig.6 Team Photo

11. ENRICHED NUTRI EGG

COLLEGE	SIR M. VISVESVARAYA INSTITUTE OF TECHNOLOGY
GUIDE	SRINIVAS B V,ASHWATHY S DAS I,DEEPA H N
COLLEGE STUDENTS	N.SANTOSH YADAV,PRATYUSHA VELLANKI,TANUJA B R,KIRAN SAHIR
SCHOOL STUDENTS	ANIL, APPORVA, 8 TH STD, SRI JAGADGURU PANDITHARADHYA SCHOOL, HUNASAMARANAHALI

ABSTRACT:

Eggs are a rich source of proteins (slightly more in the white than in the yolk). One egg contains approximately 5.5grams of proteins, 13 essential vitamins, 5 grams of fat, 1.6 grams of saturated fat, small amounts of iron and carotenoids and roughly about 68 calories.

India is the second largest producer of silk with an annual raw silk production of **18,500 MT per annum**. The mulberry silkworm pupa is one of the major waste discarded from the silk reeling industries. About **2,33,340 tons** of dry pupae is produced as a by-product of the sericulture industry. Disposal of silkworm pupae is a big problem in the silk factories. **Omega-3-fatty acids** can be extracted from silkworm pupae. It is an integral part of the cell membranes and affect the functioning of the cell receptors present in these membranes. They provide the starting point for making hormones that regulate blood clotting, contraction and relaxation of artery walls and inflammation. Eggs can be fortified with two different omega-3-fatty acids: **DHA** (docosahexaenoic acid) and **ALA** (alpha lenolenic acid). Higher intakes of omega-3-fatty acids also guard against heart diseases.

On the other hand, Marigold is another natural product that is rich in carotenoids such as lutein. Lutein is well known for protecting the human eye. It accumulates in the macular region of the retina and thus protects the eye from damage due to oxidation.

Through this project, we are introducing an innovative synergistic method of ALA and lutein extraction from pupa waste and wasted marigold flowers respectively which are not utilized efficiently inspite of having various nutritive and medicinal values, our motive is to make use of these essential properties and create a potential product.

HYPOTHESIS:

Pupae are a good source of proteins, amino acids, fat, carbohydrates and vitamins and it is rich in oil. Powdered silkworm pupae meal would make a good protein supplement for poultry mashes. Silkworm pupae meal have found satisfactory growth rate in young stock and egg production in layers. Alpha-linolenic acid (ALA), is an essential group of fatty acid belonging to omega-3 fatty acids. ALA defect is closely related to the prevalence of hypertension, diabetes mellitus, coronary heart disease, schizophrenia, Alzheimer's

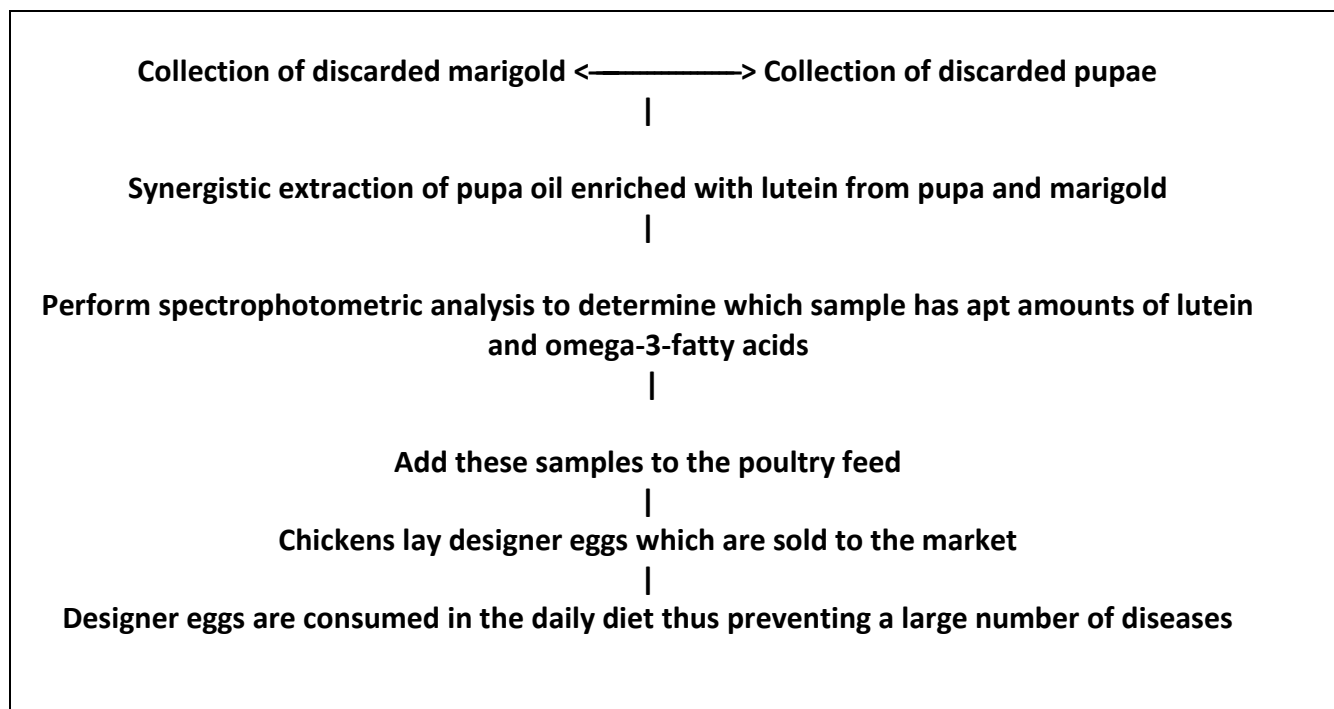
disease, athero-sclerosis and cancer, thus depicting the importance of adequate intake of ALA in daily life.

Lutein “the eye vitamin” can be used to prevent eye diseases including age-related macular degeneration (AMD), cataracts, and retinitis pigmentosa. Unsold marigold can be used in a productive way.

The application of lutein extracted from marigold and ALA extracted from pupae when added into poultry feed, and thus increases its nutritional value. This feed when consumed by the poultry gives designer eggs. The designer eggs are rich in omega-3- fatty acids and lutein, unlike the normal egg.

Including these designer eggs by human in their diet will help in enhancing the nutritive levels that can help to prevent AMD, hypertension, diabetes mellitus, coronary heart disease, schizophrenia, Alzheimer’s disease, athero-sclerosis and cancer.

METHOD & EXPERIMENT



Firstly, discarded marigold and silkworm pupae are collected and thoroughly dried. These dried samples are powdered in a mixer. Secondly, extraction of lutein from marigold powder is performed by using solvents followed by extraction of fatty acids from pupae powder. Thirdly, spectrophotometric analysis is performed to determine which sample contains the appropriate amount of lutein and ALA. Fourthly, the appropriate samples are taken and added into poultry feed. In about a month’s time, a designer egg is produced that is rich in both lutein and Omega 3 fatty acids. Fifthly, these eggs, rich in nutritional supplements, are sent to the market. When

consumed as part of the daily diet, the occurrence of large number of disease can be prevented.

PRODUCTS FORMULATED:

- Pupa oil rich in lutein
- Marigold Pigments extract
- Poultry feed supplement
- Designer Egg

SUMMARY:

Benefits of this project to the Society: Efficient utilization of waste which would reduce the environmental hazards caused by discarded silkworm pupa and marigold is the need of the hour. The advantages of simultaneous enrichment of eggs with lutein and ALA include high availability of these nutrients to people consuming these eggs. The use of ALA and lutein in diet of poultry has no detrimental effect on internal and external quality of eggs as well as egg production hence it can be used to enhance the nutritional value of eggs.

The basic scientific/engineering principle involved in the project: Synergistic extraction of ALA and lutein from pupa waste and unsold marigold flowers respectively which have various nutritive and medicinal values is performed. We use lutein which is fat soluble hence it is mixed with omega 3 fatty acids. Eggs are used as it increases the bioavailability of lutein and ALA to the body. In this way, waste from the silk industry and flower markets can be used in an efficient way.

Business Plan:

1. First and foremost, young learners are taught that discarded waste can be made into a valuable product when formulated in an appropriate way.
2. Marigold and pupa contain lutein and ALA respectively which when concocted in the right amount and added into poultry feed, can create designer eggs that are beneficial to the society.
3. When humans consume these designer eggs, disease such as cancer, Alzheimer's, diseases associated with the cardiac and optic muscles of the body can be prevented.

COST: INR -20,000/-



12. ULTRASONIC NAVIGATION SYSTEM FOR THE VISUALLY IMPAIRED & BLIND PEDESTRIANS

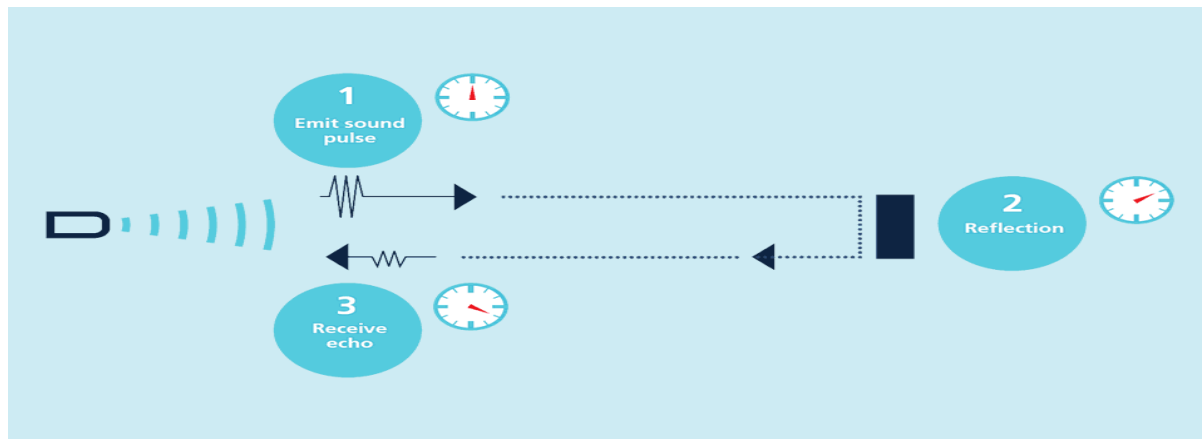
COLLEGE	PROUDHADEVARAYA INSTITUTE OF TECHNOLOGY
GUIDE	NAVEEN KUMAR KANAVI
COLLEGE STUDENTS	RAHUL C H AND SHANKAR MOORTY
SCHOOL STUDENTS	S R ABHISHEK, KESHAV, T.B SCHOOL,HULIGI

ABSTRACT:

The main aim of this paper is to expand the electronic travel aid for the blind and visually impaired pedestrians by emerging into the ultrasonic technology. The paper represents an innovative project design and implementation of an Ultrasonic Navigation system in order to provide fully automatic obstacle avoidance with vibrational notification for blind pedestrians. This blind guidance system is safe, reliable and cost effective.

HYPOTHESIS:

Ultrasonic sensors have set new standards in automation. Ultrasonic sensors emit short, high-frequency sound pulses at regular intervals. These propagate in the air at the velocity of sound. If they strike an object, then they are reflected back as echo signals to the sensor, which itself computes the distance to the target based on the time-span between emitting the signal and receiving the echo.



METHOD:

In this project, the system is designed in such a way that it gathers data about the environment via ultrasonic sensors and extracts the visual information from that data. This visual information is then transformed into an audio signal immediately and the blind pedestrian can recognize the environmental information through binaural sound generated by the system

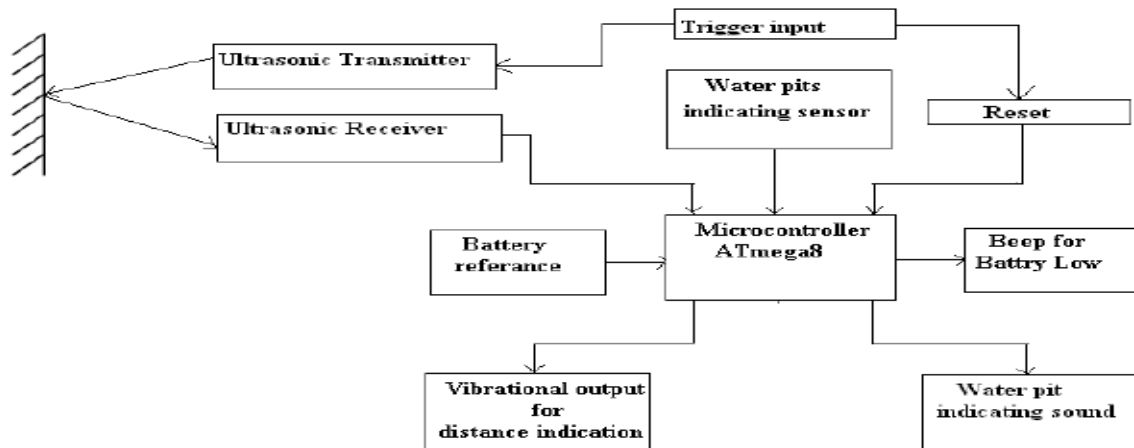


Figure 1:BLOCK DIAGRAM

The whole operation of the project can be described by using block diagram for explaining the concept of the system without the presence of the individual components within the project.

In order to describe the whole operation of the project, it is required to explain the block diagrams of Figure1 . The ultrasonic sound sensor is placed in the stick so that the buzzer could only be activated when the system detect any obstacle. So the visually impaired person can easily understand which side is obstacle-free. And different types of sound beep will be produced for different sides. Blind pedestrian should be aware of the sound beep for different sides (left/right/front) before.

The range of detecting obstacle can be controlled in high or low range by the variable resistor (POT) up to 5 meter. So there will be no difficulty for either crossing the road or walking in the stairs for a visually impaired person.

Hardware:

The working model of our project consists of arduino uno microcontroller atmega328p-pu, five or more ultrasonic sensors, one voltage regulator, hand glues, vibrators and 6v-9v battery and one spect. The whole setup runs on DC(5V,1A) and does not consume much of power.

EXPERIMENT: The equipments used for design and implementation of the following circuit are Microcontroller, Opamp , diode, voltage regulator, capacitor, crystal oscillator, transistor, variable resistor, ultrasonic sound sensor, and dc vibrators.

Proteus is the effortless and most essential software with latest technology for circuit implementation and simulation. Microcontroller needs to include the hex file for the

implementation of whole project. Proteus combines circuit simulation to facilitate co-simulation of complete microcontroller based designs.

Figure shows three reflective signals that were produced as follow: from front obstacle sensor, right obstacle sensor, and from left obstacle sensor. All signals are inputs for ADC on a microcontroller.

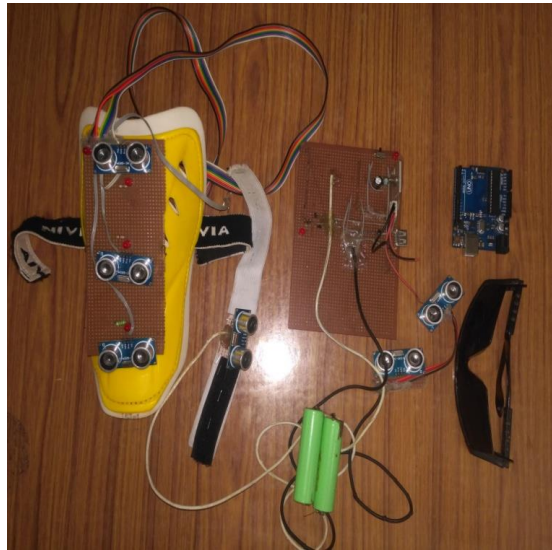
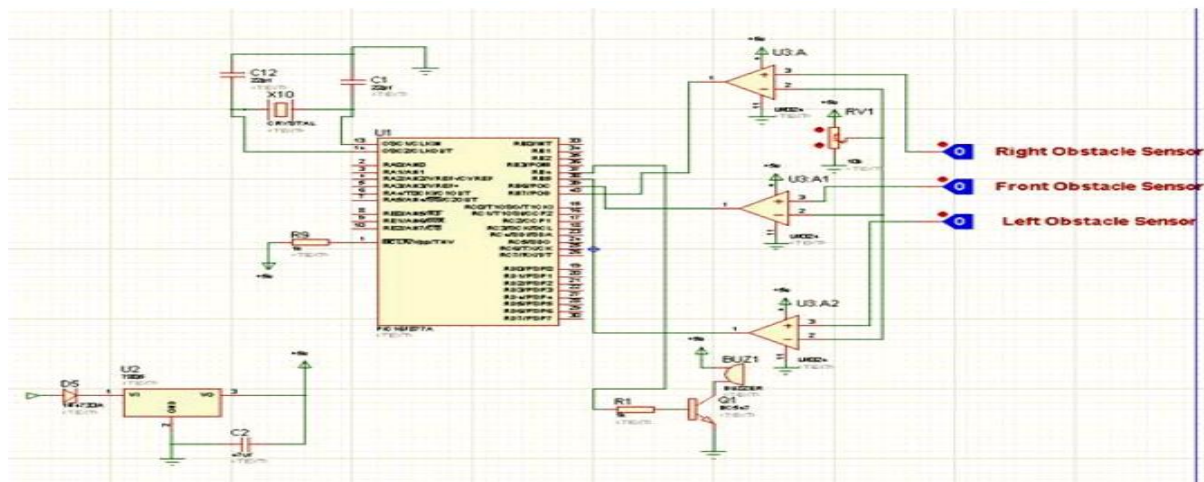


Figure 2:working module



After digitizing these signals are used as inputs to a specific program implemented in real time within microcontroller and according to some internal instructions it will produce an output which will be transferred from the microcontroller to the vibrators and aware the blind pedestrian about the barriers blocking his way.

SUMMARY: The main focus of the paper is designing a system to transform visual information to auditory information by the ultrasonic sensors which will be aid for blind pedestrian. We expect that the project will be very useful for blind pedestrian where Ultrasonic sensors are used to detect the object or obstacle in path and navigate the blind person by the use of audio and vibration instructions.

It is well-estimation from our project that the designed ultrasonic navigation system will ease the road crossing for blind pedestrians with its excellent navigation feature. More powerful sensors can be integrated in this project to provide the detection of obstacles in a wider range.

COST: Rs.2000/-



13. FOG CAMERA VISION IN VEHICLES

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COLLEGE STUDENTS	P. DHARANI, SUSHMA PATTANASHETTI
SCHOOL STUDENTS	PRIYA PATIL, SAVITA PUJAR - GHS NARENDRA

ABSTRACT:

During early mornings in winter, we usually encounter exotic view of roads covered with fog. Its scenic beauty cannot be explained with mere word and it can only be cherished. But along with its beauty, it is also quite dangerous to travel on roads covered with mist and fog.

Recently, there have been many accidents due to foggy weather and has even resulted death and injuries to travelers. Not only gets that, the transportation and movement of automobiles delayed due to foggy conditions which also results in loss of revenue etc.

The aim of the project is to develop a system known as Fog Camera Vision in vehicles, which consists of anti-fog camera along with an fog vision camera which enables the driver to see through fog. Hence this system avoids critical accident and delays in transportation due to fog.

Fundamental Concepts:

FOG and its causes:

Fog is like a low-level cloud that originates from a local body of water - such as a lake, marsh or the sea. It differs from regular clouds because it contains water droplets from a number of different sources. When water vapour in the air condenses into tiny droplets of liquid water, they stay suspended in the air and fog is formed.

Fog formation can occur in two ways. First, the air is cooled to the dew point which leads to the formation of fog droplets. When the air temperature is the same as the dew point temperature, condensation occurs on tiny particles floating in the air. The second method of fog formation requires water to evaporate from the surface into the air, raising the dew point until condensation occurs. Whenever horizontal visibility has been diminished to less than one kilometer, the term fog gets employed. Should the level of visibility reach or surpass this threshold, the appropriate term would be mist.

Problems associated with fog:

Fog reduces the visibility that is; it creates opacity which makes drivers unable to view through. Heavy fog has been causing problems across land, sea and air in recent days, creating havoc on

the roads and grounding hundreds of flights at airports across many parts of the world. Highway accidents involving fog are often chain-reaction collisions involving dozens, sometimes hundreds, of vehicles, frequently accompanied by high casualty figures. As a consequence, media attention and the need for response measures are often high.

How the camera helps to see through fog?

Propagation of light through fog In the presence of fog, visible light (with a wavelength situated between 400 and 700 nanometers) must be propagated within an aerosol that contains a large number of water droplets. During its trajectory, the light from headlamps is attenuated by the dual phenomena of absorption and diffusion. In reality however, the absorption phenomenon is negligible in this type of aerosol. The predominant phenomenon therefore proves to be diffusion, which acts to deviate light rays. Such is the origin of fog illumination, or haze luminance, a phenomenon so highly characteristic of daytime fog.

Thermal imaging camera and target Just as the type and thickness of the atmosphere has an influence on how far one can see through fog, the type of infrared camera used and specifically the waveband in which the camera operates are also of importance. There are two wavebands of importance for thermal imaging cameras: 3.0-5 μ m (MWIR) and 8-12 μ m (LWIR). The 5-8 μ m band is blocked by spectral absorption of the atmosphere by water vapour to such a tremendous extent that it is rarely used for imaging. Thermal imaging cameras that are equipped with uncooled sensors are designed to work in the long wave infrared (LWIR) band between 7 and 14 microns in wavelength, where terrestrial targets emit most of their infrared energy and uncooled detection is easy. Thermal cameras that are equipped with cooled detectors (where the sensors are cooled to cryogenic temperatures) are the most sensitive to small temperature differences in scene temperature and are generally designed to image in the midwave infrared band (MWIR) or in the long wave (LWIR) band. The spectral transmission is different in the MWIR and the LWIR bands. Therefore there will be a difference how far one can see through fog with a thermal imaging camera equipped with an uncooled LWIR detector compared to a cooled MWIR detector.

About the project:

This system consists of anti-fog camera along with ultra-sonic sensor which will be used as anti-collision system in the vehicle. The anti-fog camera is basically a thermal image processing camera which has ability to see through fog. This will be interfaced to LCD screen in order to display the video. It will be placed in front of the driver so that the driver can drive safely even through the fog.

Apart from this, this system also consists of anti-collision system, which consists of arduino kit and ultrasonic sensor. Whenever an obstacle approaches in vicinity of the vehicle, it alarms the driver and thereby makes the driver cautious.

Images of Vehicles through fog

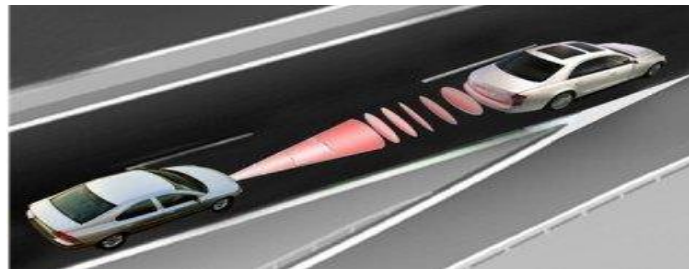
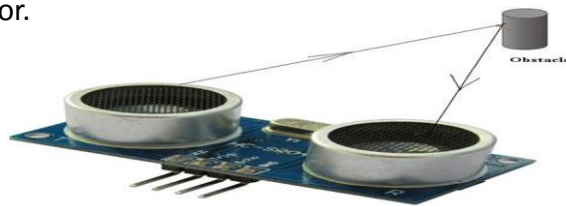


Anti-Fog Camera



LCD display inside the car

Anti-Collision System aided with ultrasonic sensor.



How is it benefit to common people?

1. This is the cheapest device that enables the driver to view through the fog while driving and hence accidents can be avoided.
2. Since it is small and compact, it can be easily incorporated in the vehicles without any difficulties.
3. This type of system is already available in most expensive cars like BMW, BENZ etc., but not available for domestic trucks, auto-rickshaws, Lorries and other vehicles. Hence this device can be installed in vehicles without affecting the performance of the vehicle.
4. In day-to-day life activities, transportation is inevitable and many are dependent on transportation for their livelihood. One day halt of automobiles may disrupt many people's occupation. Hence, this device can solve such problems of common people.

FUTURE SCOPE:

This system which we have developed, we have also incorporated anti-collision system using arduino and ultrasonic sensors. Whenever any obstacles approach in the vicinity of the vehicles, it gives an alarm to the driver.

With the use of camera we can also make use of image processing technology and it can be used in many applications. The various applications includes, drowsy detector (that is whenever the driver closes his eyes, it gives an alarm), road detector etc.

COST ANALYSIS:

Sl no.	Components	Approximate Range
1	IR Camera	2200/-
2	Ultrasonic Sensor	180/-
3	Robot car along with Arduino Kit	2000/-

Additional components can be added in future as per the requirement.

Approximate cost in Rupees = 4380/-

CONCLUSION:

This devise is most reliable and cost effective for solving problems related to foggy weather. It will easily enable the driver to see through fog and mist. Hence this system avoids delays and critical road accidents due to fog. It has many applications in the field of image processing and by making use of such technology transportation and automobiles can be made more human friendly by embedding artificial intelligence.

14. AUTOMATICALLY OPERATED IOT BASED WEARABLE SAFETY DEVICE FOR GIRL AND WOMEN

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COLLEGE STUDENTS	PRAJWAL A.N,PREAM L
SCHOOL STUDENTS	MOHAN V & SARAVANA E 9 TH STD SRI JAGADGURU PANDITHARADHYA HIGH SCHOLL,HUNASAMARANAHALI

ABSTRACT:

All device available in the market are manually operated which performance is not satisfactory if girl is in state of shock and most of the safety devices do not serve for all age groups so, the main aim of this work is to develop automatically triggered iot based wearable device for the safety of girl and women. This objective is achieved by continuously monitoring the body parameters like stress by galvanic skin resistance, and temperature using LM35, when she is subjected to stress the data is send wirelessly to server, and it analysis the sensor data, and determine whether she is in the state of stressed or relaxed in addition to that determining body position at the time of stress by using a triple axis accelerometer and in case any emergency alert notification is send to the police station and the parents

KEYWORDS:

Galvanic skin response, LM35, ADxL335, IOT, ESP8266 wife module, Virtuino

INTRODUCTION:

According to national crime Records Bureau 3, 27,394 case were registered at 2015 means 1008 cases per day...there four an average Of 320 molestation,156 attempt to molestation,112 kidnapping and mudder,180 verbal violence ,27 gangue rape and 46 incest rape cases are reporting every day in India so this is the serious issue where the technical solution is very much important

Related work

- security apps like vitu and suraksha these are manually operated and cannot be for small kids.
- The “Surakasha” device is activated by voice, switch or force. When the individual is restrained or in a state of shock, functionality of the device is not satisfied

There are many smart watch which track the individual with gps they do not sense any emergency. There are some devices which are unwearable, due to bulk nature. So I can conclude that there are many security devices all devices are manually operated and all above devices fails when the girl is in the state of shock

METHODOLOGY:

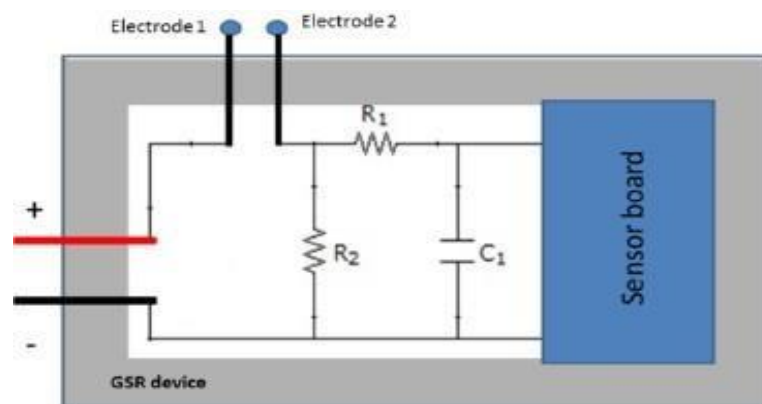
How the body parameters affected under stress??

When someone pretend any treat adrenocorticotropin Harmon of adenoypopysis of pituitary glands act on adrenal glands which intern releases adrenaline and noradrenalin both together called emergency hormones this hormone increases alertness, papillary dilation, piloerection, sweating, increasing in heart beat and rate of respiration, by observing all these parameters my aim is to develop a device the automatically sense all above body parameter and send alerts to the parents.

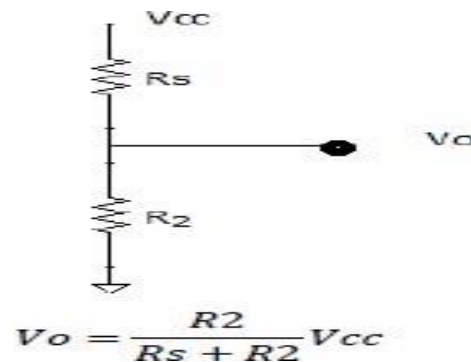
1. Galvanic skin response

We have designed a Galvanic Skin Response (GSR) device in order to detect the different conductance of the skin when a person is under stress and relaxes. We use just two electrodes which are placed on the fingers and some nonlinear circuit this device sends the data to the microcontroller and at the same time, this coordinator send the information to a things speak server.

BLOCK DIAGRAM OF GSR SENSOR:



DESIGN:



here R_S is skin resistance

The more stress, the more his hand will sweat which increase the conductance and decrease the skin resistance (R_s), which in turn increases the output voltage .when there is increase in the stress the output voltage also increases.

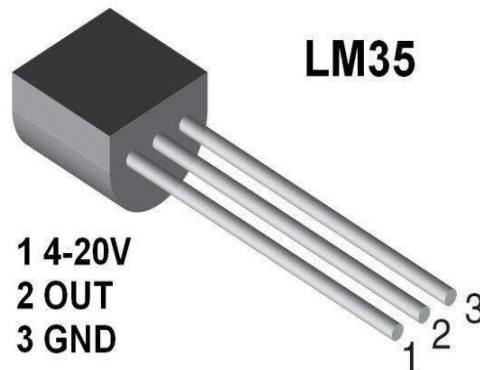
The stress level differ from person to person here are the some different stress levels

	Relax(V)	under stress(V)	Reading
User 1	1.4068	1.6945	1.6476
User 2	1.1123	1.1484	1.1426
User 3	0.876	1.0323	0.9567
User 4	1.0011	1.0868	1.002
User 5	0.8238	0.9904	0.8864
User 6	1.101	1.1145	1.1105
User 7	1.060	1.1197	1.0695
User8	0.7096	0.7546	0.7840

Tabulated output of GSR

Only if I use GSR sencer chances on getting fake alerts so we also use some other sencers

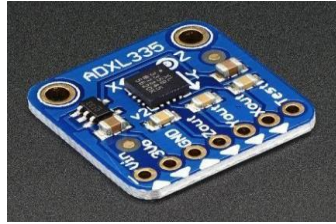
1. LM35 (TEMPERATURE SENCER)



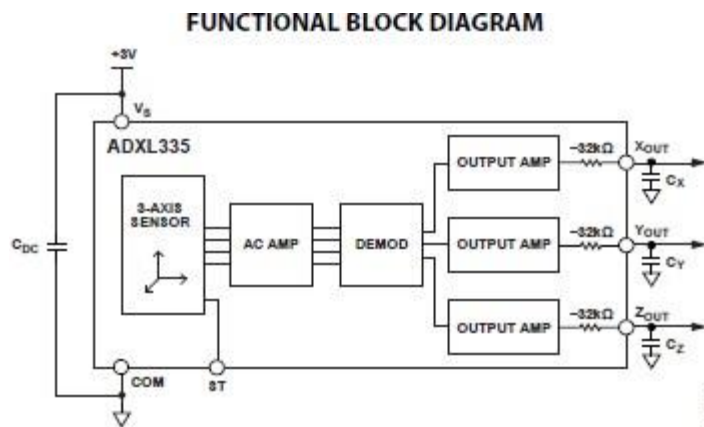
- Sensitivity of the sensor is 10mV per degree Celsius.
- 0.5°C Ensured Accuracy (at 25°C)
- LM35 device draws only 60 μ A from the supply, it has very low self-heating of less than 0.1°C in still air
- Low Cost
- Temperature is directly proportional to o/p voltage

- Finger temperature decreases under stress condition and increases relaxation condition.

Accelerometer:



- ADXL335 three-axis analog accelerometer, which reads off the X, Y and Z acceleration as analog voltages. By measuring the amount of acceleration due to gravity,



ADXL335 Module Specification

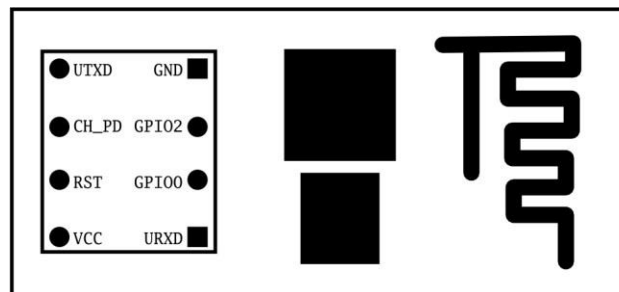
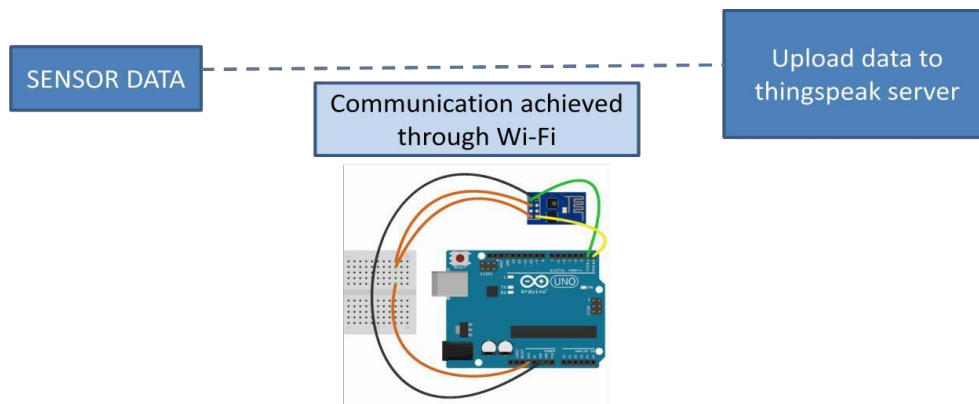
Interface :	3V3/5V Microcontroller
Voltage Requirement:	3 - 6V DC
Output format:	Analog output
Measuring range:	$\pm 3g$
Measuring values(-3 to +3):	X (-274 to +325) Y (-275 to +330) Z (-275 to +310)

Avg X	Avg Y	Avg Z	Class
315.84	412.56	333.22	sleeping
313.57	409.61	330.74	sleeping
313.59	388.90	333.24	Sitting
247.22	307.44	253.84	Standing

Tabulated results of adxl335

ESP8266 Wi-Fi module

To upload the data to thinkspeak website we need the wifi module here i am using ESP8266

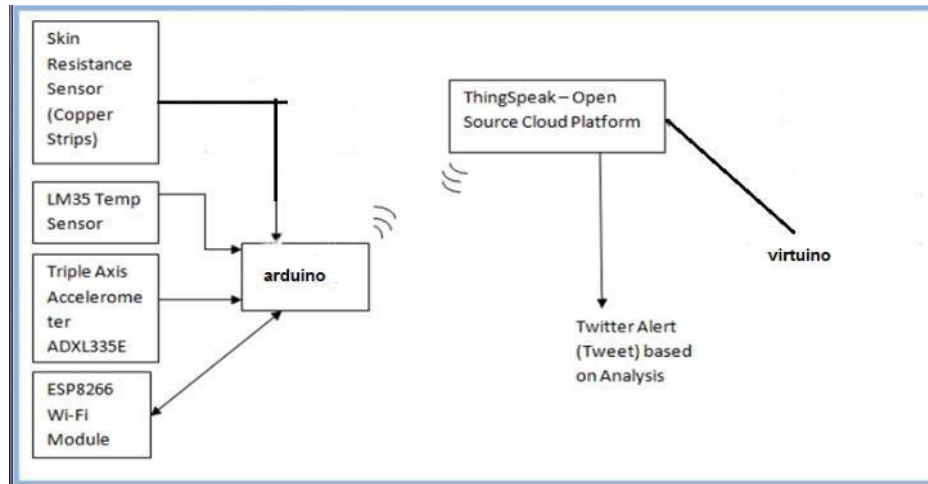


ESP8266 wifi pinout top view

The Wi-Fi module chosen in the ESP8266

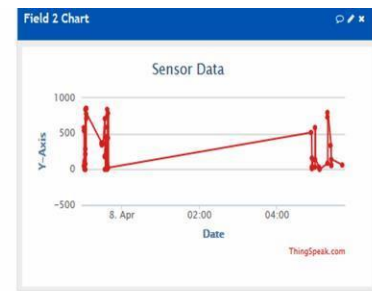
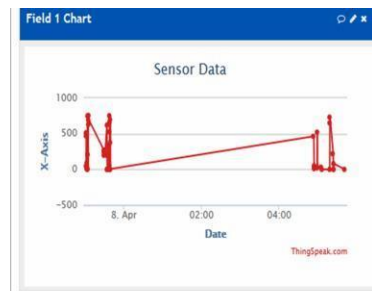
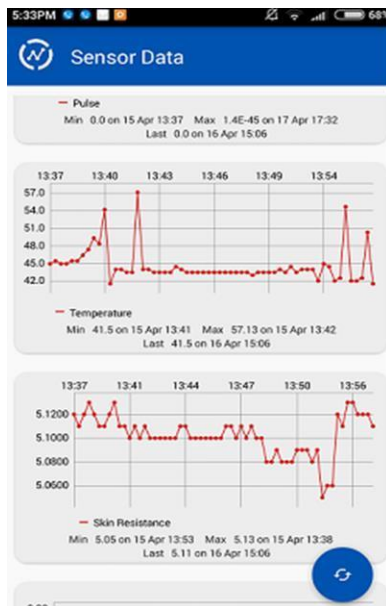
The range of the module is 479 mts.

Block diagram of the system:



RESULT:

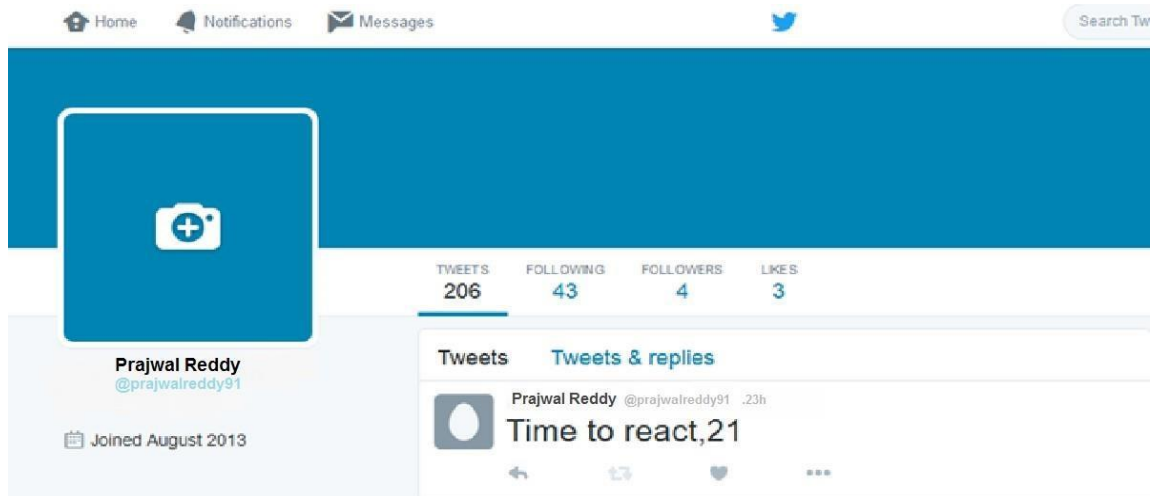
Anyone can access the data of changes in body parameters at any instant time using think speak server



Accessing the data from thingspeak server

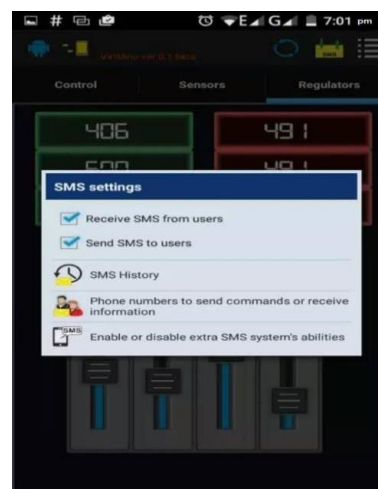
Alert Notification

Once it sense any emergency the the device sends tweets alerts to the parents



virtuino

Virtuino is an android app which access data from things peak server and allows user to set a alert message when a certain sensor data reaches a peak level, it also provides second to second tracking report of the child



APPLICATIONS

1. This device enrich the security of child and women irrespective of age What other things this device can do??
2. This device can be used to detect the sweat levels for diagnosis of sudomotor(anything that stimulates the sweat glands) dysfunction
3. Can be used to diagnosis diabilities
4. Used to detect epilepsy(sweaty hand may be a warning for epilepsy attack)
5. Can be used as fitness tracker

6. As I am using stress sensor It can even track the hypertension(hnt)

ADVANTAGES

1. This devices serves all age groups(this device serves all age groups irrespective of gender men can use this device as sudomotor sencer,diabetic regulator ,used to detect epilepsy and can also used as fitness tracker)
2. This device will definitely decrease the crime rates on girl and women
3. Automatically operated(as this device is automatically operated it works efficiently even girl is the state of shock)
4. Wearable
5. Price of the device is very economical (complete system comes under around two thousand one hundred Indian rupees if produced in large scale it can even come down to eight hundred Indian rupees)
6. It enhances confidence level of women, when they feel that they are safe
7. Great accuracy (as the device is developed by taking a individual body parameters)
8. Family level Digital integration (as this device digitally connect the child to its family)
9. Second to second tracking report
10. Easy to operate and access the data (as we are using thinkspeak public demine any one can access the data at any instant of time)

DISADVANTAGES

- Wi-Fi module used in the device requires the necessity of high speed internet at all points of time for accurate functionality. This limitation has to be overcome by making sure all areas being traversed by the women are internet enabled.
- It cannot be directly marketed because technical hands need to analysis the body parameters and develop and design the algorithm for a particular individual

15. DISTRIBUTED LOCOMOTIVE HORNINIG AND DRONE

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COLLEGE STUDENTS	PRAJWAL ASWIN CUTINA, DAVID PRABHAKAR
SCHOOL STUDENTS	MAHESH MANDEVALA, PAVNKUMAR R, 9 TH STD, GOVT. HIGH SCHOOL JAKKUR

ABSTRACT:

The subject matter of the project is providing a means of minimizing the disturbance caused by loud horning of locomotives in urban areas. The invention involves providing a lower power horn on a locomotive engine in addition to the normal horn being used as per prior art. In areas where loud horning is undesirable, a plurality of low power horns mounted on a plurality of poles on the ground beside the railway track are provided. Also provided on the locomotive engine is a wireless transceiver that can communicate with wireless transceivers provide on the first and the last poles. Upon seeing a special sign for lower power horning, the locomotive pilot uses the lower power horn which also initiates wireless signaling to the receiver on the first ground-based horning pole. The lower power horns on the ground horn concurrently with lower power and convey the successful production of sound by each of them through wireless communication to the locomotive engine. The receipt of successful horning by the ground-based horns is indicated to the pilot through a visual signal. Yet another aspect of the project is an on-rail drone that can be used to horn near the level crossing and also as a pilot to avert accidents.

DESCRIPTION

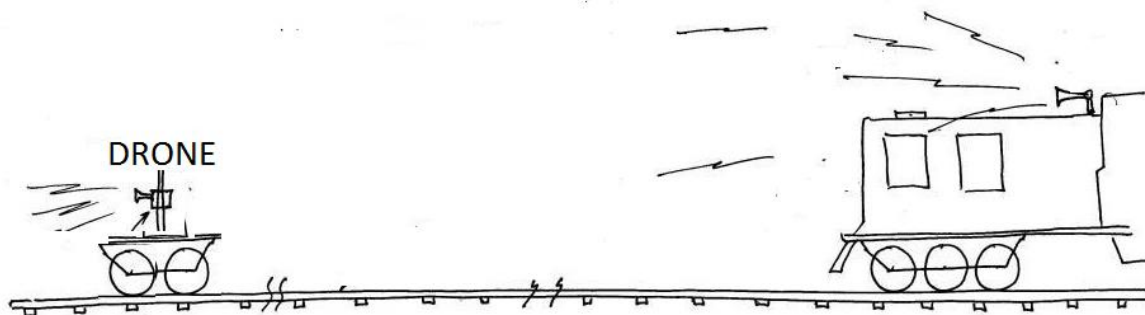
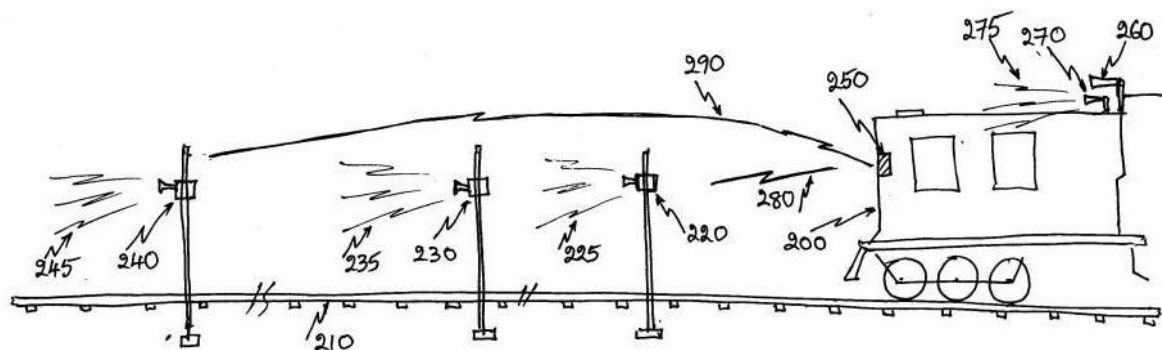
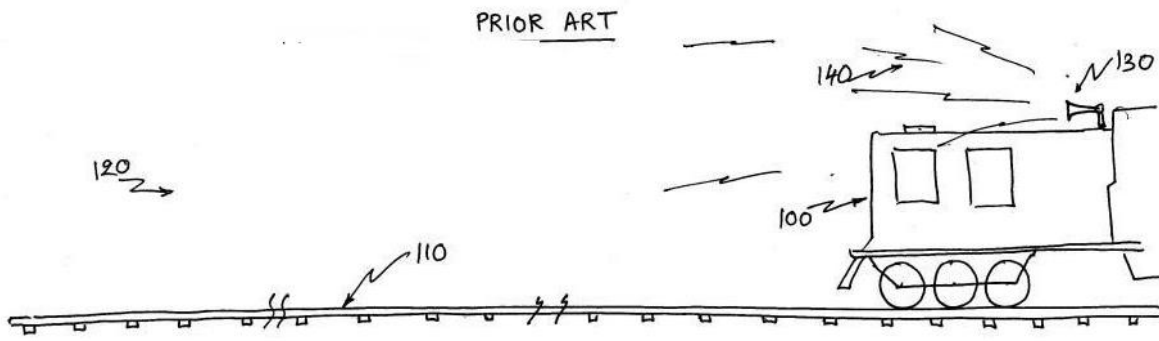
The subject matter of the project is providing a means of minimizing the disturbance caused by loud horning of locomotives in urban areas.

In prior art, locomotives pilots are required to blow whistle (i.e., sound horn) at railway crossings and other locations along the railway track. While loudness of the locomotive horn is not a problem in rural and other sparsely populated areas, it is a nuisance and an unwanted sound in urban areas. This problem is addressed in this invention by way of providing an additional low power horn to be used by the locomotive pilot in urban areas if indicated to do so by a sign alongside the railway track. The reduction in the audio power and the reach of sound along the track is made up by using a plurality of low power horns that are placed at regular intervals mounted on poles alongside the railway track and operated by wireless signals from the engine from which the horn has been activated. The locomotive pilot is given a signal from the last low power horn through wireless communication that indicates successful sounding of horn by all the horns along the track.

Our project may be understood by way of embodiments shown in the accompanying drawings in which

Fig. 1 shows prior art locomotive engine with the horn producing sound

Fig. 2 shows the distributed horning system as per the current invention



As shown in Fig. 3, as an alternative approach, a wirelessly controlled drone running on the track can be used to produce a lower volume horning. The drone may also be used to check if the track is safe for the locomotive.

SUMMARY:

The project provides a means of reducing noise pollution in urban areas because of locomotive horning near the level crossings. The on-rail drone achieve the same function as fixed horns and also helps in averting accidents by checking the track ahead of the locomotive.

16. SMART BOOK IN RURAL EDUCATION FOR GOVERNMENT SCHOOLS

COLLEGE	PESIT BANGALORE SOUTH CAMPUS
GUIDE	DR. SANDESH B J
COLLEGE STUDENTS	NIKHIL, PARTH SACHDEV
SCHOOL STUDENTS	KIRAN A, DAVIA R, 10 TH STD, SRI A THIMMAIAH REDDY GOVERNMENT HIGH SCHOOL

ABSTRACT:

Bringing Marker based Augmented Reality in text books is a great platform for learning things, visualizing 3D models, making real world learning easier. It bridges the gap between the virtual and physical worlds. This kind of learning can help teachers teach in a better way. Around 250 million children in India who are studying in schools but not learning the things in an Interactive way, So we have developed an approach using marker based Augmented Reality and Image Recognition in the field of education to teach students which would be more interactive and practical.

HYPOTHESIS:

Exploiting the potentials of Augmented Reality (AR) and Virtual Reality (VR) concepts and technologies has been a research topic for decades. Research on how to take an advantage of these concepts in the domain of education has brought forward a great number of concepts, prototypes, and working systems. Although the surveys and Studies in this designing area of Augmented and Virtual Reality keep diversifying. We have proposed a virtual approach towards assisting this space by creating special tools which can be helpful in the process of teaching and learning. We have also made some attempts to visualize their real world applications.

METHOD:

An approach using Marker based AR has been developed and experimented for NCERT books since, NCERT books are used in large scale by the students and teachers all over India. Our approach helps analyzing two dimensional figures into animated three dimensional models along with video playback. We will be providing a mobile application that scans the figures from the text books and provides appropriate 3D models using Image Analytics. It also provides video playback for the better understanding of complex figures. Video playback is made available in three languages, English , Hindi and Kannada, in order to overcome the language barriers in learning. This will help students in rural areas to connect to real world scenario and will thus augment their thinking capacities.

EXPERIMENT:

With the help of existing technologies like Unity , Blender and vuforia, the experimental projects on implementing a new way to interact with books using Augmented Reality. Marker based Augmented Reality by Vuforia helps us to produce 2D figures in 3D models and with audios it also helps to understand the concepts better. A successful experimentation has been carried out on NCERT text books and the results obtained were absolutely different from the traditional method of teaching. Here are some experimentation results.

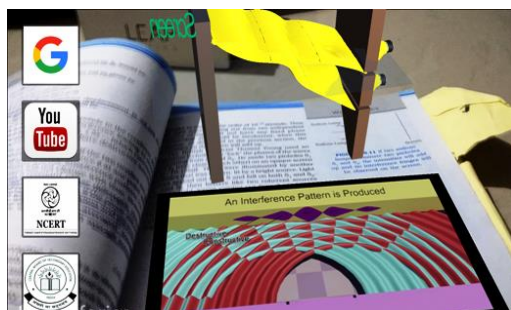


Fig 1: A 2D figure for producing interference pattern is being scanned

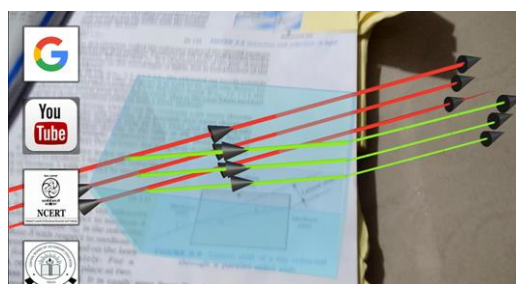


Fig 2: 3D model of lateral shift of rays through a slab

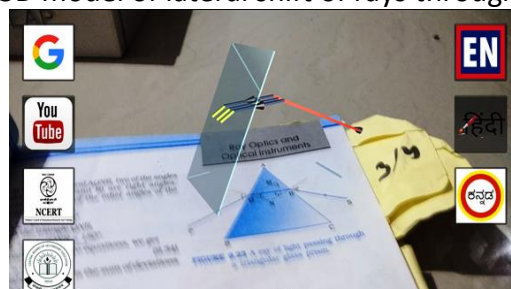


Fig 2: 3D model of working of a triangular glass prism

SUMMARY:

Augmented Reality is a new way of interacting with the world and bringing it in education will be a great platform for students to grasp the knowledge in a better way. Our project could eliminate the overpriced SMART class in schools as this is much more economic method of learning. It could thus be encouraged to implement in government schools through the faculties.

17. NON-INVASIVE GLUCOMETER USING SALIVA

COLLEGE	JAIN COLLEGE OF ENGINEERING, BELAGAVI
GUIDE	PROF. VEERESHKUMAR MATTHAD
COLLEGE STUDENTS	NITESH PATIL, SHASHANK PRABHU
SCHOOL STUDENTS	HEMANTH WADE, SHIVANANDA DENGATTI - SANGOLLI RAYANNA MEMORIAL RESIDENTIAL SCHOOL,NANDGAD

ABSTRACT:

Millions of people worldwide live with diabetes and several millions die from it each year. A non-invasive, painless method of glucose testing would highly improve compliance and glucose control while reducing complications and overall disease management costs. To provide accurate, low cost, and continuous glucose monitoring, A glucose sensor is an electrochemical diagnostic strip.

Keywords: -Biosensor, Arduino, signal conditioner, saliva glucose meter

INTRODUCTION

Diabetes is a disorder because of high sugar level in blood due to an inability to produce the hormone called Insulin. Or when beta cells present in pancreas cannot secret sufficient amount of Insulin. The International Diabetes Federation estimates 382 million people worldwide had diabetes in 2013, and the number is forecasted to reach 592 million by 2035 (a 55% increase). The present Glucometers need Blood to check glucose level. These intrusive tests are generally disliked because of the pain and inconvenience caused by finger pricking, resulting in fewer tests and inadequate blood glucose control. Poor blood glucose control results in more complications and even higher management costs. Particularly, repeated painful finger sticks are a major problem for young children and result in similar negative consequences for disease management.

Spectroscopy, fluorescence spectroscopy and Ampereometric. Although optical technologies for glucose determination are available, most of them are for laboratory use due to the size, cost, and complexity of operation. Thus, a noninvasive, convenient, accurate, easy-to-use, portable, and low-cost diagnostic tool for diabetes is highly demanded.

So we are designing here a NON INVASIVE GLUCOMETER USING SALIVA. It is very attractive as a bio medium for clinical diagnostics. Saliva can be easily collected by individuals with modest instruction and it dramatically reduces the discomfort of the tests. There are a large number of diagnostic analysts present in saliva, including glucose, steroid hormones and the HIV antibody.

Regarding to the technologies for determining salivary glucose Levels, optical measuring systems such as Liquid Chromatography–Mass Spectrometry (LC–MS) were reported. However,

the measurements can only be done in a laboratory as they require significant processing time, expensive reagents, sophisticated instrument, and highly trained professionals. Consequently, these methods cannot be used for individual glucose monitoring at home or in daily activities.

OBJECTIVE

- Our work will help in Easy diagnosis and monitoring of diabetes.
- To design Glucometer for measuring non-invasive Glucose level using saliva.

METHODOLOGY

Materials required for Hardware Design

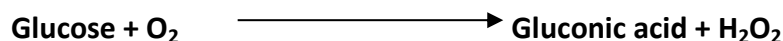
- Test strip (Biosensor): Sensor that senses the sample of saliva.
- Arduino UNO: It is a programmable device that controls whole system.
- LCD: Display the solution glucose content in units of mg/dl.
- Signal conditioner: This converts the bio recognition event into a measurable signal.
- Op-Amps: To amplify the current this is fed from output of the Biosensor.
- Battery: Two DC batteries of 9V are used here.

Test Strip (Biosensor):

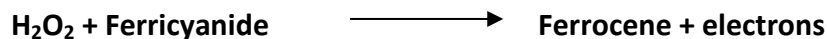
The strips used in this design have three terminals or electrodes.

- Reference electrode
- Working electrode
- Counter electrode

The working electrode is the electrode in an electrochemical system on which the reaction of interest is occurring. The working electrode is often used in conjunction with counter and a reference electrode in three electrode systems. The sensor used has an electro enzymatic approach, which means that it takes advantage of glucose oxidation with a glucose oxidase enzyme. The presence of glucose oxidase catalyzes the chemical reaction of glucose with oxygen, which causes an increase in pH, decrease in the partial pressure of oxygen, and increase of hydrogen peroxide because of the oxidation of glucose to gluconic acid.



The hydrogen peroxide when reacts with ferricyanide, Ferrocene along with electrons will get liberated and these electrons liberated are directly proportional to the glucose concentration and hence determines the concentration of glucose.



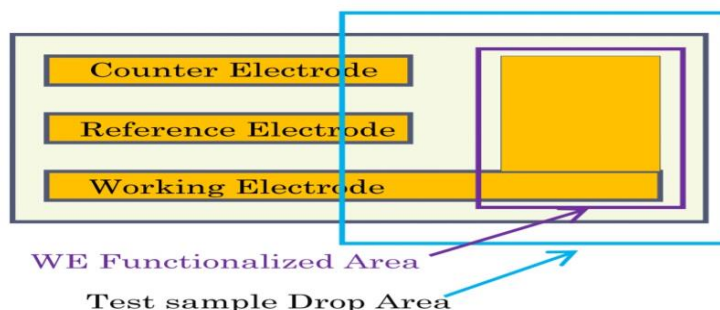


Figure 1. Biosensor

When saliva or a glucose solution is placed in the strip, a chemical reaction occurs inside it, generating a small electrical current proportional to the glucose concentration. This current is constantly monitored while the strip is in place, allowing the device to monitor when sample is placed.

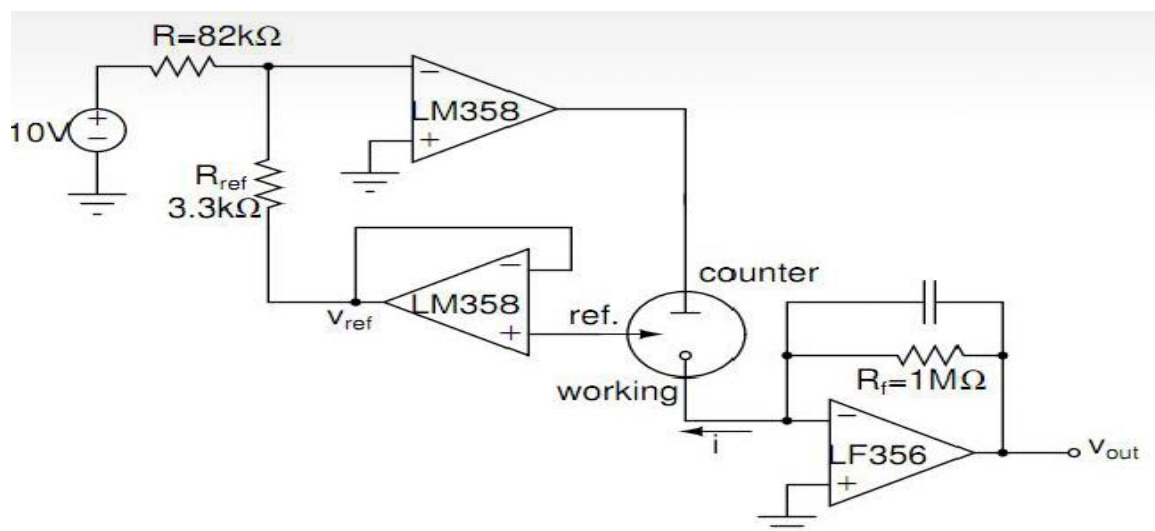


Figure 2. signal conditioner

Signal conditioner can be used to test for electrochemically active compounds and microbes in solution, and thus have applications in many areas such as environmental monitoring, food and drug testing. Typically, electrochemical experiments utilize three electrodes, the Working Electrode (WE), Reference Electrode (RE) and Counter Electrode (CE). A **signal conditioner** is a three terminals analog feedback control circuit that maintains a pre-determined voltage between the WE and RE by sourcing current from the CE.

The CE and WE are made of electrochemically inert conductive materials (we are using graphite, like from pencils, but platinum and gold are popular). The RE is designed to have a well-defined and stable electrochemical potential

BLOCK DIAGRAM

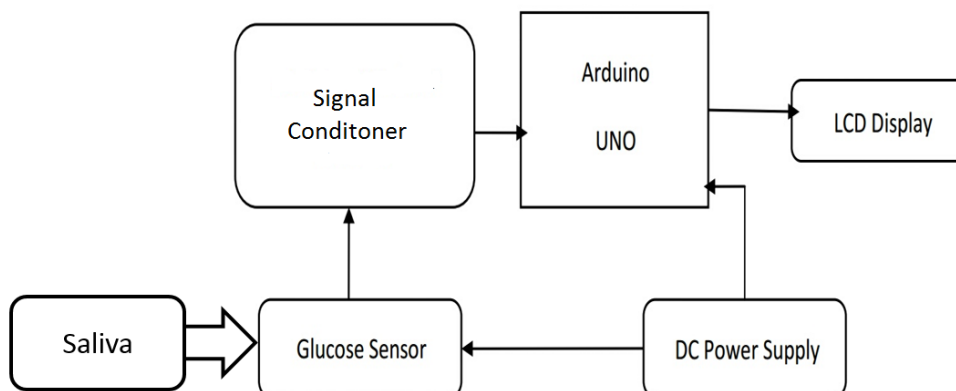


Figure 3. Block diagram of the system

- The DC power supply of 6V-20V is given to the Arduino UNO kit and Glucose sensor.
- The biosensor is used to sense the Glucose. The sample is placed on the biosensor and it recognizes substance of glucose.
- Then it sends to a signal conditioner, which converts the bio recognition event into a measurable signal.
- The signal is received by an Arduino UNO. It is a set of development board that comes with pre-tested hardware and software libraries. And we are going to write a suitable program for calculating glucose level.
- Liquid crystal display (LCD) is used to get the output of the glucometer. And it gives result in the form of mg/dL.

CALIBRATION USING DIFFERENT STANDARD GLUCOSE SOLUTION

Time (sec)	Analog Read					
	100mg /dl	50mg /dl	25mg/ dl	16.66m g/dl	9mg/ dl	6.25mg /dl
0	0	0	1	0	0	0
0.5	70	48	39	37	33	30
1	131	84	63	58	47	41
1.5	179	113	79	73	55	47
2	217	136	91	84	60	51
2.5	245	154	99	93	64	54
3	267	168	105	98	66	55
3.5	284	178	110	102	66	56
4	298	186	112	106	67	56

4.5	308	192	115	108	68	57
5	317	197	116	110	68	56
5.5	323	199	117	111	68	56
6	328	201	118	112	67	55
6.5	331	203	118	114	67	55
7	334	204	119	114	66	54
7.5	336	204	120	114	66	54
8	336	204	119	114	65	54
8.5	337	203	119	114	64	53
9	336	202	119	114	64	52
9.5	335	202	119	114	63	52
10	333	200	118	113	62	51
12.5	319	190	113	109	57	47
15	300	177	107	102	52	43
17.5	278	162	99	95	47	39
20	257	148	92	87	43	35
22.5	236	134	85	80	38	31
25	217	121	79	73	34	28

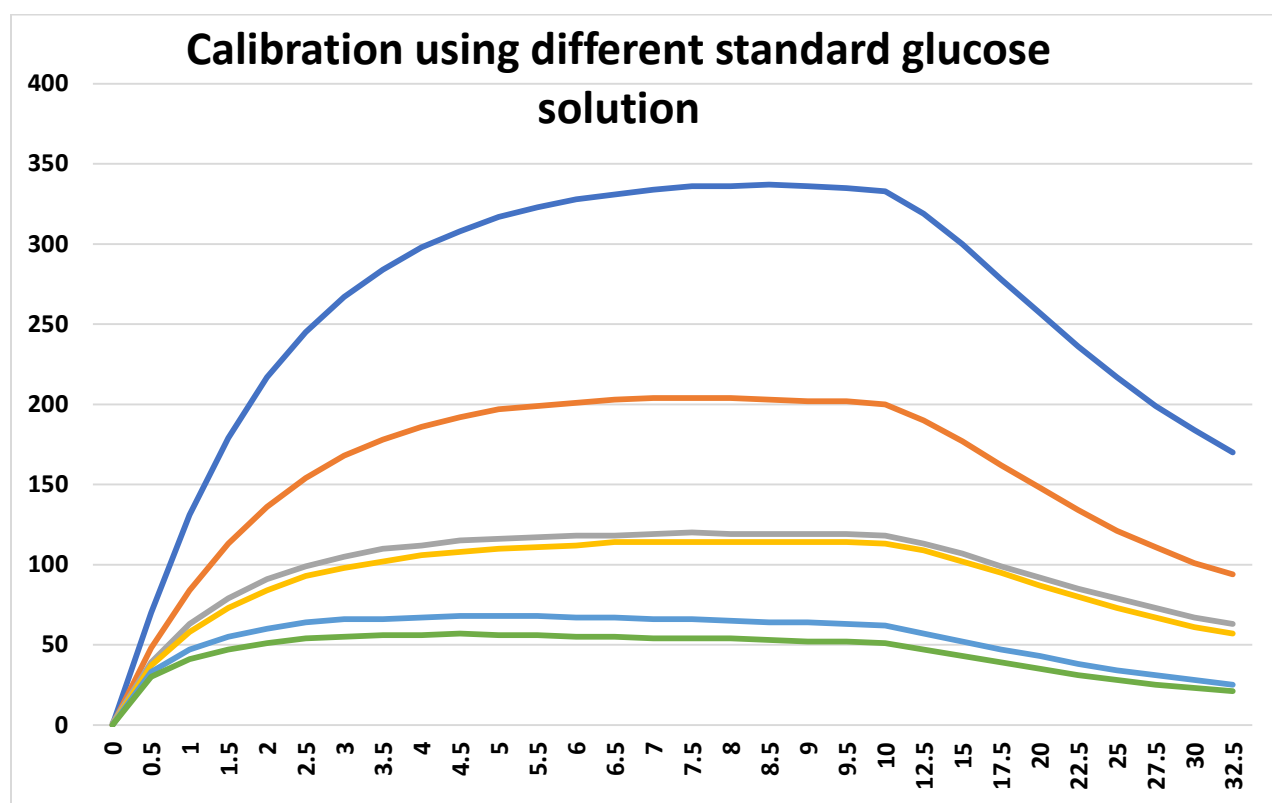


Figure 4. Analog read of Arduino for different standard glucose solutions

PROJECT MODEL:



6. RESULT AND CONCLUSION

We collected sample of blood and saliva, The serum glucose level ranged from 80 mg/dl to 150 mg/dl and saliva glucose ranged from 9 mg/dl to 16 mg/dl.

Diabetes mellitus is a massive, growing, silent epidemic that has the potential to cripple health services in all parts of the world. Currently, a diagnosis of diabetes is achieved by evaluating glucose levels in blood. But the saliva offers some distinctive advantages that whole saliva can be collected non-invasively which measures body glucose level frequently without any discomfort to the patient.

18. BI MODE SPY COPTER

COLLEGE	SHRIDEVI INSTITUTE OF ENGINEERING & TECHNOLOGY (SIET), TUMKUR
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COLLEGE STUDENTS	CHETAN T R & CHANDAN KUMAR H
SCHOOL STUDENTS	SHASHANK R & PAVAMANA S 9 Th STD.SARVODAYA BOYS HIGH SCHOOL, TUMKUR

DESCRIPTION:

BI MODE SPY MULTICOPTER, Bi mode means working in two modes in two medium (air, land).

* Bi mode spy multicopter operates in two medium all mechanism is assembled in one package; Thus, the system is unique in every way.

* In air mode brushless motor with propeller works for flying with controlled gyro and GPS technology.

* In land mode wheels coupled BLDC motor convert through mechanism with help of gear servo motor and stands on land as land vehicle starts moving on land with BLDC which are used for flight mode also.

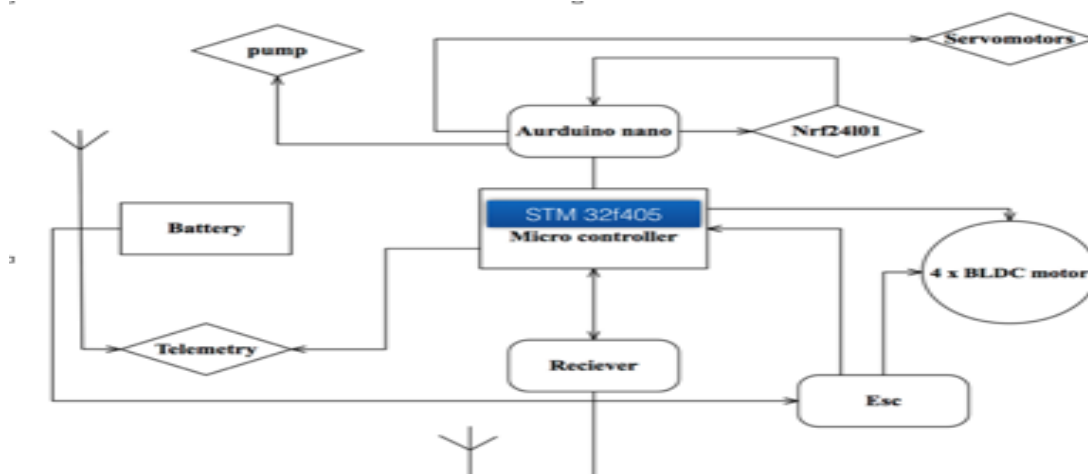
* In water mode it moves on the water and also inside the water with support of floppy wheels which intern wheels for land drive also.

* All the system is controlled by STM32f405 ARM chip, Arduino Nano, STM32f103 microcontroller, Fly sky Transmitter and receiver.

* All mode transformation takes place in one unit, here no requirement of manual contact to system all conversion is converted through wirelessly by mechanical working and electronically by use of microcontrollers.

* Spy is done by using of camera and infrared camera etc.

BLOCK DIAGRAM:



Explanation: BI MODE SPY COPTER circuitry are as shown in above block diagram. all circuitry are fabricated in one model, above circuitry consists of main motherboard (STM32f chip), Arduino, digital radio receiver, NRF24L01, telemetry, brushless dc motor, esc, servo motors, battery, pump, and ballast cylinder.

Electrical & Electronics Components:

MOTHER BOARD:

Here we are using STM32F405 motherboard which has 10DOF IC which gives 10 digital output & takes input of 10 analog signal & three 12C bus signals to land & air mode controlling system & also consists of STM32F405 chip, MPU6000 gyroscope, HMC5883L magnetometer & gives pulse width modulation output which drives the driver of motors, this motherboard takes PWM, PPM, FUTABA SBUS, SATELLITE PPM signals input from receiver and analyze the input given by the user & output's the specific work.

ARDUINO NANO:

This is universal open source board which is used to give 13 digital output & 7 analogues input this board is used for controlling of water mode and this takes input of digital signals by NRF24L01 transceiver which gives digital output & input by user through 2.4GHZ digital radio signals for controlling.

UBLOX NEO-6M GPS:

This is used for secured stabilized flight control system by global positioning systems which intern connected to motherboard which gives output and input as TX & RX digital 12C pulse by GPS module which is positioned by GEO positioning satellite at what place we conducting the flight from this system we can safely return the copter when there is a problem in radio communication the GPS helps by navigating the motherboard autonomously to bring back the copter where it was in initial position.

TRANSMITTER & RECEIVER (AFHDS RANGE 2.4GHZ):

This is 6 channel digital output of PWM type receiver & 6 channel radio controlled 2.4GHZ ranged with feature of automatic frequency hopping digital system which works both mutually binding.

NRF24L01 TRANSCEIVER:

This module is used for further transmitting data by digital radio signal for controlling for water mode of whole system for range of frequency of 2.4GHZ.

ELECTRONICALLY SPEED CONTROLLER (ESC "3 WIRE SYSTEM"):

This are the drivers which controls the brushless DC motors, it consists of ATMEL ATMEGA A8 microcontroller which drives driver MOSFET's for fast switching of motor coil poles for rotation of motor armature, ESC take PWM input and gives analog output by 3 wire system.

BRUSHLESS MOTOR (A2122 1400KV):

Here we use A2122 1400KV motor having 10 turns of copper winding which given output is directly proportional to voltage. These are 3 wire system motors are not controlled by two wire system batteries therefore it is need of esc for running this motor, these are very high speed motors for better thrust for heavy weight lift of captors.

Speed of motor can be calculated by rated value 1400KV

$K = \text{RPM (standard value for 1 volt)}$ $V = \text{applied voltage}$ $\text{Total RPM} = \text{rated RPM} \times \text{applied voltage}$
 $= 1400 \times V$ Here we use 11.1V source so motor give output $= 1400 \times 11.1$

Total rpm = 15540 rpm this rpm can give thrust of about 1.5kg/2.4kg for each motor having 10" propellers.

SERVO GEAR MOTOR:

These are metal gear motors which were used for mechanical conversion mechanism from air mode to land mode.

BATTERIES:

1200mAh capacity battery of voltage 11.1 are used, these are 3 cell lithium polymer battery, source for all electrical components.

WORKING:**AIR MODE:**

*AIR MODE use for spy above earth by Ariel view, by using BLDC (brushless dc) motor with propellers.

*Autonomous flight system-this system which provides features of pre-marked path map by user to navigate.

*RTH MODE (returns to host place)-this mode featured about, when system lost connective between user due high range distance. Automatically systems run command to return navigate to host location without any controlling device through user.

*GPS MODE- this system helps to user to monitoring location, where system position located on earth is, and where to navigate.

LAND MODE:

*Mechanism of BLDC wheels are used for high speed with high torque.

*while converting mechanism takes place there is no contact required, all mechanics were automatically converts through transmitter controller.

*spy in tunnel can be achieved in remote places by GPS mapping.

PHOTOS OF PROTOTYPE AND MODEL OF BI MODE SPY COPTER:



19. FABRICATION OF OIL SKIMMING MACHINE

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ABSTRACT:

Fabrication of mechanical equipment to separate oil from the water. Oil and water separator is mechanical equipment, which is used in the environment pollution control from oil spillage. Oil separator helps in removing the oily from the waste water. By removing the oil from waste water, it becomes free of oil pollution. This oil separator can be used in the effluent treatment plant. This project consists of construction, fabrication details, assembly, working and applications of oil and water separator. The belt speed, oil recovery rate and oil recovery efficiency are the operating parameters of oil separator. The oil recovery rate and the oil recovery efficiency, the two most important parameters displayed the performance of the oil separator.

INTRODUCTION:

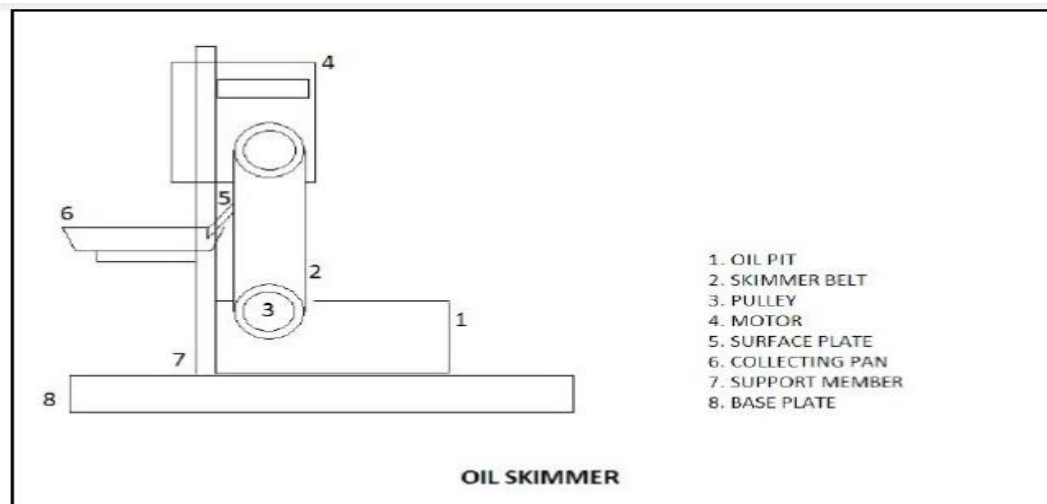
Oil is one of the precious crude and being used in many routine application of human life. Since most of the oils are toxic so quite dangerous for alive when it comes to direct contact with them. During the years of recent decades, world has witnessed many oil spillage tragedies and subsequent damage to alive and environments. Many countries has made stringent safety norms for waste water disposal contained with oils mainly typically from petrochemical and process industries so that such industries are equipped with such kind of oil skimmers to separate the oils from disposal water. The continuous removal of oil from process fluids; increases the life of the fluid; resulting of:

a) Reduce the machine fluid refilling cost. b) Improves the disposal water quality.

WORKING OF OIL SKIMMER:

This unit mainly consists of rectangular frame. In first stage of unit at the top surface of frame motor and gears are fitted. The arrangement is provided for the movement of the shaft as per the requirement. On one side of frame a scrapping arrangement is attached which removes the oil and grease from the surface of belt. The removed oil and grease is carried through the collector channel to the oil tray. Initially half of the apparatus immersed in the water & oil mixture. When the unit is switched on, motor starts, which is coupled to the spur gear. The motion of motor shaft is given to spur gear, which reduce the speed. This reduced speed is given to the driver shaft. The upper shaft is rotated, because of the driven gear rotates at 18 to 20 rpm. The belt rotates over the water surface, and then floating oil on water surface get sticks to the belt. After that stickled oil particles wiped out by wiper in collected in oil tray by

the help of channel. The belt after scrapping again goes to the downward in water channel. This cycle is repeated continuously.



OBJECTIVES OF OIL SKIMMER:

1. Main objective is to remove oil from water in a limited resource and this can be implemented to higher operations also.
2. In order to avoid improper cooling in some of the mechanical operation.
3. To separate the mixed oil from the polluted coolant.

METHODOLOGY:

Oil and grease always on the water surface. They do not mix with water. Separation of it is based on the surface tension, specific gravity and viscosity of them. The “oil and grease skimmer unit has special purpose belt, which is rotated by mechanical means such that it just touches the surface of water the oil and grease particle stick to the belt material with the belt up to scrapping arrangement where scrapping of oil and grease occurs and oil grease are collected.

COST:

SL NO	ITEM	COST
01	SKIMMER BELT	1500
02	MOTOR 2HP	10500

03	COLLECTING PAN	1000
04	PULLEY	1200
05	MISSLENIIOUS	2000
TOTAL		16200

CONCLUSION:

The trial taken shows that the design satisfies its purpose. It is found to be very convenient for skimming the oil for the operator. It is very much helpful to operators, as it avoids their tedious work of skimming the oil and grease from the wastage water. It also helps in

- a) Efficient & economical removing of oil
- b) Comfort to the operator.
- c) Controlling the water pollution.

20. REINFORCED INTERLOCKING MUD BRICKS

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ABSTRACT:

The ideal building material would be 'borrowed' from the environment and replaced after use. There would be a little or no processing of the raw material and all the energy inputs would be directly, or indirectly, from the sun. This ideal material would also be cheap and would perform well thermally and acoustically. If used carefully, mud bricks come close to this ideal material.

Basic mud bricks are made by mixing earth with water, placing the mixture into moulds and drying the bricks in the open air. Straw or other fibers that are strong in tension are often added to the bricks to help reduce cracking. Mud bricks are joined with a mud mortar and can be used to build walls, vaults and domes.

At its simplest, mud brick making places mud in moulds which, after initial drying, are removed to allow the bricks to dry slowly (not in direct sun). Moulds can be made from timber or metal — anything that can be shaped to provide the desired size for the bricks. Virtually all the energy input for mud brick construction is human labour (indirectly fuelled by the sun) and after a lifetime of use, the bricks break back down into the earth they came from. The most effective use of mud bricks in building healthy, environmentally responsible houses comes from understanding their merits and accepting their limitations.

The use of earth construction is well established in energy efficient housing. Despite the fact that most of the world's buildings are made of earth and it is one of the oldest known building materials, much about its properties and potential remains undeveloped and poorly researched

Interlocking Mud Bricks:

PROPERTIES

APPEARANCE

The appearance of mud bricks reflects the materials they are made from. They are thus earthy, with their color determined by the color of clays and sands in the mix. Finished walls can range from a strong expression of the brick patterns to a smoothly continuous surface

STRUCTURAL CAPABILITY

With thick enough walls, mud brick can create loadbearing structures up to several storey's high. Vaults and domes in mud brick prove that it can be used for many situations other than vertical walls.

1. SOUND INSULATION

A well-built mud brick wall has very good sound insulation properties. Some modern mud brick homes use mud brick for external walls and light partition walls internally; it is more effective for thermal and acoustic performance to use mud brick for the partition walls and lightweight, well-insulated external walls.

2. THERMAL MASS

Mud brick walls can provide moderate to high thermal mass. Walls should be a minimum of 300mm thick to provide effective thermal mass.

3. DURABILITY & MOISTURE RESISTANCE

Mud brick walls are capable of providing structural support for centuries but they need protection from extreme weather or continuous maintenance. Although some soils are very resistant to weathering, as a general rule mud brick needs protection from driving rain and should not be exposed to continuous high moisture.

4. ENVIRONMENTAL IMPACTS

Mud bricks could have the lowest impact of all construction materials. The bricks should be made from clays and sands and not include living soil. They require very little generated energy to manufacture, but large amounts of water. Their embodied energy content is potentially the lowest of all building materials but the use of additives such as cement, excessive transport and other mechanical energy use can increase the embodied energy of all earth construction.

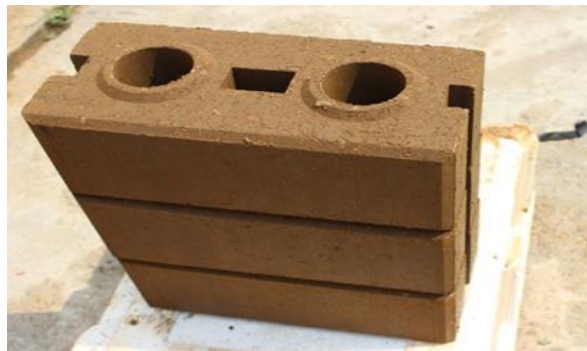
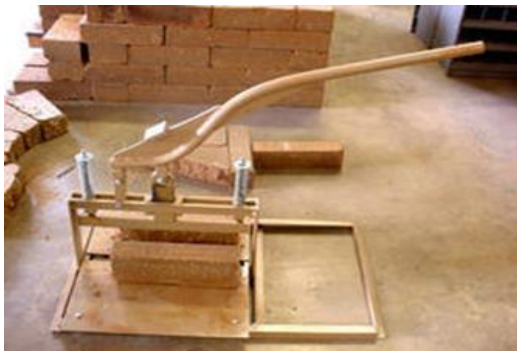
CONSTRUCTION:

1. Sieving the soil: The soil is sieved in a 4mm sieve to remove stones and lumps of clay
2. Mix sand or quarry dust to correct the clay-sand percentages in the soil
3. Add cement or cement and lime in appropriate proportions and mix thoroughly in the dry conditions.
4. Sprinkle moisture onto the mixture and further mix thoroughly till the mixture is homogeneous. Test for optimum moisture by trying to make a ball of soil in hand. If a ball can be made without the soil sticking to the hand the moisture content is right.
5. Weigh the correct amount of moist soil such that a fresh block density of 2.05g/cc can be achieved. The weight depends on the volume of finished block. In case the soil contains too much sand and silt a density of 2.05g/cc may not be feasible. Densities like 2.0g/cc or 1.95gm/cc may be attempted.
6. The weighed soil is now poured into a soil compaction press like Mardini.
7. After the compaction press the lid is opened and block is ejected.
8. Ejected block is stacked in a five or six block high stack for curing.

9. Sprinkle of moisture may be done up to 21 days to complete the block making process.

PROJECT OUTCOME:

1. To specify, our project will be building up the a Working model by demonstrating the use and method of placing and finishing of the brick set.
2. Need for new building material, its usage and also creating interest among student on properties of materials by exposing the youngsters into the world of building materials.
3. Simpler and time saving construction technique which will benefit the user in saving money due to reduction of cost of finishing and reduces the energy consumption of a building.
4. There by benefits the environment.
5. Ease of placing which specifies that the time requirement for building a wall or a structure will be decreased
6. Reduces cost of finishing i.e. cost of plastering, Labour charges i.e. requirement of skilled labours
7. Compressed-earth blocks absorb and release heat more slowly than fired bricks, they can keep interiors cooler during the day and warmer at night and also reduces the embodied energy of a building this in turn becomes an environmental friendly



21. ADIHA-PARTNER OF RUBBER FARMER

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COLLEGE STUDENTS	SURAJ V, SIRAJUDDIN K
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ABSTRACT:

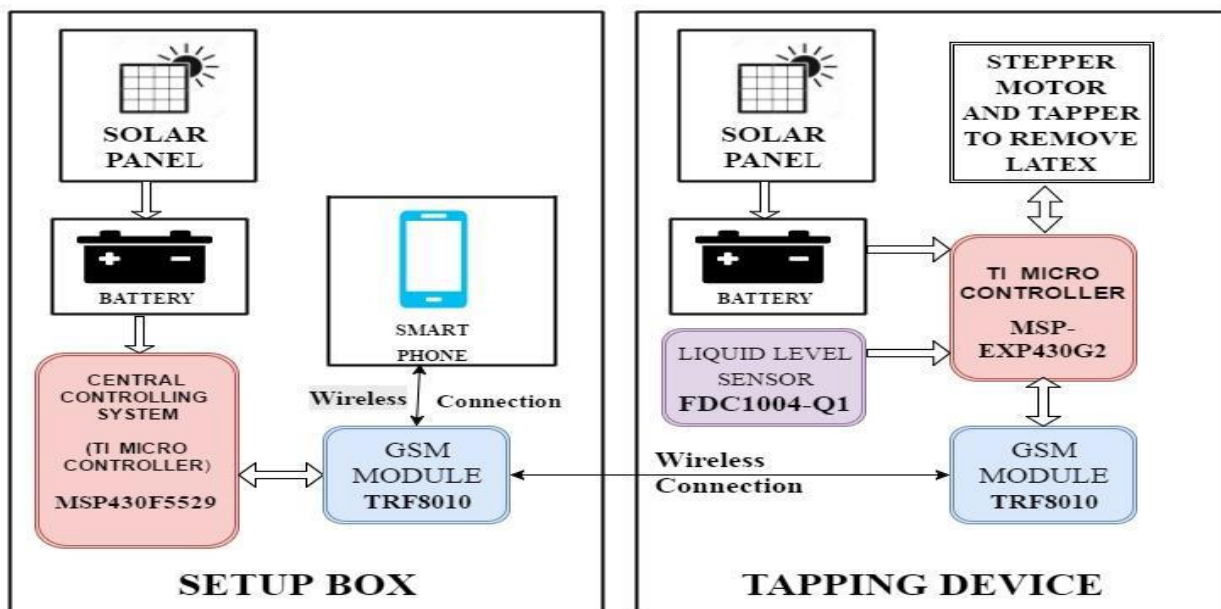
Rubber is one of the major commercial crops in India. Rubber plays a vital role in Indian agriculture and economy because of its uses and importance all over the world. India is the third largest producer and fifth largest consumer of natural rubber and synthetic rubber together in India. Rubber farming involves many procedures such as tapping, harvesting the latex. From the survey, we found that Rubber tapping is very hard work to farmers. It must be started as early as 3am. The trees must be tapped very early in the morning, at daybreak, to harvest as much latex as possible. If you make the cuts late in the day, you harvest one third less latex. But you must not tap the trees every day. Each tree should be tapped on a fixed day. Thus, one tree is tapped on Monday and Thursday, another on Tuesday and Friday, and the third on Wednesday and Saturday. Farmer will stop tapping for two months, in the dry season and early morning tapping cause health hazards to tappers. Now there is no automated tapping machine in the market. But there is a manually working tapping machine which requires man power to work and that manually working device is not solving the real-time problems of farmer.

We the team ADIHA coming with solar powered wireless automated rubber tapping machine which intends on solving the real-time problems of rubber farmer with the vision of one-time investment and life time benefit.

HYPOTHESIS:

Rubber farmer needs maximum number of skillful labours at early morning for tapping. Labours demand high wages which reduces the profit margin to the farmers and mainly early morning tapping causes health issues to labours. Our automated tapping machine results in an efficient way of tapping the latex, which reduces the burden for farmers, as well as rubber tree is very sensitive so that our device reduces human errors. Our device is about one-time investment and life time benefit. Farmer's investment to our device will return to him within a span of three months, where cost of our device is equal to three month's wages of 2 labours.

METHOD:



Components Used	How is it used in the product
1. Micro controllers	This is the heart of the entire product. It controls all the sub systems including GSM modules, Sensors and the tapping rig.
2. TRF 8010 (GSM module)	GSM module plays a very important role, where user triggers the tapping operation. And it sends a report to the user about the status of the entire product like the timings, latex level indication, security status
3. FDC1004 Q1 (Latex level sensor)	It is an ultrasonic sensor. It gives the information about the level of the latex replenished, and it informs the user through GSM module about the overflow of the latex
4. DRV 8412 (Stepper motor)	It acts as driver for the circular traversing of the tapping rig, in return the rig debarks the rubber pulp to optimum feed.
5. Solar panel	It is the main power supply to the entire product, so the product works eco-friendly
6. Battery	It stores the solar energy.

7. Tapping rig	This part carries out the tapping process with suitable gear mechanism
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EXPERIMENT:

Coming to the technical innovation we are planning to implement the system using MSP-EXP430F5529LP which is a very low powered Launch pad and has 35 pins which makes the product cost effective so that it can be reached to hundreds to thousands Rubber growers. There is no working product available in the market as of now which helps the farmers with the process of Tapping, So this will be the first working product. Since this is quite beginning in automating the Rubber Tapping process, we have planned to take all the issues farmers are facing as of now. We are designing this product in a portable format so that the end user can easily install in his farm. Technically, along with cost effectiveness we are going to add security system to the product so that any third person trying to rob the unit can be detected and alarmed and we are using solar power hence making eco-friendly.

SUMMARY:

India is growing day by day and the resource demand also is increasing. Rubber is India's one of the main commercial crop and there haven't been any new innovations in automating the process. India is importing rubber from china and other countries. And as Make in India initiative also focuses on digitalizing India, this product can really take a leap in the market. By implementing our product, farmer can get his work done from his home it also saves huge labor cost so that he can concentrate on more production.

Rubber farmer needs maximum number of skillful labors at early morning for Tapping. Labors demand high wages which reduces the profit margin to the farmers and mainly early morning tapping can cause health issues to labors. Our automated tapping machine results in an efficient way of tapping the latex, which reduces the burden for farmers, as well as rubber tree is very sensitive so that our device reduces human errors.

Our device is about one time investment and life time benefit. Farmer's investment to our device will return back to him within a span of three months, where cost of our device is equal to three month's wage of 2 labors.

This product assures real time implementation as it is cost effective, consumes inexhaustible power, and easily adoptable. This can also be part of digital India promoting e-Kranti.

COST:

- Cost of project : INR 10,000 -20,000 approx.
- Business plan : In India there is a huge market for agricultural products, since it is a new innovation in rubber farming, so we are planning to start a new agricultural based company with a vision of Make In India.

22. ELECTROSTATIC PRECIPITATOR

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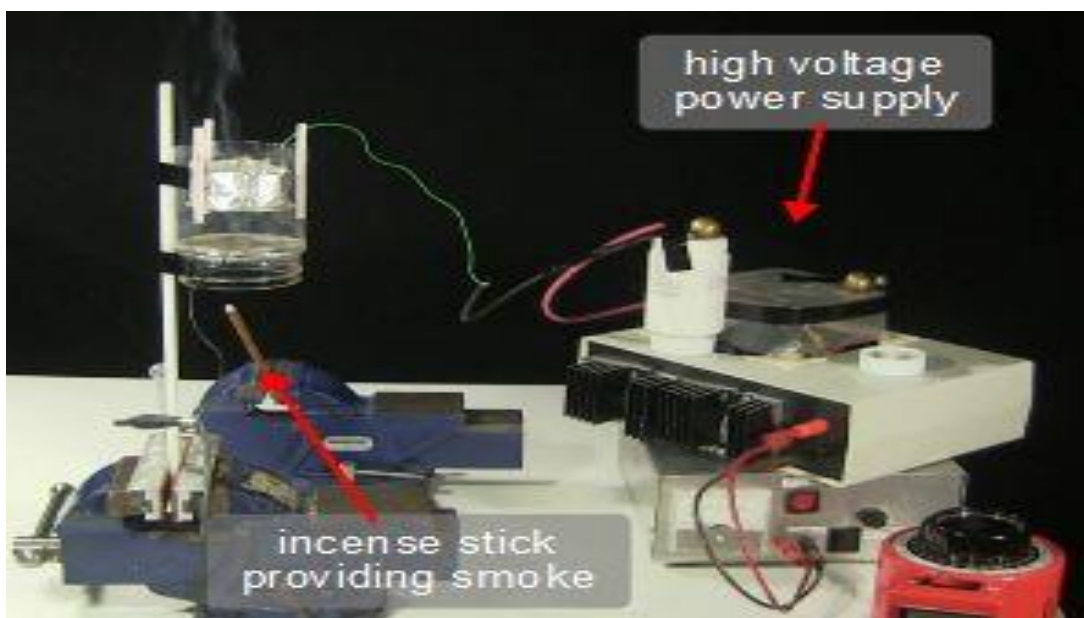
ABSTRACT:

Electrostatic precipitators have been used widely in industry, and play an important role in environmental protection. Electrostatic precipitator (ESP) can be operated with a high collection efficiency and a low pressure drop. Recently, ESP also has been used for cleaning indoor air. In this review, principles of electrostatic precipitation, such as particle charging, migration velocity of charged particles and collection efficiency, are described. Performance of ESP deteriorates by abnormal phenomena, including back corona for treating high resistivity dust, abnormal re-entrainment for low resistivity dust, and corona quenching for fine dusts. To cope with these phenomena, new technologies have been developed. Pulsed energization is a technique to cope with high resistivity dusts, and this results in lower power consumption. Using pulsed energization, non-thermal plasma can be generated and chemical reactions can be promoted for treating gaseous pollutants such as NO and volatile organic compounds. Wet ESP can also remove dusts and gaseous pollutants simultaneously. These new advancements will widen the field of application of electrostatic precipitation. Some novel applications of ESP, such as removal of dioxin from incinerators, are also included in this review.

METHOD:

The methods used for this project are as follows:

- The working model consists of a plastic jar that has fairly straight side. Cut the bottom of the jar, and then fit a metal mesh on any one side of jar by using piece of metal flyscreen that has no coating on it.
- On other end of jar, stick the three straws inside the jar which acts as support for the aluminum foil.
- Cut a piece of kitchen aluminum foil around 2.5 inches. Tape foil around the wire, then lower it into the jar between straws.
- High voltage power supply is given to aluminum foil (discharge electrode) and the mesh is connected to earthing by connecting wire.



Working model of ESP

EXPERIMENT:

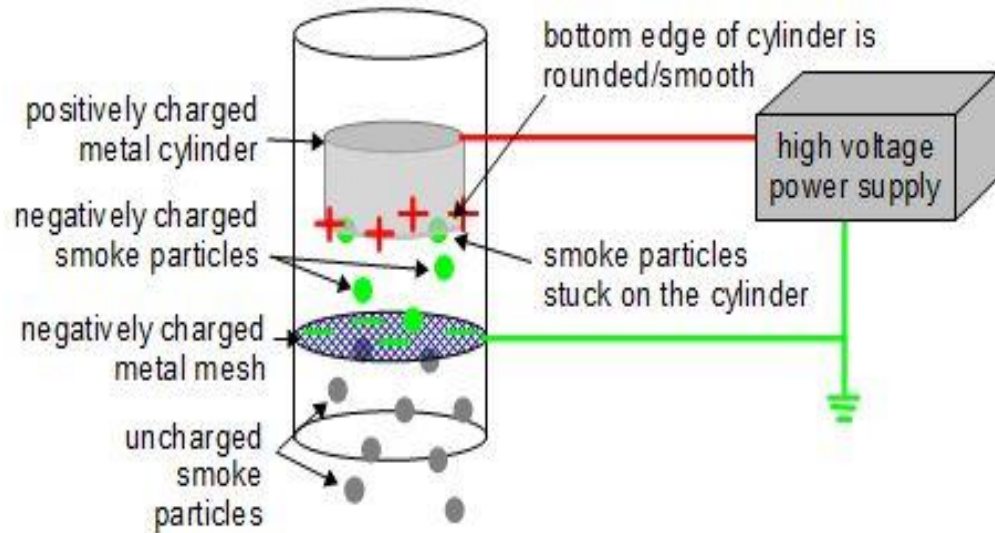
There are two phases in working:

Corona Discharge:

- Free Electron Generation: As voltage applied to the foil is increased, it eventually reaches a point when the electric field around the conductor is high enough to form a conductive region, but not high enough to cause electrical breakdown or arcing to nearby objects. This phenomenon is commonly referred as a corona discharge.
- Corona discharge can be seen by the human eye as a luminous blue glow surrounding the aluminium foil.

Ionization of gas molecule:

- As the electrons leave the strong electrical field region surrounding the discharge electrodes, they enter into the electrode region where they begin to lose energy and slow down. The ions created near the discharge electrode are positive and remain in that area. However, because the ions created in the inter-electrode area are negative, they want to move with the electrons in the direction opposite to the strong negative field.



Block diagram of working

CONCLUSION:

- There are various electrostatic precipitator manufacturing industries and Helios infrapro is one of the leading names in this field.
- They were originally developed to stop serious smoke and air issues and have definitely helped the environment.
- Today ESP's are found mainly on large power plants, cement plants, incinerators, etc.



23. REGENERATIVE BRAKING SYSTEM

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COLLEGE STUDENTS	SUMANTHA R.P, ASHFAQ MASOOD
SCHOOL STUDENTS	MOHAMMED FARHAN ABDUL HAYYI, SYED MOHAMMED AASIM,9 Th Std BEARYS PUBLIC SCHOOL, MANGALORE

ABSTRACT:

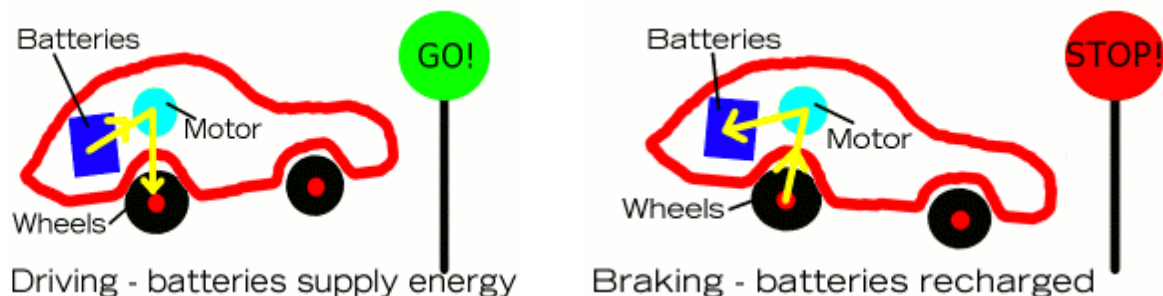
Presently what the world needs is a method or a technology that saves energy from getting wasted. Energy conservation is the hour of need. In case of automobiles, energy conservation can be done by using regenerative braking systems (RBS). When driving an automobile, a great amount of kinetic energy is wasted when brakes are applied, which then makes the start up fairly energy consuming. The main aim of this project was to develop a product that stores the energy which is normally lost during braking, and reuses it. The use of regenerative braking system in automobiles provides us the means to balance the kinetic energy of the vehicle to some extent which is lost during the process of braking. The authors of the paper have discussed and presented two methods of using the kinetic energy which generally gets wasted by converting it into either mechanical energy or into electrical energy. Flywheel is used for converting the kinetic energy to mechanical

INTRODUCTION

Brakes are employed to stop or retard the motion of any moving body. Thus, in automobiles the brakes are having the most important function to perform. In conventional braking system the motion is retarded or stopped by absorbing kinetic energy by friction, by making the contact of the moving body with frictional rubber pad (called brake liner) which causes the absorption of kinetic energy, and this is wasted in form of heat in surroundings. Each time we brake, the momentum of vehicle is absorbed that it has gained by it and to re-accelerate the vehicle we have to start from the scratch to redevelop that momentum by using the more power from an engine. Thus, it will ultimately result in huge waste of energy. As the basic law of Physics says 'energy can neither be created nor be destroyed it can only be converted from one form to another'. It will be good if we could store this energy somehow which is otherwise getting wasted out and reuse it next time we started to accelerate. That's the basic concept of regenerative ("regent") brakes, which provide braking for the system when needed by converting the available energy to some usable form. These are widely used in electric trains and the latest electric cars. Regenerative brake is an energy recovery mechanism which slows a vehicle by converting its kinetic energy into another form, which can be either used immediately or stored until needed. Thus, the generated electricity during the braking is fed back into the supply system (in case of electric trains), whereas in battery electric and hybrid electric vehicles, the energy is stored in a battery or bank of capacitors for later use. Energy may also be stored by compressing air or in a rotating flywheel.

Working principle

Concept of this regenerative brake is better understood from bicycle fitted with dynamo. If our bicycle has a dynamo (a small electricity generator) on it for powering the lights, we'll know it's harder to peddle when the dynamo is engaged than when it's switched off. That's because some of our peddling energy is being "stolen" by the dynamo and turned into electrical energy in the lights. If we're going along at speed and we suddenly stop peddling and turn on the dynamo, it'll bring us to a stop more quickly than we would normally, for the same reason: it's stealing our kinetic energy. Now imagine a bicycle with a dynamo that's 100 times bigger and more powerful. In theory, it could bring our bike to a halt relatively quickly by converting our kinetic energy into electricity, which we could store in a battery and use again later. And that's the basic idea behind regenerative brakes! Electric trains, cars, and other electric vehicles are powered by electric motors connected to batteries. When we're driving along, energy flows from the batteries to the motors, turning the wheels and providing us with the kinetic energy we need to move. When we stop and hit the brakes, the whole process goes into reverse: electronic circuits cut the power to the motors. Now, our kinetic energy and momentum makes the wheels turn the motors, so the motors work like generators and start producing electricity instead of consuming it. Power flows back from these motor-generators to the batteries, charging them up. So a good proportion of the energy we lose by braking is returned to the batteries and can be reused when we start off again. In practice, regenerative brakes take time to slow things down, so most vehicles that use them also have ordinary (friction) brakes working alongside (that's also a good idea in case the regenerative brakes fail). That's one reason why regenerative brakes don't save 100 percent of our braking energy.



APPLICATIONS:

- For recovering Kinetic energy of vehicle lost during braking process.
- One theoretical application of regenerative braking would be in a manufacturing plant that moves material from one workstation to another on a conveyer system that stops at each point.
- Regenerative braking is used in some elevator and crane hoist motors.
- Regenerative Braking Systems are also used in electric railway vehicle (London Underground & Virgin Trains).

ADVANTAGES

- Improved Performance.

- Improved Fuel Economy- Dependent on duty cycles, power train design, control strategy, and the efficiency of individual components.
- Reduction in Engine wears.
- Reduction in Brake Wear- Reducing cost of replacement brake linings, cost of labor to install them, and vehicle down time, Emissions reduction- engine emissions reduced by engine decoupling, reducing total engine revolutions and total time of engine operation.
- Operating range is comparable with conventional vehicles- a problem not yet overcome by electric vehicles.

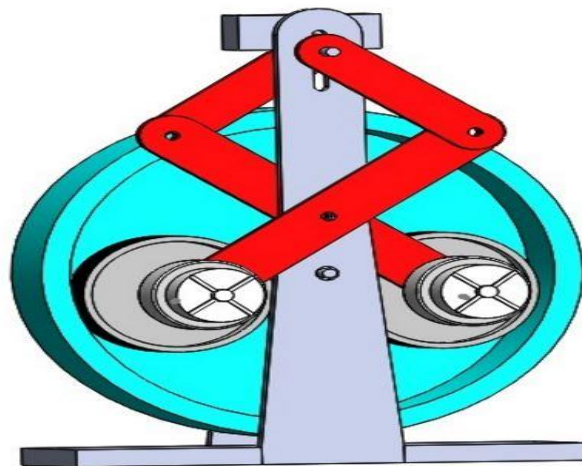
DISADVANTAGES:

- The main limitation of regenerative brakes when compared with dynamic brakes is the need to closely match the electricity generated with the supply. With DC supplies this requires the voltage to be closely controlled and it is only with the development of power electronics that it has been possible with AC supplies where the supply frequency must also be matched (this mainly applies to locomotives where an AC supply is rectified for DC motors).
- Regenerative braking is necessarily limited when the batteries are fully charged. Because the additional charge from regenerative braking would cause the voltage of a full battery to rise above a safe level, our motor controller will limit regenerative braking torque in this case.
- Increases the total weight of vehicle by around 25-30 Kilograms

COMPONENTS AND DESCRIPTION

The major parts that are effectively employed in the design and the fabrication of the regenerative braking system are described below.

- Brake drum (which is attached to the wheels)
- Friction lining
- Electric generator (D.C.Motor)
- Linking mechanism



Project Cost

SL .NO.	PARTICULARS	AMOUNT(RS).
1	BRAKE DRUM	500
2	FRICTION LINING	120
3	ELECTRIC GENERATOR	500
4	LINKING MECHANISM	450
5	MISCELLANEOUS	550

TOTAL RS = 2,120/-

FUTURE WORK

Regenerative braking systems require further research to develop a better system that captures more energy and stops faster. As the time passes, designers and engineers will perfect regenerative braking systems, so these systems will become more and more common. All vehicles in motion can benefit from these systems by recapturing energy that would have been lost during braking process. Future technologies in regenerative brakes will include new types of motors which will be more efficient as generators, new drive train designs which will be built with regenerative braking in mind, and electric systems which will be less prone to energy losses. Of course, problems are expected as any new technology is perfected, but few future technologies have more potential for improving vehicle efficiency than does regenerative braking.

CONCLUSION

The regenerative braking system used in the vehicles satisfies the purpose of saving a part of the energy lost during braking. Also it can be operated at high The regenerative braking system used in the vehicles temperature range and are efficient as compared to conventional braking system. The results from some of the test conducted show that around 30% of the energy delivered can be recovered by the system. Regenerative braking system has a wide scope for further development and the energy savings. The use of more efficient systems could lead to huge savings in the economy of any country.

24. NANO ENGINEERED WATER

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ABSTRACT:

The river water is available on a large scale but is not fit for use. Nanotechnology has a widespread application potential and also offers the possibility of an efficient and an effective removal of pollutants, impurities and germs in the area of water treatment. In recent times, the implementation of nano-particles and nano-membranes are innovative technologies used for the removal of physical, chemical and biological substances; including nutrients, dissolved solids, organic content, inorganic salts, bacteria and antibiotics. Our research focuses on Carbon Nano Tubes(CNTs) and its multi-use for the treatment of river water. The surface area of CNTs are in the range of $300\text{m}^2/\text{g}$. This environmental-friendly technology has a great and widespread potential to combine the redox processes with adsorption, coagulation and flocculation effect in one technological step in order to remove crucial impurities pollutants present in river water. The aim of our study is to investigate the treatment efficiency of the surface water by passing through CNTs induced membranes doped with metal oxides. The CNTs doped with certain metal oxides will be synthesized using Chemical Vapor Deposition Method. After characterization and testing the CNTs for toxicity; they will be induced to grow the membranes. Tests will be carried out in laboratory and performed on real surface water. Impurities are bound in complex structures and are difficult to remove from the surface water. CNTs showed possibility to solve this problem via environment friendly as well as economical way. By this project, we want to develop a cost-effective and a reusable river water treatment kit, which will remove the impurities of the river water; using nano-particles doped with metal oxides. This will encourage the individual houses or colonies to use this nano-engineered water treatment kit and enable to live a hygienic life.

HYPOTHESIS:

A. Problem Detection

The report, based on latest data from the ministry of urban development (2013), census 2011 and Central Pollution Control Board, estimates that 75-80% of water pollution by volume is from domestic sewerage, while untreated sewerage flowing into water bodies including rivers have almost doubled in recent years. Increasing incidence of water

pollution is giving rise to different vector-borne diseases like cholera, dysentery, jaundice and diarrhea etc. Water pollution is found to be a major cause for poor nutritional standards and development in children also. Hence clean and safe water is essential in every household for domestic and drinking purpose.

B. Scope and Objectives:

1. The development of a cost-effective and a reusable river water treatment kit, which will remove the impurities of the river water; using Carbon nano-particles doped with metal oxides.
2. To reduce the various parameters like total solids, turbidity, chlorides, sulphates, nitrates, iron, sodium and other inorganic substances present in the river water.
3. To remove the organic content such as algae, bacteria, protozoa, cysts and other pathogenic microbes present in the river water.
4. To encourage the individual houses or colonies to use this nano-engineered water treatment kit and enable to live a hygienic life.

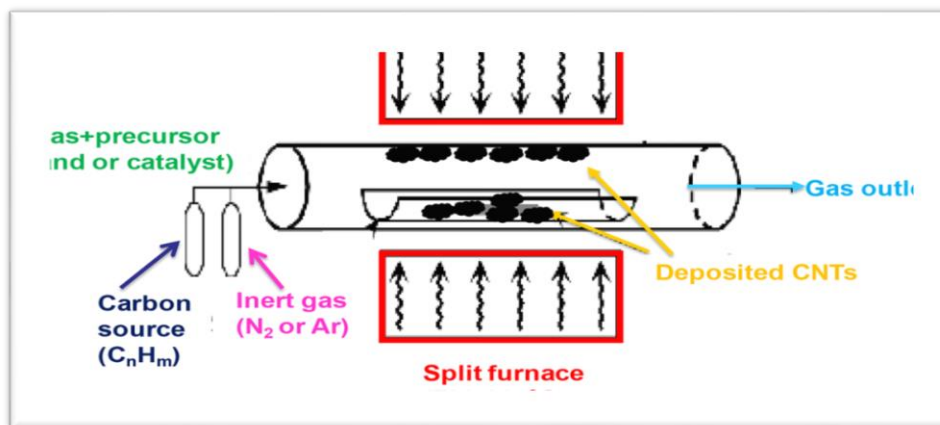
C. Nanotechnology:

Nanotechnology has emerged as one of the attractive technologies for water treatment, and various nanoadsorbents have been explored for water treatment applications. Membrane processes are considered key components of advanced water purification and desalination technologies and nanomaterials such as carbon nanotubes are contributing to the development of more efficient and cost-effective water filtration processes. Nanoparticles owe their potential to the high specific surface area and surface reactivity compared to conventional bulk materials. Depending on the mechanism of uptake, nanoparticles can be designed to establish high selectivity against specific pollutants and provide the required efficiency for application.

METHOD:

A. Preparation of CNTs by CVD method:

The synthesis of modified Carbon Nanotubes is by Chemical Vapour Deposition (CVD) method. These materials were obtained using nanocrystalline iron as a catalyst and ethylene as a carbon source at 700°C. The influence of argon addition to reaction mixture was investigated. After ethylene decomposition samples were hydrogenated at 500°C. As a results iron carbide (Fe_3C) in the carbon matrix in the form of multi walled carbon nanotubes was obtained. After a treatment under hydrogen atmosphere iron carbide decomposed to iron and carbon and small iron particles agglomerated into larger ones.



B. Design and Fabrication of the kit:

A kit of sufficient size is fabricated. A chamber is provided where the preliminary treatment of the water can be done in order to remove the floating and bigger particles present in the water sample. The nano-particles are induced on semi-permeable membranes; which in turn are rolled and placed in a cylindrical chamber. Pipes of sufficient diameter are connected at regular intervals to the various chambers.

C. Collection of river water:

The water to be filtered is collected from various river sources around the city outskirts. Some of the rivers from where sample is collected are – Kaveri River, Arkavathi River, Sasalu River, Komghatta Lake, Vrishabhavathi River, Narayanakere Lake, Doddakere, Kannuru Lake, Madhuru Kere and Muddalinganahalli Kere. Sufficient amount of water was brought for testing in the laboratory.

D. Filtration and testing of river water:

The collected river water is made to pass through the filtration unit. The unfiltered and filtered water is taken in the laboratory and through testing is done for different parameters such as turbidity, total solids, Biochemical Oxygen Demand, Chemical Oxygen Demand, Chlorides, Sulphates, Fluorides, Hardness, heavy metals etc. A comparison is done for both the water samples. And checked with The Bureau of Indian Standards(BIS) if the filtered water can be used or not for domestic purposes.

EXPERIMENTS:

A. Characterization of Carbon Nano Tubes:

Electron Microscopy, X-ray photoelectron Spectroscopy (XPS), Nanoparticle Tracking Analysis (NTA) and Nano-particle Toxicity Test.

B. Testing of water sample:

Naphelo-turbidity meter, Chloride Content test, Sulphate Content test, Total Solids test, BOD Test and COD Test.

SUMMARY:

The eco-friendly technology of Nano-particles has a great and widespread potential to combine the redox processes with adsorption, coagulation and flocculation effect in one technological step in order to remove crucial impurities and pollutants present in river water. The water samples after passing through the fabricated water treatment kit had fewer impurities. This was proved by the various test results for the several parameters of the pre-treated and post-treated water sample. The development of a cost-effective and a reusable river water treatment kit is possible; which will remove the impurities of the river water; using nano-particles doped with metal oxides. The aim is to encourage the individual houses or colonies to use this nano-engineered water treatment kit and enable to live a hygienic life. Also the nation will be benefited by decreasing the mortality rate.

COST:

S.No.	Item Particulars	Cost (Rs.)
1.	Raw Material	4800
2.	Chemicals	3200
3.	Fabrication Materials	2500
4.	Labour & Service Charge	500
5.	Miscellaneous	1000
	GRAND TOTAL	12000/-



25. WIRELESS SENSING NETWORK MONITORING FOR WATER POLLUTION IN LAKES AND RIVERS

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COLLEGE STUDENTS	RASHNI, SONALI
SCHOOL STUDENTS	VINAY, ELSON ROHAN NORONHA 9 th STD. LITTLE FLOWER ENGLISH MEDIUM SCHOOL, RANGANPALKE

ABSTRACT:

Water is that chemical substance which is essential for every living organism to survive on this planet. Water Pollution is a major global problem which requires ongoing valuation and modification of water resource guiding principle at the levels of international down to individual wells. It has been surveyed that water pollution is the leading cause of deaths and diseases worldwide. In traditional water quality assessment approach, water samples tested in the laboratory using the analytical technologies. Such approaches are time consuming and no longer to be considered efficient. By focusing those issues, we propose design and development of a low cost water quality monitoring system that can monitor water quality in real time using IOT environment. In our proposed system water quality parameters are measured by the different water quality monitoring sensors such as pH, turbidity, conductivity, dissolved oxygen and temperature. These sensor-values are processed by the microcontroller and these processed values are sent to the core controller remotely using ZigBee IEEE 802.15.4 protocol.

HYPOTHESIS:

Water Pollution is an undesirable change in physical, chemical or biological characteristics of water. Wastewater from manufacturing or chemical processes in industries contributes to water pollution. During the last fifty years, the number of industries in India has grown rapidly. But water pollution is concentrated within a few sub sectors, mainly in the form of toxic wastes and organic pollutants.

In earlier days we had to go near the water bodies to know how contaminated the water is. This method is too time consuming and uncomfortable as it is difficult to always go near water bodies and measure its content of contamination. So using this method work is being reduced to certain extent they'll not always have to go near water bodies to check the status of the

water. We can directly measure it through wireless sensors and get the details as and when required.

METHOD:

The proposed system consists the following components

1. Turbidity sensor
2. Conductivity sensor
3. Ph sensor
4. Dissolved sensor
5. Arduino
6. GSM Module
7. ZigBee

This proposed block diagram consists number of devices having respective sensors, and the collected data from all devices are gathered at the core controller raspberry pi via ZigBee protocol IEEE 802.15.4. This device consists several sensors for measuring water quality parameter such as pH, turbidity, conductivity, dissolved oxygen. The data of sensors are not in a proper manner for sending them directly to the core controller using ZigBee protocol. Sensors are analogous in nature. ADC is used to convert those analogous signals to digital. Digitised signals are passed to microcontroller.

ZigBee has low data rate, low power consumption, more node density that makes it suitable for sensor networking in the proposed system. A ZigBee module consists router ZigBee, which located on all devices that transmit the processed data to the coordinator ZigBee, which collects data from devices connected in the same network. The router ZigBee and coordinator ZigBee are connected in same network using a same PAN ID (personnel are network) for all ZigBee devices in the network. The PAN ID provides the personal area network for wireless data communication for sensor networking. Coordinator ZigBee is connected to the core controller, the core controller manages data coming from different devices. The core controller puts the data in a text file which is transmitted to the IOT module. For transmitting data to the IOT, gateway is created on the raspberry pi using FTP (file transfer protocol) protocol.

EXPERIMENT:

The proposed system is placed in the water bodies. Turbidity sensor used here will measure the turbidity of water. Conductivity sensors are being used here in order to measure the conductivity of water. Here a microcontroller named Arduino is being used. This Arduino can access the data which is being sent by the sensors. This data is converted into text format using ZigBee. If the data which is been supplied by the sensors crosses the threshold

limit then GSM module sends the warning message to the concerned authority stating that the water which they have let into rivers are highly contaminated and is unfit for the drinking purpose, they need to be purified before they are let into the water bodies

SUMMARY:

Based on a study of existing water quality monitoring system and scenario of water we can say that proposed system is more suitable to monitor water quality parameters in real time. The proposed system introduces wireless sensor networking using several sensors to measure water quality, microcontroller and ZigBee module which make sensor network simple, low cost and more efficiently. Furthermore, to monitor data from all over the world IOT environment is provided using raspberry pi for creating gateway and also, cloud computing technology is used to monitor data on the internet. Moreover, to make system user-friendly web browser application is there. Therefore, the system will be low cost, faster, more efficient, real time and user friendly. Thus, we can fulfill aim and objective of the proposed system.

COST: RS 10,000



26. HYBRID SOLAR ADSORPTION SYSTEM

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COLLEGE STUDENTS	MANOHAR J ACHAR, JAYANTH RY, RONAL MB, CHETHAN RAMESH
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ABSTRACT:

Solar based adsorption refrigeration devices are of significance to meet the needs for cooling requirements such as air-conditioning, ice-making and medical or food preservation in remote areas. They are also noiseless, non-corrosive and environmentally friendly. Various solar powered cooling systems have been tested extensively; however, these systems are not yet ready to compete with the well-known vapor compression system. This hybrid system utilizes the solar energy to achieve the required heating for the production of vapour.

For these reasons, research activities in this sector are still increasing to solve the technical, economical and environmental problems.

OBJECTIVES OF THE PROJECT

To achieve the above-mentioned research aim, the project objectives are as follows.

1. Review of theoretical and experimental research work on adsorption refrigeration cycles.
2. Review of various adsorbents to understand their advantages and disadvantages and the parameters that are used in evaluating of new materials.
3. Review of various Condenser, Evaporator and Adsorbed/Desorbed designs.
4. Fabrication of the test facility of Double bed silica gel / water adsorption cooling system.
5. Performance evaluation of Double bed silica gel / water adsorption cooling system by conducting experiments at different operating conditions.

HYPOTHESIS: *Fundamental concepts*

Adsorption is the adhesion of atoms, ions, or molecules from a gas, liquid, or dissolved solid to a surface. This process creates a film of the adsorbate on the surface of the adsorbent. This

process differs from absorption. Adsorption is a surface-based process while absorption involves the whole volume of the material.

The Main Advantages of Adsorption Cooling Technology:

- It is a robust technology with no risk of crystallization, no danger of damage due to temperatures.
- The materials used today (zeolite, silica gel) are environmentally friendly
- Very low intrinsic electricity consumption due to the lack of a pump. Electricity is only required for the switching valves and the control unit.

The Main Disadvantages are:

- High requirements to the vacuum tightness of the container.
- Slightly lower COP than for comparable absorption technology.
- Cyclic temperature variation in the hydraulic circuits requires careful design of the external hydraulic circuits

MATERIAL SELECTION

Selection of Adsorbents

Adsorbents are used usually in the form of spherical pellets, rods, mouldings, or monoliths with a hydrodynamic radius between 0.25 and 5 mm. They must have high abrasion resistance, high thermal stability and small pore diameters, which results in higher exposed surface area and hence high capacity for adsorption.

Physical Adsorbents:

Physical adsorbents are usually porous materials with different pore sizes. It adsorbs the adsorbate (refrigerant) by an intermolecular force called Van der Waals force. The physical adsorbent can retain its original properties after removing the refrigerant by adding heat during the desorption process .

Chemical adsorbents:

Chemical adsorbent sorbs the adsorbate (refrigerant) chemically by Valence force, where one layer of refrigerant reacts with the surface molecules of the adsorbent.

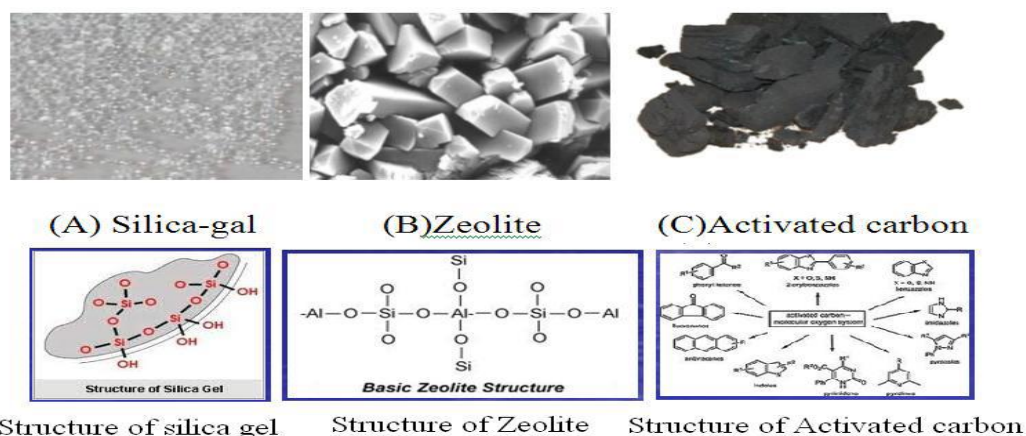


Figure 1: Types of physical adsorbents.

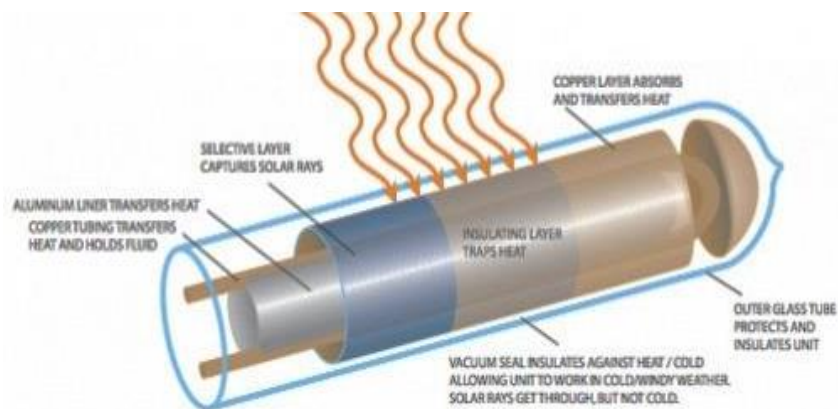
Silica gel is a granular, highly porous form of silica made synthetically from sodium silicate. According to ASHRAE journal, for the silica gel/water working pair, the adsorption heat is about 2500 kJ/kg and the desorption temperature could be as low as 50°C. Such a low desorption temperature makes it suitable for solar energy use. One of the drawbacks of the silica gel–water working pair is its low adsorption quantity (about 0.2 kg water/kg [0.2 lb water/lb] silica gel). Another drawback is the limitation of evaporating temperature due to the freezing point of water.

Table: Working pairs for Adsorption Cooling System.

Working pairs for Adsorption Cooling System	
Adsorbate	Adsorbent
Sulphur dioxide	Silica gel
Water	Silica Gel
Ammonia	Silica Gel
Methanol	Activated carbon
Ammonia	Activated carbon
Ammonia	Calcium chloride
Water	Zeolite(Metal-Alumo-Silicate)

Solar Water heating system

The main purpose of using solar water heating system in adsorption cooling is to generate hot water by utilizing waste heat or low-grade heat energy like solar radiation. To heat the water by absorbing solar radiations, evacuated solar collector is used. The hot water is then supplied to the adsorbent block with the help of a circulating pump with a rated power of $\frac{1}{2}$ HP. The water tank is having a storage capacity of 150 liters. There are 10 evacuated collector tubes with length 68 inches and outer diameter of 60mm.



Vacuum Pump

The Adsorption cooling system test rig is kept at full vacuum during the adsorption process. The vacuum intensity is based on the size and operating variables. A vacuum pump is used to generate the required vacuum level.

The vacuum pump used in this system is oil cooled rotary vacuum pump. It has a rated power consumption of $\frac{1}{2}$ HP. It has multiple impellers to generate more vacuum in less time. Before using this pump during starting vacuum must be created with the help of a diaphragm vacuum pump to avoid problem of oil contamination.

Vacuum Gauge

The vacuum gauge is pressure measuring device used for identifying the vacuum level in the test Rig. In order to have adsorption cooling effect entire Test Rig circuit must be depressurized in a proper manner with the help of oil cooled rotary vacuum pump. The pressure gauge used in this system has a pressure range starting from atmospheric pressure to -760mmof Hg(Vacuum).

Experiment:

Test rig commissioning

After the installation of the adsorbent bed reactor and integrating it with the test plant, including cooling / heating water tank and vacuum pump, the system was ready for

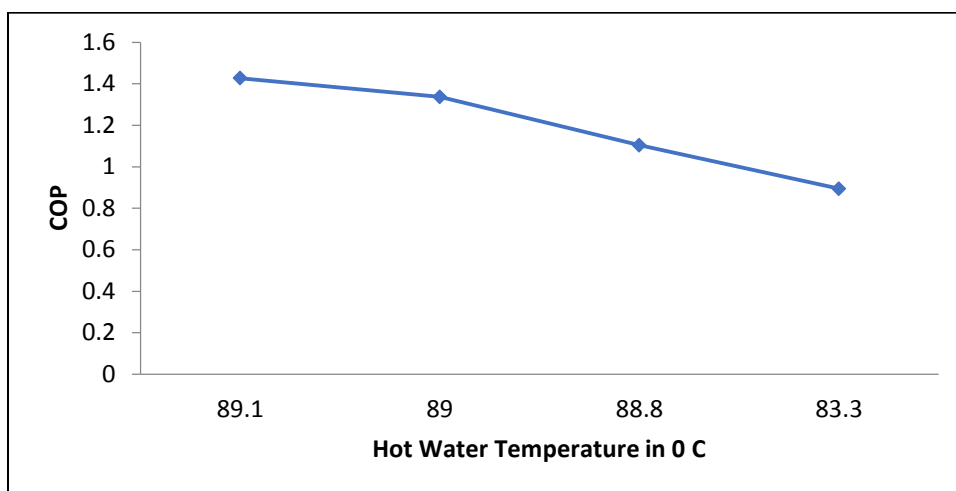
commissioning and initial testing for the various aspects of the investigation. Firstly, the system was pressurized up to 3bar to inspect the leakage locations using liquid soap. After ensuring that the test rig is capable of holding vacuum, the refrigerant flask was filled with 300 ml of deionized water. The leakage in the secondary flow side was also inspected before and after component assembly.

Testing procedure

- The adsorbent bed reactor is fully vacuumed and the refrigerant flask is isolated. After obtaining full vacuum condition, the vacuum pump was switched off and isolated.
- The secondary fluid (water) tank is filled and water started to be heated up. The secondary fluid flow control valve is closed.
- When the water temperature becomes over 60°C, the water pump is turned on and the flow control valve is closed while the bypass valve is open. The water temperature decreased where the pump, tubes and valves temperature lower than hot water temperature.
- When the water tank temperature is raised again over 60°C the flow control valve is opened to start adsorbent bed regeneration. The water flow rate is regulated using the flow control valve and the bypass valve simultaneously.
- The reactor is kept heated for one hour, then the reactor pressure increased gradually by opening the drain line to facilitate condensing the refrigerant vapour to be collected via the drainage line.
- The previous step is repeated four times to insure the dryness of the adsorbent bed reactor.
- The water control valve is closed then the pump is turned off and subsequently the water tank is drained and then filled with cold water from the mains.
- The water pump is turned on, while the bypass valve is fully open. During very short time the flow is stabilised and the flow control valve is opened gradually to allow the water flow through the adsorbent bed. The required flow rate is controlled by the flow control valve and bypass valve.
- The adsorbent bed is pre-cooled for five minutes and subsequently the refrigerant flask is connected to the adsorbent bed to start the adsorption process. During this process the connection line including the connection valve temperatures are maintained at about 10 degrees above the refrigerant temperature to avoid water vapour condensation. During the pre-cooling and adsorption process the vacuum pump is turned on.
- After the adsorption period for the predefined sorption time, the refrigerant flask is isolated, flow control valve is fully closed, vacuum pump is stopped and secondary flow pump is turned off.

Effect of Hot Water temperature

Hot water for adsorption cooling is obtained from an evacuated solar collector. The temperature of hot water obtained will be directly dependent on the amount of solar radiation intensity. If solar intensity is more then, the hot water temperature will be more. From the Figure 5.1 it can be observed that the COP of the adsorption cooling system is keeps on reducing by reduction in the hot water temperature.



Effect of Adsorption time

The water in the liquid phase is available in the evaporator and this must be take heat from the chilled water and result in cooling. After serving its purpose this water must be adsorbed by the Silica gel which present in the Adsorbent block. If the time of adsorption is increased it results in the increase of the amount of water vapor adsorbed on the surface of the adsorbent. This increase in adsorption timing also results in reduction of the liquid refrigerant.

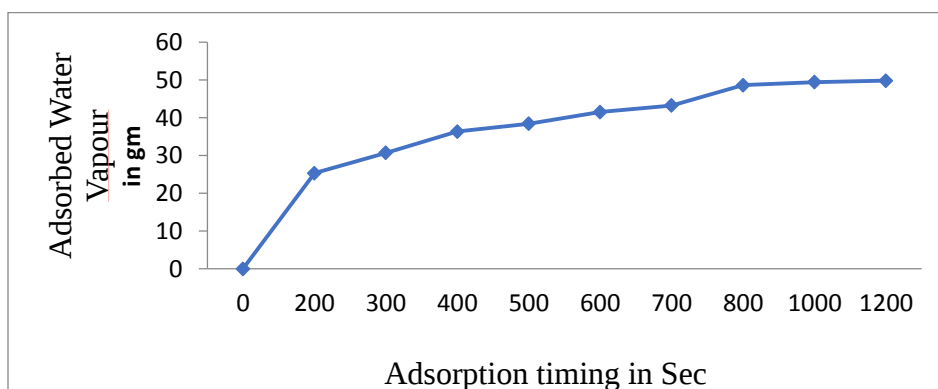


Figure : Adsorption time v/s Adsorbed water vapour quantity

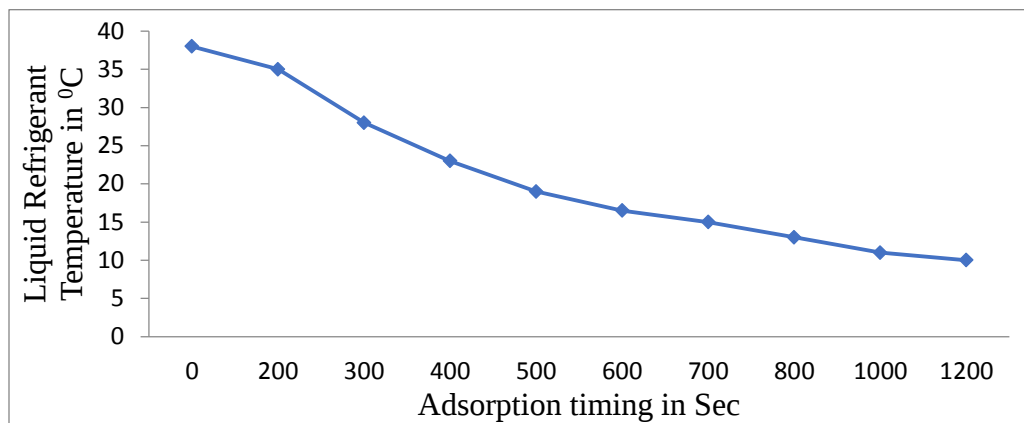


Figure 5.3: Adsorption time v/s Liquid Refrigerant Temperature

Conclusion:

The following conclusions are derived from the performance study on Adsorption Cooling System:

1. The double bed Silica gel/Water Adsorption cooling system produces intermittent cooling effect.
2. The COP of the cooling system decreases as the hot water temperature decreases.
3. The liquid refrigerant or Adsorbate Temperature Decreases as the adsorption time is increased and results in more cooling in the Evaporator.
4. The amount of adsorbed water vapor from evaporator to the Adsorbent block is increased by increasing the Adsorption time.

27. WIND LENS

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SCHOOL STUDENTS	SHREYASKUMAR, 9th std, SANTHOME PUBLIC SCHOOL. LAKSHMISHA ,9 Th std, ABHINAVA BHARATHI VIDYA KENDRA .

ABSTRACT:

Energy resources in our modern fast paced techno- world are fast depleting. Hence a renewable energy source is much required at this moment. Thus researching new and developing innovative systems in renewable energy sector is an indispensable prerequisite. This project aims in generation of clean energy by harnessing the power of wind by new design of wind turbine. The scope of this project concentrates on a new approach to harvest wind power by using diffused structure called "WINDLENS".

HYPOTHESIS:

If one can accelerate the local wind speed by capturing and concentrating the wind with some mechanism, there appears hope for utilizing the wind power in a more efficient way. By using a diffused structure around normal wind turbine the wind speed can be accelerated . The main idea of this project is to accelerate wind by using diffused structure called wind lens and this concept of accelerating the wind was named the WindLens technology.

THEORY OF WIND ENERGY:

The power in the wind is proportional to the cube of wind speed; the general formula for power in the wind is:

$$P = \frac{1}{2} \rho A V^3$$

Where: P - The power available in watts.

ρ - The density of air (which is approximately 1.2kg/m³ at sea level).

A - The cross-section (or swept area of a windmill rotor) of air flow of interest

V - The instantaneous free-stream wind velocity.

Because of this cubic relationship, the power availability is extremely sensitive to wind speed; doubling the wind speed increases the power availability by a factor of eight.

EXPERIMENT:



The methods used for this project as follows:

- Here a 5v DC generator is used as turbine.
- A table fan is used as a source of wind.
- A multimeter is used to know the generated voltage .
- A propeller made of plastic is used.
- Initially distance between fan and wind turbine is adjusted and DC generator is connected to multimeter.
- When Fan gets on, wind turbine starts to rotate and multimeter will show the voltage generated.
- After some time when voltage generated becomes constant, wind lens (diffuser) is inserted, then we can see the increase in voltage generation and once wind lens is removed, voltage generation gets decreases.

ADVANTAGES:

- Two to five times increase in output power as compared to conventional wind turbines.
- Significant reduction in wind turbine noise.
- No Bird strike report.

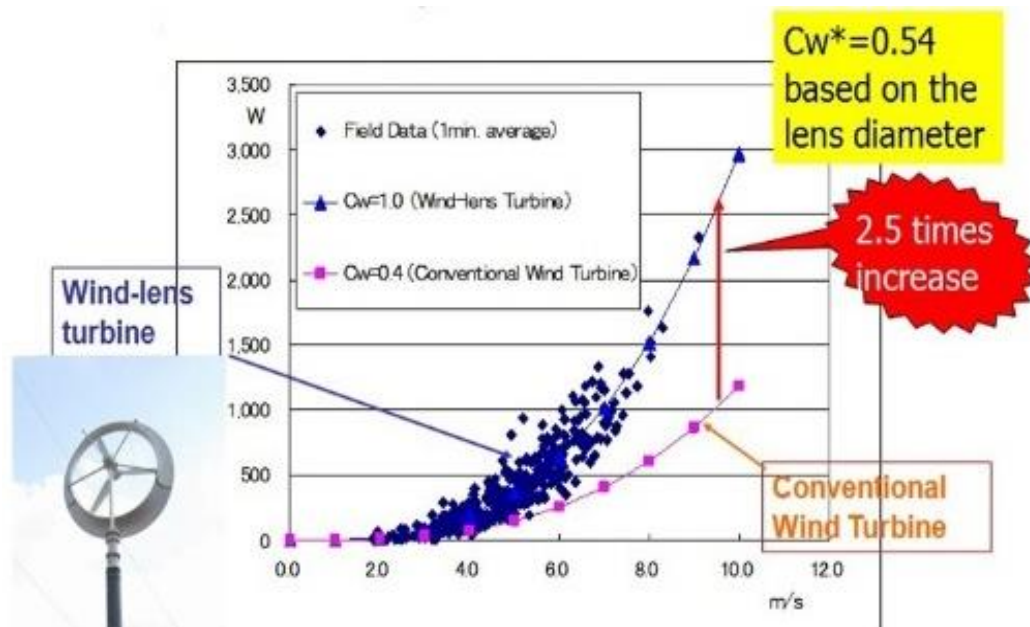
COST: INR 1000/-.

FUTURE SCOPE:

Simulation of proposed model to be conducted to improve the practical building of the model

SUMMARY:

We can see approximately 2-2.5 times increase in voltage generation than earlier. This system can further have developed to get more power & the stress on poles can be reduced effectively by the proposed model of wind lens.



Team members:



28. ADVANCED CONTROL OF INDUCTION MOTOR

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SCHOOL STUDENTS	PRAGNA M, CLASS VIII, St. ROSSELLO'S CENTRAL SCHOOL, MYSURU NAYANA E, CLASS IX, VISHWAPRAJNA HIGH SCHOOL, MYSURU

ABSTRACT:

The induction motor is very popular in variable speed drives due to its well-known advantages of simple construction, ruggedness, and inexpensive and available at all power ratings. Its history is very extensive and also control is important in applications and also better power management. Since IMs demands well control performances: precise and quick torque and flux response, large torque at low speed, wide speed range, the drive control system is the most sensitive point of IMs. The switching logic control facilitates the generation of the stator voltage space vector, with suitable choice of the switching pattern of power electronics circuit. Now thanks to artificial intelligence that is capable of learning the desired mapping between the inputs and outputs signals of the system without knowing the exact mathematical model of the system.

HYPOTHESIS:

Pulse-width modulation (PWM) inverters are used to reduce harmonics in the output current and/or voltage by increasing the switching frequency and control the inverter output voltage as well as frequency by changing modulating wave. PWM inverters are more appropriate for speed control of induction motor (IM) instead of other techniques. The most popular technique is Sinusoidal PWM (SPWM), which is appropriate for, linear modulation index up to 0.7855 only. Above this modulation index, SPWM produce more harmonics in output voltage and current of the inverter. For enhancing the linear modulation range up to 0.907, third harmonic injected PWM (THIPWM) and space vector PWM (SVPWM) techniques are used to improve the total harmonic distortion (THD) as well as increase the basic value of inverter output voltage.

The control techniques for induction motor are of three types: scalar control, vector control and Direct Torque Control (DTC). In this project voltage scalar control is used, it is the simplest controller, as it is the largely used in industrial applications. It works by imposing a constant relation between voltage and frequency, to give constant flux for the wide range of speed variation. Constant voltage control keeps the stator flux linkage fixed in steady state without decoupling between the flux and torque. The speed and torque control of three phase induction motor using PI controller gives the simulated output of Speed and Torque and the obtained speed and torque consists of fluctuations and ripples. The supply is given to the motor through converter and inverter to vary the input voltage according to the requirement, then its

connected to the measuring circuit where it measures the input parameters. After supply is given to the motor, speed and torque of the motor is controlled using the PI controller, In this project we have implemented closed loop voltage control of Induction motor using SVPWM based 3 level inverter.

Principal of Voltage Control: In motors relationship between rotor speed, synchronous speed, and slip is as follows,

$$S = \frac{N_s - N_r}{N_s}$$

$$N_r = N_s(1 - S)$$

$$\text{Rotor speed } N_r = \frac{120f}{P} (1 - s)$$

Hence, changing frequency (f), number of poles (P) or slip (S) can change the speed of an induction motor. In scalar control speed is controlled by increasing or decreasing in frequency Units. But change in frequency results change in impedance. Lessening in supply current expand the air gap flux which bring about saturation at the core. To keep away from these issues, it is important to vary the frequency and the voltage simultaneously. From equation below of induced voltage, it can be concluded that constant V/f control provide constant flux in the stator.

$$\frac{V_{rms}}{f} = 4.44N\Phi \quad \text{where } V_{rms} \text{ is induced voltage}$$

f is frequency of supplied voltage

N is number of turns

Φ is flux linkage in stator and

Φ is coil constant

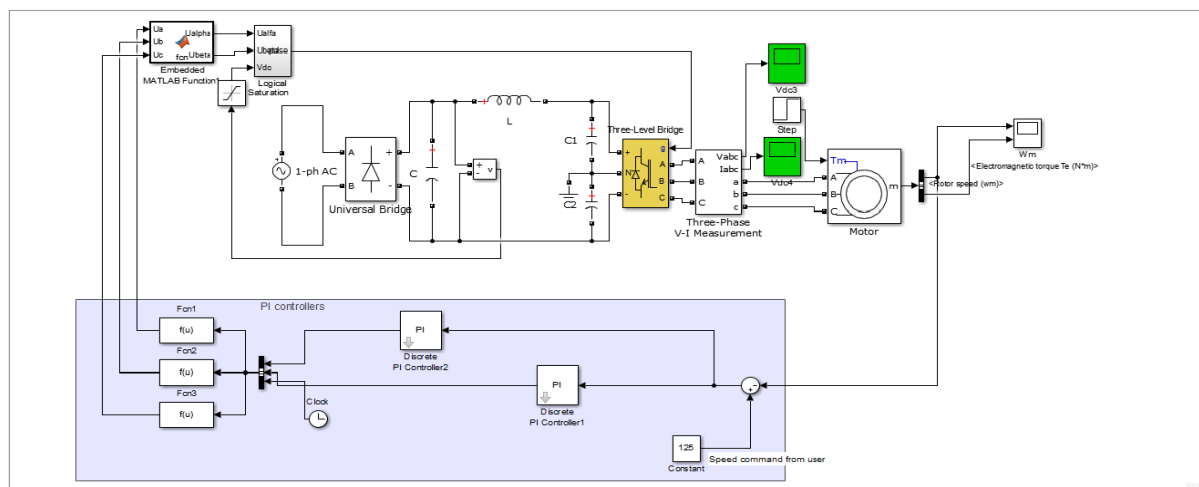


Fig: Simulation Using MATLAB

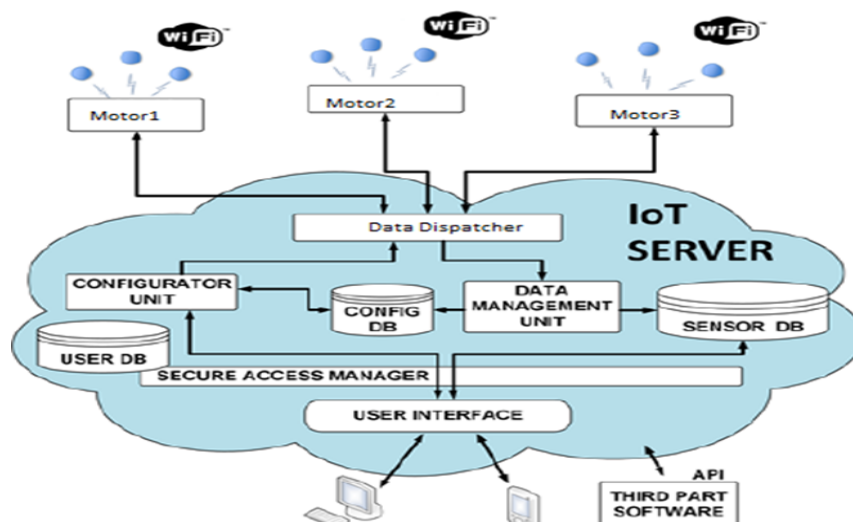
Close loop speed control: In this speed of the rotor is measured and compared with reference speed. The difference is given to a PI controller which tries to minimize error to zero and according to PI output frequency and voltage is define for SVPWM based inverter. Connecting To Internet: Motor circuit will be pre-programmed according with an unique apikey. In application apikey should be used as user id to start to communicate with the devices.

Sending Data To Server: Data is recorded by the on board sensors present in motor circuit and sent to server with an apikey over internet. The data is stored based on apikey received and same is sent when requested by the android application.

Receiving Data from Server: Command sent from user is stored in server and then it is sent to the sensor in motor circuit for particular operation. Use Of Machine Learning Algorithm: Machine learning algorithm is capable of learning mapping between input and output characteristics. Two stages of training are required to train the algorithm, namely, an offline training stage and another stage where experimental data is employed to train the algorithm. For offline training set of pre-existing data is fed to the algorithm and it tries to learn the input output characteristics. The true power and advantage of algorithm lies in their ability to represent both linear and non-linear relationships and in their ability to learn these relationships directly from the data being modelled. Traditional linear models are simply inadequate when it comes to modelling data that contains non-linear characteristics.

METHOD:

Motor is switched on then it is connected to internet, open the android application and check whether the motor is online. Motor speed, voltage, heat, torque of the motor can be checked in application. Command can be sent to the motor to perform operation such as change in speed, if armature is too hot reduce voltage, set timer to run during certain interval and switch off after that time. Get the best operation condition by using machine learning algorithms.



ig: Block diagram IoT architecture

From the block diagram shown in the fig, the data from motor is sent to the server via Wi-Fi an network, server stores the data in database also does operations on it. User can avail the data from the website or the application. Command sent from the user is sent to server and then to the device.

EXPERIMENT:

The results of simulation obtained in this work are for the induction motor of 5HP. During 0-1 secs the motor runs at 1000rpm then it raised o nearly 2000rpm. It ca be seen that mechanical torque has less change and it almost remains same. During 8-10 secs motor runs at around 600rpm but in torque there is slightly vague. Hence this model can be used for the control of induction motor.

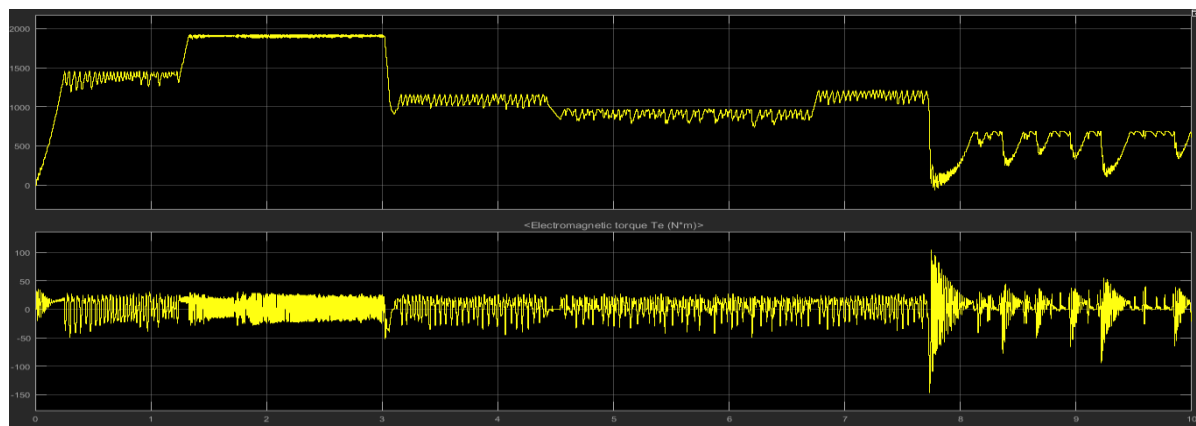


Fig: simulation result for different speed of motor and its corresponding torque

SUMMARY:

The proposed project helps in easy control of induction motor and also condition of motor can also be known. By using machine learning algorithm best suited input for motor can also be known. This helps in proper use of power and reduces un-necessary use of over power. The performance of motor increases giving required output. This motor lasts for long time. This decreases armature winding from getting damaged or also the mechanical damage to the rotor. The use of traditional control methods is tedious and requires a knowledge person to control, this method helps any layman to use the motor. This can be one of the power saving and best control of induction motor.



29. DRIVER EYE

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SCHOOL STUDENTS	EMIL VIJU ,9 th STANDARD, ST. JOSEPH'S G.H.S CHENGAL, ERNAKULAM, KERALA, GODWIN DAVIS ,7 th STANDARD, ST. SEBASTIAN'S, H.S KANJOOR, ERNAKULAM, KERALA

ABSTRACT:

Road traffic constitutes a major part in the problem of society. As the road traffic is increasing day by day there is a necessity of following the traffic rules with proper discipline. Traffic rules include of traffic signals and traffic sign boards which are meant to be followed by everyone in the society. To provide a comprehensive assistance to the driver for following the traffic signs, we are representing Driver Eye - Traffic sign detection and driver alert system. This gives the driver a sort of assistance which alerts the driver and reduces the accidents that taking place due to the negligence of the traffic sign boards. Traffic signs are detected by examining the shape and morphological operations. The system is mainly aimed to traffic police to control the traffic rule negligence and to save the valuable lives.

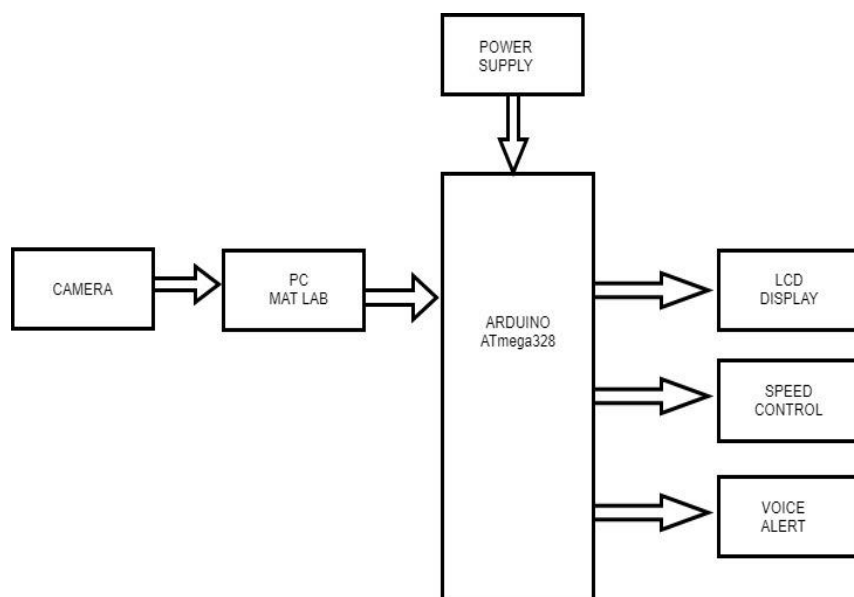
HYPOTHESIS:

The main idea of making the Driver Eye is to place a camera on the front of the vehicle. Using this camera we are detecting the traffic sign boards. This will give a voice alert through the speaker of the vehicle. There is LCD display to show the details of the speed and traffic sign board detected and the changes that is made by the system under process.

METHOD:

We are using an Arduino ATmega328 as the IC. Software used is MATLAB. The camera placed at the front of the vehicle will capture the image of the traffic sign board .Then the data is send to the mat lab program in the system where it is compared and recognize the traffic sign from the data stored. After identifying it will display the command through the LCD display and also give a voice alert through the speaker. When the identified traffic sign is of any speed limit. It will reduce the speed of the vehicle if the speed is above the limit.

BLOCK DIAGRAM OF THE SYSTEM



EXPERIMENT:

We evaluate the system using 10 traffic sign boards. Stop, narrow road, zebra cross, no U-turn, parking, speed limit, etc. are used for evaluate the system. All the traffic signs are giving the voice alert and also displays the command on the LCD display. For the speed limit traffic sign it will check the current speed. If the current speed is greater than the limit the speed of the vehicle is reduced. At this time if we tries to accelerate the speed will not be increased.

SUMMARY:

This system will help us to reduce the road accidents due to the careless driving. At present 40% percentage of death that taking place in a day in India is mainly due to the road accidents. By our project we expected that we can able to reduce it up to 20%.



30. MOVABLE ROAD DIVIDER FOR ORGANISED VEHICULAR TRAFFIC CONTROL WITH MONITORING OVER INTERNET OF THINGS

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SCHOOL STUDENTS	NIKHIL N IYER, 9 TH STD, GOPALAN TWINKLERS SCHOOL. INSIYA ABDUL KADAR VAKHARIA, 8 TH STD, RYAN INTERNATIONAL SCHOOL.

PROBLEM:

The problem with Static Road Dividers is that the number of lanes on either side of the road is fixed. Since the resources are limited and population as well as number of cars per family is increasing, there is significant increase in number of cars on roads. This calls for better utilization of existing resources like number of lanes available.

For example; in any city, there is industrial area or shopping area where the traffic generally flows in one direction in the morning or evening. The other side of Road divider is mostly either empty or very underutilized. This is true for peak morning and evening hours. This results in loss of time for the car owners, traffic jams as well as underutilization of available resources, An Automated road divider can provide a solution to the above mentioned problem effectively.

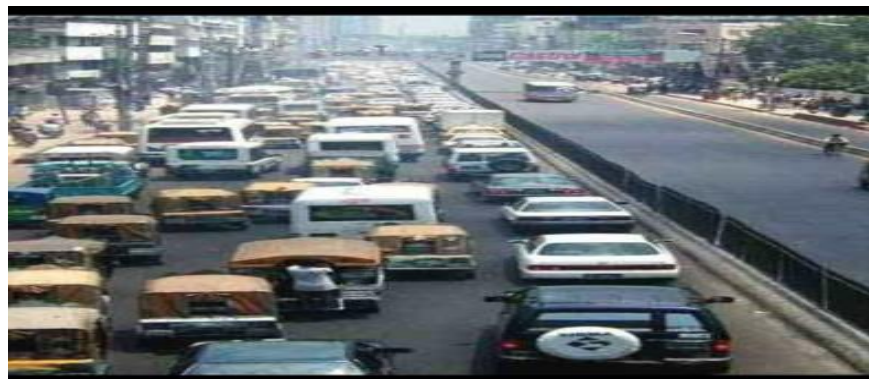


Fig:Today's picture on road density

An extensive and a good road network is needed to spur growth and development. Road transportation system move goods and people to facilitate production and trade. The elements of road transport are vital to the cost of trade, the global competitiveness of the country and its

development prospects, Road transport has grown in importance with the mode accounting for an increasing share in the conveyance of passengers and goods in the overland traffic.

India's road density averages about 1042km of road length per square km of land and is much higher compared to USA (0.67km/sq.km) and china(0.40 km/sq.km).

Rehabilitation and construction of new roads are essential to provide sufficient, safe and efficient transportation for passengers and goods and are vital for making the economy competitive and for sustaining a high rate of growth.

Therefore, an organized movable road divider will do a major help to improve the scenario.

About the project:

Our aim is to formulate a mechanism of automated road divider that can shift lanes, so that we can have number of lanes in the direction of the rush.

The principle of it works on the principle of traffic density using IR sensor and camera.

Here Low, Medium and High density of traffic value will be posted on IOT server as a graph.

The main components are:

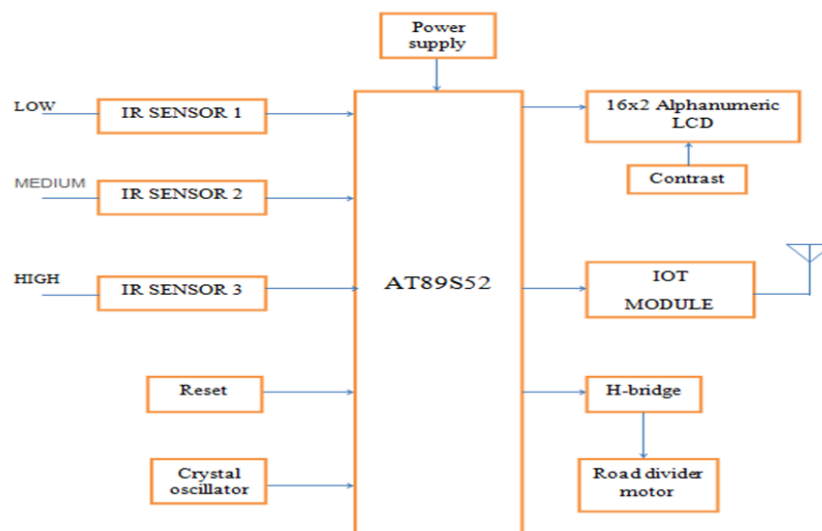
Microcontroller

IR Sensor

DC Motor

Communication module (IOT)

BLOCK DIAGRAM:



How it works?

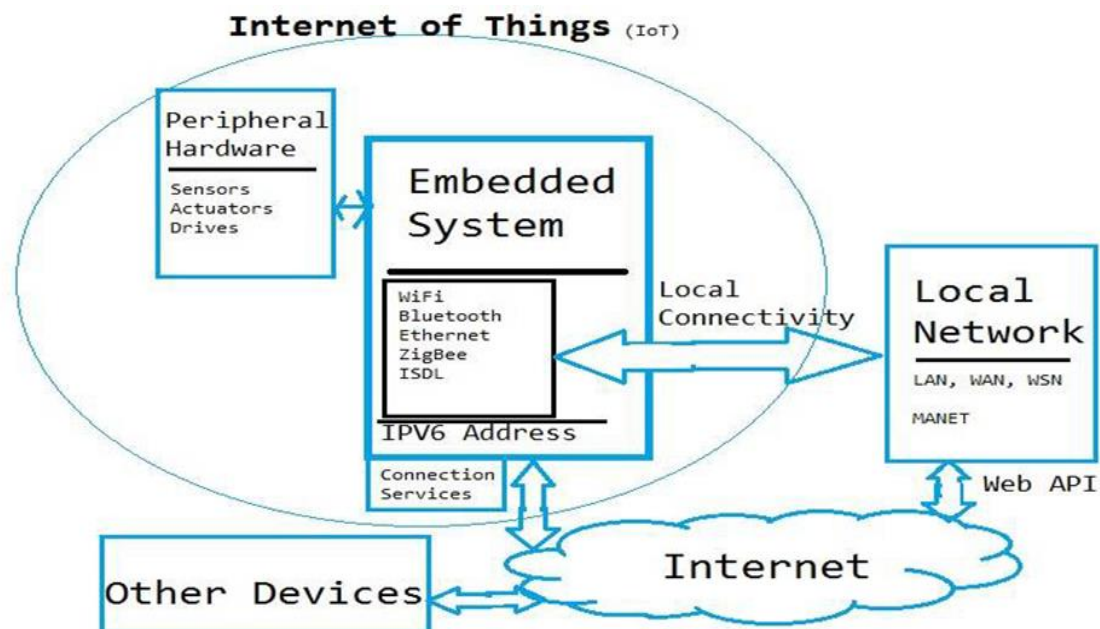
Basically the IR Sensors will be placed on the road. Let us consider an example that the width of the road is around 6 meters. The road will be divided towards the right as 3 meters and towards the left as 3 meters. When the sensor will be enabled due to high traffic density as in the road divider will be moved towards the opposite direction of high density lane.

ABSTRACT:

The internet of things Internet of things to indicate the common things, mainly everyday objects, that is legible, considerable and manageable via the internet. The IoT will improve all ways which are public safety, carrying and health care with better information and faster communication of this information. Internet of things many ways impact in society. At least three major benefits of IoT that will impact every field. They are communication, control and cost savings. This paper gives just overview of the internet of things.

INTRODUCTION:

The Internet of Things is a rising topic in present world. The internet of things, also called the internet of objects, refers to a wireless network between objects, usually the network will be wireless and self -configuring, such as house hold application. The internet of things is the network of physical objects or things embedded with electronics, software, sensors and network connectivity which enables these objects to collect and exchange data.

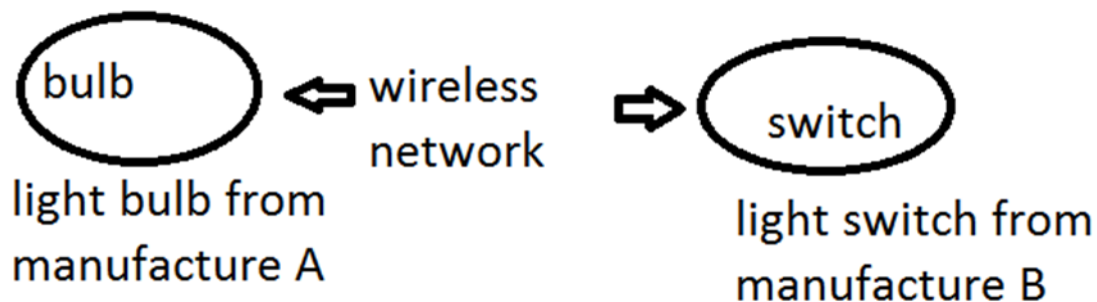


What is IoT?

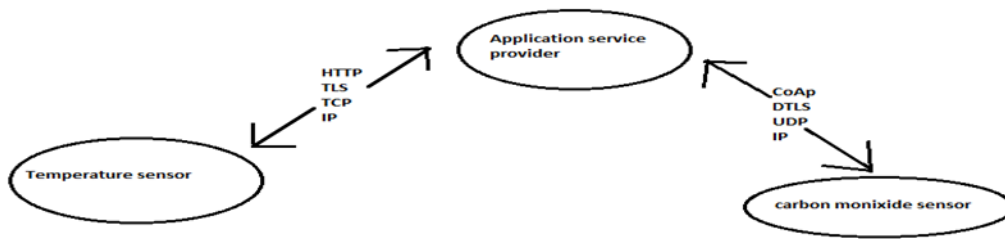
These devices must be uniquely discovered. For unique discovery of the devices in a Network, they need to have unique IP address. As number of IoT devices online is expected to surpass 20 billion mark and that IPv4 can only support up to 4Billion unique addresses, IoT devices essentially have IPv6 addressing scheme. All these devices have either fixed or Subnet masked IP addresses of type v6.Unique IP addresses makes IoT devices discoverable in the internet as independent node. This is the most important concept to have in mind to understand IoT.

IOT devices used mainly four communication models.

- **DEVICE TO DEVICE COMMUNICATIONS:** This model serves communication between two or more than two devices through an intermediate application server. These devices communicate many types of networks like IP networks or internet. These devices use protocols to build communication like Bluetooth, Zigbee ,Z-wave etc. This communication model is normally used in small applications like home automation system in home automation scenario the residential iot devices like bulbs, switches, thermostats, and door locks normally send small amount of information to each other which typically use small data packets of information to communicate between devices with small data rate requirements.

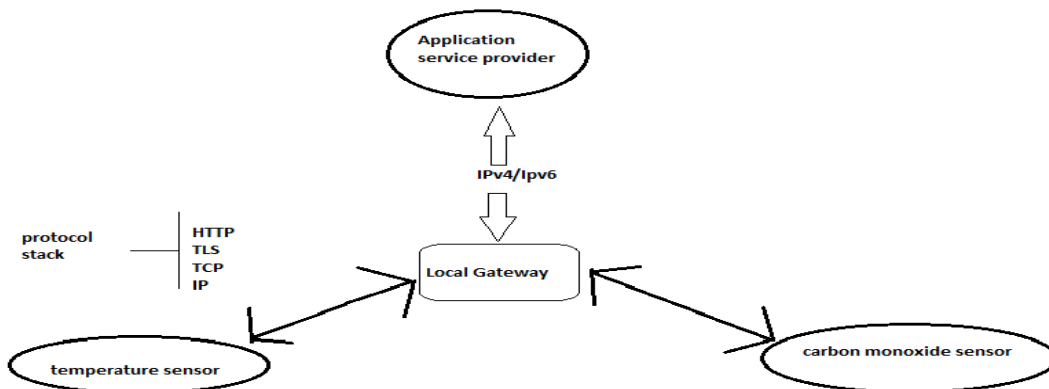


- **DEVICE-TO-CLOUD:** In a device to cloud communication model IoT device directly communicate to an internet cloud Service to exchange data like from traditional wired Ethernet or Wi-Fi connections to establish Connection between device and IP network which connects to the cloud service. This communication model is applied by some lot devices like the nest labs learning thermostat and the Samsung smart TV.

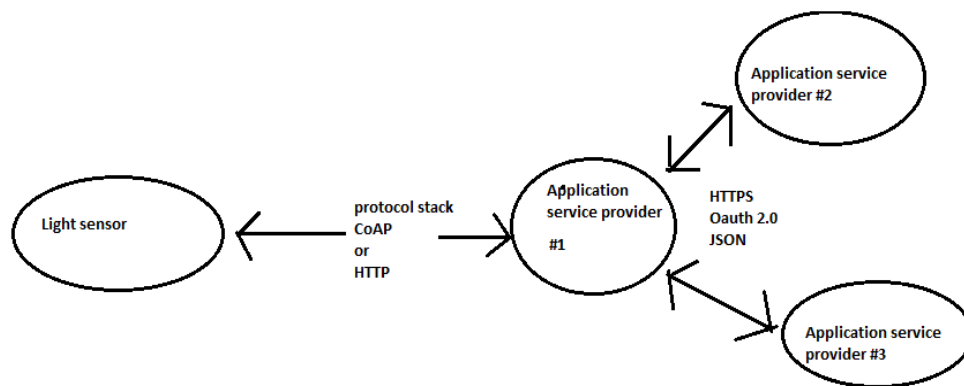


○ **DEVICE TO GATEWAY MODEL**

In this model, the device is associated to local gateway which is connected to the cloud service. Here local gateway is considered as an intermediate server between devices to the cloud. The intermediate gateway is usually smart phone which has an app to communicate with device to cloud service. Gateway devices can also potentially bridge the interoperability gap between devices that communicate on different standards. For instance, Smart Things' Z-Wave and Zigbee transceivers can interact with both families of devices.



- **BACKEND DATA SHARING:** This model refers to export evaluate smart object data from cloud service in combination of data with other service providers means third parties. The other service providers access the uploaded sensor data it is user allows. This model is single device to cloud communication model extension.



Power supply:

The primary function of a power supply is to convert electric current from a source to the correct voltage, current, and frequency to power load. All power supplies have a power input connection, which receives energy in the form of electric current from a source, and one or more power output connections that deliver current to the load.

IR Sensor:

An IR Sensor can measure the heat of an object as well as detects the motion. These types of sensors measure only infrared radiation, rather than emitting it that is called as a passive IR Sensor. Usually in all infrared spectrums, all the objects radiate some form of thermal radiations.

Conclusion:

Movable road divider controlled by IOT is an unseen technology for Indian cities, as it is not implemented anywhere in India till now.

31. MICROBIAL FUEL CELLS

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ABSTRACT:

Energy is the prime mover of economic growth and is vital to the sustenance of a modern economy. Future economic growth crucially depends on the long-term availability of energy from source that are affordable, accessible and environmentally friendly. Microbial fuel cells (MFCs) may be represents a completely new approach to waste water treatment with production of sustainable clean energy. MFC is a device that uses bacteria to generate electricity from the breakdown of organic substrates. Bacteria gain energy for metabolism by transferring electrons from an electron acceptor, to an electron acceptor, such as oxygen. The anode electrode of a MFC takes the place of the bacteria's typical electron acceptor, moving the electrons into a circuit, through a resistor, to the cathode electrode of the MFC, generating electricity. Protons diffuse from the anode join with oxygen to form water at the cathode completing the reaction. The benefits of using microbial fuel cells for wastewater treatment include: clean, safe, quiet performance, low emissions, high efficiency, and direct electricity recovery.

INTRODUCTION:

Microbial fuel cells (MFCs) are devices that directly convert chemical energy to electricity through catalytic activities of microorganisms. Electricity has been generated in MFCs from various organic compounds, including carbohydrates, proteins and fatty acids [1-4].one of the greatest advantages of MFCs over hydrogen and methanol-fuel cells is that a diverse range of organic materials can be used as fuels [1-2]. A microbial fuel cells (MFC) is a device that converts chemical energy to electrical energy with the aid of the catalytic reaction of microorganisms. A MFC consists of anode and cathode separated by a cation specific membrane. Microbes in the anode oxidize fuel, and the resulting electrons and protons are transferred to the cathode through the circuit and the membrane, respectively. Electrons and protons are consumed in the cathode. Reducing oxidant, usually oxygen.

Since the microbial cells are electrochemically inactive due to the nonconductive cell surface structure, mediators are employed to facilitate electron transfer from the microbial cells to the anode in MFCs [1, 2].

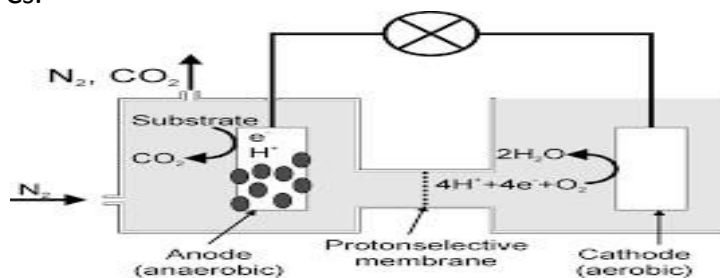
Microbial Fuel cell system

A typical MFC consists of two separate chambers which can be inoculated with any type of liquid media. These chambers, an anaerobic anode chamber and an aerobic cathode chamber, are generally separated by a proton Exchange Membrane (PEM) such as Nafion [5](Fig.1a). A MFC such as this can be classified into two types. One type generates electricity from the addition of artificial electron shuttles (mediators) to accomplish electron transfer to the electrode (Fig.1b). The other type does not require these additions of exogenous chemicals and can be loosely defined as a mediator less MFC [6-8] (Fig.1c). Mediator less MFCs can be considered to have more commercial potential than MFCs that require mediators because the typical mediators are expensive and toxic to the microorganisms.

However, one major disadvantage of the two-chamber system is that the cathode chamber needs to be filled with a solution and aerated to provide oxygen to the cathode. In hydrogen fuel cells, the cathode is bonded directly to a PEM which allows for oxygen from the air to directly react at the electrode [9]. This same principle can be used to design a single chamber MFC (SCMFC) where the anode chamber by a gas diffusion layer (GDL) allowing for a passive oxygen transfer to the cathode, eliminating the need for energy intensive air sparging of the liquid.

The primary difference between single and double chamber MFCs is the absence of an ion permeable membrane in the single chamber MFC. Both anode and cathode are housed in the same compartment and are thus subjected to the same solutions and similar environments. The cathode is exposed to the solution in the chamber on one side and external air on the opposite side. In the double chamber MFC, different conditions (such as anaerobic, aerobic, etc.) can be maintained in each compartment (Fig. 1d). The rate of oxygen diffusion into the anode without an ion permeable membrane is 2.7 times higher than a double chamber design using a Nafion 117 membrane. The advantages of a single chamber MFC are reduced setup costs, due to the absence of expensive membranes, and higher power output. A disadvantage to the single chamber is a decrease in coulombic efficiency generally attributed to the diffusion of oxygen to the anode area.

Facultative anaerobic bacteria will pass their electrons directly to oxygen rather than the surface of the electrode if oxygen is available, reducing the efficiency of the fuel cell. Table 1 shows a summary of MFC components and the materials used in the construct of either double or single chamber MFCs.

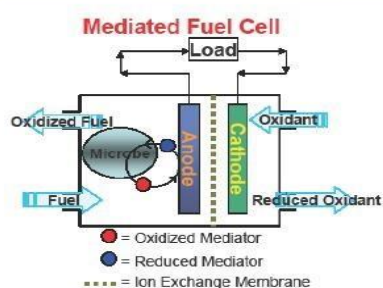


Block diagram of MFCs

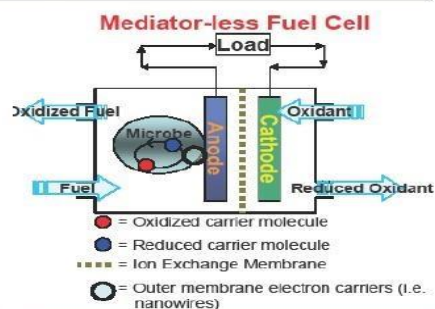
Table 1 Basic components of MFCs

Items	Materials	Remarks
Anode	Graphite, graphite felt, carbon paper, carbon-cloth, Pt.,Pt. black, reticulated vitreous carbon(RVC)	Necessary
Cathode	Graphite, graphite felt, carbon paper, carbon-cloth, Pt.,Pt. blank, RVC	Necessary
Anodic chamber	Glass, polycarbonate, Plexiglas	Necessary
Cathodic chamber	Glass, polycarbonate, Plexiglas	Optional
Proton exchange system (PEM)	Proton exchange membrane: Nation, Ultrex, polyethylene, poly(styrene-co-divinylbenzene); salt bridge, porcelain septum,or solely electrolyte	Necessary
Electrode catalyst	Pt., Pt. black, MnO ₂ , Fe ³⁺ , polyaniline, electron mediator , immobilization anode	Optional

TYPES OF MFC

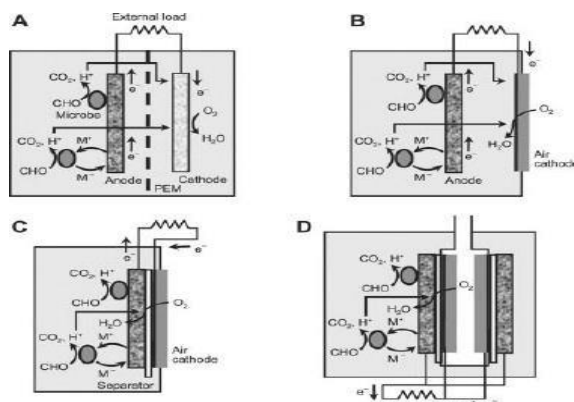


1. ANY MICROBE CAN PRODUCE ELECTRICITY WITH AN ELECTRON SHUTTLE (INEFFICIENT)
2. MEDIATORS ARE MOSTLY PHENOLICS WHICH ARE EXPENSIVE & TOXIC



1. NO ADDITIONAL ELECTRON SHUTTLE IS NEEDED
2. FEW KNOWN MICROBES HAVE THIS ABILITY
3. SHEWANELLA AND IRON REDUCERS DO!

Mediator MFC & mediator less MFC

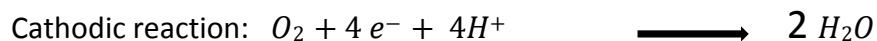


Single chamber MFC(no PEM, no platinum, poisoning minimized MFC)

Metabolism in MFCs

In normal microbial catabolism, a substrate such as a carbohydrate is initially oxidized anaerobically when its electrons are released by enzymatic reactions. The electrons are stored as intermediates (e.g., Nicotinamide adenine dinucleotide –NADH, Quinones) which become reduced and are then used to provide the living cell with energy. The ending location for the electrons is molecular oxygen or dioxygen at the end of the respiratory chain [12]. A MFC uses bacteria to catalyze the conversion of organic matter into electricity by transferring electrons to a developed circuit [13]. Microorganisms can transfer electrons to the anode electrode in three ways; exogenous mediators (ones external to the cell) such as potassium ferricyanide, thionine, or neutral red; using mediators produced by the bacteria; or by direct transfer of electrons from the respiratory enzymes (i.e., cytochromes) to the electrode [6,14]. These mediators can divert electrons from the respiratory chain by entering the outer cell membrane, becoming reduced, and then leaving in a reduced state to shuttle the electron to the electrode [12].

The basic reactions are presented below, when micro-organisms consume a substrate such as sugar in aerobic conditions they produce carbon dioxide and water. However, when oxygen is not present they produce carbon dioxide, protons and electrons as described below [12]



Future out look

MFC designs need improvements before a marketable product will be possible. Issues of the scale-up of the process remain critical issues. While full scale, highly effective MFCs are not yet within our grasp, the technology holds considerable promise, and major hurdles will undoubtedly be overcome by engineers and scientist. The growing pressure on our environment and the call for renewable energy sources will further stimulate development of this technology, leading soon to its successful implementation.

32. USE OF RUBBER AS A AGGREGATES

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COLLEGE STUDENTS	SHREYANSH V P, NAGALAKSHMI P
SCHOOL STUDENTS	SANJANA T, KUSUMA, 9 TH STD, BLOSSOM INTERNATIONAL SCHOOL

ABSTRACT:

Rubber is produced excessively worldwide every year. It cannot be discharged off easily in the environment as its decomposition takes much time and also produces environmental pollution. In such a case the reuse of rubber would be a better choice. In order to reuse rubber wastes, it was added to concrete as coarse aggregate and its different properties like compressive strength, Tensile strength, ductility etc. were investigated and compared with ordinary concrete. As a result, it was found that rubberized concrete is durable, less ductile, has greater crack resistance but has a low compressive strength when compared with ordinary concrete. The compressive strength of rubberized concrete can be increased by adding some amount of silica to it.

In the present experimental study, the experimental program was carried out for the partial replacement of natural coarse aggregate by using waste rubber tyre aggregates of maximum size 20mm. In this study the natural coarse aggregates were replaced by rubber tyre aggregates by 5%, 7.5% & 10% by weight of coarse aggregate. The compressive & flexural strength were determined at 7 days and 28 days and the results were compared with ordinary concrete of same grade. A normal concrete of natural aggregate without any replacement with rubber particles is used for the purpose of reference. The concrete of M20 grade has been used.

Keywords: Compressive strength, controlled mix, flexural strength, rubberized concrete, tensile strength

HYPOTHESIS: *Fundamental concepts*

A large variety of waste materials are considered feasible and even much valuable additives for concrete. Some of these materials include cellulose, fly ash, silica fumes and wood particles. Rubber obtained from scrapped tyres is considered as the most recent waste materials that have been examined because of its vital use in the construction field.

Worldwide, the production of rubber increases every year. Different countries of the world have different rate of producing rubber, for instance United States produces 3.6 million tons of rubber per year. Iran produces 100,000 tons of rubber per year; similarly, Malaysia produces 200,000 tons of rubber per year. These number increases with the increase in the production of

vehicles. Investigations have shown that scrapped rubber tyres contain materials that do not decompose under environmental conditions and cause serious problems.

One choice of decomposition is burning, but that would also result in harmful pollutions. Based on these problems, tyres can be used as aggregates in concrete. It is very difficult to manage the waste produced by the rubber-tyre industry and to handle the waste. It is not easily biodegradable waste form. The rubber waste is not easily biodegradable even after a long span passes after the landfill treatment.

The rubber tyres shows better performance in concrete when they are cut in the form of normally sized coarse aggregate to take the full advantage of the shape factor of the aggregate. Due to this fact, the compressive strength of the concrete can be made more or less strong as compared to the aggregate sizes which are not in the proper shape to be incorporated in the concrete.

EXPERIMENTAL WORK:

The study carried out is totally concerned with the partial replacement of natural coarse aggregate by used rubber tyre aggregates of maximum size 20 mm. In this study the natural coarse aggregates were replaced by rubber tyre aggregates by 5%, 7.5% & 10% by weight of coarse aggregate. The compressive & flexural strength were determined at 7 days and 28 days and the result was compared with ordinary concrete of same grade. A normal concrete of natural aggregate without any replacement (0%) is used for the purpose of reference. The concrete of M20 grade has been used.

i) Rubber aggregates

Tyre aggregates used in this study were made by cutting the scrap tires into maximum sizes of 16mm & 20mm. They were used by mixing them in proportion of 2:3. The cutting of tire was done by labor with chisels & hand cutters. The maximum and minimum size of rubber aggregate used is 20mm and 16mm respectively. The tyres used in the analysis are from the same origin (scrap of APPLO tyre were used).

ii) Chemical for surface treatment

During the initial stage of the study it was observed that the bonding between the rubber particles in concrete was very week. To enhance the bonding between the rubber particle with rest of the materials, surface treatment becomes necessary.

For the purpose of surface treatment we have used NaOH solution. NaOH is a powerful cleansing agent removes the dirt and cleans the surface of rubber which enhances the bonding between the rubber aggregate with the other materials in concrete. The rubber particles were first soaked in the NaOH solution for 24 hours before using. After Subjected to NaOH solution the aggregate were washed with water and cleaned. After the completion of the surface treatment of the rubber aggregates they were allowed to use in the concrete.

RESULTS:

i) Effect on workability

It is noted that by increasing the rubber content in concrete the slump as well as the unit weight decreases. But it still gave a workable mix despite of adding rubber to it when compared with ordinary concrete.

ii) Effect on Unit weight

The density of rubberized concrete was found comparatively less than ordinary concrete. With the increase in the percentage of rubber in concrete the density of it decreases. The density of concrete greatly depends upon the amount of air entrained or air entrapped, water-cement ratio, which in turn depends upon the size of aggregates. The increase in rubber content in concrete increases the air content which decreases the density (unit weight) of concrete. At about 25% of the content of rubber in concrete, the density decreases to about 90% of the ordinary concrete. However this decrease is very less when rubber content is less than 10-15% of the total aggregate volume.

iii) Effect on Compressive Strength

Compressive tests are considered as the most convenient test for evaluating the quality of the Concrete. Various tests on rubberized concrete, having tyre articles and crumb rubber of sizes 36, 24 and 18 mm and found that there is a reduction of 85% in compressive strength and about 50% of reduction in split tensile strength but showed large absorption of energy. As per investigation, that increase in rubber content in concrete decreased the compressive strength. This reduction was due to the presence of entrapped air. Experiments have showed that compressive strength can be increased by adding some de-airing agents into rubberized concrete.

iv) Compressive strength after 7 days & 28 days

Sl. No.	Sample	Percentage of rubber aggregate	7 days Compressive strength (N/mm ²)	28 days Compressive strength (N/mm ²)
1	S ₁	0	17.5	26
2	S ₂	5	16.5	21.6
3	S ₃	7.5	13.8	17.9
4	S ₄	10	12.5	15.68

Table showing compressive strength of concrete at different age

v) Effect on Flexural strength

The flexure strength of concrete having rubber decreases by increasing the content of rubber in concrete. As per other investigators, the flexural strength was increased by adding rubber in roller compacted concrete. By increasing the content of rubber into concrete the flexural strength and ultimate tension elongation increases when the compressive strength was kept constants for roller compacted concrete.

3.4.1 Flexural Strength after 28 Days:

The results obtained for flexural strength after 28 days are tabulated as follows:

Sl. No.	Sample	Percentage of rubber aggregate	Average load (KN)	Flexural strength (N/mm ²)
1	S ₁	0	9.1	3.68
2	S ₂	5	11.65	4.7
3	S ₃	7.5	16.45	6.62
4	S ₄	10	14.73	5.92

28 days Flexural Strength of Rubberized Concrete

Water Absorption

The water absorption of the concrete cube specimen containing used rubber tyre aggregates was determined by placing the cube specimen in the water for 24 hrs just after the removal from the casting mould, wiped with the dry cloth and then weighed in the surface saturated dry condition (W_{ssd}). The cube specimen was then placed in hot oven for 24 hrs maintaining the temperature of $105 \pm 5^\circ \text{C}$. The cube specimen was then weighed (W_{od}). The water absorption of the concrete was determined by using following formula:

$$\text{Water absorption} = \frac{W_{ssd} - W_{od}}{W_{od}} * 100$$

Sl. No.	Sample	Weight (SSD)(in Kg)	Weight (Oven Dry (in Kg)	Water Absorption (%)
1	S ₁	7.717	7.453	3.5
2	S ₂	7.650	7.403	3.33
3	S ₃	7.470	7.309	2.20
4	S ₄	7.595	7.315	3.8

Water absorption of rubberized concrete

CONCLUSIONS:

1. The decrease in compressive strength may be due to weak bonding between rubber particles and cement paste. i.e., weak interfacial transition zone.
2. With increase in the rubber aggregates content in rubberized concrete, the compressive strength decreases significantly & the flexural strength first increases (up to 7.5%) and then it gradually decreases.
3. The water absorption of the rubberized concrete first decreases (up to 7.5%) with increase in rubber aggregates, and then with the further increase in rubber content, water absorption increases. The increase in water absorption may be due to the increase in voids in the rubberized concrete.
4. The workability of rubberized concrete decrease with increase in rubber content which could be compensated by increasing the dosage of the chemical admixtures.
5. From the above discussions of results which are obtained it can be concluded that rubberized concrete has limited application in load bearing structure due to reduction in compressive strength but it can be used in non-structural structures.
6. It is recommended to use rubberized concrete small structures like road curbs and non-bearing walls etc.

COST: Rs. 30,000/-

Sl. No.	Particulars	Quantity	Cost (Rs.)
1	Cement	5 bags	3000
2	Coarse Aggregates	20 bags	3000
3	Fine aggregates	20 bags	3000
4	Rubber Aggregates	4 bags	5000
5	Cutting Blades and other accessories	5+5	5000
6	Molds (Beams and cubes)	10	2000
7	Helpers	5	1000
8	Field Trips	-	4000
9	Misc.	-	4000
	Total		30000

33. BIOWASTE INTO ACTIVATED CHARCOAL

COLLEGE	BASAVESHWAR ENGINEERING COLLEGE
GUIDE	Dr. BHARATI S METI
COLLEGE STUDENTS	SUMAN H MALAGAR, SWATI GAVIMATH
SCHOOL STUDENTS	ROHINI, NAYANA – VIVEKANANDA GOVT. SCHOOL,

ABSTRACT:

India, an agricultural based country where industrial or agricultural wastes are produced in large quantity. This kind of untreated waste is considered as waste but if it is properly treated it can become wealth. There are many options to convert biomass to a valuable product. One among them is activated charcoal. These wastes are inexpensive and subjected to biodegradation for the chemical activation of agro-waste; it is converted o activated charcoal which is expensive and efficient adsorbent. Activated charcoal plays major role in many areas like,

1. Deodorization
2. Decolourisation
3. Purification of metal ions
4. Waste water treatment.

Also used as electrode in super capacitors as well as it also used at medicinal level like in the treatment of cholesterol during pregnancy and for dialysis purposes. The other important example of decolourisation is in biodiesel industry, decolorizing the glycerine change the value of it.

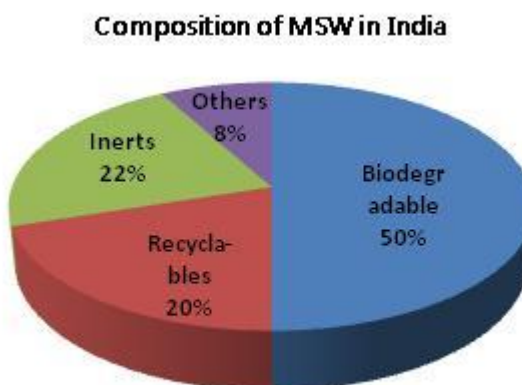
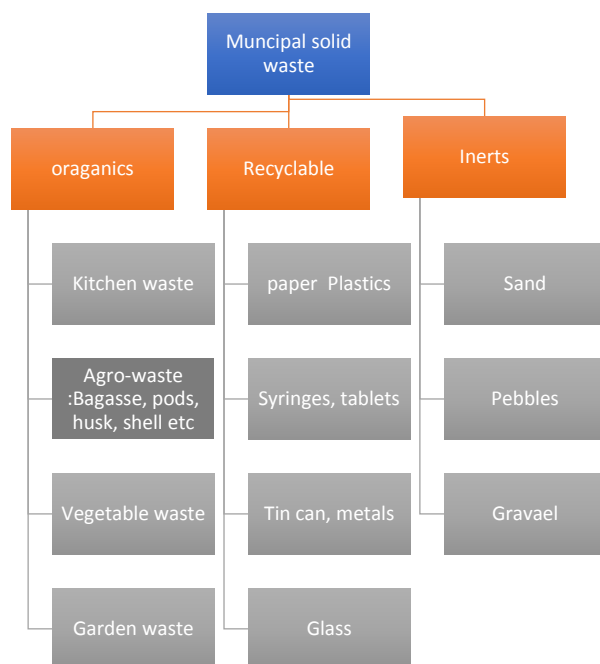
Introduction:

In India, the biodegradable portion dominates the bulk of Agro- Solid Waste. This is mainly due to food and yard waste. With rising urbanization and change in lifestyle and food habits, the amount of municipal solid waste has been increasing rapidly and its composition has been changing.

As per estimates more than 55 million tons of Municipal solid waste is generated in India per year; the yearly increase is estimated to be about 5%. It is estimated that solid waste generated in small, medium and large cities and towns in India is about 0.1 kg, 0.3 – 0.4 kg and 0.5 kg per capita per day respectively. The estimated annual increase in per capita waste generation is about 1.33 % per year.

Energy can be recovered from the organic fraction of waste through thermo-chemical and biochemical methods. One of the methods is the conversion of bio-waste into activated charcoal or activated carbon.

Activated charcoal is a fine black powder made from bone char, coconut shells, peat, petroleum coke, coal, olive pits or sawdust. **Activated carbon**, also called **activated charcoal**, is a form of carbon processed to have small, low-volume pores that increase the surface area available for adsorption or chemical reactions. It is also known as 'DECOLOURISING CARBON'. A solid, porous, carbonaceous and a good adsorbing material prepared by carbonizing and activating organic substances.



The raw materials, which include sawdust, peat, seeds, cellulose residues, coconut shells, molasses and bagasse's of sugarcane mainly agro-waste, may be carbonized and activated at high temperature. Here the organic carbon is mainly converted into chemically activated carbon. Activated carbon works by trapping toxins and chemicals in its millions of tiny pores. It doesn't absorb the toxins. However, instead it works through the chemical process of adsorption. In the body, absorption is the reaction of elements, including nutrients, chemical and toxins soaked up and assimilated into the blood stream. Adsorption is the chemical reaction where elements bind to a surface.

The porous surface of activated charcoal has a negative electric charge that causes positive charged toxins and gas to bond with it. The nooks and crannies in activated charcoal are created through a heating process. The activated carbon acted as a good absorbent and dye was absorbed. The charcoal's porous texture has a negative electrical charge, which causes it to attract positively charged molecules, such as toxins and gases. This helps it trap toxins and chemicals in the gut. Because activated charcoal is not absorbed by your body, it can carry the toxins bound to its surface out of your body in feces. Adsorption is one of the most important percolations processes used in industry for the purification and separation of solutes from a fluid stream onto a surface. Activated carbon also known as activated carbon or

activated coal is the best known general purpose adsorption medium and the system using activated carbon requires little space than many competitive processes and is impervious to toxic wastes and produces little or no sludge or secondary pollution.

Hypothesis:

Agricultural waste produced is quite commonly distributed as a result of agricultural practices. They are inexpensive and subjected to biodegradation, also act as source of adsorption. For the chemical activation of agro-waste is converted to activated charcoal. Activated carbon is expensive and efficient adsorbent. In this task the activated carbon is produced by activation with H_2SO_4 . This activated carbon would be used in preparation of metal ions and removal of pollutant from waste water.

The adsorption properties of activated carbon vary with raw material used and the method of activation. The production of activated carbon has been increased because it is cheap, readily available and also viewed as veritable way of combating waste disposal problem in agro industries. Hence, the use of inexpensive material and performing a suitable production method may result to generate high cost product.

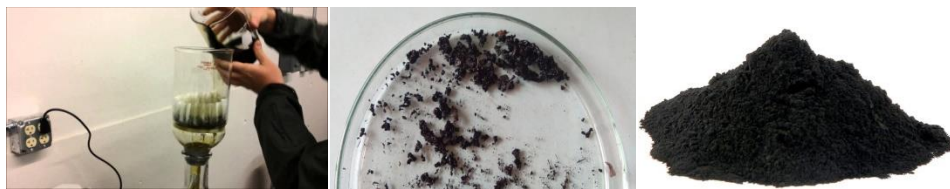
In our project, we considered a bagasse, a sugarcane waste. We collected the bagasse from S V industries, a cane juice factory at Gaddankeri, Bagalkot. Bulk quantity of bagasse, a bio-waste is produced every day in this industry. Bagasse, the inexpensive waste is converted into value of activated charcoal which is used to treat the crude biodiesel glycerin into its pure forms. As a solution for this problem, the following technique is implemented. The purity of prepared activated charcoal is checked through HPLC technique.

Method to prepare activated charcoal:

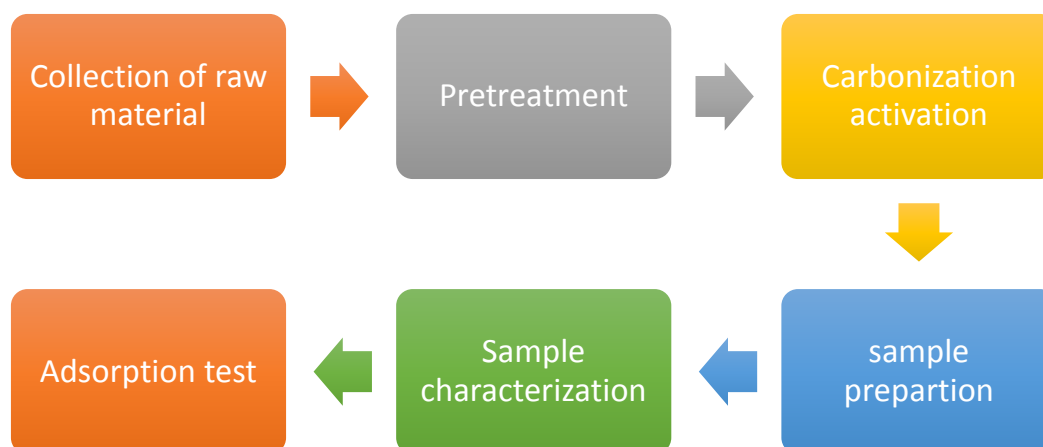
1. Production of charcoal.

- We considered a bagasse as bio-waste
- Raw bagasse was collected and pulverized.
- Raw bagasse was sieved to obtain a fraction of $300\mu m$.
- Bagasse was washed with water for 2-3 times.
- It is dried in hot air oven at $50^\circ C$ overnight.
- Concentrated sulphuric acid was added and was kept in shaker for 2 hours and wash with water.
- It is dried in hot air oven at $50^\circ C$ overnight
- Activated charcoal was obtained in granular form which was crushed to powdered form.





1. Dried Bagasse 2. Sieved sawdust 3. Soaked in H_2SO_4 4. Washed with water 5. Activated carbon



Flow chart represents the producer of preparation of activated charcoal

Confirmation test for activated charcoal:

- Test the prepared charcoal to decolorize the crude glycerine produced in biodiesel industry.
- The purity is conformed to HPLC technique.

Conclusion:

A quick, single-stage chemical activation process was employed in order to prepare good-quality activated carbons from Indian sugarcane bagasse. We want to implement this technique with other bio-waste such as cereals husk, fruit's pod and peel, dry leaves of plants and bio-waste. We will trial with other strong acids for getting activated charcoal. Many of the entrepreneurs have begun their starts up, they fail economically viable. For them activated charcoal is an industrial product. The other important use we implant is de-colorization is in biodiesel industry, de-colorizing the glycerin change the value of it.

The following objectives are selected for present studies:

- To prepare charcoal using industrial waste.
- To optimize the adsorption properties.
- To find potential applications of charcoal.

34. PLASTIC BOTTLE BRICK HOUSE

COLLEGE	SHRI JAGADGURU BALAGANGADHARANATHA SWAMIJI INSTITUTE OF TECHNOLOGY
GUIDE	VARUN VL
COLLEGE STUDENTS	HEMANTH GOWDA KB , NANDAN SADASHIV
SCHOOL STUDENTS	HARINI SHIVKUMAR, SAMEKSHA S

PROJECT OVERVIEW:

Plastic bottle brick house is a concept which was developed in Nigeria. It is a type of construction material which is designed for the purpose of construction of houses. It is an effective way of replacing traditional bricks for the construction of primary and secondary structures. These types of bricks are made of plastic bottles which are filled with any solid waste that does not decompose.

INTRODUCTION:

As we all know plastics are one of the most widely used materials in the world. The waste produced by plastics just in India is around 15000 tonnes. The effects of plastics is something almost everyone are aware of and to reduce these effects there have been many recycling techniques which have come up and are also doing a good but the recycling also cause a lot of pollution which is in turn disadvantageous . So we have come up with a project of reusing the plastic material I.e, using plastic bottles as a construction material THE PLASTIC BOTTLE BRICKS.

METHOD OF CONSTRUCTION

STEP 1 : COLLECTION OF THE PLASTIC BOTTLES.

This step involves collection of plastic bottles from various sites, for example, for our project we required a lot of bottles of similar sizes so we went to marriage halls and collected them.

STEP 2: FILLING UP OF BOTTLES

The bottles are dried up and later they are filled with any solid material of the size 1 to 4.75 mm. The material to be filled must be non-decomposable, for example, mud, fly ash, construction waste, etc.



STEP 3: PACKING OF BOTTLES

The bottles are packed very tightly so that it does not change its shape when force is applied. This is a very important step as the bottle strength will depend on the quality of packing so it is necessary to pack these bottles with care.

STEP 4: DESIGNING OF WALLS

Based on the type of wall required the arrangement of the bottles can be done. It's better to build partition walls using these bottles.

These bottles can be used to give aesthetic look to the buildings.

STEP 5: FINISHING

It is very important to give a proper finish to these sort of buildings as it requires more binding material and also good finishing is important or else the stability of the structure will be lost.

ADVANTAGES

- 1) It gives a very good architectural effect to the structures.
- 2) As a single unit a plastic bottle with mud is almost 20 times stronger than bricks as it also possess better plastic behaviour than brick.
- 3) The study looked into the strength properties of waste PET bottles filled with fine sand. Five different sizes (250, 500, 1250, 1500 and 2000ml) of waste PET bottle bricks were tested for compressive strength and the largest bricks gave a compressive strength of 17.44MPa. The 1000ml bottle brick filled cubes with 9 and 12 bottles were prepared and tested. The 9 bottle brick filled cubes gave a compressive strength of 35MPa and the 12 bottle bricks filled cubes gave a compressive strength of 33.7MPa. These bottle brick filled cylinders exhibited double the compressive strength of conventional concrete cylinders.

PROJECT PROTOTYPE

The picture below is the prototype of the plastic bottle brick house constructed by our team . The prototype has dimensions 10*8 feet length and breath and height of 6 feet wall + 2 feet sloped roof. We have used steel king post truss as the roof support. The prototype does not involve any use of mortar as it would be difficult for us to move the model outside. The prototype shows only the bottle arrangement and wall designs.

The bottles used here are empty and for real construction we shall use filled bottles as mentioned above.



Cost of project:

Cost of construction of such a building is generally economical and according to the studies it is found that it can reduce the cost of construction by 40%.

Approximately cost of one plastic bottle brick of size 28*21*15 cm will around 4 to 6 rupees.



35. BOREWELL CHILD RESCUE ROBOT SYSTEM

COLLEGE	SRI SAI RAM COLLEGE OF ENGINEERING
GUIDE	MUTTUVEL
COLLEGE STUDENTS	MONISH BABU.K & PURANDAR RAJ.S
SCHOOL STUDENTS	HARI KARTHIK S, NANDINI B S, 9 TH STD, SARASWATHI VIDYA MANDIR

In some applications, the object geometry or the need to access the exterior of the object will require that the object is held from the center. In this case the opening.

4.1 LIST OF MATERIALS

Sl. No.	PARTS	Qty.	Material
1	D.C. Motor (12 V)	3	DC
2	Cylinder	1	MS
3	Battery	1	Lead acid
4	Bearing	6	MS
5	Gripper	1	MS
6	Rope wire	1	Nylon
7	Connecting wire	-	Copper
8	Balloon	1	-
9	Roller	2	MS
10	Spur gear	4	CI

4.2 COST ESTIMATION

Sl. No.	PARTS	Qty.	Amount (Rs)
1	D.C. Motor (12 V) 1200 rpm	3	2400
2	D.C. Motor(12v) 500 rpm	3	900
3	Cylinder plates	2	600
4	Battery	1	1500
5	Bearing	6	1500
6	Gripper	1set	500
7	Rope wire	1	1000
8	Connecting wire 3phase	20m	1200

9	Balloon	2	500
10	Roller	1	400
11	Spur gear	4	3800
12	Screw rod	1	300
13	Control switches	5	250
14	Wireless Camera	1	5000
15	Hoses and pipes	1	200
16	Control box	1	200
17	Frame+Rake sheet 30 cm dia	1	1200

2. LABOUR COST

LATHE, DRILLING, WELDING, GRINDING, POWER HACKSAW, GAS CUTTING:

Cost = **15,000/ RS.**

3. OVERHEAD CHARGES

The overhead charges are arrived by “Manufacturing cost”

$$\begin{aligned}
 \text{Manufacturing Cost} &= \text{Material Cost} + \text{Labour cost} \\
 &= \\
 &= 26,850 + 15,000
 \end{aligned}$$

$$\begin{aligned}
 \text{Overhead Charges} &= 20\% \text{ of the manufacturing cost} \\
 &= = \mathbf{8,370 \text{ RS/-}}
 \end{aligned}$$

TOTAL COST:

$$\text{Total cost} = \text{Material Cost} + \text{Labour cost} + \text{Overhead Charges}$$

$$\text{Total cost for this project} = \mathbf{50,220 \text{ RS/}}$$

WORKING PRINCIPLE

PART V

The experimental setup of our project consists of frame which is usually mounted on the ground rigidly with the help of suitable supports. At the center of the frame, it consists of a cylinder, around which the strong rope is mounted in such a way that when the cylinder is rotated, the rope gets wound over the cylinder and when it is rotated in the opposite direction,

the rope is loosened and gets lowered. The cylinder rotation is provided with the help of the DC motor. At the other end of the rope, a gripper arrangement is provided which moves over a lead screw. When the lead screw is given motion, the gripper grips the victim. Also a balloon connected with hoses is mounted near the gripper who helps to supply fresh oxygen which may avoid the risk of death for a certain long time.

Hence when a victim gets caught under a bore well, this device is mounted firmly and the cylinder is actuated by activating the motor. As the cylinder rotates, the rope gets loosened and lowered and enters into the bore well along with the gripper arrangement. Once the gripper reaches near the victim, the air from a source is let in so that the victim may not lose his/her conscious. Then the motor connected with the lead screw is activated so that the gripper holds the victim and the cylinder is rotated in the opposite direction. The rope along with the victim comes up and thus the life of the victim can be easily saved with our innovative bore well rescue robot.

MANUFACTURING PROCESS

PART VI

Manufacturing processes are the steps through which raw materials are transformed into a final product. The manufacturing process begins with the creation of the materials from which the design is made. These materials are then modified through manufacturing processes to become the required part. Manufacturing processes can include treating (such as heat treating or coating), machining, or reshaping the material. The manufacturing process also includes tests and checks for quality assurance during or after the manufacturing, and planning the production process prior to manufacturing.

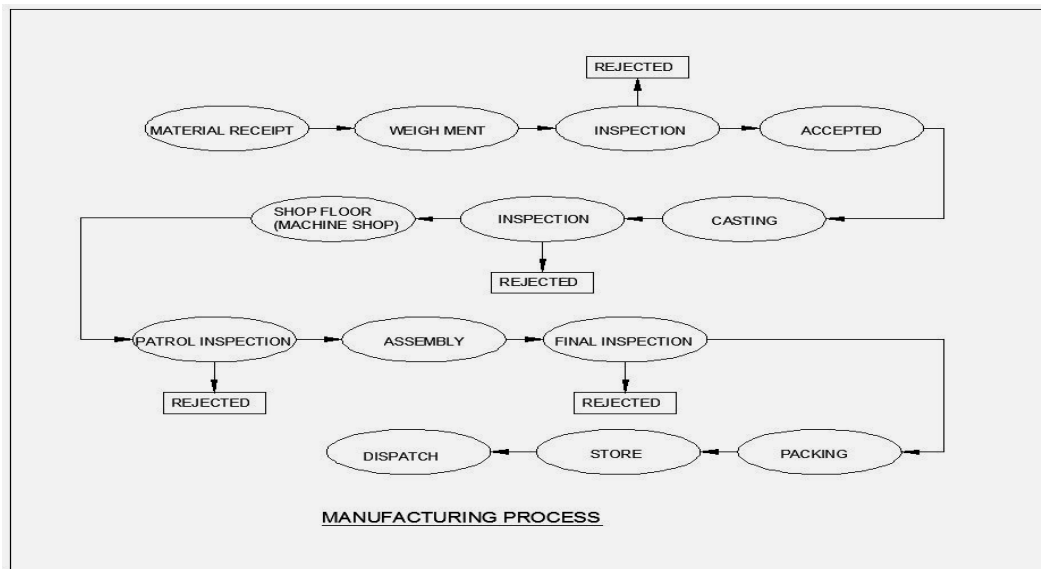


Table 3: Manufacturing Process



INSPECTION

Critical appraisal involving examination, measurement, testing, gauging, and comparison of materials or items. An inspection determines if the material or item is in proper quantity and condition, and if it conforms to the applicable or specified requirements. Inspection is generally divided into three categories: (1) Receiving inspection, (2) In-process inspection, and (3) Final inspection. In quality control (which is guided by the principle that "Quality cannot be inspected into a product") the role of inspection is to verify and validate the variance data; it does not involve separating the good from the bad.

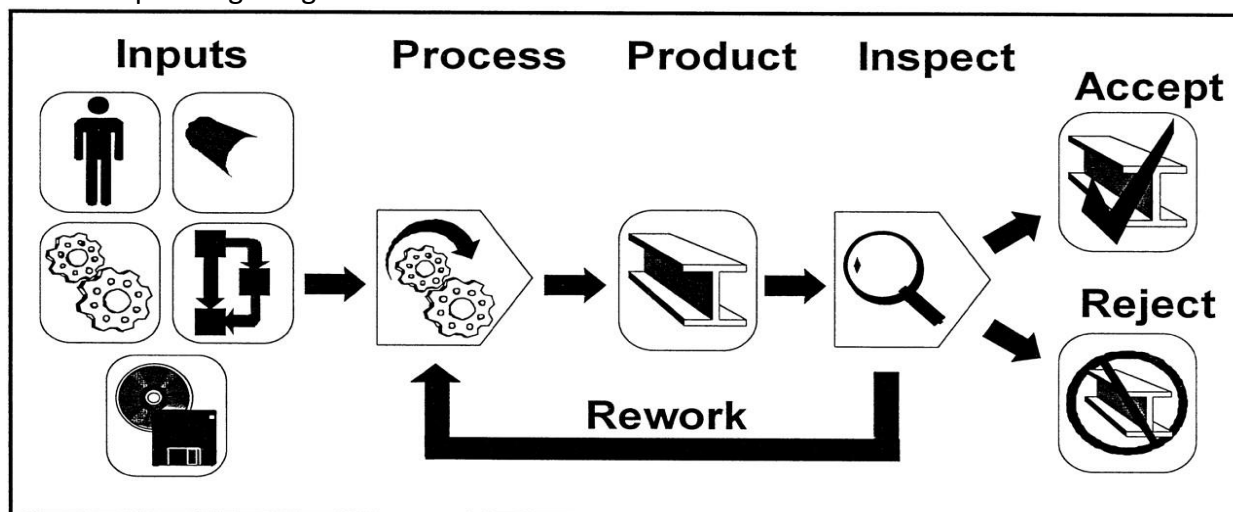


Table 4: Inspection table

CONCLUSION:

This project work has provided us an excellent opportunity and experience, to use our limited knowledge. We gained a lot of practical knowledge regarding, planning, purchasing, assembling

and machining while doing this project work. We feel that the project work is a good solution to bridge the gates between the institution and the industries.

We are proud that we have completed the work with the limited time successfully. The **DESIGN AND FABRICATION OF BORE WELL RESCUE ROBOT** is working with satisfactory conditions. We can able to understand the difficulties in maintaining the tolerances and also the quality. We have done to our ability and skill making maximum use of available facilities.

In conclusion remarks of our project work, let us add a few more lines about our impression project work. Thus we have developed a **“BORE WELL RESCUE ROBOT”** which helps to reduce the accident rates by implementing an effective way by introducing a new concept of bore well rescuing operation. This project serves its best to all in defense and rescuing fields. By using more techniques, they can be modified and developed according to the applications.

TOTAL COST=26,850

36. SEMI AUTOMATED HONEY EXTRACTOR MACHINE

COLLEGE	CANARA ENGINEERING COLLEGE
GUIDE	Prof. VIJETH PS
COLLEGE STUDENTS	PRATHITH PS, VIJAY NAYAK
SCHOOL STUDENTS	ANANTH KAMATH, NARASIMHA BHANDARY, 9 TH STD, CANARA HIGH SCHOOL, URVA

ABSTRACT:

The honeybee population is vastly decreasing due to many reasons and has created a global concern due to their high importance . The Semi Automated Honey Extractor is meant to increase the number of hobbyist beekeepers and small beekeeping businesses and as a result stimulate the globally decreasing population of honeybees. Traditional method of extracting honey leads to reduction in nutritional value and quality thus, a semi-automated honey extractor; a mechanical device that extracts honey from its comb was designed and constructed using easily available materials. The main objective of this study is the development and performance evaluation of a honey extractor. The main functional parts of the machine are net frame, wire mesh, driving shaft, basket (designed to hold and spin four honeycomb frames) placed vertically. The machine is portable and can be operated without any special training or technical knowledge, the machine also has the ability to preserve and leave the honeycomb undamaged after honey extraction. The time taken for honey extraction had significant effect on the performance of the honey extractor; the machine capacity, efficiency.

INTRODUCTION:

- ☐ Honeybees play an indispensable role in agriculture (honeybees play a major role in pollinating crops) and more.
- ☐ The Semi automated Honey Extractor is meant to increase the number of hobbyist beekeepers and small beekeeping businesses. and as a result stimulate the globally decreasing population of honeybees.
- ☐ Traditional method of extracting honey leads to reduction in nutritional value and quality thus, a semi-automated honey extractor; a mechanical device that extracts honey from its comb was designed and constructed using easily available materials

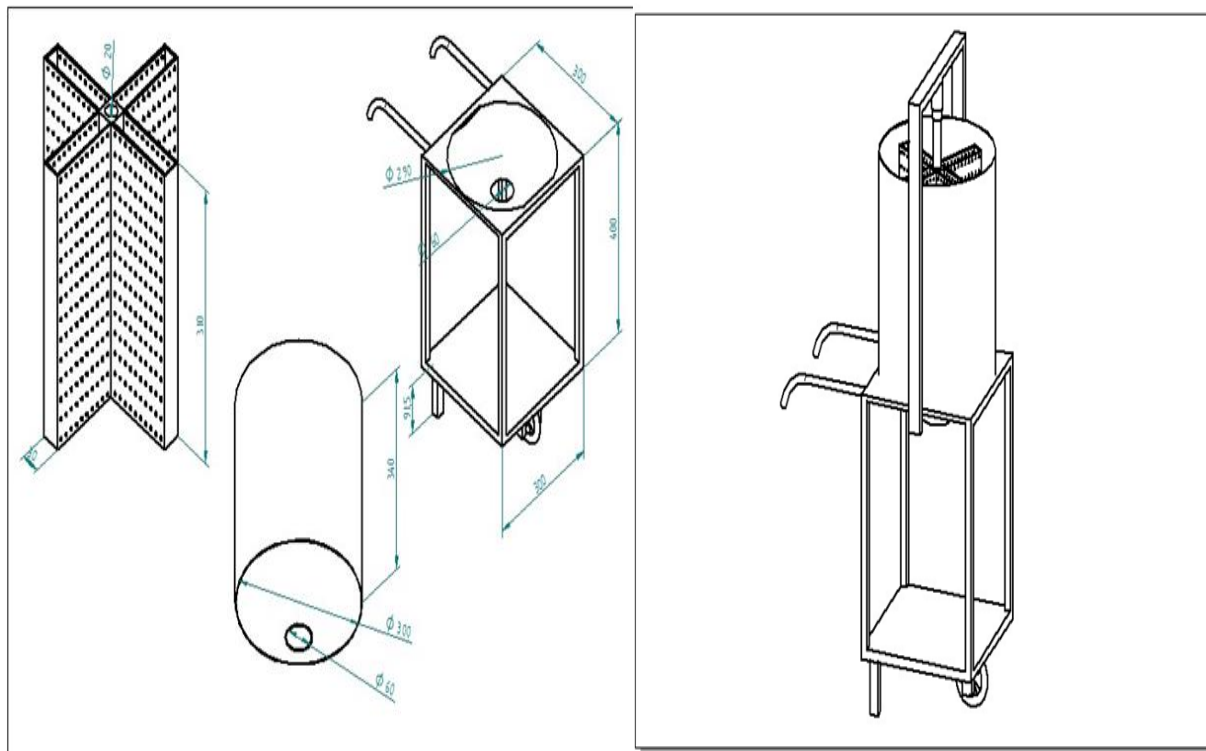
OBJECTIVES:

- ☐ Design and fabrication of semi-automated honey extractor
- ☐ Testing and analysis of the performance of the machine.
- ☐ Extract honey with minimal input from the user.

- ☐ To extract good quality honey.

METHODOLOGY:

- ☐ To understand the availability of the similar machine literature survey was done.
- ☐ Market survey was conducted to know the additional feature required in the machine by the beekeepers
- ☐ According to the market survey and literature survey done, a design was proposed.
- ☐ By using the various design aspects, a model was created by using solid edge software.
- ☐ The machine was fabricated according to the design specification.
- ☐ Testing for the fabricated machine was done and found out that 310rpm was the ideal speed.
- ☐ Analysis was done by comparing semi-automated honey extractor and manual honey extractor.



37. MAGNETIC LEVITATION

COLLEGE	BEARYS INSTITUTE OF TECHNOLOGY
GUIDE	PROF. MOHAMMAD KAFEEL
COLLEGE STUDENTS	MOHAMMED FAZAL, SYED YASIR MUSHARRAF
SCHOOL STUDENTS	MOHAMMAD AZFER, S. M ANAS

ABSTRACT:

Maglev is a method of propulsion that uses magnetic field to propel vehicles with magnets rather than with wheels, axles and bearings. With maglev, a vehicle is propelled a short distance away from a guide way using magnets and coils. High-speed maglev trains promise dramatic improvements for human travel if widespread adoption occurs. Maglev trains move more smoothly and somewhat more quietly than conventional mass transit systems. Their non reliance on friction means that acceleration and deceleration can surpass that of wheeled transports, and they are unaffected by weather. The power needed for levitation is typically not a large percentage of the overall energy consumption. Most of the power is used to overcome air resistance (drag). Although conventional wheeled transportation can go very fast, maglev allows routine use of higher top speeds than conventional rail, and this type holds the speed record for rail transportation. Attempt is made in present work to develop mini vehicle for local short distance transportation purpose using MAGLEV working principle. Also tried to overcome problem occur in present conventional vehicle by overcoming friction, wear and eliminating use of exhaustible fuel.

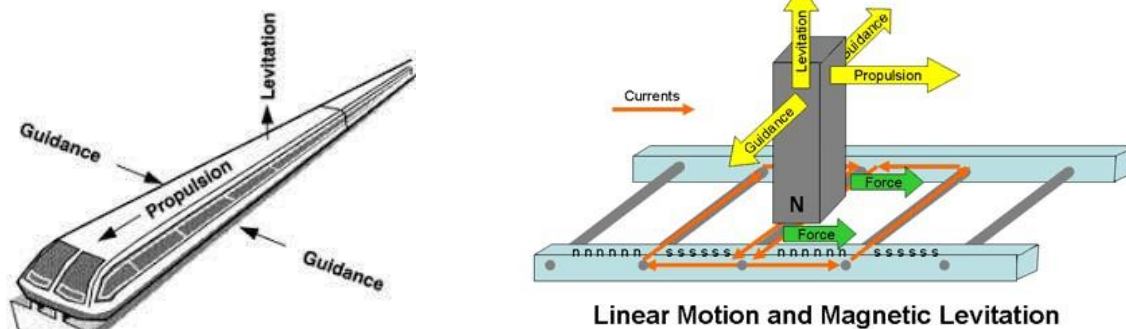
INTRODUCTION

Maglev is a transport method that uses magnetic field to move vehicles.

Compared to conventional wheeled trains, differences in construction affect the economics of maglev trains. With wheeled trains at very high speeds, the wear and tear from friction along with the concentrated pounding from wheels on rails accelerates equipment deterioration and prevents mechanically-based train systems from routinely achieving higher speeds. Conversely, maglev tracks have historically been found to be much more expensive to construct, but require less maintenance and have low ongoing costs. Despite decades-long research and development, there are presently only two commercial maglev transport systems in operation, with two others under construction. In April 2004, Shanghai began commercial operations of the high-speed Trans rapid system. In March 2005, Japan began operation of the relatively low-speed HSST "Linimo" line in time for the 2005 World Expo. In its first three months, the Linimo line carried over 10 million passengers. South Korea and the People's Republic of China are both building low-speed maglev lines of their own design, one in Beijing and the other at Seoul's Incheon Airport. Many maglev projects are controversial, and the technological potential, adoption prospects and economics of maglev systems have often been hotly debated. The Shanghai system has been accused of being a white elephant.

WORKING PRINCIPLE

The magnetized coil running along the track, called a guide way, repels the large magnets on the train's undercarriage, allowing the train to levitate above the guide way. Once the train is levitated, power is supplied to the coils within the guide way walls to create a unique system of magnetic fields that pull and push the train along the guide way. The electric current supplied to the coils in the guide way walls is constantly alternating to change the polarity of the magnetized coils. This change in polarity causes the magnetic field in front of the train to pull the vehicle forward, while the magnetic field behind the train adds more forward thrust. Maglev train float on a cushion of air, eliminating friction. This lack of friction and the train aerodynamic designs allow these train to reach unprecedented transportation high speeds or twice as fast as fastest commuter train.



APPLICATIONS

- For automobile application
- For Railway Department
- Industrial application

ADVANTAGES

- High speed can be obtained
- Maglev train cars are less expensive to build and are relatively quiet in comparison to conventional trains.
- The maglev tracks take up a lot less land, because they are elevated. This also reduces the amount of collisions and accidents.
- No traffic!
- Maglev trains use far less energy than other types of transportation.
- Maglev trains do not pollute (since instead of using fossil fuels, magnetic fields are used to levitate and propel the trains forward).
- Maglev trains are much faster, because they float over the track eliminating rolling resistance and potentially improving the power efficiency.
- Maglev trains require Less maintenance (no wear because they float over the track).
- A lot of potential. The possibility of linking 2 cities, over a distance of 1500km.

DISADVANTAGES

- Cost is major issue when considering maglev trains, especially since they cannot operate on the existing, conventional rails. Guide ways would need to be built in order to make use of this new technology.
- The weight of the electromagnets in the EMS and EDS systems are also an issue. A very strong magnetic field is required to levitate the heavy trains and maintaining the field constant requires a lot of energy.

COMPONENTS AND DESCRIPTION

The major parts that are effectively employed in the design and the fabrication of the magnetic levitation train are described below:

1. Battery,
2. Frame,
3. Magnetic arrangement,
4. Control unit.



Total: Rs 12,786/-

FUTURE WORK

- System can be improved by using self-generating power which can be used when the coils etc. fails or improper working.
- Various sensors can be used in order to get more efficient operations.
- Sensors can also be used for Safety measures.

CONCLUSION:

This project work has provided us an excellent opportunity and experience, to use our limited knowledge. We gained a lot of practical knowledge regarding, planning, purchasing, assembling and machining while doing this project work. We feel that the project work is a good solution to bridge the gates between the institution and the industries.

In conclusion remarks of our project work, let us add a few more lines about our impression project work. Thus we have developed a **“DESIGN AND FABRICATION OF MAGNETIC LEVIATION TRAIN”** which helps to climb up the walls of high rise buildings at a significant low

cost which may be used for several applications. By using more techniques, they can be modified and developed according to the applications.

When it comes to learning associated with Young Learners, they have gained a practical understanding of Magnetic fields, transportation and some engineering topics. Also they are being acknowledged with Automatic sensing using sensors (proximity, optical sensors etc...) will give them an insight to Industrial Automation and Robotic.

Project Cost

Sl. No.	Particulars	Amount (Rs)
1	Materials (Frames, Wires, Nuts & Bolts, Coil Platform, etc.)	1,101
2	Control unit	3,125
3	Coil winding	3,900
4	Battery	1,200
5	Miscellaneous	3,460

38. DESIGN OF EMBROIDERY STAND

COLLEGE	BMS COLLEGE OF ENGINEERING
GUIDE	MS KAVITHA RANI N
COLLEGE STUDENTS	THIRUMALA SV
SCHOOL STUDENTS	ARADHYA DHANRAJ, C. P. LALITHA SHREE, SWARGARANI SCHOOL & P U COLLEGE

ABSTRACT:

A completely detachable fabric frame holder, for the purpose of holding the frame firmly, which is commercially available in different sizes, enabling the artist to work on the fabric with ease. The work on fabric can be embroidery or other artworks such as painting, aari work, zardosi work etc. The stand consists of a rigid base with two vertical sliding arms, each having a holder, which can be tightened to hold the frame. The arms can move horizontally along provided dovetail joints, and can be locked in place, so as to adjust it to the different sizes of the fabric frames. The stand promotes women, especially from the rural areas, to carry out craft on the cloth, without much stress in holding the hoop in their hand, so as to help promote not only the artistry of women, but also to improve small scale trade in rural areas, for economic development.

HYPOTHESIS:

The usage of the hoops necessitates the artist to hold it in one hand and work with the other. This has a few disadvantages. The work, at times, may need the usage of both the hands, is difficult. Since the work takes large durations of time, holding the work in one hand, and working with the other, creates ergonomic difficulties to the artist, and can cause aches in the hand and the back. In small scale handicraft production, the difficulties are multiplied. This necessitates the need of a stand to hold the hoops, freeing the artist of this additional burden, and so that they can work at a faster pace with both the hands.

The stand should be able to satisfy the user needs efficiently. It should be able to securely hold the hoop, preferably the outer ring, and not harm the fabric in any way. Once fixed, there should be sufficient space for the artist to work with ease, above and under the fabric. The holder should be such that the work is tilt-able, not compromising the grip, once in the new orientation. It should also be able to adjust to different heights. The major concern, is that it should be adjustable to different diameters of rings that are commercially available, and should be able to lock onto the new position, after every change. The fasteners and joints used for these transitions should be smooth, quick and efficient for the transitions, and should also be securable in the new position. It is also necessary to have the different positions of the vertical arms marked, for different ring sizes. The wood used for the job should be cheap, light, easily

The cloth to be worked on, is fixed in the embroidery hoop of the required size, stretched and tightened. The vertical arms of the hoop are slid horizontally to the desired position, preferably at equal distance from the center, using the markings on the base as the guide, and tightened in the position. The Clamping assembly is adjusted vertically; its angular position is set, according to the comfort of the artist and tightened in the position. The slider of the clamping assembly is loosened, and the hoop is fixed, so that about half the thickness of the ring of the hoop rests in the two clamps, and the slider is tightened. The artist can work on the cloth, changing the position of the hoop as required for the work, when required. Two blind holes in the base, would be used by the artist to keep small beads, threads etc. to make it easier for the artist to work.

EXPERIMENT:

The cloth to be worked on, is fixed in the embroidery hoop of the required size, stretched and tightened. The vertical arms of the hoop are slid horizontally to the desired position, preferably at equal distance from the center, using the markings on the base as the guide, and tightened in the position. The Clamping assembly is adjusted vertically; its angular position is set, according to the comfort of the artist and tightened in the position. The slider of the clamping assembly is loosened, and the hoop is fixed, so that about half the thickness of the ring of the hoop rests in the two clamps, and the slider is tightened. The artist can work on the cloth, changing the position of the hoop as required for the work, when required. Two blind holes in the base, would be used by the artist to keep small beads, threads etc. to make it easier for the artist to work.

SUMMARY:

It can be concluded that the human effort required in holding the embroidery hoop in one hand, and working with the other, poses ergonomically difficulties, which can be eliminated with the usage of the embroidery hoop stand. The stand would be economical in the long run, used by rural women on a small scale. It can also be use of for hobbyists. The stand can be produced on a small scale by carpenters, and marketed, or the design sheets can be sold, for DIY enthusiasts. The stand provided a rigid base for artwork on cloth, not only embroidery, but also paintings on cloth. It also promotes rural women to work in a group, earning their livelihood. The drawings can also be used for mass production, and the process be automated using CNC machines. The stand can also be used to hold other objects such as a painting board, or a writing pad for user comfort while working.

39. ADVANCED STICK FOR BLIND

COLLEGE	GIRIJABAI SAIL INSTITUTE OF TECHNOLOGY
GUIDE	NIKESH JAGADEESH RAIKAR
COLLEGE STUDENTS	PRIYANKA JANNU, SWATI RANE
SCHOOL STUDENTS	PAYAL RAIKAR, SHRAVANI- BP PUBLIC SCHOOL

ABSTRACT:

Blind stick is an innovative stick designed for visually disabled people for improved navigation. We here propose an advanced blind stick that allows visually challenged people to navigate with ease using advanced technology. The blind stick is integrated with ultrasonic sensor along with light and water sensing. Our proposed project first uses ultrasonic sensors to detect obstacles ahead using ultrasonic waves. On sensing obstacles, the sensor passes this data to the microcontroller.

The microcontroller then processes this data and calculates if the obstacle is close enough. If the obstacle is not that close the circuit does nothing. If the obstacle is close the microcontroller sends a signal to sound a buzzer. It also detects and sounds a different buzzer if it detects water and alerts the blind. One more feature is that it allows the blind to detect if there is light or darkness in the room.

The system has one more advanced feature integrated to help the blind find their stick if they forget where they kept it. A wireless rf based remote is used for this purpose. Pressing the remote button sounds a buzzer on the stick which helps the blind person to find their stick. Thus, this system allows for obstacle detection as well as finding stick if misplaced by visually disabled people.

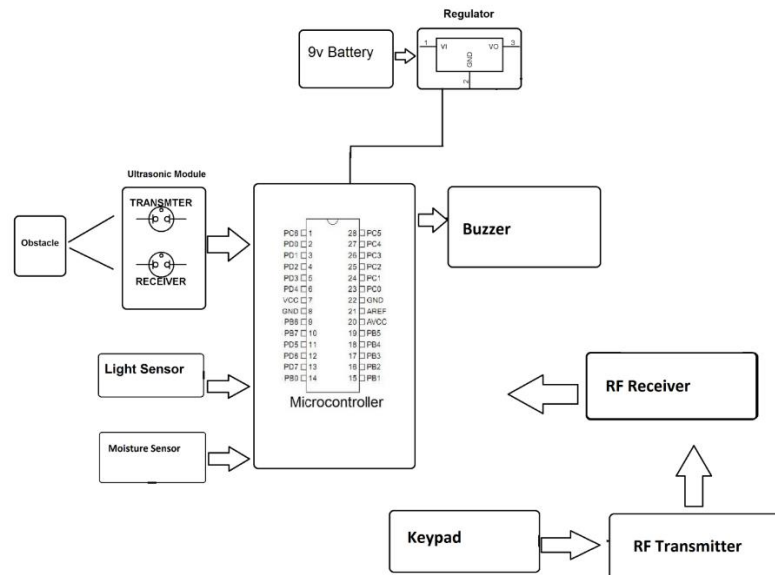
Hardware Specifications:

- Arduino Microcontroller
- Micro-switch
- light Sensor
- Buzzer
- Ultrasonic sensor
- RF Rx-Tx

Software Specifications

- Arduino IDE
- MC Programming Language: Embedded C

Block Diagram:



ATmega328:

The Atmel 8-bit AVR RISC-based microcontroller combines 32 KB ISP flash memory with read-while-write capabilities, 1 KB EEPROM, 2 KB SRAM, 23 general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, SPI serial port, 6-channel 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages), programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts. The device achieves throughputs approaching 1 MIPS per MHz.

Features:

High Performance, Low Power AVR® 8-Bit Microcontroller

Advanced RISC Architecture

131 Powerful Instructions

Most Single Clock Cycle Execution

32 x 8 General Purpose Working Registers

Fully Static Operation

Up to 20 MIPS Throughput at 20 MHz

On-chip 2-cycle Multiplier

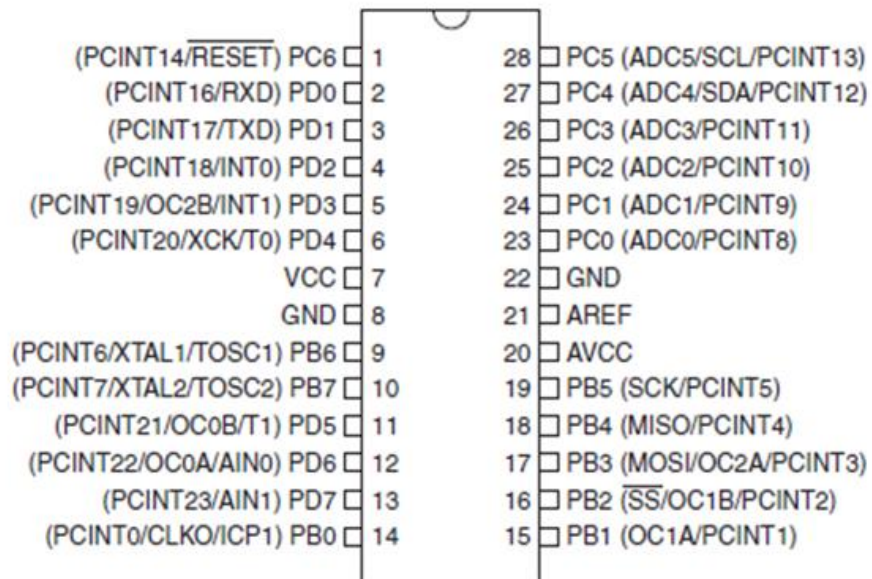
Flash Program Memory: 32 kbytes

EEPROM Data Memory: 1 kbytes

SRAM Data Memory: 2 kbytes

I/O Pins: 23

- Timers: Two 8-bit / One 16-bit
- A/D Converter: 10-bit Six Channel
- PWM: Six Channels
- RTC: Yes with Separate Oscillator
- MSSP: SPI and I²C Master and Slave Support
- USART: Yes
- External Oscillator: up to 20MHz



Project Cost: 12000/-

Commercial cost: 1500/-

40. RAILWAY ACCIDENT CONTROL BY RADAR TECHNOLOGY

COLLEGE	JAWAHARLAL NEHRU NATIONAL COLLEGE OF ENGINEERING
GUIDE	Dr. MANJUNATH
COLLEGE STUDENTS	SHREYAS B, DEEKSHA A, USHA HJ
SCHOOL STUDENTS	BHAVAN KIRAN SAGAR, SREESHA KATEEL, 8 Th STD, NATIONAL PUBLIC SCHOOL

ABSTRACT:

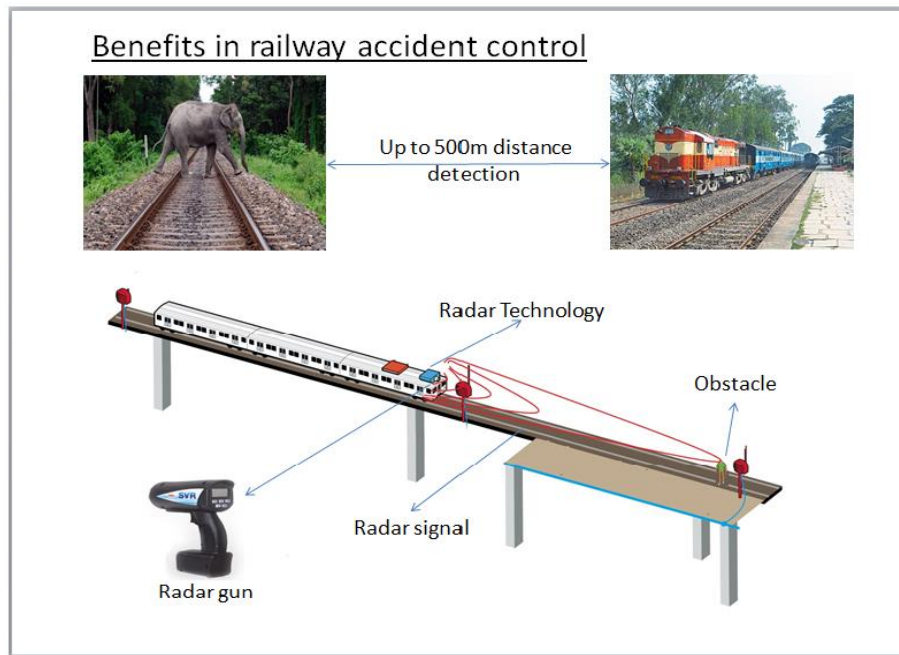
Accidents in railways is the main problem faced by the Indian government, it may due to many reasons. Some of them are railway network through the critical forest and other areas due to sudden arrival of animals or land sliding or may be flaws in the track which may cause death and some part of economical loss .To prevent all of these problems **Radar technology** is used .As per the technology the systems are designed .It works on the principle of bouncing of sound waves, radar source on locomotive shuts the waves which cover about few kilometer's around the train and senses that, is there any problem around the track network. If any, automatically the locomotive reduces the speed.



INTRODUCTION:

RADAR- Radio Detection And Ranging. This uses Principle of **Doppler effect**. RADAR uses Radio waves. Radio waves have the travelling capability of **500m** with a velocity of **330 m/s** (which is more than the velocity of maximum speed train). Radar used in a particular application starts emitting signals from the source antenna to the destination, at the speed of 330 m/s. When the

signal hits/ reaches the destination and gets reflected back then that received by the receiving antenna.



Benefits in railway accident control:

- Accidents in railways is the main problem faced by the Indian government, it may due to many reasons.
- Some of them are railway network through the critical forest and other areas due to sudden arrival of animals or land sliding may be flaws in the track which may cause death and some part of economical loss
- To prevent all of these problems **Radar technology** is used.
- As per the technology the systems is designed.
- It works on the principle of bouncing of sound waves, radar source on locomotive shuts the waves which cover about 500 meters around the train and senses that, is there any problem around the track network. If any, automatically the locomotive reduces the speed or message will be sent to the near receiving sensor.

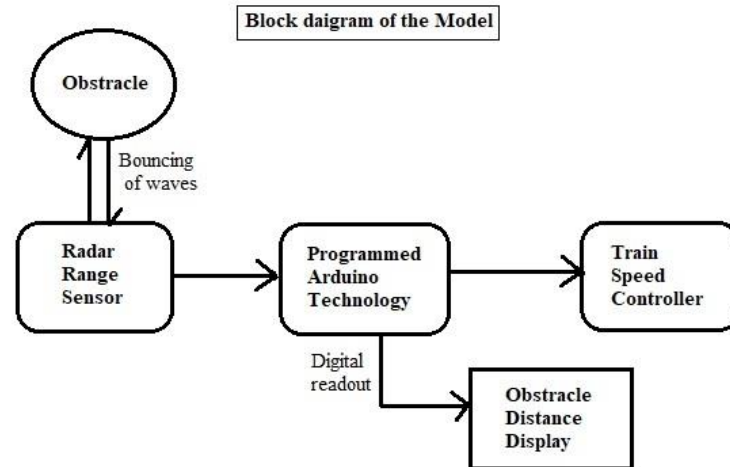
Benefits for society by this Project:

- Many accidents in railways can be reduced.
- This device can be easily implemented.
- This project helps in saving many lives of animals in forest areas.

Marketing:

This project is very useful in Indian railway department; it helps to improve the Indian railway system. So we are planning to Market this with Government of India (Indian Railways).

Block diagram of the prototype:



Expenditure of Real-time model:

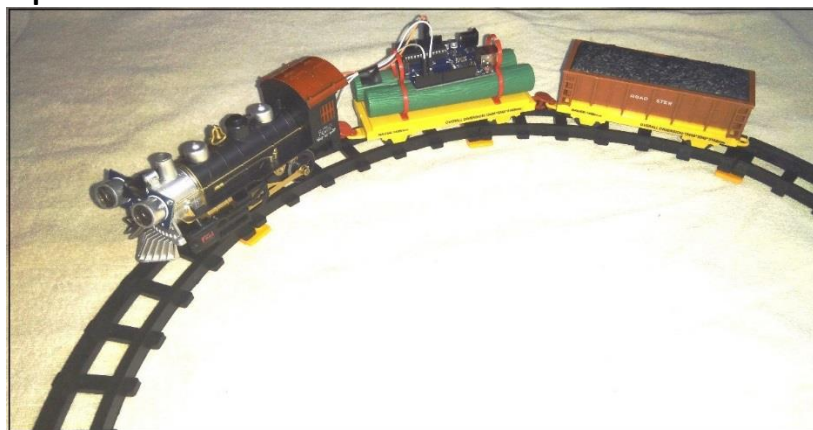
- The cost of exact model including installation is approximately estimated about Rs:1,20,000/-

Components used:

Component	Component Name	Cost
Train Toy	--	1500/-
	Arduino Board	850/-

	Ultrasonic Distance Finder	300/-
Jumper wires kit	--	350/-
Miscellaneous	--	1000/-
Total	--	4000/-

Working model photo:



41. SMART SPECS FOR DISABLED

COLLEGE	P.E.S COLLEGE OF ENGINEERING
GUIDE	D.M SRINIVASA
COLLEGE STUDENTS	MOHAMED ADNAN KHAN, MAUNIKA & JEEVAN T.J
SCHOOL STUDENTS	NOUMAN SHURAIM, MUHAMMAD ABUBAKR - HUDA PUBLIC SCHOOL, MYSORE

Keywords:

Optometrists, Smart specs, Braille, OCR, Lithium Polymer Batteries, GPS

Abstract:

India is now home to the world's largest number of blind people. Of the 37 million people across the globe who are blind, over 15 million are from India. While India needs 40,000 optometrists, it has only 8,000. On the other hand, while India needs 2.5 lakhs donated eyes every year, the country's 109 eye banks manage to collect a maximum of just 25,000 eyes, 30% of which can't be used. Navigating mega-cities on foot can be a fraught experience no matter who you are. But as a sighted person living in a sighted world, it's nearly impossible to imagine what that experience can be like with a visual impairment. There are items designed specifically to help people with vision loss including everything from screen readers or screen magnifiers for low-vision computer users, video magnifiers and other devices for reading and writing with low vision, to Braille watches and Braille printers one of the most emerging idea of integrating all at one device is Smart Specs.

Hypothesis:

India is now home to the world's largest number of blind people. Of the 37 million people across the globe who are blind, over 15 million are from India. While India needs 40,000 optometrists, it has only 8,000. On the other hand, while India needs 2.5 lakhs donated eyes every year, the country's 109 eye banks manage to collect a maximum of just 25,000 eyes, 30% of which can't be used. According to Ajeet Bhardwaj, outgoing president of the Asia Pacific Optometrists Organization, India has 12,000 ophthalmologists who have no time to conduct blindness-preventing surgeries because they are flooded with general eye check-up of patients. "For India, it is vital that ophthalmologists focus on surgeries and optometrists take charge of primary eye care refractive errors like presbyopia, contact lenses, low-vision aids and vision therapies."

Bhardwaj says 153 million people in the country require reading glasses. Optometrists are eye physicians concerned with vision care, eye diseases and prescribe eyeglasses, contact lenses and medications to treat eye disorders.

An ophthalmologist specializes in surgical care of the eyes. India has just 20 optometry schools which produce just 1,000 optometrists annually as against the 17 million people being added to the population during the same period.

There is a shortage of faculty as well. There are also no regulatory laws to control the practice of optometry even though refractive error is one of the leading causes of blindness.

There is, therefore, no recognition, making Indian optometrists migrate to foreign shores. Optometry is among one of the best 10 professions in US and UK. Ophthalmologist Dr. J S Titiyal, specializing in cornea and refractive surgery at AIIMS, agrees.

"Better trained professional optometrists will immensely help India as it will give us time to concentrate on surgery, our primary specialization. Anyway India has just one eye surgeon per 100,000 people. At present, patients come to us even for eye power check-up. The government also needs to standardize optometric education to maintain quality," he says.

Meanwhile, shortage of donated eyes is becoming a huge problem. Of the 15 million blind people in India, three million, 26% of whom are children, suffer due to corneal disorders. But only 10,000 corneal transplants are being done every year due to the shortage of donated eyes. The Union health ministry has already launched a national programme to control blindness and expects to reach its blindness elimination target of 0.3% by 2015, five years before the WHO deadline of 2020.

Take, for example, the ubiquitous pedestrian crossing. While many in India is outfitted with tactile pavements to indicate where to cross and a protruding "cone" device at the bottom of the control box, it can easily take a blind person 10 seconds to orient them enough to safely enter the street. In that time, dozens of sighted Londoners may have already crossed the street without giving it much thought.

A variety of tech-fuelled solutions are now enabling the visually impaired to experience their world in a more customized, intuitive, and independent way, by creating solutions that are low cost and accessible to the roughly two million Indians living with some form of visual impairment. One such tech-fuelled solution is Smart Specs.

Smart specs:

A smart spec is a spec that uses a high-speed, high-definition camera, the smart specs looks like a cross between a pair of everyday sunglasses and a set of virtual reality goggles. They're big, but not obnoxiously huge, and fit over the wearer's prescription glasses via a pair of elastic, magnetic bands. On the front is a 1080p camera that grabs a live video feed of everything in memory, pipes it down to a processing unit that tucks into a pocket or purse, and then sends it back to a headphone speaker.

The person wearing the smart spec has to switch ON the device, with no lag time; the person can listen to the readings of the paper. He or she can also capture photos and store in memory which will recognize and intimate the user when he meets the person.

What's really unique about this device is that it lets anyone instantly auto-focus between short-range visions like reading a book or texting on a Smartphone, to mid-range vision, recognize faces, to long-range vision, such as looking down a hallway or outside a window to read the boards etc.,

How does a Smart Spec work?

1. Cameras are the size of pin heads hidden in the frames to see text or recognize a person

2. Information is sent to mobile phone sized computer in pocket. This simplifies it into an audio and this audio transfer through a media of wires.
3. The computer converts the texts to words which it speaks to a user via headphone.
4. The cameras can also snap photos like bus numbers or railway departure boards and send an audible message via earpiece.
5. There is an integrated system of GPS (global positioning system) which can sense the position of the disabled person.
6. There is a memory allocation to save data like texts, audios etc.,
7. This system uses lithium polymer batteries for better backup and long lasting performance.
8. The images consisting of texts are captured and are read by OCR (optical character recognition) and are read by the headphones.
9. This also has an addition feature as it can be associated with android Operating system to copy and paste data from PC or Laptop or any other devices to the Smart Specs. In future advancements one can use smart spec to replace the Smartphone.

How does an OCR work?

1. Optical character recognition, or OCR, is a method of converting a scanned image into text.
2. When a page is scanned, it is typically stored as a bit-mapped file in TIF format. When the image is displayed on the screen, we can read it. But to the computer, it is just a series of black and white dots. The computer does not recognize any "words" on the image.
3. This is what OCR does. OCR looks at each line of the image and attempts to determine if the black and white dots represent a particular letter or number.
4. OCR was actually developed originally to assist sight-impaired individuals gain access to printed information.
5. That same technology has been updated and improved and is now used to "read" computer files.
6. OCR can be a very powerful tool for a law firm. The key is its ability to produce a text version of the scanned documents. Once a text file has been created, it then becomes possible to launch a text search and locate any page with a given word or set of words.

APPLICATIONS:

1. It helps to meet new people and socialize online.
2. These can be used for educational purposes.
3. Device has a video camera mounted on the frame of the glasses which can capture and save photos.
4. Software projects images of nearby objects to the see-through displays and could retrieve the information as audios.
5. The glasses don't replace lost vision, but an attempt to assist with spatial awareness, this prototype display could one day be the same size as standard glasses.
6. In future it is hoped to cost no more than a smartphone, will allow wearers to experience the world of smartphones.
7. The glasses work by combining information relayed by an infra-red beam and normal video camera. A small computer processes the data before it is retrieved at the headphone speaker.
8. It is thought that up to 100,000 Indians could benefit from the breakthrough, which capitalizes on the fact that most people who are registered blind can still perceive advancements of technology.
9. And despite the bulky prototype, the technology is advancing so rapidly that researchers hope the final product will be no bigger than chunky sunglasses.

CONCLUSIONS:

The technology can now be used in the form of a protective sleeve or cover glass; but we hope eventually to see display manufacturers seamlessly integrate it into the technology so a user can adjust a slider on their phone, tablet, or computer to reach their ideal resolution.

To make life easier for visually impaired people, it's essential to consider their requirements from the inception of the design process, rather than as an afterthought. Hence one such technology is the Smart Specs

Simulation of proposed model to be conducted to improve the practical building of the model

Therefore this positive ramification of this entire research is manifold and will tend to elevate the major problem faced by the blind all over the world. The scientists found that people could quickly get used to the bulky glasses, but it was the third of people with the lowest vision that really found benefits in getting around and avoiding obstacles.

Dr. Hicks' team has set up testing venues in Oxford and Cambridge where they can control the lighting and introduce obstacles to avoid. A total of 30 participants with poor vision will be tracked as they navigate through obstacle courses, with and without smart glasses.

The research and development of the glasses is funded by the National Institute for Health Research (NIHR) and the trials are being carried out with the support of the Royal National Institute of Blind People (RNIB).

The team will next look at how to add features such as face, object or text recognition into the glasses, as well as an audio prompt via an earphone, which could give wearers more information about who or what they are seeing.

42. STRENGTH OF DIELECTRICS

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SCHOOL STUDENTS	SHREYA SRINIVASA D, MINCHANA DEV 8TH STD CARMEL CONVENT HIGH SCHOOL, MANDYA

ABSTRACT:

Insulating oil in an electrical power transformer is commonly known as transformer oil. It is normally obtained by fractional distillation and subsequent treatment of crude petroleum. That is why this oil is also known as Mineral Insulating Oil. Transformer oil serves mainly two purposes one it is liquid insulation in electrical power transformer and two it dissipates heat of the transformer i.e. acts as coolant. In addition to these, this oil serves other two purposes, it helps to preserve the core and winding as these are fully immersed inside oil and another important purpose of this oil is, it prevents direct contact of atmospheric oxygen with cellulose made paper insulation of windings, which is susceptible to oxidation. The mineral or synthetic oil is mostly being used in conjunction with paper as the dielectric medium in most of the high voltage equipment. However, impact on environment, lack of petroleum oil reserves and disposal problems with used oils, have prompted researchers to direct their focus onto biodegradable and renewable insulating materials.

In this work, the life of insulating medium is estimated by comparing the Breakdown strength and Viscosity of different oils with and without moisture and also finding the alternative for mineral oil i.e. vegetable oils which are reliable, cost-effective and environmentally friendly even when they are contaminated.

HYPOTHESIS:

The life of an insulating medium (oil) is estimated by comparing the breakdown strength and viscosity of different oils with and without moisture and also finding the alternative for mineral oil i.e. vegetable oils which are reliable, cost-effective and environmental friendly even when they are contaminated. The breakdown strength voltage varies with different oils and for different distance between electrodes.

For Mineral Oil, the breakdown voltage is about 15KV.

For Palm Oil, it is about 17KV and for Sunflower Oil the breakdown voltage is about 28KV.

Kinematic Viscosity of the testing oil is given by the formula,

$C_{st} = (\text{No of Seconds}) \times (\text{Standard factor of the bulb of the viscometer tube used for testing})$

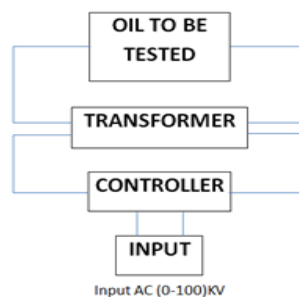
Advantages of Vegetable Oil over Minerals Oil are,

Renewable raw material, high flash and fire point, high dielectric strength, economical, excellent lubricity, high viscosity.

EXPERIMENT:

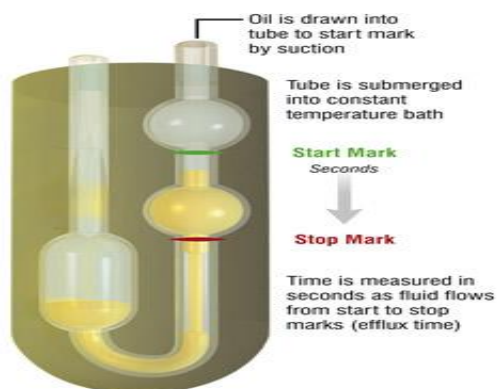
Breakdown Test

In this experiment we are going to compare and study the breakdown strength voltage of transformer oil and vegetable oil. This experiment requires a high voltage transformer and container with electrodes to place the oil. First the oil is poured inside the container and the electrodes are adjusted such that the distance between them is 2.5mm. Now test voltage is applied to the electrodes and is increased continuously up to the breakdown voltage with a constant standard compliant slew rate (2KV/Sec). At certain voltage, breakdown occurs in an electric arc, leading to collapse of test voltage. The test voltage is switched off automatically by the testing device. Oil is stirred and the above procedure is repeated for 5-6 times and the average value of voltage is the breakdown voltage of the given oil. Same standard is maintained for both the oils.



Viscosity Test

Firstly the viscometer has to be cleaned and dried properly. Now we have to introduce the testing oil into viscometer tube and apply suction at the other end until the oil reaches the mark. Now insert the viscometer tube to a holder and place in a Cannon Fenske Viscometer and wait until the temperature reaches 40°C. After this the viscometer tube is taken out and release the suction and at the same time turn on the stopwatch and note down the time taken by the oil to cross the lowest mark and then the time is multiplied with viscometer constant.



Flash and Fire Point Test

Oil cup and other parts of the apparatus are cleaned thoroughly. The oil sample is filled up to the mark in the cup. The thermometer is inserted in the sample. The apparatus is inserted homogeneously through the air bath by the burner. Stirrer is worked with the rate of 2 revolutions per second. Heating is regulated so as to increase the oil temperature by 5°F per minute. At every 2°F rise of temperature, test flame is introduced for a moment by the help of shutter. When a distinct flash appears inside the cup, the temperature reading on the thermometer is the flash point. The procedure is continued as before until the oil vapour catches fire, which stays at least for 5 seconds. This is the fire point of the oil sample.



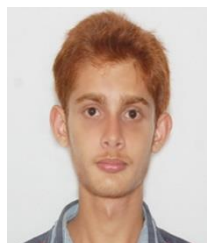
SUMMARY:

From Breakdown Test we can say that the oil with moisture in sunflower oil and palm acts as a better dielectric when compared to the oils with moisture in mineral oil. Hence vegetable oils are better liquid dielectrics when compared to mineral oil even when they are contaminated.

From Viscosity Test we can clearly say that the viscosity of oils increases for oils with moisture. However when compared to mineral oil, sunflower oil and palm oil shows higher viscosity when they contain moisture.

From Flash Point Test we can say that the sunflower oil has larger flash point when compared to mineral oil. So oils without moisture will ignite late when compared to oil with moisture.

From Fire Point Test we can conclude that the vegetable oil has larger fire point when compared to mineral oil. Therefore the oils without moisture will ignite late when compared to oils with moisture.



43. LEADING STICK

COLLEGE	SAMBRAM INSTITUTE OF TECHNOLOGY
GUIDE	PADMASHREE S
COLLEGE STUDENTS	S. ATHULYA, MOHAMMAD IMRAN SHAIKH
SCHOOL STUDENTS	ABHIPSA SAMAL, SHAWNA ROSE GEORGE, 9TH STD, ORCHIDS THE INTERNATIONAL SCHOOL JALAHALLI

ABSTRACT:

Independence is the building methodology for achieving dreams goals and objectives in life. Visually impaired persons find themselves challenging to go out independently. The electronic walking stick will help the blind person by providing more convenient means of life.

The main aim of this project is to contribute our knowledge and service to the people of blind and disable society.

HYPOTHESIS:

Traditionally, visually challenged individuals employ the white stick to aid their mobility outdoors, which provides very limited utility. In order to improve the safety of visually challenged users and enhance their awareness of their surroundings while navigating in outdoor environments, a smart device is needed.

In this project, a smart walking stick for the visually challenged has been presented. The proposed device can detect obstacles as well as terrain changes in the user's path. A conventional walking stick forms the main frame of the device, upon which ultrasonic sensors are mounted at appropriate locations to detect obstacles, steps, and pits in the path of the user.

Additionally, a provision to indicate the presence of puddles and slippery surfaces in the user's path has also been included in the device. The presence of these obstacles is notified to the user by the means of voice recordings played via earphones or through haptic feedback, provided. The smart walking stick further employs GPS and GSM modules which can be used to send a distress signal to the user's kin along with the user's location upon being activated by a simple press of a button. The device is lightweight and is powered by a rechargeable battery. The overall design of the device ensures accuracy, energy efficiency, and easy portability.

METHOD:

The abandoned blind stick allows visually challenged people to navigate with ease. It is integrated with various environmental sensing sensors such as temperature, humidity etc. It is provided with a vocal guide that guides the user as per the surrounding conditions. The scanner

scans the environment with the objects preloaded to the memory inculcating the artificial intelligence of learning image recognition Surface level sensors notify the surface condition, the ultrasonic sensor to detect obstacles around in all direction using ultrasonic waves.

On sensing obstacles, data passed to a controller, the controller calculates the closeness and rate of approaching of a moving obstacle, signals the vocal guide to instruct the user for the corrective action in such situation also informing the user about the nature of obstacle. In case of an accident happening to the user the GPS and GSM module plays its role in identifying the location and informing it to the loaded contacts. Also finding the stick if misplaced by the user.

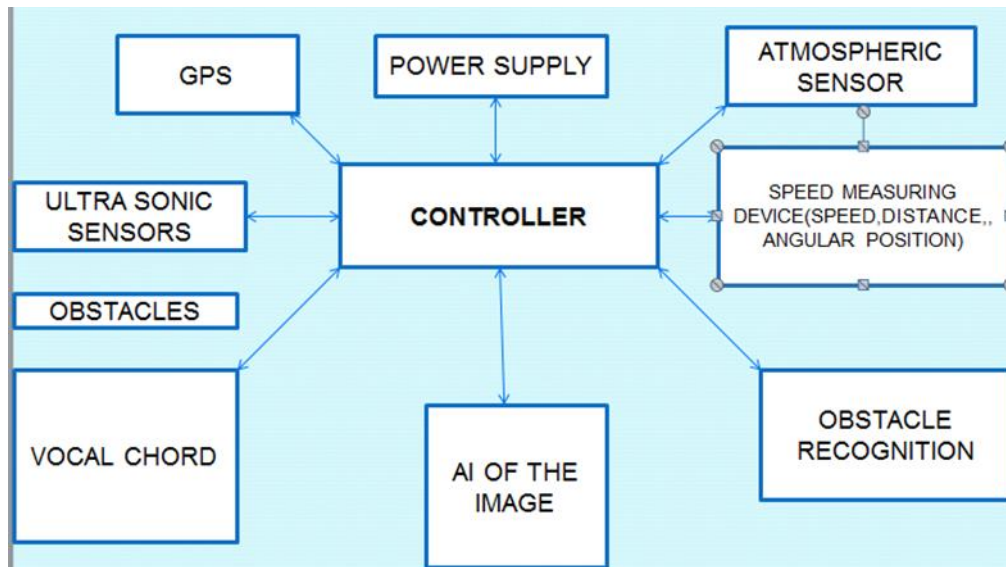


Figure: Block Diagram of Purposed plan.

EXPERIMENT:

The basic frame of the device has been formed by a wooden walking cane. A rigid annular structure was made using aluminum wire at a height of 45 cm from the ground level to accommodate the three ultrasonic sensors for obstacle detection, facing left, Centre and right respectively. The sensors were placed thus to ensure obstacle detection above the knee level. The step sensor was placed at a height Ultrasonic sensor have been used due to their high precision within a shorter distance and resistance to external disturbances such as vibration and electromagnetic interference.

In this device, the HC-SR04 ultrasonic sensor has been used, which has a detection range of 2-400 cm and a viewing angle of 15°. It can determine the distance of obstacles with an accuracy of 3mm, making it perfectly suited for outdoor environments. It is energy efficient, having an operating voltage of 5V and drawing a maximum current of 15mA. The time taken by the ultrasonic wave to return to the detector after reflection can be determined using the time duration for which the Echo signal from the sensor remains high. The distance of the obstacle from the user is calculated using the formula: $D = \frac{v \cdot t}{2}$, Where D is the distance of the obstacle in m, v is 330m/s, which is the speed of the

ultrasonic wave in air, and t is the time duration in seconds for which the Echo signal from the sensor remains high. The distance of the obstacle from the user is then converted to centimeters. GPS module is used to obtain the location of the user along with other useful information such as the altitude and the speed. This module runs a supply voltage of 3.6V and draws a peak current of 67mA, thus consuming low power. The user can send their location as an SMS to a previously specified contact when they are under duress.

SUMMARY:

A smart walking cane for visually challenged individuals that can detect obstacles as well as changes in terrain in the user's path was presented. Multiple ultrasonic sensors were used for obstacle detection in the path of the user, providing a wide field of vision.

A surface level sensor fitted at the base of the walking stick indicates changes in terrain. Feedback for obstacle detection is haptic in nature; terrain information is conveyed through audio recordings that can be heard through earphones.

The GPS and GSM module in the device can be used to send emergency messages to a set of numbers when in distress by the simple press of a button. The modules have been programmed in such a way that the user can be notified of multiple obstacles present simultaneously. It can be inferred that the proposed device is energy efficient and offers significant improvements over the existing devices.

However, there is considerable scope for improvement and addition of features to this device. The ability to distinguish between moving and stationary objects can be added. The smart walking stick can also be interfaced with the user's smartphone to integrate the distress signal feature and to introduce navigation from one location to another, which can be enhanced using online resources.



44. SMART FUEL GAUGE

COLLEGE	VIDYA VIKAS INSTITUTE OF ENGINEERING & TECHNOLOGY
GUIDE	G NARAYANASWAMY
COLLEGE STUDENTS	SANCHAVI H J & NISARGA S V
SCHOOL STUDENTS	NISCHAL UGAD, 9 TH STD, St. THOMAS CENTRAL SCHOOL, MANYA KRISHNA, 9 TH STD, VIDHYA VARDHAKA BM SRI EDUCATIONAL INSTITUTION

INTRODUCTION:

This chapter contains the brief introduction of our project “Smart fuel gauge”, literature survey and motivation to choose this project.

Possessing own transportation has become more common now a days. The number of vehicles on the road keep on increasing and most of us are eager to own personal vehicle as they can go anywhere without limitation.

When we need to refill the fuel to our vehicle, petrol attendants will never refill exact amount of fuel what we demand for. In India, most of the petrol pump (gas station) owners illegally tamper their fuel dispensing machines to dispense less fuel than what is paid for, there by cheating the customers in a rampant manner. This fraudulent practice happens more or less on every petrol pump. And even petrol attendants use many tricks to cheat the customers.

As we seen in petrol bunks the common trick that the petrol attendants use is to engage you with a small talk while setting the meter to level zero in fact customer might not notice if the fuel started from the zero level or the attendant might not reset the meter.

Distraction is the commonly used weapon by the attendants. For example, as shown in the figure 1.1 petrol attendants might ask customer will pay on card or cash or ask for some change.

Sometimes the meter is initially started from zero but it is suddenly stopped in between (say at the Rs. 50 mark when customer had actually asked for Rs.150 worth fuel). On asking, the attendant will then say that he heard incorrectly and would fill the rest of the amount. He will try not resetting the meter back to zero level and then trying to distract customer he'll continue without resetting till the 100 rupee mark. So it would seem to you that a total of Rs. 150 (50 +100) fuel has been put in, but in reality you get only Rs. 100 worth of fuel.



Figure 1.1 Distraction by the attendants.

The queue system as shown in the figure 1.2 is a common scene in most of our petrol pumps and people just lack the patience to wait. The attendant might hurry up and people might end up not looking at the meter customer naturally want to ease up the queue and get moving fast.



Figure 1.2. Customer's waiting in a queue.

When customers realized that they were being cheated, they cannot go for an argument with the petrol attendants, because they have no proof. So, we came up with the novel idea of indicating the exact amount of fuel filled by the petrol attendants called "Smart Fuel Gauge". This concept of knowing the amount of fuel filled by the petrol attendants is the main objective of the project. Here we have done a prototype that gives the information about the exact amount of the fuel filled. We have used the flowmeter which senses the amount of fuel filled and $\mu\text{c-ATMEGA-8}$ to control the necessary operations and calculations. These calculated values are displayed on 16*2 LCD.

MICRO CONTROLLER:

A microcontroller is a small and low-cost computer built for the purpose of dealing with specific tasks, such as displaying information in a microwave LED or receiving information from a television's remote control. Microcontrollers are mainly used in products that require a degree of control to be exerted by the user.

Unlike processor application such as work stations the computing and controlling elements of the embedded controller applications are embedded inside the applications. The consumer is the only concerned with very top-level user interface such as keypads, display and high level commands. Very rarely does an end user know the embedded controller inside (processor type, clock speed, direct memory access (DMA) capabilities and so on).

It is however, most vital for the designers of the embedded control products to select the most suitable controller and companion devices. Embedded controller products are found in all markets segments: consumer, commercial, PC peripherals, and telecommunication, automotive and industrial.

Most embedded products meet special requirements like cost effectiveness, low power and small form-factor and high level of system integration. Typically most embedded control systems are designed around the microcontroller, which integrates the chip program memory, data memory (RAM) and various peripheral functions such as timer and serial communication. In addition, these systems usually require complementary serial electrically erasable programmable read only memory (EEPROM), display drivers, keypads or small display.

Criteria for Choosing a Microcontroller

The first and foremost criterion is that it must meet the task at hand efficiently and cost effectively. In analysing the needs of a microcontroller that can handle the computing needs of the task most effectively.

1. **Speed:** The highest speed that the microcontroller supports.
2. **Packaging:** It may be a 40-pin DIP (dual inline package) or a QFP (quad flat packages), or some other packaging format. It is important in terms of space, assembling, and prototyping the end product.
3. **Power consumption:** This is especially critical for battery-powered products.
4. **Availability of memory on the chip:** the amount of RAM/Rom on the chip.
5. **Availability of peripherals on the chip:** The number of I/O pins and the timer on the chip.
6. **Up gradation :** it is easy to upgrade to higher performance or lower consumption versions
7. **Cost per unit:** This is important in terms of the final cost of the product in which a microcontroller is used.

The second criterion in choosing a microcontroller is how easy it is to develop products around it. Key considerations include the availability of an assembler, debugger, compiler, technical support.

The third criterion in choosing a microcontroller is its ready availability, currently of the leading 8-bit microcontrollers; the 8051 family has the largest number of diversified suppliers. By supplier is meant a producer besides the originator of the microcontroller. In the case of the 8051, this has originated by Intel several companies also currently producing the 8051.

Structure of Microcontroller

Microcontroller consists of the following parts:

- Core
- Peripheral

➤ Special features

Core: The core pertains to the basis features that are required to make the device operate. These include device oscillator: CPU operations, ALU operations and device memory map organization and interrupt origination.

Peripherals: These are the features that add a differentiation to the processor.

These ease the interfacing to the external world such as

- Central purpose I/O
- Timers
- Compare, capture and pulse width modulation
- USART
- Comparators, A/D converters
- LCD drivers
- Voltage reference, parallel slave ports etc.

Special Features: These are unique features that help to do one or more of the following function:

- Decrease system cost
- Increase system reliability
- Increased design flexibility

As the process of miniaturization continues, all the components needed for a controller were built right on to one chip. A one chip or microcontroller, which is a single VLSI unit, was born. A microcontroller is highly integrated chip, which includes on one chip all or most of the parts needed for controller. The microcontroller should be called one chip solution.

It typically includes:

- CPU
- RAM
- EPROM/PROM/ROM
- I/O serial and parallel.
- Timers
- Interrupt controller

A microcontroller is a special digital processor system. It is the most essential part of a control of communication circuit. It imbibes the limited computational capabilities. The latter is particular suitable for the real time control application.

It is capable of performing the following function:

- Enhance I/O capabilities of the external circuit devices or systems including handling of interrupts from or to these.

- Using timers, counters for the series I/O and for the real time control application and of the real time detection of an event
- Programmable control of the interrupts and control of computer not operating properly.
- Performing the bit manipulation in case its ALU associates a Boolean processors and the CPU is capable of processor bit manipulation instruction.
- Interfacing capabilities ADC, DAC.
- Modulation and demodulation task as in modems.
- The digital signal-processing task DFT, FFT.
- A non-linear controller.
- Capable of interfacing external memory.

Applications:

The microcontroller has very diversified applications. Some examples are as follows:

- An accurate control of speed and position of DC motors.
- A Robot.
- A CNC machine
- A Target tracker.
- An automobile signal tracker.
- Bio medical instruments.
- Digital answering machine etc.,

Flow Measurement:

Flow measurement is the quantification of bulk fluid movement. Flow can be measured in a variety of ways. Positive-displacement flow meters accumulate a fixed volume of fluid and then count the number of times the volume is filled to measure flow. Other flow measurement methods rely on forces produced by the flowing stream as it overcomes a known constriction, to indirectly calculate flow. Flow may be measured by detecting the rotating speed of the wheel. The flowmeter used here contains a dial magnetic wheel and a hall effect IC with integral hall sensors.

Detection of Rotation Speed:

Currently, a rotating part such as a small-sized motor is widely used in various fields. To control the rotating part, highly accurate speed detection is one of the essential technologies. The technology used here is to detect the rotation speed using Hall Effect ICs with integral hall sensors.



Figure 3.1 Flowmeter with three wires or terminals

Hall Effect ICs

Principle: A Hall element can obtain the output proportional to the magnetic flux density owing to its principle. Placing magnets in series on a rotating part enables the detection of the rotation speed from the allocation of the magnets or from the detection of the number of poles and magnetic flux. The Hall Effect IC employs the ON/OFF digital output to facilitate the subsequent processing. This is shown in figure 3.2

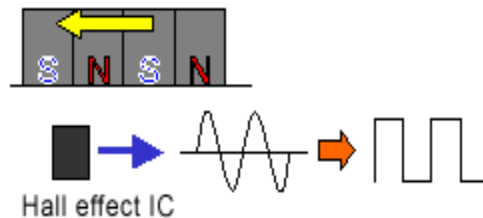


Figure 3.2 working principle of Hall Effect IC

Configuration example: The two typical configuration examples to obtain the magnetic flux density distribution proportional to the travel amount and one characteristic configuration of Hall Effect ICs are shown in figure 3.3 and figure 3.4. The Hall Effect IC integrating a Hall element and signal processing IC into a package is used. The rotor rotation speed can be detected by detecting the magnetic field.

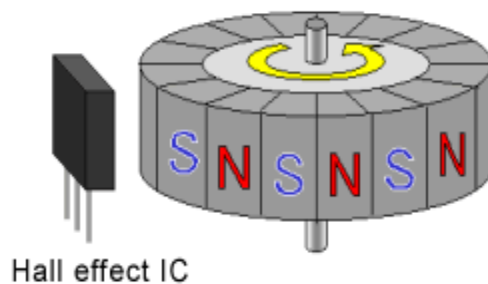


Figure 3.3 Configuration of Pulse encoder

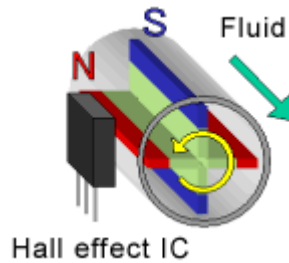


Figure 3.4 Configuration of Flowmeter

Using Hall Effect ICs on a flowmeter in addition to a pulse encoder can implement a downsizing and highly accurate measurement.

Block Diagram

Below figure 4.1 shows the implementation of the block diagram of “Smart Fuel Gauge”
The key hardware components used in our project are flowmeter, μ C-ATMEGA-8 and 16*2 LCD. The reset switches are used to clear the display. The power supply part contains rectifier with capacitor filter and regulator which produces regulated DC voltage of 5V.

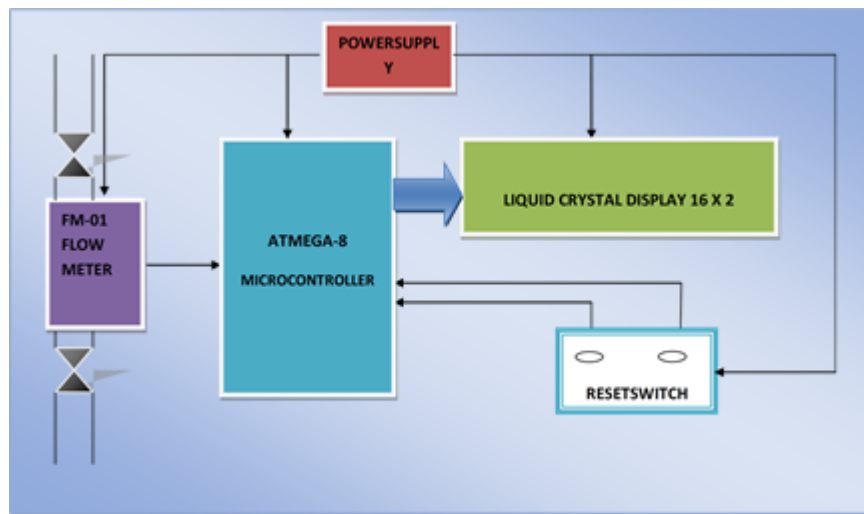


Figure4.1. Implementation of block diagram

LCD Interfacing:

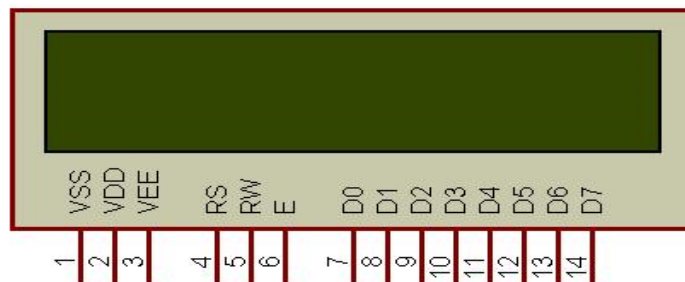


Figure 4.6 LCD

Pin description

LCD (Liquid Crystal Display) screen is an electronic display module and find a wide range of applications. LCD interfacing to microcontroller in 4-bit mode requires only 6 pins. LCD has 16 pins. Out of these, 8 pins (pin 7 to 14) are used for data transfer, 2 pins (pin 2- Vdd, pin 1-Vss) are used for power supply. Pin 3 is used for brightness control of LCD.

There are 3 control pins used for LCD namely RS, RW, EN.

- **RS (Register Select):** Used to switch between data register (RS=1) and control register (RS=0).
- **RW (Read/Write):** Used to indicate the direction of data flow (always '0').
- **EN (Enable):** Used to enable LCD.
-

D4-D7 are the data pins connected to PD4-PD7 of microcontroller and Enable and Register select are LCD control pins connected to PB0 and PB1 respectively. LCD displays the flow rate (L/min) and petrol inputted in litres and millilitres as shown in figure 4.7.

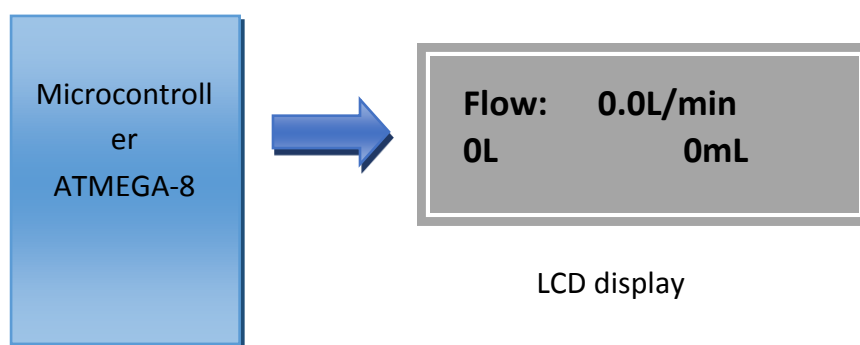


Figure 4.7. Fuel amount is displayed on LCD.

Conclusion:

As the demand for fuel is ever increasing and is at an all-time high. An unplanned shutdown of just one refining can have an immediate impact on fuel or gasoline prices. As the demand grows or if a disruption in supply occurs there will be upward pressure on prices. We should prepare our self to fuel shortages in future. The petrol attendants are looking to make a fast buck by cheating the customers. We never get the exact amount of fuel what we paid for. They play many tricks to cheat people. Some are they can engage the customers in some conversation, they can impress people by their customer friendly talk, and by providing customer friendly services and hence can divert them while refilling the petrol.

Advantages:

- Cost effective
- Light weight and handy.
- Tamper proof.

- Low power consumption.
- High durability due to non-corrosive material
- Prospective Customers:
- Two-wheeler owners
- Car Owners
- Truck / Bus owners
- Practically every person who can be cheated by petrol pumps.

Disadvantages:

- The cost on each product will be less on bulk production or else will be more.

Future Implementation

- One can extend this application to include functionalities that are used to display the cost of the fuel per litre as in the petrol bunks. And to display the distance that can be covered by the available fuel in the tank. These may require the inclusion of one or more LCD for displaying.
- And it can extend further to detect the adulterants in the petrol and diesel. Kerosene is the most common adulterant used in India for petrol and diesel, which not only causes pollution, also troubles the engine.
- This surely save customers money and to overcome malpractices at the petrol bunks. This can be successful on implementing this model in all our vehicles.

45. DIGITAL BRAILLE AUDIO LEARNING DEVICE

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INTRODUCTION:

Braille is an important language used by the blind to read and write. It is vital for communication and educational purposes. The Braille code has become the main system for the majority of those blind people who read and write using tactile means, and can be found in many countries around the world. Braille uses raised dots in groups of six which are arranged in three rows to two columns. These six positions which can be raised or flat, are used in combination to give just 64 different Braille characters. This clearly means that there can be a one to one correspondence between Braille characters and text. The blind person touches the raised dots and understands the English characters. The proposed Braille digital audio learning device makes patterns of all the letters in the alphabetical order on the Braille touch board. The voice module spells out the letters simultaneously and the visually impaired children can learn all the letters using this module by just feeling the Braille touch board. This module will make learning very simple and interesting.

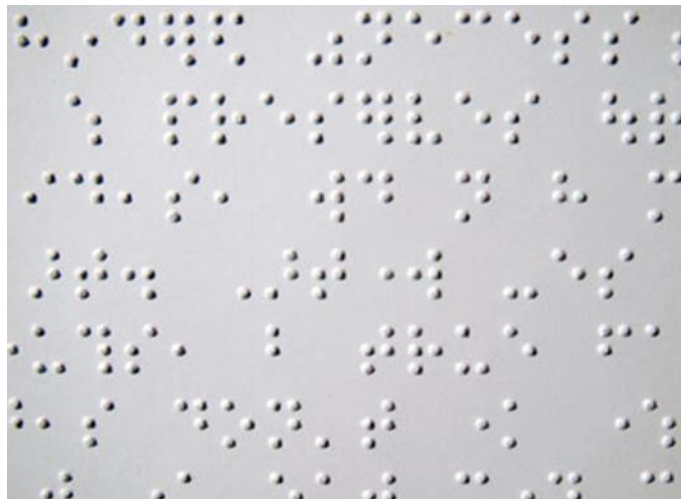


Figure 1.1: Braille sheet

Block diagram Description

System block diagram provides an overview of the proposed methodology. It renders a system design that includes interface with different components and hence an idea of the complete integrated system is obtained.

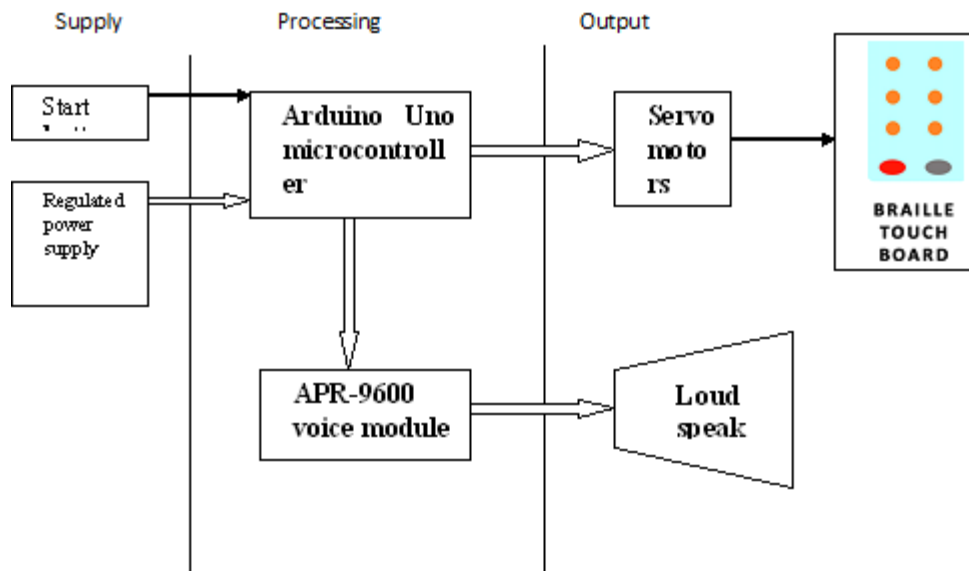


Fig 3.1: Block diagram of Digital Braille Audio Learning Device

The proposed prototype consists of three blocks; one is the power supply, the processing block and other being the output. Figure 3.1 illustrates the supply, processing and output blocks of the Digital Braille Tutor. Referring to figure it can be seen that a microcontroller is interfaced with a Braille board and a voice module. The Braille board consists of six micro servo motors under it. These servo motors are programmed to create the Braille patterns. Once the kit is turned on the voice module starts spelling the letters and the patterns are generated by the motors at the same time with a delay of few milliseconds. The learner can just place his/her hand and feel the patterns and learn the letters by listening to the kit.

Arduino Uno

The second block consists of a microcontroller and a voice module. The ATmega328 microcontroller which is interfaced with servo motors, it drives the motors to generate patterns, Arduino Uno is a microcontroller board based on the ATmega328P. The boards is equipped with sets of digital and analog input/output pins that may be interfaced to various expansion boards and other circuits, It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz crystal oscillator, a USB connection, a power jack, an ICSP header, and a reset button. The board features serial communications interfaces, including Universal Serial Bus on some models, which are also used for loading programs from personal computers. The microcontrollers are typically programmed using a dialect of features from the programming languages C and C++. In addition to using traditional compiler tool chains, the Arduino project provides an integrated development environment (IDE) based on the Processing language project.

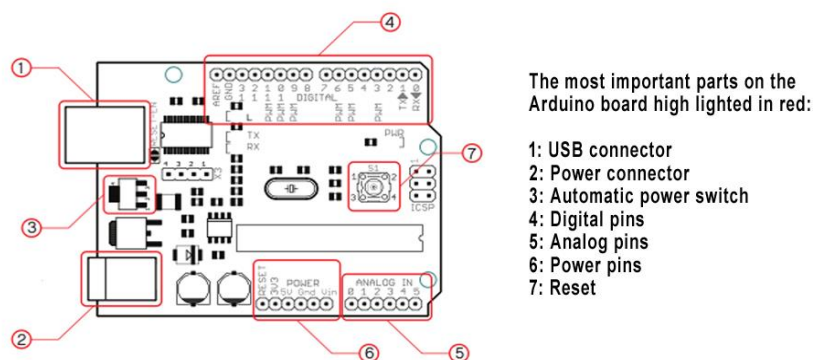


Figure 3.3: Pin diagram of Arduino Uno

CONCLUSION:

The requirement for the progression in innovation and the dependent products is to benefit the society. The proposed prototype fulfills the objectives and gives satisfactory benefits using the Arduino Uno microcontroller which is sufficient to control the pattern generation and to control the voice output. The power consumption has been made as low as possible by making use of the regulated power supply. Most importantly, this prototype helps in reducing the difficulties faced by the visually impaired children in connecting the Braille devices to computes and also difficulties in changing the modes of working of other devices is completely eliminated here. The project was aimed keeping in mind the demands and needs of the visually impaired children, especially of ages between 4 to 6 years.