



Student Projects Technical Record

**Released on the occasion of
Science & Engineering Fair of Selected Projects**

At

National Science Center, Pragati Maidan Delhi

On

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Organised by

Agastya International Foundation

In support with

Synopsis

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FOREWORD

Science and Technology are the engines that drive the development and progress of a country. Science is culture of a society and mostly curiosity driven. Technology, especially science driven technology, is the one which produces wealth for a country. In the present interconnected world and globalized economy, country which can educate its younger population to invent and innovate has a greater chance of success in capturing the market by providing services and products that others are willing to pay to acquire the same.

Dr. Michael Mumford, a distinguished professor of Psychology at the University of Oklahoma, says “Over the course of last couple of decades we seem to have reached a general agreement that creativity involves the production of novel, useful products”. The question, therefore, is how to create creativity. Clearly education is an essential ingredient. Arousing curiosity and building self- confidence to think unconventionally are other necessary attributes.

Over the last couple decades Agastya International Foundation has experimented successfully in science education, kindling curiosity, and in building self-confidence among primary and secondary school children. Among the many innovative ideas implemented by Agastya, Anveshana is a novel one in which the school children are coupled with science and engineering undergraduates to design and demonstrate simple S&T projects. This innovative experiment has led to bidirectional learning of the children and the undergraduates. The themes selected – ecology, environment, energy, water resources, robotics etc. – besides being topical have generated many creative ideas some of which are even implement table as products.

Over the last few years the initial success of Anveshana held in Bangalore has led to its implementation in a few other cities across India. I feel that the spread of this idea is going to challenge the spread of wild forest fire.

I wish Anveshana 2015-16 all the success. I would soon like to see it all the cities in India.

Dr. V.K. Aatre
Scientist and Former Head of DRDO

ABOUT AGASTYA

ABOUT AGASTYA INTERNATIONAL FOUNDATION

Email: agastyadmin@gmail.com | phone: +91-80-2354 5054 / 4112 4132

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 temper 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 pre-screening 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

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 an 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

10th Feb 2016

INVITATION

SCIENCE & ENGINEERING FAIR 2016

Welcome Address: 10 am

Sri. Ramji Raghavan
Chairman, Agastya International Foundation

Inauguration: 10.10 am

Prof. Ashutosh Sharma
Secretary, Department of Science And Technology,
Govt. of India

Abstract Book Launch: 10.20 am

Dr. Rajeev Murgai
Principle Engineer, Design Group, Synopsys

100 Times Curious - Book Launch: 10.30 am

Dr. V.K. Aatre
Scientist and former head of DRDO

Guest of Honor

Sri D. Rama Sarma
Director, National Science Centre, Delhi

Members of the Jury Panel:

Sri. Sanjay Jain
Sr. R & D Manager, Solutions Group, Synopsys

Sri. M.G. Subramanian
Educationist & Advisor
Agastya International Foundation

Dr. Debajyoti Bera
Asst. Professor, IIT-Delhi

11th Feb 2016

Welcome Address: 3 pm

Sri. Ramji Raghavan
Chairman, Agastya International Foundation

Keynote Address: 3.10 pm

Prof. Nageshwar Rao
Vice Chancellor (Incharge)
Indira Gandhi National Open University

Awarding winners by: 3.20 pm

Sri. Rajiv Kumar
Director, Solutions Group, Synopsys

Vote of Thanks: 3.40 pm

Dr. Neeraj Goel
Senior R & D Engineer, Solutions Group
Synopsys

Contact: +91 9449596365
Website: www.anveshana.org

Venue : National Science Centre, Near Gate No 1, Bhairon Road, Pragati Maidan, New Delhi - 110001

Supported by



PROGRAM CHART

9 th February 2016		
3 pm to 4 pm	Student Registration (full team should be present)	In the venue
4 pm to 5 pm	Briefing about Anveshana	Mr. Suresh
5:00 PM	Tea/snacks & break for the day	will be served in the venue
8:00 PM	Dinner for participants	will be served at their respective accommodation facility provided
10 th February 2016		
8 am to 8.45 am	Breakfast for participants	will be served in the venue
10 am to 11 am	Inaugural Function	NSC Auditorium
11 am to 1 pm	Model Judging Process Begins	Juries will be visiting each and every stall
1 pm to 1.30 pm	Lunch for participants	will be served in the venue
1.30 pm to 3.30 pm	Models Judging continues	
4:00 PM	Tea/Snack Break	will be served in the venue
8:00 PM	Dinner for participants	will be served at their respective accommodation facility provided
11 th February 2016		
8 am to 8.45 am	Breakfast	will be served in the venue
10 am to 1 pm	Anveshana Fair	Open to School Students & Visitors
1 pm to 1.30 pm	Lunch for participants	will be served in the venue
1.30 pm to 2.45 pm	Anveshana Fair	Open to School Students & Visitors
3 pm to 4 pm	Valedictory Function	NSC Auditorium
4:00 PM	Tea/Snack Break	will be served in the venue

PROJECTS EXHIBITED IN THE FAIR

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1. Saving of Power from Street Lamp Using Motion Sensors

COLLEGE: NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY, NOIDA

GUIDE: Dr. N.R. CHANDAK

SCHOOL STUDENTS: CHANDAN SINGH, CRS GIRLS INTER COLLEGE, SADARPUR VILLAGE, RSS INTER NATIONAL SCHOOL, SADARPUR VILLAGE, NOIDA

COLLEGE STUDENTS: ANSHUMAN SINGH, NAVEEN KUMAR SINGH, URVASHI SHARMA

ABSTRACT

In the world today one of the challenge is to save the electricity without compromising the human needs .The electricity is the life line of today's society, we can't even imagine a world today without electricity. Observing the importance of electricity, everyone in the society is responsible to think and act in the direction of saving electricity. Today if each person will save even one unit of electricity in any field, the whole sum of saving will be huge. So, here we are going to try an idea to save electricity being used in street lamps. We all know that the street lamps work with the solar sensors installed in them i.e. in case of low light they glow automatically, and they are on as long as the natural light is dim whether any vehicle is passing or not. In this project we are going to provide a motion sensor in between two street lamps which are 30 m apart and in such a way that it will work for both pedestrian and vehicles. Passive infrared (PIR) sensors will be used for the concerned project with a purpose of activation of led street lights unless any vehicle or person passes through the motion sensors. A large amount of electricity can be saved in this manner.

HOW TO IMPLEMENT

We will provide the motion sensors in such a way that a pair of street lamp will glow by one sensor, out of two lamps one will be 20m ahead and other lamp will be 80m ahead. In this way if any person will walk on the road the lamp 20m ahead of him will glow and fulfill his requirement of light, in case of any vehicle passing on the road the lamp 80m ahead will glow and meet the requirement of light for driver. Another sensor will be installed along with the motion sensor that will freeze the light for at least 45sec.

EXPERIMENTAL DATA AND OBSERVATIONS

For one LED lamp

Power consumed in one hour - 0.720 KWh

Power consumed in twelve hours – 8.640 KWh

If the electricity cost is – Rs. 5 for 1 KWh (1 unit)

Total cost of electricity for twelve hours – Rs. 43.2/-

Let us assume that the lamp is off for two hours in one night-

Power consumed in ten hours= 7.2 KWh

Cost of electricity for ten hours= Rs. 36/-

Electricity saved in one night= 1.440 KWh

Total saving by one LED lamp in one night= Rs. 7.2/-
No. of lamps in one kilometer for one way= $1000/30=33.33$ (approx. 33)
Total saving in one kilometer in one night= Rs. 237.6/-

CONCLUSION:

By implementing this idea huge amount of electricity and money can be saved.

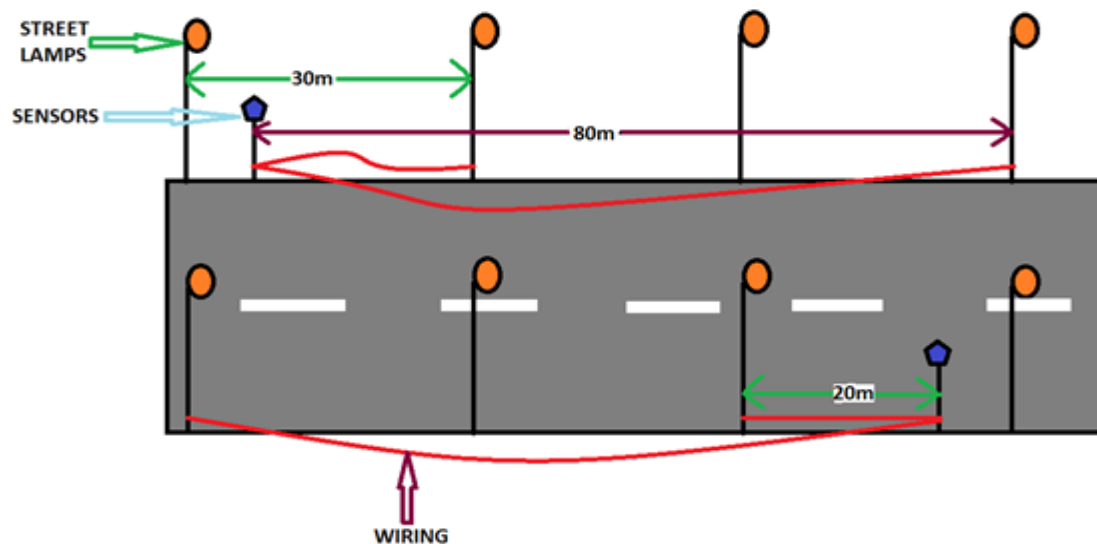
BIBLIOGRAPHY:

J.B. Gupta

SUMMARY:

Implementation of street lamp along with Motion Sensors will save both electricity and money. The Sensors will work in such a way that it can be useful for both pedestrian and drivers.

The pictorial representation of the idea is given below



2. AUTONOMOUS VEHICLE FOR HANDICAPS

COLLEGE: AJAY KUMAR GARG ENGINEERING COLLEGE, GHAZIABAD
GUIDE: Dr. MAMTA BHUSRY, Dr. INDERJEET KAUR, Mr. DEEPAK RAI
SCHOOL STUDENTS: YOGESH KUMAR, RITIK SHARMA, DHRUV
COLLEGE STUDENTS: SHASHANK SHEKHAR, SRAJIT DEVA, GAGAN SINGHAL, ANIMESH KUMAR

ABSTRACT

World's current population is around 7.3 billion out of which around 1 billion (i.e., about 13.5%) people are suffering from various disabilities. That's 1 of every 7 people and as the population ages, this number will grow.

The objective of our project is that people with disabilities travel, shop and live in our community with friends and families, just like everyone else. Hence, we propose an "Autonomous Vehicle" that welcomes people with disabilities to use it; which not only allow movement both inside and outside of their home but also provides an interactivity to be connected with the world. Our project aims to provide a complete solution for people with disabilities. The chair can be controlled by the joy-stick and voice commands of the disabled person. Moreover he can also be connected to the social world through Facebook, Twitter etc.

HYPOTHESIS

The propose model will comprise the following:

- 1) Self-guidance system:** The guidance system will enable the vehicle to trace and identify the path itself using manual or auto mode (i.e., using intelligence).User have to give the location where he/she want to reach as an input to the machine and then machine will self-guide itself to the desired location up to a distance of few metres.
- 2) Path storage:** System will comprise of an inbuilt database to store the path and route to travel along with the location name.
- 3) Obstacle detection and avoidance:** Due to uncertainty of location and environment, a mechanism is required for security of individual from obstacles both indoors and outdoors.
- 4) Social connectivity:** Our project allows people to get connected with family and friends on social networking sites like Facebook, Twitter etc. They can post text messages, voice messages or video messages directly to their account.

METHOD:

The proposed model provides two modes for controlling wheelchair, i.e., Manual Mode and Auto Mode.

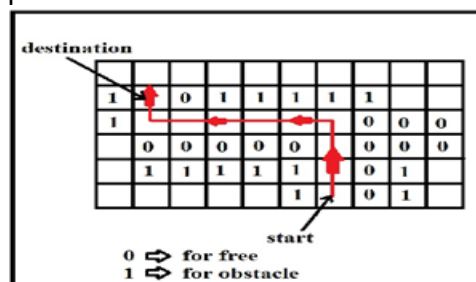
1) Manual Mode:

1.1) Joystick Control:

This mode provides joystick for controlling the wheelchair. Person can guide the chair in different direction using it. The output signal (for direction) given by joystick is transmitted to arduino (microcontroller) which instructs motors to start or stop. In between arduino and motors, a relay assembly is used to control voltage levels required by motors for their proper functioning and to generate required torque. According to the direction of motion the relays are triggered and accordingly the motors rotate resulting in the movement of wheelchair.

1.2) Generating Occupancy Grid Map

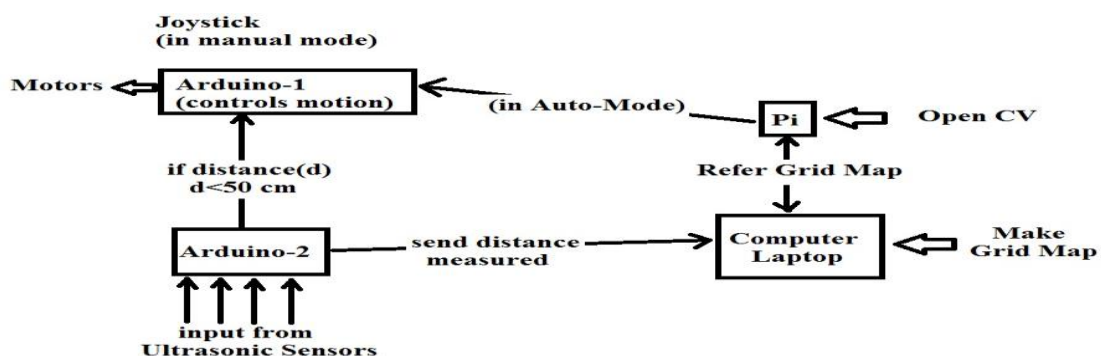
In order to perform motion planning it is necessary to define some representation of the environment and have some method of determining the vehicle location in that environment. The technique used for map representation is the use occupancy grid maps to approximate the environment. An occupancy grid map represents the environment as a block of cells, each one either occupied, so that the vehicle cannot pass through it, or unoccupied, so that the vehicle can traverse it. Information about the environment is collected from sensors in real time. We use Ultrasonic sensors to find obstacles. A binary occupancy grid uses simple true (1) and false (0) values to represent the occupied workspace (obstacles) and free workspace respectively. MATLAB is used to make the grid map of the path traversed by the wheelchair in the manual. The grid tools are used to make the occupancy grid map so that map contains the information about free and the occupied spaces.



Occupancy Grid Map

2) Auto Mode:

During Auto Mode the data is fetched from Grid Map made by using MATLAB and move on that path according to the input (destination position) given by the user. On its way it detects the obstacles and avoids them by the help of the software Open CV. Open CV (Open Source Computer Vision) is a library of programming functions used for real time computer vision. It dynamically detects the path on which the wheelchair can move and also detects the obstacles to prevent any collision.



Block Diagram for Instructing motors in Manual and Auto mode

3) Social Connectivity:

To connect people with their friends and family we are including social connectivity by designing an easy –to-use and interactive .net application using Facebook Graph API to connect with Facebook. Person can instruct the system using Touch panel or voice commands.

DESCRIPTION OF THE COMPONENTS USED

[A] HARDWARE COMPONENTS:

1) ARDUINO MEGA

Arduino is an open-source prototyping platform based on easy-to-use hardware and software. These are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online.

2) RASPBERRY PI 2

The raspberry Pi 2 is a second generation Pi. It consists of a 900MHz quad-core ARM Cortex-A7 CPU and 1GB RAM. It is very useful for development of projects as it acts like a mini-computer.

3) D C MOTOR

It's a device which converts D.C. electric energy into mechanical energy that is rotation after been feed by a D.C source.

4) JOYSTICK

A joystick is an input device consisting of a stick that pivots on a base and reports its angle or direction to the device it is controlling.

5) ULTRASONIC SENSORS

Ultrasonic sensors generate high-frequency sound waves and evaluate the echo which is received back by the sensor, measuring the time interval between sending the signal and receiving the echo to determine the distance to an object

6) CAMERA

The Raspberry Pi camera module can be used to take high-definition video, as well as stills photographs.

7) ACCELEROMETER

These are the instruments used for measuring the acceleration of a moving or vibrating body. They can also be used to measure the distance travelled by a body.

[B] SOFTWARE COMPONENTS

1) MATLAB-

MATLAB is a high-performance language for technical computing. It integrates computation, visualization, and programming in an easy-to-use environment where problems and solutions are expressed in familiar mathematical notation. Typical uses include: Math and computation.

2) OPEN CV-

Open CV (Open Source Computer Vision Library) is an open source computer vision and machine learning software library. Open CV was built to provide a common infrastructure for computer vision applications and to accelerate the use of machine perception in the commercial products. The library has more than 2500 optimized algorithms, which includes a comprehensive set of

both classic and state-of-the-art computer vision and machine learning algorithms. These algorithms can be used to detect and recognize faces & objects, classify human actions in videos, track camera movements, track moving objects, etc.

3) .net Visual Studio:

Microsoft Visual Studio is an integrated development environment (IDE) from Microsoft. It is used to develop computer programs for Microsoft Windows, as well as web sites, web applications and web services. Visual Studio uses Microsoft software development platforms such as Windows API, Windows Forms, Windows Presentation Foundation, Windows Store and Microsoft Silverlight. It can produce both native code and managed code.

EXPERIMENT

In the process of making our project, we analysed many practical aspects and performed some experiments to decide the correct methodology that should be used, while making the project. Few are listed as follows:

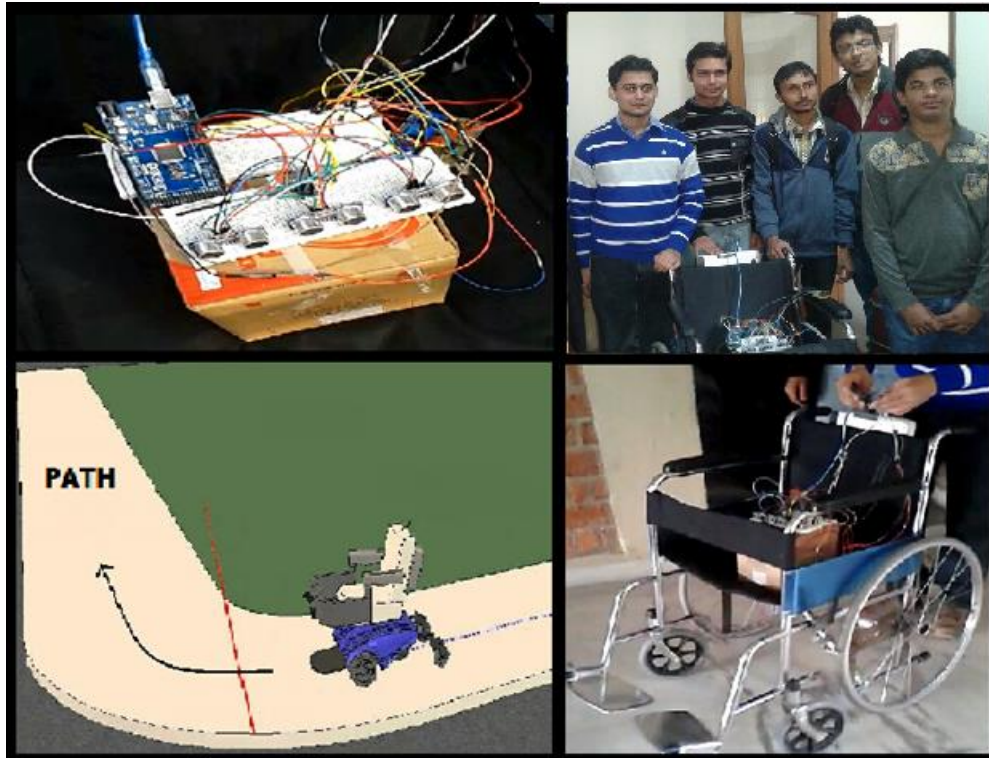
- 1)** Analysed and verified the range of Ultrasonic sensors used for obstacle detection. Analyse to what angles they are capable of detecting the objects.
- 2)** Researched and performed experiments to find the best method that should be adopted for self-guidance system.
- 3)** Studied the drawbacks of GPS (Global Positioning System) and the reasons it can't be used for the autonomous vehicles.

COST

Our project completely follows the concept of create more value from less material resources for more people. We have developed a cost effective wheelchair considering economic conditions and situations of people living in India and South Asian countries. Our project provides:

- 1) Cost effective product comparing to present technology available in market.
- 2) Allows easy mobility of chair.
- 3) Less weight of chair compared to other power wheelchairs.

PROTOTYPE AND TEAM PICTURE:



3. Trains Got Brains

COLLEGE: AJAY KUMAR GARG ENGINEERING COLLEGE, GHAZIABAD
GUIDE: DR. MAMTA BHUSRY, DR. INDERJEET KAUR
SCHOOL STUDENTS: DEVENDRA SINGH, PIYUSH, CLASS-9, MAHARISHI DAYANAND VIDHYAPEETH
COLLEGE STUDENTS: SHASHANK SHEKHAR, SRAJIT DEVA, GAGAN SINGHAL, ANIMESH KUMAR

INTRODUCTION

Train accidents have become part and parcel in our daily routine life. Not a single day passes without them. It usually occurs when trains, travelling on the same tracks collide or when trains derail because of technical faults in the rolling stock, the rails or the security systems, or because of landslides, avalanches or objects obstructing the rails.

Usually, these types of accidents cannot be avoided as the train driver or security personnel do not have enough time to react, unless they are travelling under special protection, in such type of exceptional cases. Such accidents cause direct and indirect damage to people and the environment, especially when they involve trains carrying freight or dangerous or polluting substances.

They are relatively rare, however, and can be avoided by taking strict preventive and protective measures.

ABSTRACT

The solution is mainly focused on setting up reliable sensor devices attached with each train (on both ends). These sensors will be able to detect any train on the same track over a certain distance.

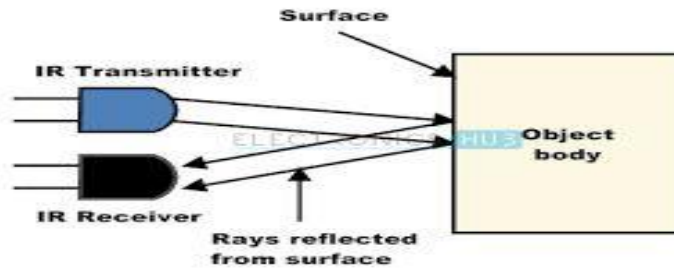
HYPOTHESIS

This will be made possible by a highly interconnected network of devices, communicating with each other, attached with each train.

Each device will contain a transmitter and receiver sensor, which will facilitate intercommunication between devices. A receiver, after receiving signal from transmitter will trigger an alarm which will in turn, inform the driver about trains on the same track.

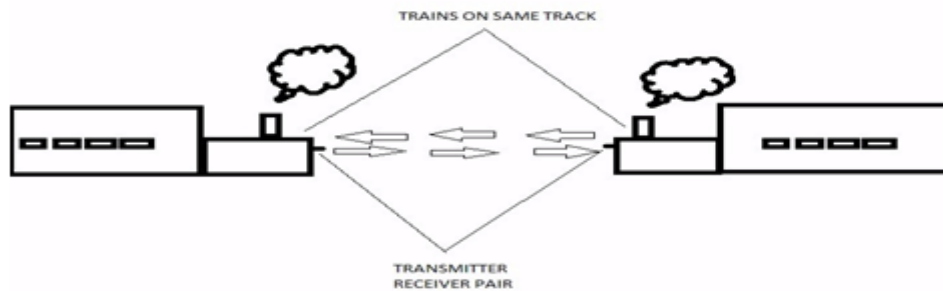
WORKING

An Infrared (IR) sensor is used to detect obstacles in front of them. An IR sensor consists of an emitter, detector and associated circuitry. The circuit required to make an IR sensor consists of two parts; the emitter circuit and the receiver circuit.



The emitter is simply an IR LED (Light Emitting Diode) and the detector is simply an IR photodiode which is sensitive to IR light of the same wavelength as that emitted by the IR LED. When IR light falls on the photodiode, its resistance and correspondingly, its output voltage, change in proportion to the magnitude of the IR light received. This is the underlying principle of working of the IR sensor.

In case of our smart device we can use the above mentioned principles of IR sensors, and hence can establish communication link between the devices on different trains.



So, when two trains come across each other over a certain distance on the same track, then the IR photodiode on one device can detect the IR light coming from the other device's IR LED (mounted on the other train on the same track). This detection can be acknowledged by lightening up of a LED, which can act as an alarm to the train driver, so that he can take all necessary steps so as to avoid any collision.

COST: Rs. 3000/- (Infrared Receiver, Infrared Detector, Microcontroller with base , LED's , toy trains , track , etc.)

BLOCK DIAGRAMS

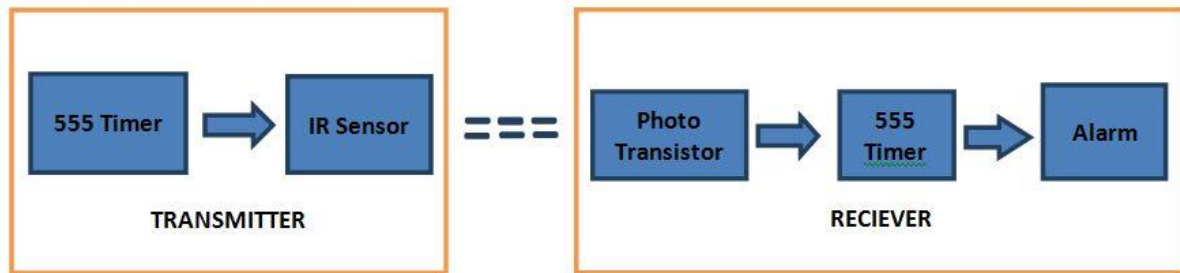
Transmitter section



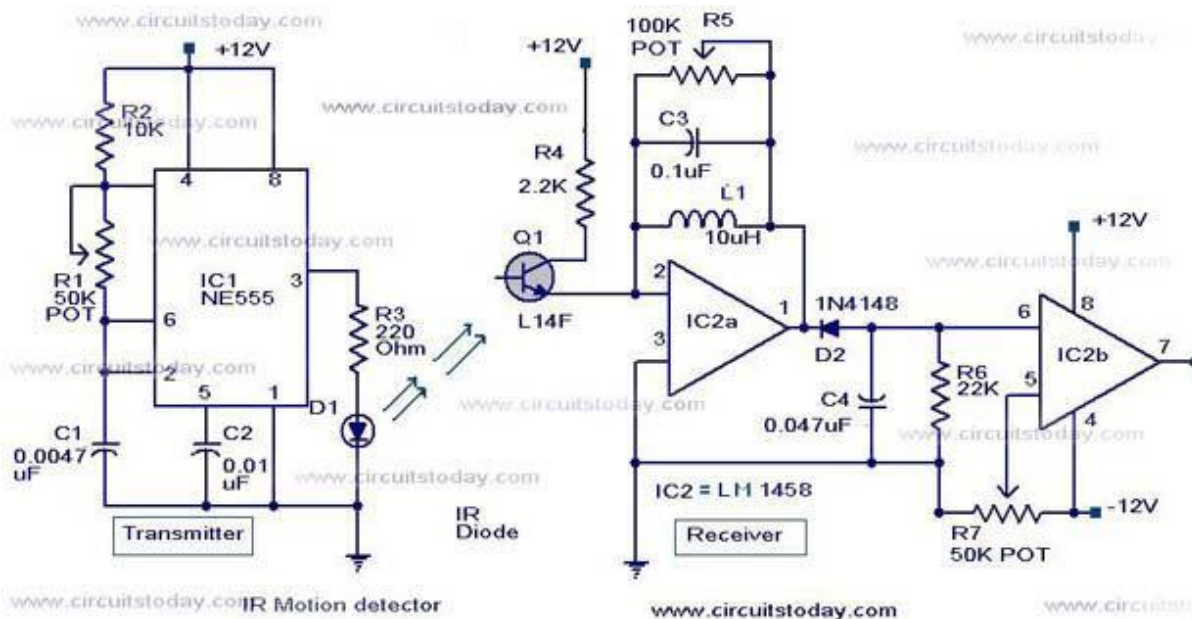
Receiver Section



Block Diagram of Infrared Remote Control Switch



CIRCUIT DIAGRAMS



ADVANTAGES

Absence of any such idea

Only of its type

Focus on lives of mob.

It is of national importance.

Any alternative methodology will be very costly and would take much long to get implemented.

Our smart devices will be easy to install, use and maintain.

FUTURE SCOPE

These sensors will easily communicate among them and with the nearest station as well, and hence can prove to be a great asset when it comes to prevent train accidents. These devices are self-capable of realizing any on-coming danger and can react on their own to avoid it. They will be easy to implement and monitor.

As a result, the trains are going to be smart enough to avoid accidents with minimum human efforts. Various other features can be added with our smart device resulting into a safer journey.

For example: Separate LED screens can be attached with each compartments of train, these screens will continuously communicate to the nearest station via our smart device and hence can be used to fetch information and display it. Information regarding number of trains currently

standing on next station with their platform details and status of various trains arriving there as well, which will avoid a lot of chaos on stations.

These smart trains can not only protect us from unavoidable accidents but can also provide a lot of other services to the common citizens. On the bright side, the basic abstraction of the device will award the people with their lives in case of any mishappening which may have occurred otherwise and will open the gates to a new era of smart trains.

4. Let's Geopark

COLLEGE: AJAY KUMAR GARG ENGINEERING COLLEGE, GHAZIABAD
GUIDE: Dr. MAMTA BHUSRY, Dr. INDERJEET KAUR
SCHOOL STUDENTS: MANAV KASHYAP, ISHAN AGARWAL, CLASS-9, ST. PAULS ACADEMY, GHAZIABAD
COLLEGE STUDENTS: SYED INSHA JAWAID, RAJAT SINGH, RASHMI ARYA, SIDHANT KANDPAL, RAHUL GAUTAM

ABSTRACT

With the increasing population, the need for safety emerges as a major concern of one's life. The proposed system provides a solution to this prominent problem.

The basic concept of the proposed system is Geofencing. It primarily refers to a feature in software program that uses the Global Positioning System (GPS) or Radio Frequency Identification (RFID) to define geographical boundaries. It can also be interpreted as a "Virtual boundary".

The proposed system assists the user by allowing people to create any arbitrary shaped virtual fence for the places they visit. This fence can be fabricated merely with the employment of internet (web) over their smart phones.

The proposed system consists of an interface wherein the users can create a Geofencing according to their requirement. This interface acts as a key to monitor the boundary coordinates of the barrier. Its center would be the current location of the individual. These boundary coordinates become the barrier coordinates whose values are regularly compared with the individual's current coordinates so as to monitor his/her location. As soon as the current location lies outside the fenced area, an event is triggered to alert the individual.

Also, the feature of "Updating" the fenced area makes it user friendly and personaliazble. The proposed system is installed on the vehicle without hindering its functionality.

HYPOTHESIS

1. The prerequisite for the proposed system includes persistent Internet connection.
2. It is believed that the device is present in network coverage area.

METHOD

The proposed system is developed using an amalgamation of cloud and electronic computing. Cloud forms the major feature of the system. Cloud mainly operates on three services which can be defined as IaaS (to record data send by the device), PaaS (to run all the codes) and SaaS (to create web app).

In the proposed system we will incorporate the web interface along with Google map API, which is used to fabricate the polygon of our choice, hence moulding the fence area for the vehicle. This Polygon will be finalized by pressing the “Create Geofence” button on the web interface. Also the feature of retaining the previously accessed geofence, adds another attribute to the system.

The proposed system utilizes the Ray-Casting algorithm to constantly scrutinize whether the vehicle is within the fenced area or not. Also, the GPS module installed in the system will incessantly log the current location of the system. As soon as the vehicle traverses the geofence, an event is triggered and an alert message is sent to the vehicle owner.

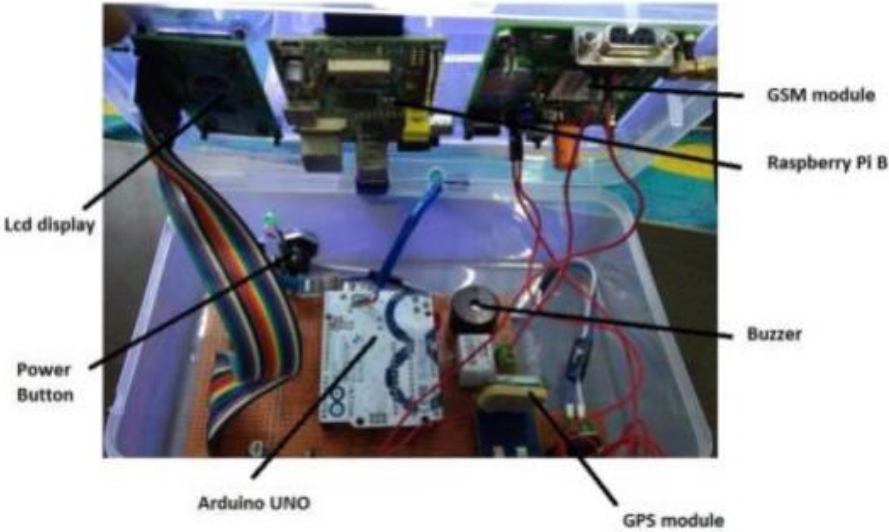


Fig 1. Hardware

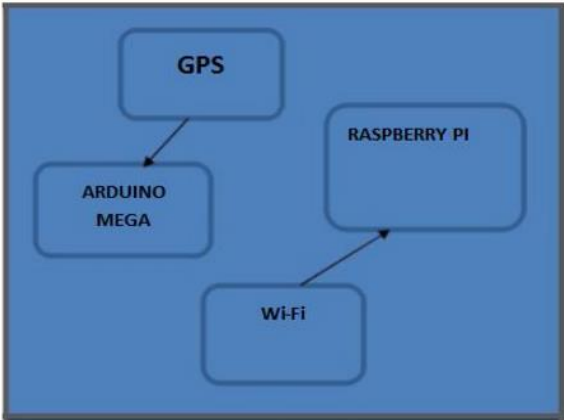


Fig 2. Hardware implementation

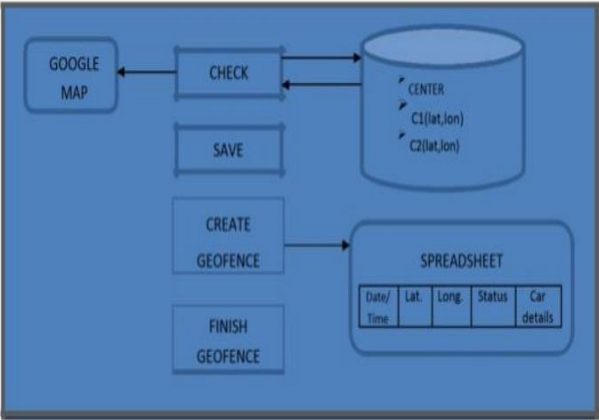


Fig3. Layout of proposed approach

EXPERIMENT

The proposed system is tested for certain areas in order to test its functionality. For example, the snapshot of the geofenced web page depicts the geofence created for vehicle HONDACITY Brown UP 14C 4323 parked at AKGEC (28.725517,77.027206) with three control points

Indergrahi (28.683776, 77.499215), Hi-Tech Institute of Technology (28.672681, 77.495690) and IMS Engineering College (28.680031, 77.509974).As the Fig 4 clearly depicts that the web page contains four controls:

1. Check preset - Use the saved fenced area.
2. Save - Used to save new fenced area.
3. Create Geofence -To activate geofence within drawn area.
4. Finish Geofence-To stop monitoring.

The device contains GPS module which continuously logs values into the spreadsheet. Using this data, Ray-Casting algorithm is implemented in order to know whether the vehicle is inside/outside the fenced area, as it crosses an event is triggered which will send the message to the owner of vehicle stating “HONDACITY Brown UP 14C 4323 out of the fenced area.” well depicted by Fig 5. This message is triggered after the last entry of spreadsheet (28.682959, 77.510137) as it is the first coordinate that lies outside the fenced area.



Fig 4.Screen shot of web page

1	DATE AND TIME	LATITUDE	LONGITUDE	STATUS	USER DETAILS
2	6/10/2015 16:10:00	28.67755	77.500421	CREATE GEOFENCE	HONDACITY Brown UP 14C 4323
3	6/10/2015 16:10:11	28.677616	77.50055	TRACKG	HONDACITY Brown UP 14C 4324
4	6/10/2015 16:10:15	28.677691	77.500453	TRACKG	HONDACITY Brown UP 14C 4325
5	6/10/2015 16:10:20	28.677771	77.500330	TRACKG	HONDACITY Brown UP 14C 4326
6	6/10/2015 16:10:22	28.677875	77.500456	TRACKG	HONDACITY Brown UP 14C 4327
7	6/10/2015 16:10:25	28.677941	77.500585	TRACKG	HONDACITY Brown UP 14C 4328
8	6/10/2015 16:10:28	28.678054	77.500724	TRACKG	HONDACITY Brown UP 14C 4329
9	6/10/2015 16:10:32	28.678138	77.500918	TRACKG	HONDACITY Brown UP 14C 4330
10	6/10/2015 16:10:36	28.678223	77.501036	TRACKG	HONDACITY Brown UP 14C 4331
11	6/10/2015 16:10:39	28.678317	77.501186	TRACKG	HONDACITY Brown UP 14C 4332
12	6/10/2015 16:10:43	28.678411	77.501325	TRACKG	HONDACITY Brown UP 14C 4333
13	6/10/2015 16:10:44	28.678411	77.501325	TRACKG	HONDACITY Brown UP 14C 4334
14	6/10/2015 16:10:48	28.6786	77.501636	TRACKG	HONDACITY Brown UP 14C 4335
15	6/10/2015 16:10:50	28.67876	77.50183	TRACKG	HONDACITY Brown UP 14C 4336
16	6/10/2015 16:10:55	28.678844	77.502012	TRACKG	HONDACITY Brown UP 14C 4337
17	6/10/2015 16:10:58	28.678976	77.502226	TRACKG	HONDACITY Brown UP 14C 4338
18	6/10/2015 16:11:03	28.679145	77.50243	TRACKG	HONDACITY Brown UP 14C 4339
19	6/10/2015 16:11:05	28.679250	77.502634	TRACKG	HONDACITY Brown UP 14C 4340
20	6/10/2015 16:11:08	28.679334	77.502859	TRACKG	HONDACITY Brown UP 14C 4341
21	6/10/2015 16:11:01	28.679597	77.503171	TRACKG	HONDACITY Brown UP 14C 4342
22	6/10/2015 16:11:15	28.679983	77.503825	TRACKG	HONDACITY Brown UP 14C 4343
23	6/10/2015 16:11:18	28.680313	77.504362	TRACKG	HONDACITY Brown UP 14C 4344
24	6/10/2015 16:11:20	28.680567	77.504769	TRACKG	HONDACITY Brown UP 14C 4345
25	6/10/2015 16:11:25	28.680802	77.50508	TRACKG	HONDACITY Brown UP 14C 4346
26	6/10/2015 16:11:28	28.681028	77.505499	TRACKG	HONDACITY Brown UP 14C 4347
27	6/10/2015 16:11:32	28.681282	77.505821	TRACKG	HONDACITY Brown UP 14C 4348
28	6/10/2015 16:11:34	28.68164	77.506368	TRACKG	HONDACITY Brown UP 14C 4349
29	6/10/2015 16:11:38	28.68195	77.50684	TRACKG	HONDACITY Brown UP 14C 4350
30	6/10/2015 16:11:42	28.682261	77.507451	TRACKG	HONDACITY Brown UP 14C 4351
31	6/10/2015 16:11:44	28.682564	77.507982	TRACKG	HONDACITY Brown UP 14C 4352
32	6/10/2015 16:11:48	28.682762	77.508389	TRACKG	HONDACITY Brown UP 14C 4353
33	6/10/2015 16:11:51	28.682837	77.508819	TRACKG	HONDACITY Brown UP 14C 4354
34	6/10/2015 16:11:54	28.682912	77.509287	TRACKG	HONDACITY Brown UP 14C 4355
35	6/10/2015 16:11:56	28.682959	77.509312	TRACKG	HONDACITY Brown UP 14C 4356
36	6/10/2015 16:11:58	28.682942	77.509439	TRACKG	HONDACITY Brown UP 14C 4357
37	6/10/2015 16:12:00	28.683027	77.510137	TRACKG	HONDACITY Brown UP 14C 4358

Fig 4.Screen shot of spreadsheet



Fig 5.Alert Message

SUMMARY

The proposed system employs the Google API interface to enable the user to contrive a customized geofence and also retain it. Also, Ray-Casting algorithm and GPS module uniformly scans vehicle location to trigger the message sending event in case the vehicle spans out of the fenced area.

COST

S.NO	NAME AND DESCRIPTION	PURPOSE	QUANTITY	COST
1.	ARDUINO MEGA 2560	Main M.C.U	1	Rs 1050
2.	RASPBERRY PI	Connecting cloud to device	1	Rs 3200
3.	GPS Module	For GPS coordinates	1	Rs 1799
4.	GSM Module	For GSM(calls, SMS)	1	Rs 999
5.	PIZEO SENSOR	For crash senses	1	Rs 20

Total cost**Rs 7068**

5. Synthesis of Rayon

COLLEGE: G D GOENKA UNIVERSITY, GURGAON

GUIDE: Dr. PRIYANKA SHARMA

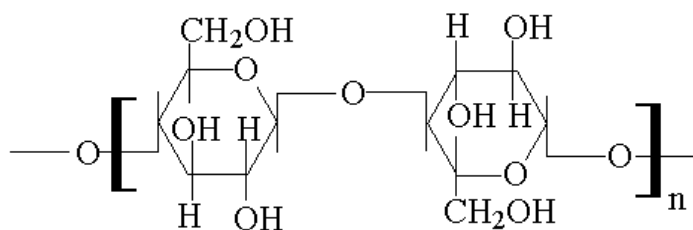
SCHOOL STUDENTS: MANAN KHARBANDA, DESHANT VERMA, CLASS 10, MEWAT MODEL SCHOOL, FEROPUR JHIRKA, MEWAT

COLLEGE STUDENTS: DIKSHA CHAWLA, MAYANK BHARDWAJ

ABSTRACT

Fibers and fabrics play a large role in everyday applications. A fiber is a hair-like strand of material. They are the smallest visible unit of a fabric. Fibers can be spun into yarn and made into fabrics. Synthetic or semi synthetic fibers are nothing just enhancement of the properties of natural fibers like strength, resistant to moths and fungi, abrasion-resistance, low absorbency etc. Rayon is one of the most peculiar fabrics in commercial use today. It is not an artificial fiber, because it is derived from naturally occurring cellulose. It is not, however, a natural fabric, because cellulose requires extensive processing to become rayon. Rayon is usually classified as a manufactured fiber and considered to be “regenerated cellulose”. Rayon is used in a variety of textile applications, including shirts and skirts, and appears in both woven and knitted forms, home furnishing, medical surgical products etc.

Thus, it was, thought to synthesize this important fiber, “rayon (cuprammonium rayon)” in laboratory by dissolving pieces of filter paper in a deep blue solution containing tetra-ammine cupric hydroxide. The latter is obtained from a solution of copper sulphate. In the reaction mixture, NH_4OH solution is added to precipitate cupric hydroxide, which is then dissolved in excess of NH_3 . Strength of the thread was found to be satisfactory.



Structure of rayon

METHOD:

We are using semisynthetic route method.

EXPERIMENT:

Procedure for preparation of RAYON

A. Preparation of Schweitzer's Solution:

a) Weigh 20g of $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$.

b) Transfer this to a beaker having 100ml distilled water and add 15ml of dilute H_2SO_4 to prevent hydrolysis of CuSO_4 .

c) Stir it with a glass rod till a clear solution is obtained. Add 11ml of liquor ammonia drop by drop with slow stirring. The precipitate of cupric hydroxide is separated out.

d) Filter the solution containing cupric hydroxide through a funnel with filter paper.

e) Wash the precipitate of cupric hydroxide with water until the filtrate fails to give a positive test for sulphate ions with barium chloride solution.

f) Transfer the precipitate to a beaker that contains 50ml of liquor ammonia or wash it down the funnel. The precipitate when dissolved in liquor ammonia gives a deep blue solution of tetra-ammine cupric hydroxide. This is known as SCHWEITZER'S SOLUTION.

B. Preparation of Cellulose material:

a) After weighing 2g of filter paper divide it into very fine pieces and then transfer these pieces to the tetra-ammine cupric hydroxide solution in the beaker.

b) Seal the flask and keep for 10 to 15 days, during this period the filter paper is dissolved completely.

C. Formation of Rayon Thread

a) Take 50ml of distilled water in a glass container. To this add 20ml of conc. H_2SO_4 drop by drop. Cool the solution under tap water. In a big glass container pour some of the solution.

b) Fill the syringe with cellulose solution prepared before.

c) Place the big glass container containing H_2SO_4 solution produced before in ice.

d) Immerse the tip of the syringe in the solution and press gently. Notice the fibers getting formed in the acid bath.

e) Continue to move your hand and keep pressing the syringe to extrude more fibers into the bath.

f) Leave the fibers in solution till they decolorize and become strong enough.

g) Filter and wash with distilled water.



SUMMARY:

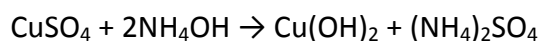
Fibers and fabrics play a large role in everyday applications. A fiber is a hair-like strand of material. They are the smallest visible unit of a fabric. There are different types of fibers natural, semi synthetic and synthetic.

Rayon is one of the most peculiar fabrics in commercial use today. Rayon is a manufactured regenerated cellulose fiber. Because rayon is manufactured from naturally occurring polymers, it is considered a semi-synthetic fiber.

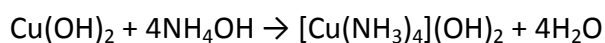
Cuprammonium Rayon:

Cuprammonium rayon is obtained by dissolving pieces of filter paper in a deep blue solution containing tetra-ammine cupric hydroxide. The latter is obtained from a solution of copper sulphate. To it, NH_4OH solution is added to precipitate cupric hydroxide, which is then dissolved in excess of NH_3 .

Reactions:



Pale blue ppt



$[\text{Cu}(\text{NH}_3)_4](\text{OH})_2$ + pieces of filter paper left for 10-15 days give a viscous solution called VISCOSE.

Applications-Synthesized fiber can be used as:

Apparel: Accessories, blouses, dresses, jackets, lingerie, linings, millinery, slacks, sport shirts, sportswear, suits, ties, work clothes;

Home Furnishings: Bedspreads, blankets, curtains, draperies, sheets, slipcovers, tablecloths, upholstery;

Industrial Uses: Industrial products, medical surgical products, nonwoven products, tire cord

Other Uses: Feminine hygiene products were synthesized by cellulosic material.





6. Design of 7W LED Bulb luminary for domestic interior lighting

COLLEGE: G D GOENKA UNIVERSITY, GURGAON
GUIDE: Mr. RAMANDEEP SINGH,
SCHOOL STUDENTS: KAJAK, SEHNAZ
COLLEGE STUDENTS: MONTI KHATANA, POOJA YADAV

HYPOTHESIS

Our aim was to study about designing and fabrication of circuits and prepare low cost LED bulb for domestic Interior lighting for the purpose of charity. We came to learn about the difference between CFL bulb and LED Bulb on the basis of their performance, durability, intensity and many more.

INTRODUCTION TO LED BULBS

Nowadays LED bulbs have become very popular because of their light weight and high luminosity. This paper aimed at study and production of low cost LED bulbs which consumed less power supply and gives more light. LEDs are the next generation in home lighting.

LEDs or Led bulbs are excellent form of lighting and are of low cost and can easily compete with other forms of lighting that are already available in the market. White LED bulbs can easily be used in place of incandescent light bulb which consumes more power and energy.

STUDY ABOUT LED DRIVERS

LED Drivers:

Due to increasing energy regulations, most of us are familiar by now with the long life spans and energy savings associated with LEDs, or light-emitting diodes. However, many are not aware that these light sources require specialized devices called LED drivers to operate.

LEDs require drivers for two purposes:

1. Mainly, LEDs are designed to run at low voltage (12-24V), DC electricity. However, most places supply higher voltage (120-277V), AC electricity. So here an LED driver comes into use. It rectifies higher voltage, AC to low voltage, DC.
2. LED drivers also protect LEDs or LED Bulbs from voltage and current fluctuations. LED output is proportional to the current being supplied to it. Therefore, too much or too little current can cause light output to vary due to higher temperatures within the LED.

4. TYPES OF BULBS

4.1. AC Bulb

As we know LED requires a driver to convert high AC voltage to low DC voltage. However, AC LED bulb fixtures can operate directly from the normal power supply and work on voltages from as low as 12V to up to 240V.

4.2. DC Bulbs

The DC bulb requires conversion from AC to DC power.

These focus on:

- Efficiency consideration: A 15% power loss in the conversion from AC to DC is typical but may be greater if done improperly.
- Sub-components lifetimes: Must be carefully selected to ensure long life.

4.3. Solar Based LED bulbs:

Solar powered LED lights works on solar power and they can be used both indoor and outdoor. Moreover, they are water proof and have a long lifespan of up to 50,000 hours or 11 continuous years.

ADVANTAGES OF SOLAR BASED LED BULBS:

- I. LED lights operate at an efficiency of 90% as compared to incandescent bulbs which operate at 5%.
- II. Reduced energy bills.
- III. Low on maintenance, they have a lifespan of 50, 000 hours.

5. Comparison of LED Bulbs with CFL and Tungsten Filament Bulb

S.No	Fields of Comparison	Light Emitting Diodes (LEDs)	Incandescent Light Bulbs	Compact Fluorescents (CFLs)
1	Life Span (average)	50,000 hrs.	1,200 hrs.	8,000 hrs.
2	Watts of electricity used	6-8 watts	60 watts	13-15 watts
3	Annual operating cost (30 Bulbs per year equivalent)	\$32.85/year or 2081.70 Rs./year	\$328.59/year or 20822.74 Rs./year	\$76.65/year or 4857.31 Rs./year
4	Contains the TOXIC Mercury	No	No	Yes
5	Turns on instantly	Yes	Yes	No
6	Durability	Very Durable - LEDs can handle jarring and bumping	Not Very Durable - glass or filament can break easily	Not Very Durable - glass can break easily

8	On/off Cycling	No Effect	Some	Yes - can reduce lifespan drastically
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6. Method and Production

Fabrication of circuit using EXPRESSPCB: The best way of designing a PCB is through an application named "EXPRESSPCB"

Steps for downloading the application:

1. Opened this link: <http://www.expresspcb.com>.
2. Downloaded the application from the webpage.
3. Open the application.
4. Learned the basic of the application through online tutorials.
5. Designed the circuit which was to be used in the production of LED Bulb.
6. Got the circuit made in Express PCB printed in a glossy paper.
7. Took a copper plated PCB board, traced the circuit from the glossy paper on the board with the help of hot iron.



8. Took some amount of ferric chloride in small amount of water and boiled it.
9. Dipped the circuit fabricated PCB board in the boiling solution of water and ferric chloride.



10. Boiled it further until the copper was completely removed from the board.
11. Washed it and rubbed it with a sand paper.
12. Drilled small holes wherever soldering was to be done.
13. Soldered the components on the fabricated board.
14. Tested the circuit.

7. Production Process:

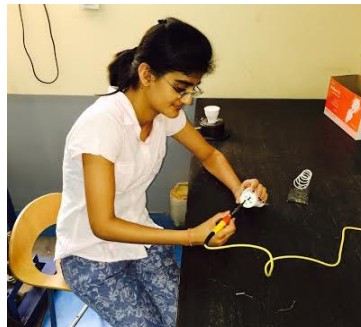
Now when the circuit was ready we were supposed to start working on the final product.

1. Cleaned the work station where the actual work was supposed to be done.
2. Set up different tables for the each step of manufacturing.

- Kept the raw material on the corresponding tables.
- Clamping: was done to clamp the plastic body with the lower portion.



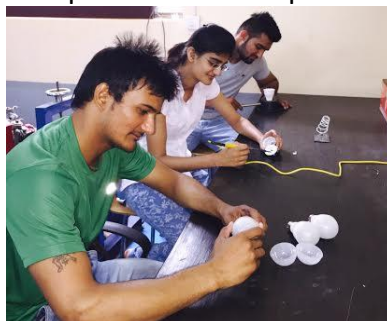
- Then soldering of components was done:



- Assembly: the components were assembled carefully.



Overall work was done in different steps to make it simpler and faster.



- Soaking test: testing of each and every single bulb was done.



8. Stocking rack: the bulbs manufactured were placed on a stocking rack.



CONCLUSION/SUMMARY

From this project report we studied the basic introduction of “Design of 7W LED Bulb luminary for domestic interior lighting”. We studied the difference between CFL, tungsten bulb and LED bulbs. It was opportunity for us to see how theory is put into practice. LED bulb helps in reducing the electricity bills.

COST

Each bulb cost us around 180 rupees.

7. Street Light and Traffic Light Automation System

COLLEGE: BHARATI VIDYAPEETH'S COLLEGE OF ENGINEERING
GUIDE: Mr. SANDEEP BANNERJEE
SCHOOL STUDENTS: SALONI, MANSI, ANJALI, CLASS 9, SARVODAYA KENDRIYA VIDYALAY, D BLOCK
COLLEGE STUDENTS: HIMADRI SINGH, GAGAN BATRA

ABSTRACT:

The proposed model aims at reducing the power consumption in each and every nook and corner of the country by converting the conventional roads into smart ones with the inclusion of technology and automation. This in addition to the smart homes can constitute smart cities. According to Central Electrical Authority, 1% energy consumption in India is on public lightening and till 2030 the Government of India plans to build 2.5 billion square meters of roads which would put more pressure not just on the economy but also on the energy resources. Hence, in the proposed model the current problem has been addressed with the use of LED bulbs and light dependent resistor(LDR) to make the process of turning the lights on and off automatic. In addition to that, for reducing the number of deaths due to delay in reaching the hospital in India the model uses an IR sensor to detect the special vehicles like ambulance to automatically enable it to pass through traffic checkpoint in the condition of a red light also. There is also a provision of displaying the color of the next traffic light on LCD screens in the vehicles to decongest the roads.

HYPOTHESIS:

The motivation behind the model fabrication has been not just to reduce the power consumption but also to effectively and efficiently consume the power available to facilitate sustainable growth.

Hence three major hypothesis have been researched upon-

- 1- The LED bulbs consume less power as compared to the generally used incandescent bulbs.
- 2- All the street lamps are not required to function for the whole day and hence their turn off time has to be regulated.
- 3- The easy passage of special vehicles like ambulances and police vehicles is possible by pre-programming the traffic lights to sense them.

METHOD:

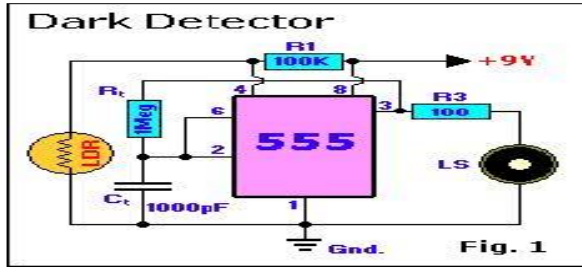
The methodologies undertaken are simple but effective. Before adopting any methodology we have kept in mind that there are two ways in which we can develop sustainably-

- a- By using renewable sources of energy
- b- By using the available energy judiciously

Hence we have tried to implement the second approach. Our proposed model comprises of three main features-

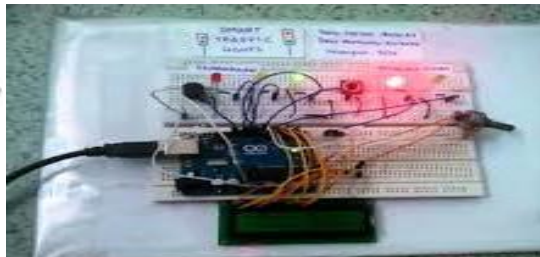
1- AUTOMATIC STREET LAMPS

- These street lamps automatically turn on and off according to the light availability
- This saves energy and is done using a Light Dependent resistor



2- Automatic Traffic Light

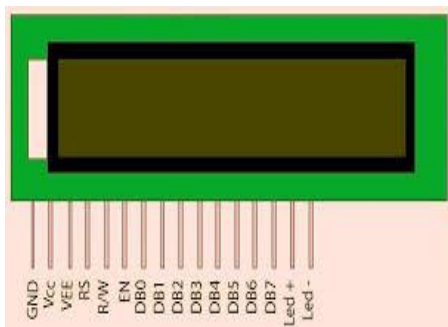
- For ordinary vehicles like cars and trucks at red light the barricade attached to it is closed
- But for special vehicles like ambulance the barricade attached to it is open



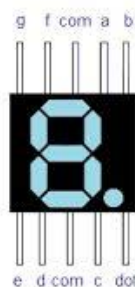
- This helps the general public in emergency situations and is done using an Infrared sensor

3- Live feed to the vehicle drivers

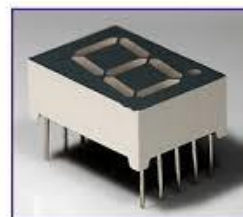
- The color of the next traffic light is displayed on the LCD screens of the vehicles
- This is represented by 7 segment



LCD

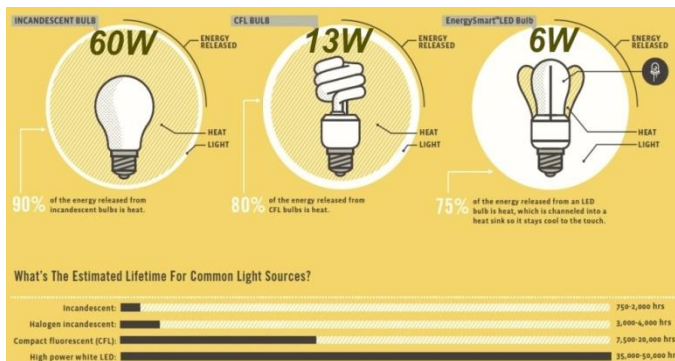


7 SEGMENT DISPLAY



FOR ALL THE LAMPS, WE HAVE USED SMALL COLOURED LED BUT FOR PRACTICAL PUROSES WE ADVOCATE THE USE OF SUITABLE LED BULBS OF THE REQUIRED WATTAGE.

LED Lighting Features, Advantages & Benefits



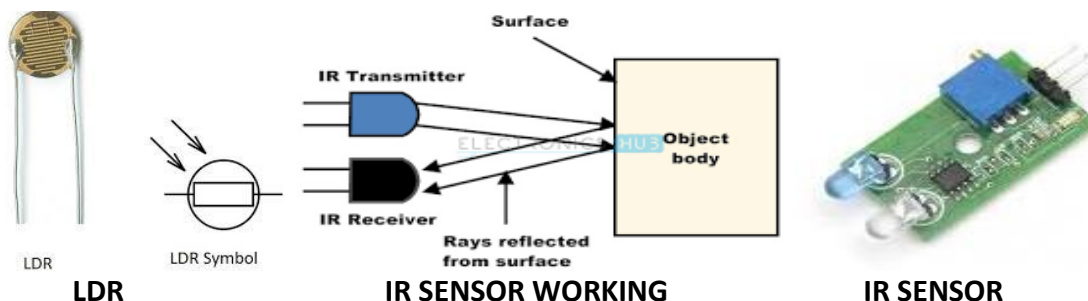
EXPERIMENT:

Apparatus used are

DEVICE	FUNCTIONS
ARDUINO UNO	It is the microcontroller
INFRARED SENSOR	It detects the proximity of the object
L293D MOTOR DRIVER IC	It moves the motor in the forward and backward direction
LIGHT EMITTING DIODE (LED)	It emits light of different color
MOTOR	It moves the barricade in an automatic traffic light system and also drives vehicles

LDR-The experiment consists of the LDR sensing the amount of light present and sending a signal to the microcontroller which turns the LED on automatically in the presence of low light. The LDR is a resistor and its resistance varies according to the amount of light falling on its surface. When the LDR detect light its resistance will get decreased, thus if it detects darkness its resistance will increase.

Traffic light- In case of traffic light the IR sensors sense the special vehicle through their transmitter – receiver mechanism and subsequently the barricade is raised with the action of the motor attached to it when the signal is sent by the sensor to the controller even in case of a red light. Also, the output of the red light to the incoming vehicles on a LCD



SUMMARY:

The experiment explained above yielded results stated below-

1-The use of Light Emitting Diode(LED) bulbs reduce the power consumption to 58% and hence the cost is subsequently reduced to less than half with the LED's also offering longer service due to a longer lifespan.

2-The use of Light Dependent Resistor further decreases the power consumption by checking the power wastage when sufficient amount of light is present and hence also indirectly reduce CO2 emissions.

3-The use of automated traffic lights incorporating an Infrared sensor is successfully used to detect the special vehicles and hence not obstruct their movement.

4-The live feed to vehicles about the color of the next traffic light will help them to plan and use an alternative route in the case of a red light which leads to decongestion of roads. Hence , on the practical application of the proposed model the energy consumption can be reduced many folds and the available energy is consumed effectively and efficiently .The number of deaths due to delay in the patient reaching the hospital would be reduced thereby helping the general public.

COST:

For a street light automation system- Consider a street with 10 lamps. This cost goes down further when LDR is used to reduce the power wastage.

<p>Incandescent Bulbs POWER=60W, TIME DURATION= 10 h, PERIOD= 30 days Total power= $60 \times 10 \times 30 = 180000 = 180 \text{ UNITS}$ COST= Rs 1260</p>	<p>LED bulbs POWER OF LED= 12 WATTS ONLY Total Power= $12 \times 10 \times 30 = 36000$ Units =36 Money = Rs 252</p>
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8. Walking Stick for the Blind

COLLEGE: BHARATI VIDYAPEETH'S COLLEGE OF ENGINEERING
GUIDE: Mr. SHASHI GANDHAR
SCHOOL STUDENTS: ANKITA NAND, SHIRIN ANSARI, SHIVANI GUPTA, NISHIKA
COLLEGE STUDENTS: ABHISHEK MATLOTIA, AJAY KUMAR, SHAKSHI BHARDWAJ

ABSTRACT

Walking stick is an innovative stick designed especially for visually disabled people, helping them becomes self-sustained and connecting them to technology. Our prime purpose is to alarm the visually disabled person, as and when any problem comes in the way. There are three main parts of the stick namely, the microcontroller, sensors and indicators. The brain of the walking stick lies in the microcontroller. The sensors are used to detect any change in input and then alarm the person through indicators. The cost of such stick available in the market is worth thousands, so we have designed a low cost yet very efficient walking stick.

HYPOTHESIS

The project works on the basic principle of detection of variation in input by sensors and indicating the change by indicators. Sensors need to be such that they can be easily griped inside the walking stick. The indicators need to be such that the message can be easily conveyed to the blind person.

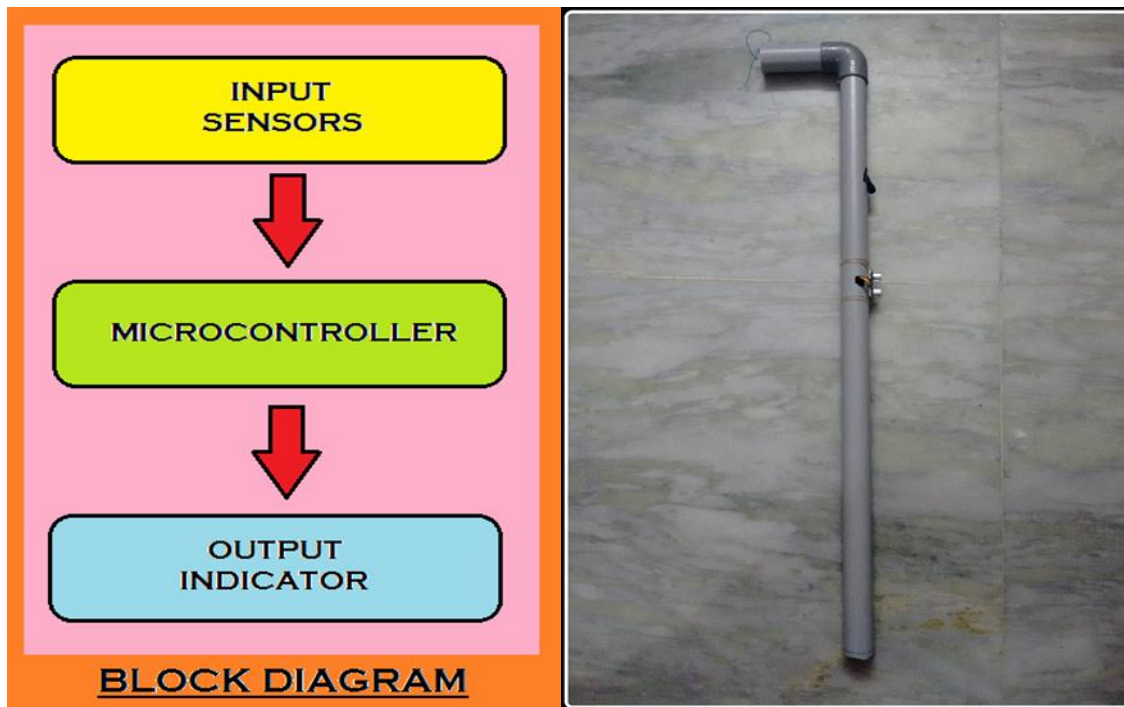
METHOD

The whole stick comprises of three basic devices namely, sensors, indicators and microcontroller. The microcontroller used is arduino nano. The microcontroller is the brain of the stick. The sensors used are ultrasonic sensor, dark light sensor and water sensor. The indicators used are buzzer and vibration motor. The arduino nano is one of the smallest microcontrollers, so we have used it in the stick.

The ultrasonic sensor would detect the distance of the coming object and give a signal to arduino nano. Arduino nano would then give a signal to buzzer and vibration motor. The sound of buzzer can be easily heard by the person and the vibrations can also be felt by the person because of the vibration motor. Hence the blind person gets to know that there is an object coming close and so an appropriate action can be taken.

The water sensor detects whether there is water in front and indicates the person through the sound of buzzer.

The dark sensor is used to indicate the other person, when the blind person enters the dark room the other person would come to know. Hence, it would be very helpful for the blind person and his safety would be insured.



WALKING STICK BASIC DESIGN

EXPERIMENT

Apparatus used are-

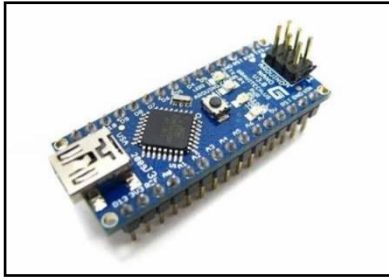
DEVICE	FUNCTIONS
A. ARDUINO NANO	It is the microcontroller
B. ULTRA SONIC SENSOR	It detects the proximity of the object
C. DARK LIGHT SENSOR	It detects a dark place
D. WATER SENSOR	It detects water ahead

INDICATORS	FUNCTIONS
A. LIGHT EMITTING DIODE (LED)	It emits light
B. VIBRATION MOTOR	It vibrates and indicates the person.

**AR
DUI
NO
NA**

NO

It is the microcontroller. It has various input and output pin. The ultrasonic sensor, buzzer and vibration motor are connected to it.



ULTRASONIC SENSOR

Ultrasonic sensors broadcast a powerful, ultrasonic frequency, then detects the ultrasonic sound waves as they bounce off of the objects and return to the sensor. Ultrasonic sensors depend on two separate devices, an ultrasonic transducer and a detector. An ultrasonic transducer is any device that converts energy into an ultrasonic frequency. Ultrasonic transducers are usually made from piezoelectric crystals that can change size when a voltage is applied to them. When an alternating current is applied to a piezoelectric crystal, it vibrates extremely fast and produces an ultrasonic sound wave. The detector is also made of a piezoelectric crystal, but produces a voltage when an ultrasonic frequency comes in contact with it.

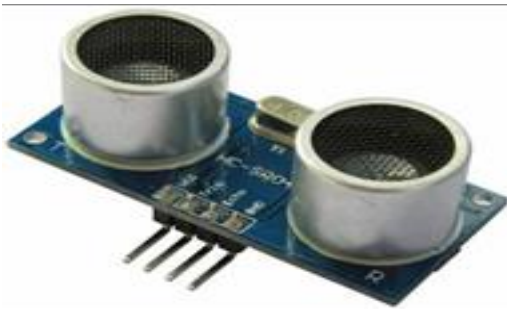


Figure 1 ULTRA SONIC SENSOR

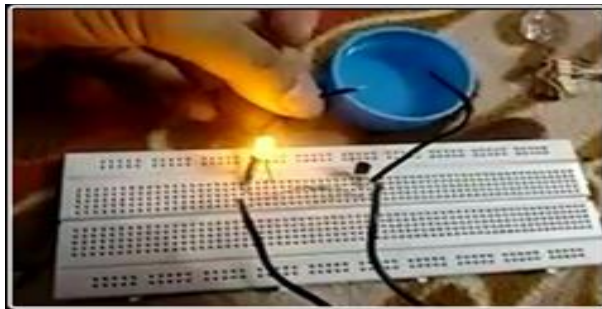
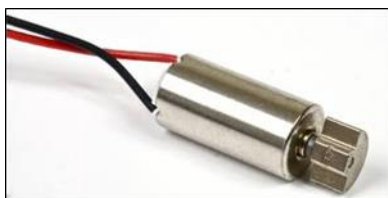


Figure 2 WATER SENSOR

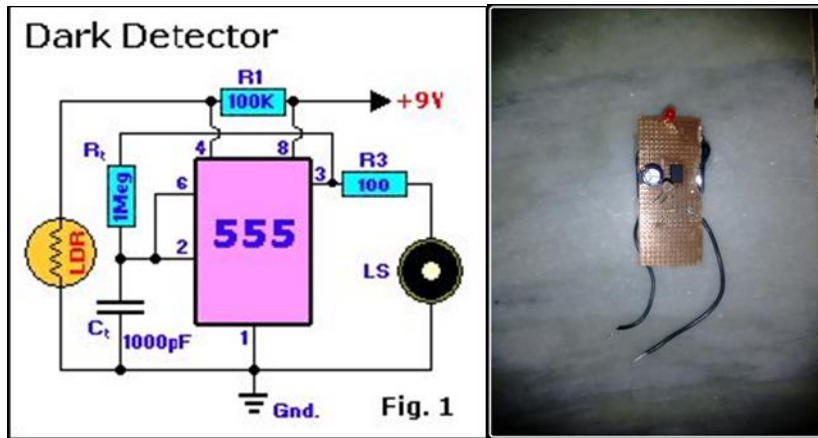
VIBRATION MOTOR

It is a small motor running at 3V. It produces vibrations when supply is given to it. These vibrations can be easily felt by the blind person and hence vibration motor becomes an indicator. In the stick the motor will vibrate when any object comes in the proximity of the person.



DARK LIGHT SENSOR

Input is LDR and output is led. When light falls on LDR, led will be off and when there is dark light on LDR, the led will get on. When led is on, it indicate the other person that blind person is there. Hence, blind person is safe and secure.



COST

The overall cost of project is 700 rupees



9. Solar Backpack

COLLEGE: BHARATI VIDYAPEETH'S COLLEGE OF ENGINEERING
GUIDE: Mr. SANDEEP BANERJEE
SCHOOL STUDENTS: SHOBHA, SHWETA GIRI, ISHA KATARIA, CLASS 9, SARVODAYA KANYA VIDYALAY
COLLEGE STUDENTS: SHUBHAM BAUNTHIAL, VAIBHAV BALUJA

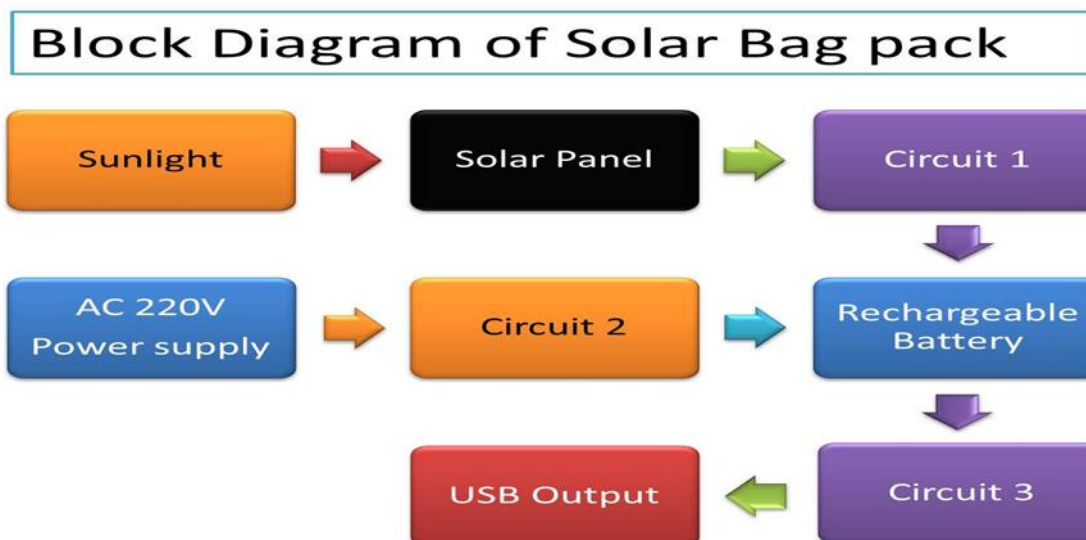
ABSTRACT:

A **Solar backpack** is a cloth sack carried on one's back and secured with two straps that go over the shoulders, equipped with thin film solar cells and batteries. The solar panels convert sunlight into electricity, which is stored in the batteries and can be used to power portable electronic appliances like mobile phones and mp3 players.

HYPOTHESIS:

The solar backpack contains a flexible monocrystalline solar panel, battery, charge controller, plugs, cords and light bulbs. It provides users with power up to 120 watt hours/days, capable of powering electronic equipment rated up to 300 W. It can also be utilized in international aid, disaster relief, emergency power and field research.

This can power or charge all your gadgets (cell phone, mp3 player...) while on the road. HAMs can use it to power small QRP transmitters and receivers on a field day etc.



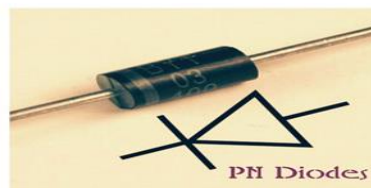
METHOD

Connect the panels in series (red-to-black etc.) and solder. Insulate with heat shrink tubing. At the end you will have a black and red cable (minus and plus). Solder a 0.5m cable to this and attach a connector plug to go to the battery box. Use this to charge 4 NiMH AA batteries rated capacity $C=2600\text{mAh}$.

Drill holes for the connectors, one coming from the solar panel and one to go to your gizmos. Once the circuit is ready, connect a load (say 100 ohm). Then using a power supply, go up slowly starting from zero volts. Adjust the trimmer so the circuit trips at 4.8V. Then go down again, the circuit should disconnect the load somewhere between 4.0V and 3.6V NOT LOWER. To adjust the lower threshold, you can also replace the 470kohm resistor with a trimmer if needed.



Components Required



SUMMARY

It is used to power electronic devices with a charging time of just 6 hours. As it weighs at around 10 pounds, it can be carried as a backpack easily. In addition to solar power, it can also convert ac power from wall outlets and utilize power from disposable batteries and vehicles.

- Solar backpacks can also power laptops for up to 3 hours.
- After an exposure of about six hours, it can power an emergency light for 14 hours.
- Solar backpacks can also be used to power medical equipment and humanitarian relief efforts where power from the utility grid is not available.
- These types of backpacks can also be used to power cameras for use in remote areas.

ADVANTAGES

- Solar backpacks are light-weight, hence making it easier to carry.
- Solar backpacks carry a green energy source for the environment.
- Solar backpacks have a wide range of ideas and opportunities to the society itself.

(Modern phones use about 1-2 amps of energy. According to research, calculations expected as 10-20% of our electric bills). This can decrease the usage of our energy bills. Flexible solar panels also are light and portable.



COST

Solar panel – 300Rs

Transformer-100Rs

Rest electronic components-50Rs

Re chargeable Battery-100Rs

Bag -700Rs

Total cost of project-1250Rs



10. Burglar Alarm - *Autonomous Security System*

COLLEGE: BHARATI VIDYAPEETH'S COLLEGE OF ENGINEERING, NEW DELHI
GUIDE: Mr. SANDEEP BANNERJEE
COLLEGE STUDENTS: SHUBHAM BAUNTHIYAL AND SAARTHI BHATIA
SCHOOL STUDENTS: YAMINI, POOJA AND ARYAN, CLASS 9TH

ABSTRACT:

A security alarm is a system designed to detect intrusion – unauthorized entry – into a building or area. Security alarms are used in residential, commercial, industrial, and military properties for protection against burglary (theft) or property damage, as well as personal protection against intruders.

A Burglar Alarm is a microcontroller based autonomous home security system. It is highly sensitive to any kind of burglary movement. Our system on sensing any kind of manly movement in the home, in the absence of the owners, triggers an alarm.

Instead of using usual Infrared sensors we're using PIR sensors which are more sensitive than Infrared sensors. PIR sensors are used to detect motion, usually human movement. Whenever a sensor senses any movement, it gives an output else it doesn't.

The other important part of our Security system is GSM module. A GSM module is similar to a mobile phone but integrated with a microcontroller based environment for communication purpose. In our project, the GSM module shall help the Security system to communicate with the owner of the house on detection of a burglar. The system can be made to either phone call or message the owner.

HYPOTHESIS:

With the advancement of technology and automation now common people are also willing to have access to these security systems. Such system doesn't require regular surveillance. They work automatically. Whenever the system detects an illegal access into the home, the system automatically sets the alarm ON and side by side also sends an sms or call to the master of the home or to the local police (with the help of GSM modules).

The system can be also be made to have access to internet (via use of Ethernet modules) and controlled by using a smartphone or laptops. But such additions add to the cost of the system.

The major problem with present day security systems in our country is their automation part. They don't work automatically and need to have someone for the controlling part of the system. Further, the system usually doesn't communicate with their owners as in our Security system. Further the sensors we've used doesn't get triggered by all obstacles but only by some living animal obstacle like human, dog, cat, etc. So we hypothesise that our system shall provide suitable solution for all these problems by adopting modern day technology equipment's.

METHOD:

Components used -

1. PIR sensors
2. Keypad
3. LCD screen
4. Gate lock system
5. Arduino Uno Microcontroller
6. GSM module
7. Buzzer
8. LEDs
9. Breadboard
10. Jump wires

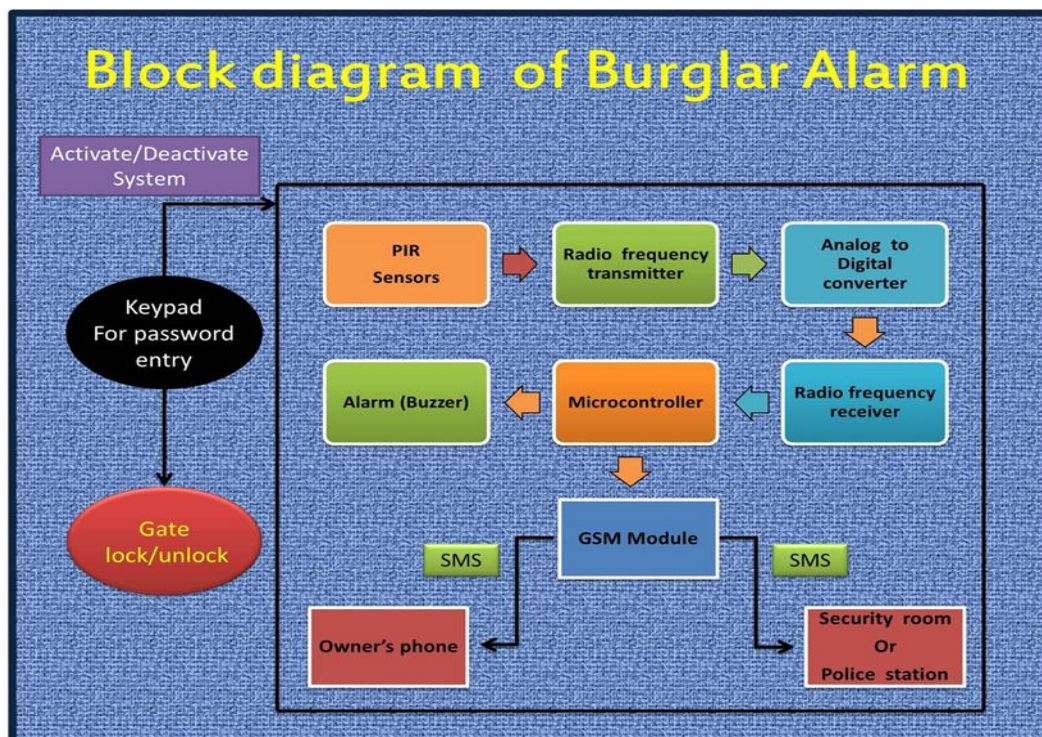


WORKING

The method or working of this security system is very easy to understand. Our home security system comprises of a password based gate lock system. The password keypad helps in activating and deactivating the system as well as locking and unlocking the gate. The sensors are placed at all the suitable locations in the house.

When the owner leaves the house he/she activates the system by entering the password via the keypad. As soon as the system is activated the gate is locked and the sensors are commanded to work. If some burglar enters the home, his movement is sensed by the PIR sensors. The sensors are connected to a Radio frequency transmitter which transmits an output on receiving an output from the sensor. The signal is transmitted to a security room where it is received by the microcontroller via a Radio frequency receiver.

On receiving the news of a burglary movement, the microcontroller immediately commands the GSM module to communicate with the owner of the house and with the local police or security service. At the same time an alarm is triggered which warn the neighbors about an act of burglary.



SUMMARY:

Our security system thus provides a smart, suitable solution against burglary at a really low cost. Considering the present day world where there's always a chance of thievery, where thieves are gradually becoming smarter, it is time that people should also adopt smart solution for the protection of their assets.

COST:

This system cost us around Rs. 2000, which i don't think is high enough for a smart security system.

The system can be made even smarter by additional features like floor pressure sensors, CCTV cameras with or without face recognition, finger print module, eye retina sensing module, etc. This shall definitely add to the cost but it should be kept in mind that a person who demands for such a ultra-smart security system will definitely be able to pay for it. However, we believe that we can provide such a system with all features within a price of Rs. 10000.

11. Gear for Colour Blind

COLLEGE: BHARATI VIDYAPEETH'S COLLEGE OF ENGINEERING, NEW DELHI
GUIDE: Mr. SANDEEP BANNERJEE
COLLEGE STUDENTS: CHETNA GAUTAM, KHUSHI, RITIK CHOPRA
SCHOOL STUDENTS: VAIBHAV BALUJA, GAGAN BATRA

ABSTRACT

Gear for colour blind is a gadget which senses various colours. This gear can be worn by a colour blind and the colour of a particular object can be recognised by using it. The person using it will get display on 7-segment display and on his smartphone.

HYPOTHESIS

Colour blind or colour vision deficiency is an inability or decreased ability to see colour or perceive colour differences under normal lighting conditions. They often face problem in recognising colour in their day today life. Thus, they require a gadget or gear which they can use to recognise colours. We thus made a gear for colour blind which is portable enough to be carried easily, and almost everywhere. It is economical and quite efficient. It can sense a wide range of colours.

METHOD

This colour blind gear uses TCS3200 module, arduino, 7-segment display, resistors, PCBs, Bluetooth module, wires etc.

TCS3200 is intensity to frequency converter. It has a matrix of 8x8 photodiode. These photodiodes are covered with three types of filters. There are RED, GREEN, BLUE and clear filters with sixteen sensors each, thus making total of 64 sensors.

Arduino is a microcontroller which is used to control various hardware used. Bluetooth module sends information from the gear to smartphone

EXPERIMENT

Hold the color sensor at a distance of around 2 cm - 4 cm from the object whose color is to be detected and then run the code.

Logic of the code:

- Select the RED photodiode and store the number of pulses received.
- Select the BLUE photodiode and store the number of pulses received.
- Select the GREEN photodiode and store the number of pulses received.
- Now compare the number of pulses received after using each type of photodiode.
- The photodiode which gave highest number of pulses is the color of the object.

- For eg. If the RED photodiode gave more pulses than BLUE photodiode and GREEN photodiode then the color of the object is RED.

SUMMARY

- The project is a sensor which is used to identify the color of an object for color blind people.
- It can be used to identify four colors which are RED, BLUE, GREEN and BLACK.
- It serves as a very cost effective product for people with color blindness.

COST

Total project cost around – 1000 Rupees



12. Water Level Controller

COLLEGE: BHARATI VIDYAPEETH'S COLLEGE OF ENGINEERING, NEW DELHI
GUIDE: Mr. NEERAJ KUMAR
COLLEGE STUDENTS: SOURABH SINGH, GAURAV, PUSHPENDER SINGH
SCHOOL STUDENTS: AJAY KUMAR, ABHISHEK MATLOTIA

ABSTRACT

The drinking water crisis in India is reaching alarming proportions. It might very soon attain the nature of global crisis. Hence, it is of utmost importance to preserve water. In many houses there is unnecessary wastage of water due to overflow in Overhead Tanks. Automatic Water Level Controller can provide a solution to this problem

HYPOTHESIS

The principle of water level controller works upon the fact that water conducts electricity. So water can be used to open or close a circuit. As the water level rises or falls, different circuits in the controller send different signals. These signals are used to switch ON or switch OFF the motor pump as per our requirements

METHOD

We know the property of 555 timer IC, i.e. its output goes HIGH when voltage at the second pin(trigger pin) is less than $\frac{1}{3} V_{cc}$. Here 3 wires are dipped in water tank. Let us define two water levels- Bottom (Low) level and Top (Up) level. One of the wire or probe is from Vcc. The probe from bottom level is connected to the trigger (2nd) pin of 555 IC. So the voltage at 2nd pin is Vcc when it is covered by water.

When water level goes down, the 2nd pin gets disconnected (untouched) from water i.e. Voltage at the trigger pin becomes less than Vcc. Then the output of 555 becomes high. The output of 555 is fed to a BC547 transistor, it energizes the relay coil and the water pump set is turned ON. While the water level rises, the top level probe is covered by water and the transistor becomes ON. The low voltage at the 4th pin resets the IC. So the output of 555 becomes 0V. Hence the motor will turn OFF automatically

EXPERIMENT

The apparatus used are as follow -

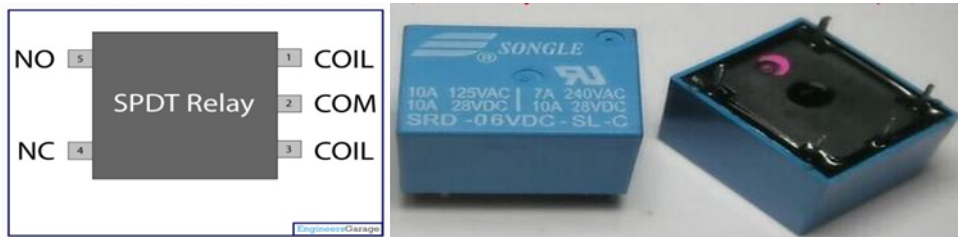
Relay: Relay is defined as controlled electrical switches that are controlled by another switch. Relays allow a small current flow in a circuit to control a higher current circuit. The relay used here is a Single Pole Double Throw (SPDT) relay who's magnetizing coil terminals operate on 6V DC supply. It has the following terminals: COIL- This is one end of the coil.

COIL: This is the other end of the coil. These are the terminals where we apply voltage to in order to give power to the coils (which then will close the switch).

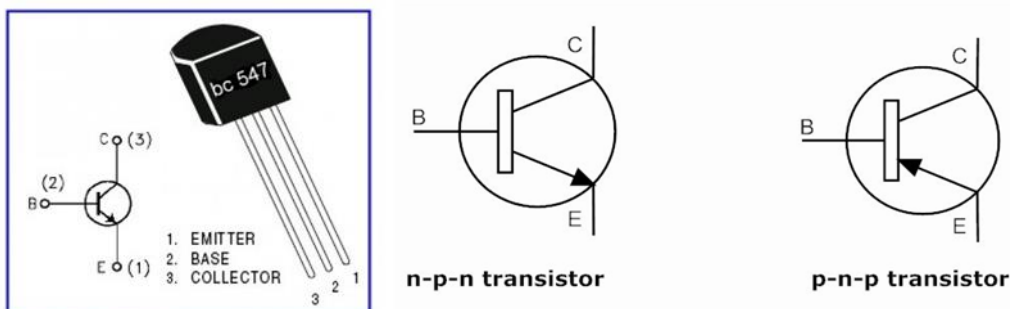
NO: This is Normally Open switch. This is the terminal where the device is connected that we want the relay to activate when the relay is powered.

NC- This is the Normally Closed Switch. This is the terminal where we connect the device that we want powered when the relay receives no power

COM- This is the common terminal of the relay. When the relay is powered and the switch is closed, COM and NO will be shorted. If the relay isn't powered and the switch is open, COM and NC get shorted. It is used in normally open mode

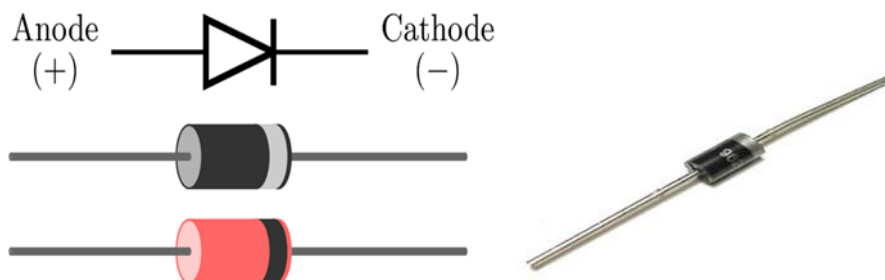


Transistor -: A transistor is a semiconductor device used to amplify or switch electronic signals and electrical power. It is composed of semiconductor material with at least three terminals for connection to an external circuit. The three terminals of the transistor are namely called as emitter base and collector.

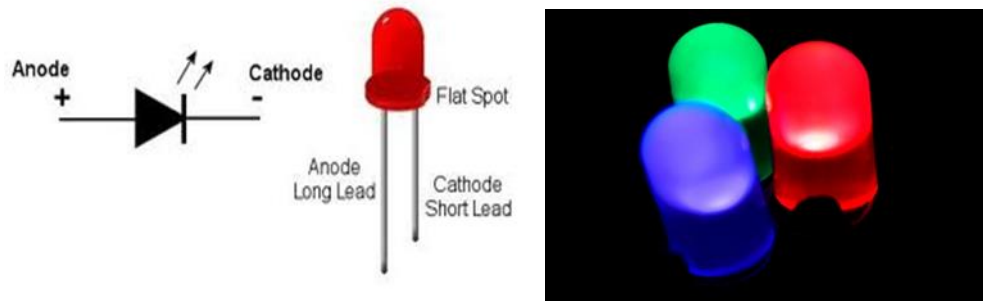


DIODE -: A diode is a specialized electronic component with two electrodes called the anode and the cathode. Most diodes are made with semiconductor materials such as silicon, germanium, or selenium. .

A semiconductor diode, the most common type today, is a crystalline piece of semiconductor material with a p–n junction connected to two electrical terminals. A vacuum tube diode has two electrodes, a plate (anode) and a heated cathode. Semiconductor diodes were the first semiconductor electronic devices.

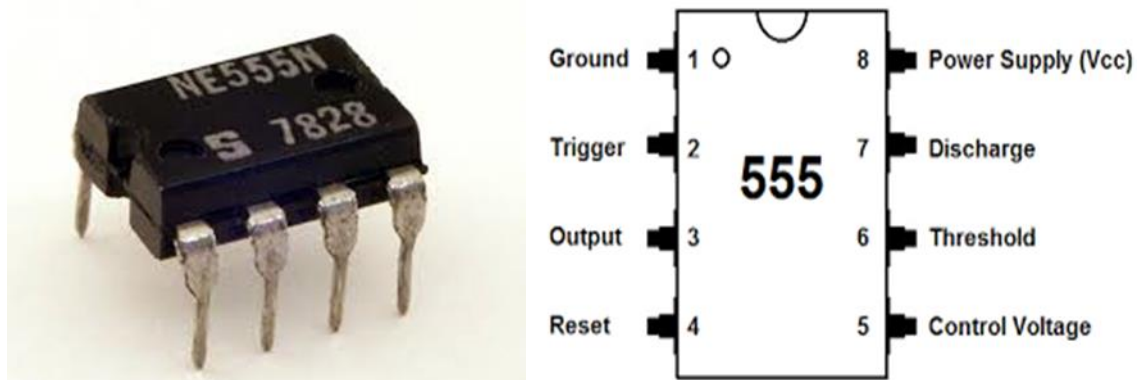


LED: A light emitting diode (**LED**) is a two-lead semiconductor light source. It is a pn-junction diode, which emits light when activated. When a suitable voltage is applied to the leads, electrons are able to recombine with electron holes within the device, releasing energy in the form of photons.



555 Timer -: The 555 timer chip is extremely robust and stable 8-pin device that can be operated either as a very accurate monostable, bistable or astable Multivibrator to produce a variety of applications such as one-shot or delay timers, pulse generation, LED and lamp flashers, alarms and tone generation, logic clocks, frequency division, power supplies and converters etc., in fact any circuit that requires some form of time control as the list is endless.

The **555 timer** which gets its name from the three 5kΩ resistors it uses to generate the two comparators reference voltage



SUMMARY:

This system is very beneficial in rural as well as urban areas. It helps in the efficient utilization of available water sources.

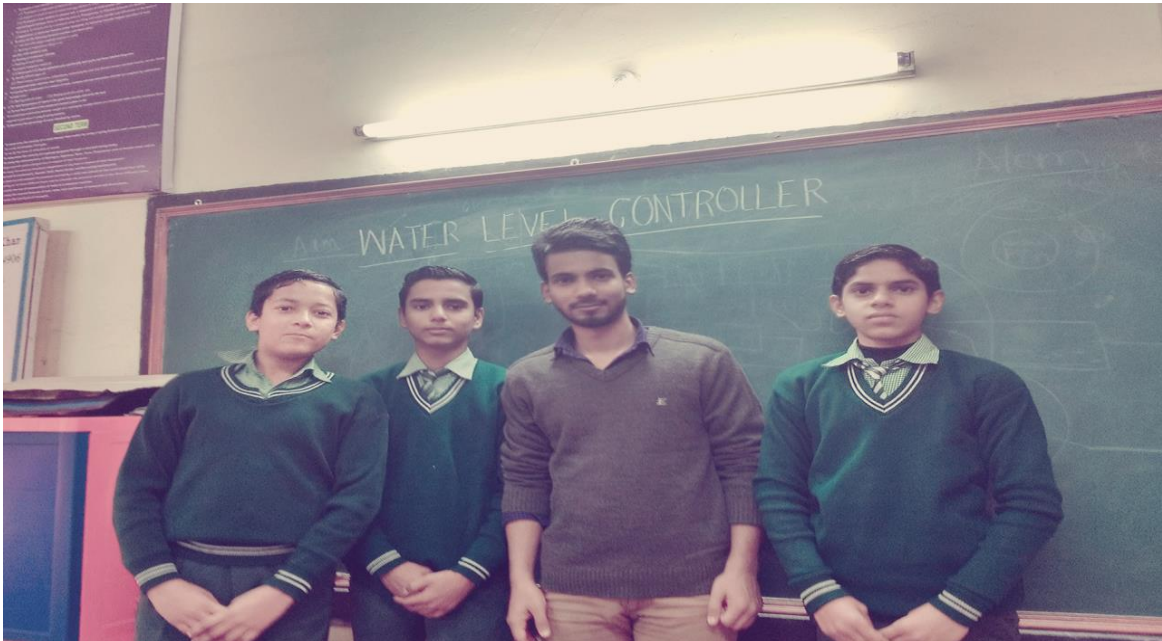
If used on a large scale, it can provide a major contribution in the conservation of water for us and the future generations.

Water level controller is a simple yet effective way to prevent wastage of water. Its simplicity in design and low cost components make it an ideal piece of technology for the common man

COST:

The main advantage of the water level controller is it has very low cost than the conventional one available in markets. For example, some commercial controllers use microcontrollers which

are costly. But for our system, the components used are less in number and easily available. Hence losses will be less leading to a better efficiency. The cost of our project is approx. Rs.200.



13. Smart Safety & Security System: One Stop Solution for Automobile

COLLEGE: JSS MAHAVIDYAPEETHA, JSS ACADEMY OF TECHNICAL EDUCATION, NOIDA
GUIDE: Ms. GAYATRI SAKYA, Ms. MONIKA MALIK
COLLEGE STUDENTS: RAJAT KUMAR SONI, SURABH SINGH, SUHIT SAXENA
SCHOOL STUDENTS: HIMANSHU, SAGAR JHA, NEELIMA

OBJECTIVE

To implement automated vehicle safety and security system and Android application for it

ABSTRACT

The population of our country has been increasing rapidly which indirectly increases the vehicle density and leads to many road accidents. The aim of the project is to minimize the road accidents which causes the loss of invaluable human life and other valuable goods. Besides, the provision for the safety of the vehicle is also provided to avoid the theft action. In this fast moving world, new technologies have been evolved for every second for our human life style improvement. There have enormous advancement in automobile technologies already and still to come. Because of these technologies, now we are enjoying the necessary comfort-ness and safety. But there is lot of accidents happening now-a-days. It is because of increased vehicle density, violating rules and carelessness. The embedded technology is used to prevent accidents due to drunk driving, using mobile phones while driving etc, If accidents occurs in remote areas, the feature of auto-providing the accident area to the emergency centers for help and support is also provided. On the other hand, the security for the vehicle is also enhanced. This is made possible because the theft vehicle area can be known to the user and the vehicle fuel can be cut off and center lock is enabled. By using these concepts, we hope that the road accidents due to violating rules and carelessness will be minimized and this will be one of the project required for now-a-days and with the significance of low cost.

HYPOTHESIS

In this fast moving world, new technologies have been evolved for every second for our human life style improvement. There have enormous advancement in automobile technologies already and still to come. Because of these technologies, now we are enjoying the necessary comfort and safety.

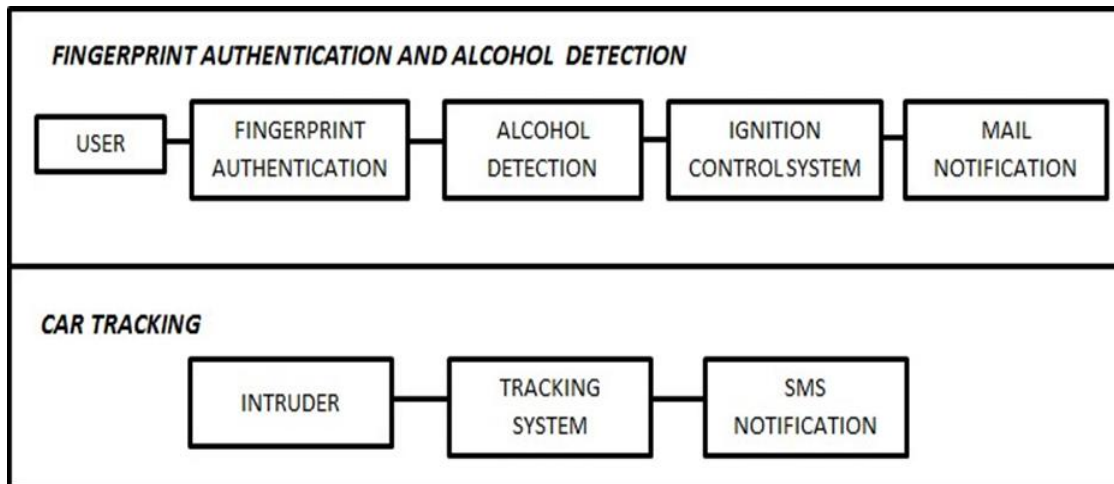
But there are lots of accidents happening now-a-days. It is because of increased vehicle density, violation of rules and carelessness. India ranks fifth in the road accidents over the world.

We have the objective to minimize the road accidents due to above mentioned facts in real time using **embedded systems** platform in low cost. In our project, we proposed few concepts to

minimize the accidents due to violating rules and carelessness and proper safety after it happens.

METHOD:

BLOCK DIAGRAM OF THE PROJECT:



HARDWARE/SOFTWARE TOOLS REQUIRED

Arduino Uno R3

ESP 8266 Wifi Module

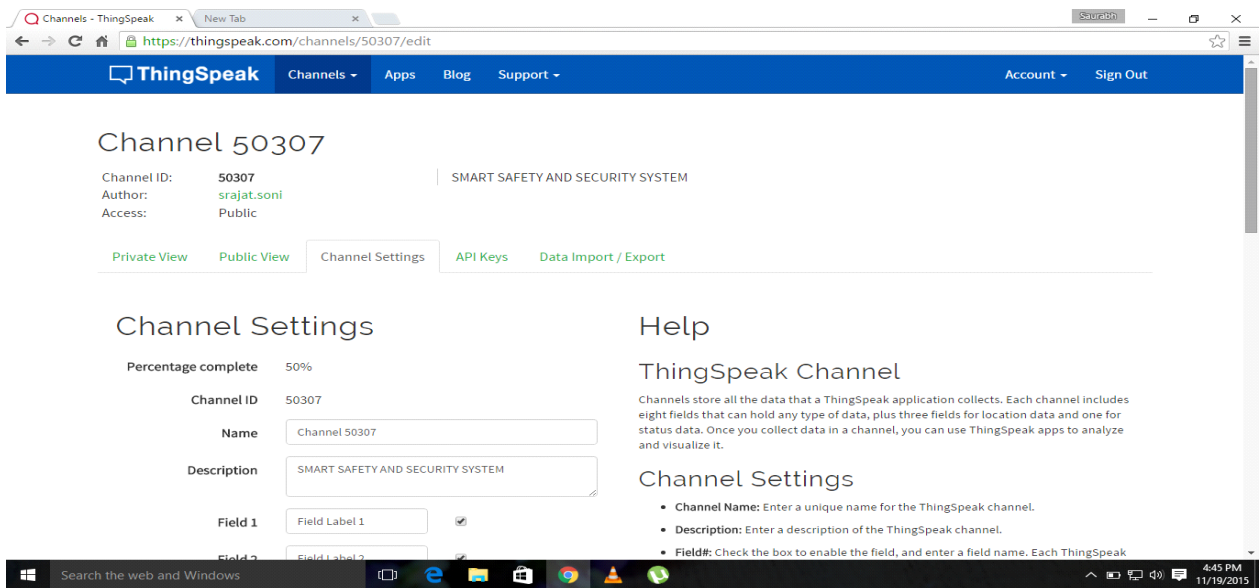
MQ3GasSensor

GPS Module NEO6MV2

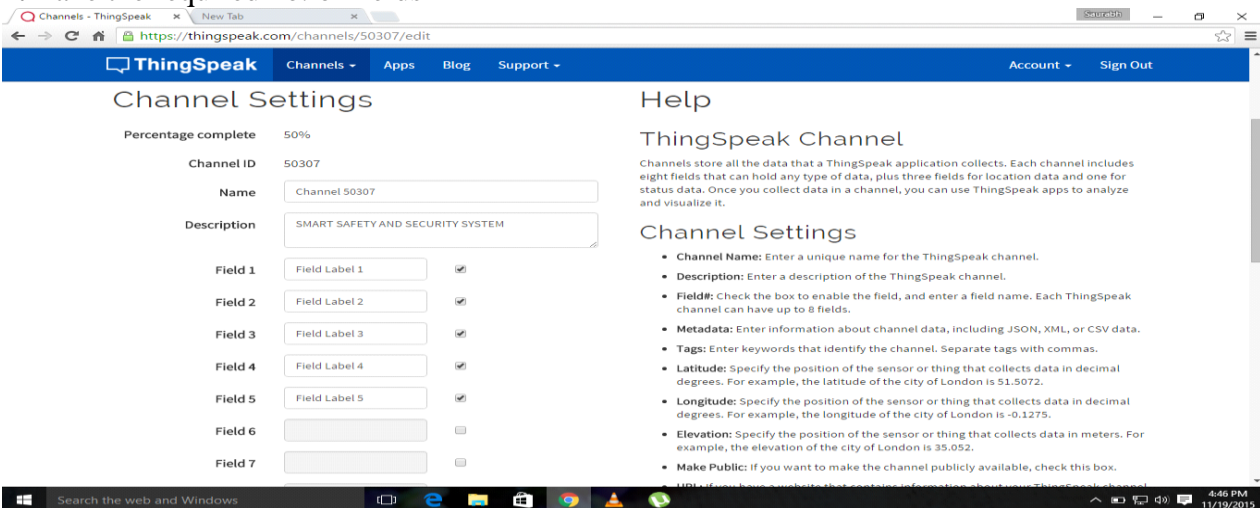
Fingerprint Module

EXPERIMENT:

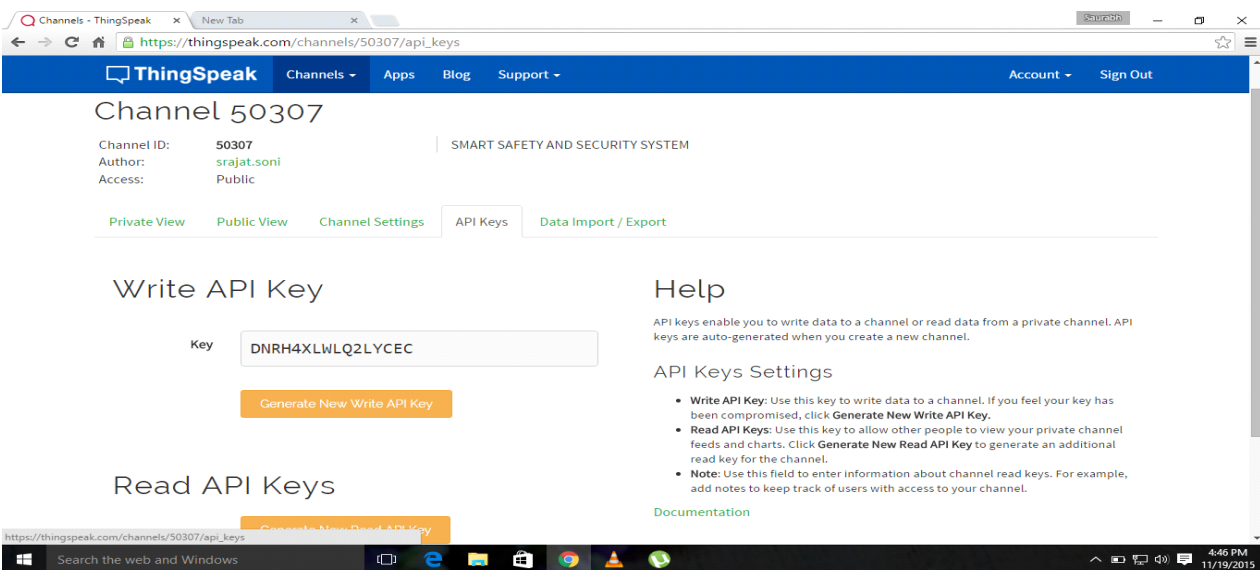
1. Create channel



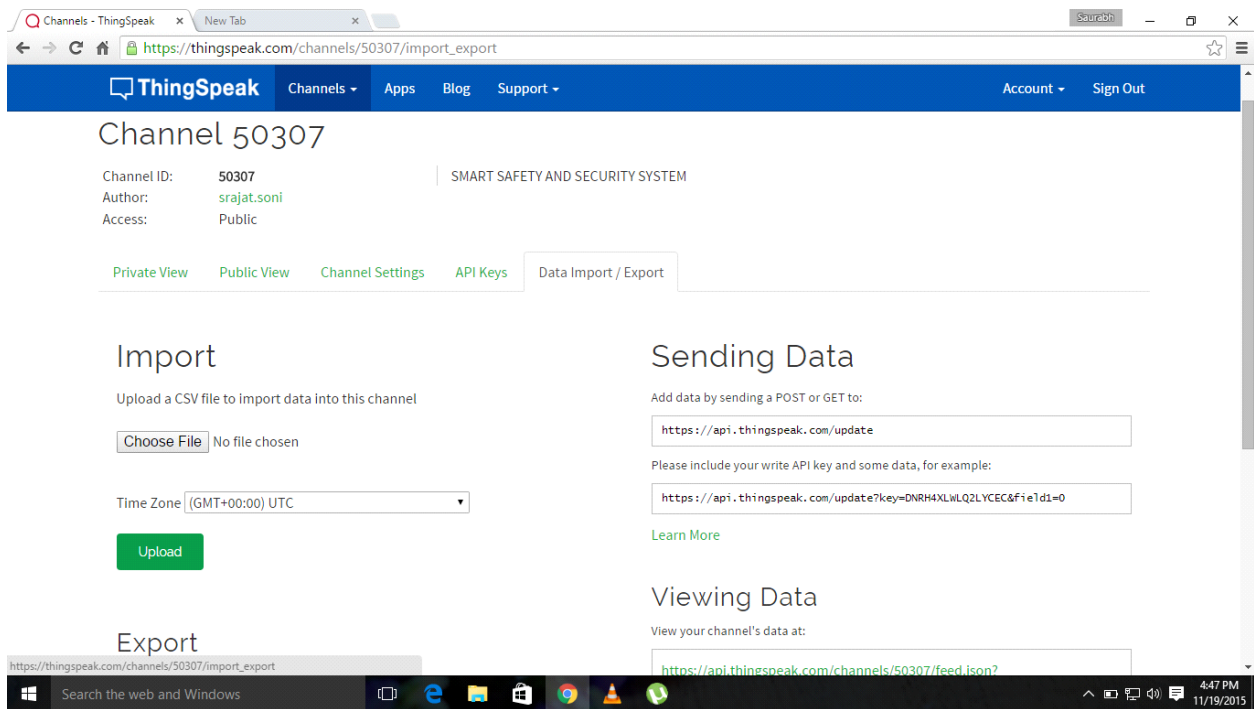
2. Make the required no. of fields



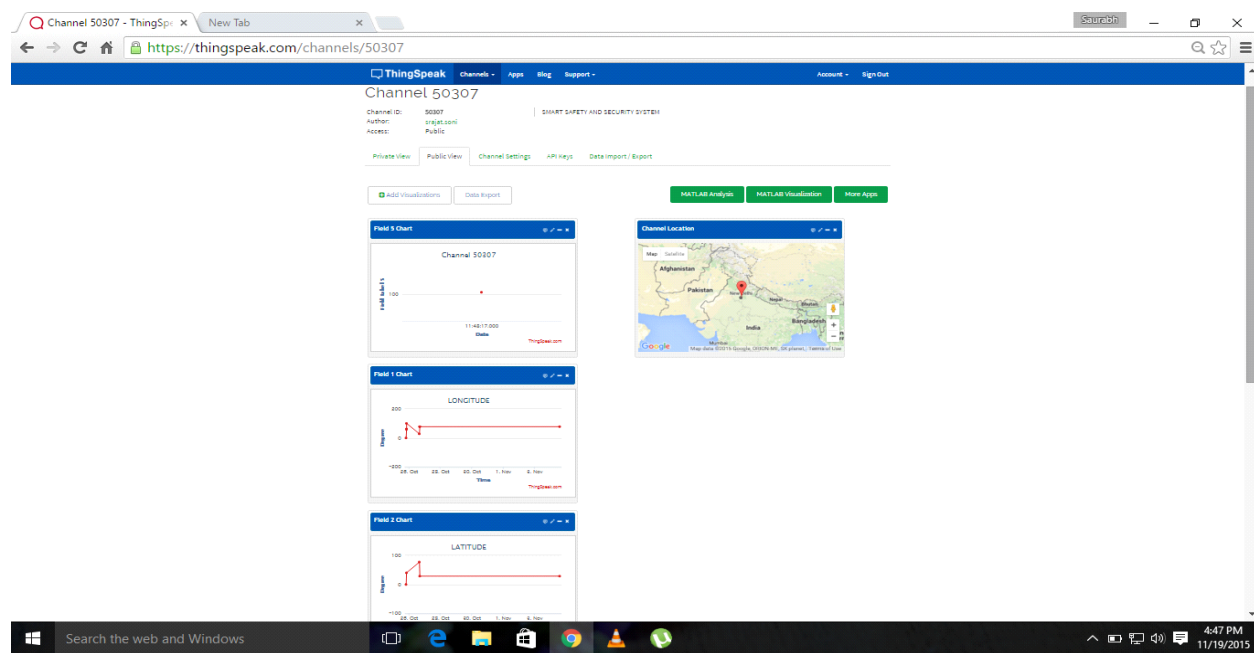
3. Got an API KEY



4. Can export/import data



5. Output visualization



SUMMARY:

This project is basically based Internet Of Things (IOT). Smart safety and security system deals with the problem faced by common people in India. Android application makes it more user friendly. The embedded technology is used to prevent accidents due to drunk driving, using mobile phones while driving etc, If accidents occurs in remote areas, the feature of auto-providing the accident area to the emergency centers for help and support is also provided. On the other hand, the security for the vehicle is also enhanced. This is made possible because the theft vehicle area can be known to the user and the vehicle fuel can be cut off and center lock is enabled and corresponding notifications to user will be sent.

COST: Approximately 5,000



14. Real Time Battery Charging System by Human Walking

COLLEGE: JSS MAHAVIDYAPEETHA, JSS ACADEMY OF TECHNICAL EDUCATION, NOIDA
GUIDE: Mr. SUMIT KHANDELWAL
COLLEGE STUDENTS: RASHMI SINGH, PANKHURI PRABHAKAR, RASHMI GUPTA
SCHOOL STUDENTS: VINITA YADAV, KALYANI JHA, NEETA MANDAL, CLASS 9

ABSTRACT:

With the extend use of technology, it has been the vital function to develop something new in both software and hardware. A worn out battery or a lost charges are the two difficulties every electronic device user undergoes through. To overcome this we have proposed a new technology to adopt charging of these portable electronic devices with the help of human walking. Walking is the best and common activity in day to day life. As per the study of biomechanics, we came to realize that ground reaction force (GRF) exerted from the foot, when converted into voltage gives enough power supply to run a device. While walking the person loses some energy from foot in the form of vibrations which are sensed and converted into electric form. Piezoelectric crystal does the work of generating output out of foot moment. Piezoelectric materials have the capability of absorbing mechanical energy from surroundings, especially vibrations and transform it into electric energy that can be used as power supply in real time to other appliances like mobile phones, power banks, various small handy biomedical instruments etc. This project can be implemented while jogging in the morning, gym, walking on trade-mill, in dense populated areas like railways, bus stands, etc.

HYPOTHESIS:

The world's energy consumption is high all the time with the demand continuously increasing. With the advent use of portable machines in this technological world; it has become a major issue of power source.

The situation brings up several challenges that need to be addressed.

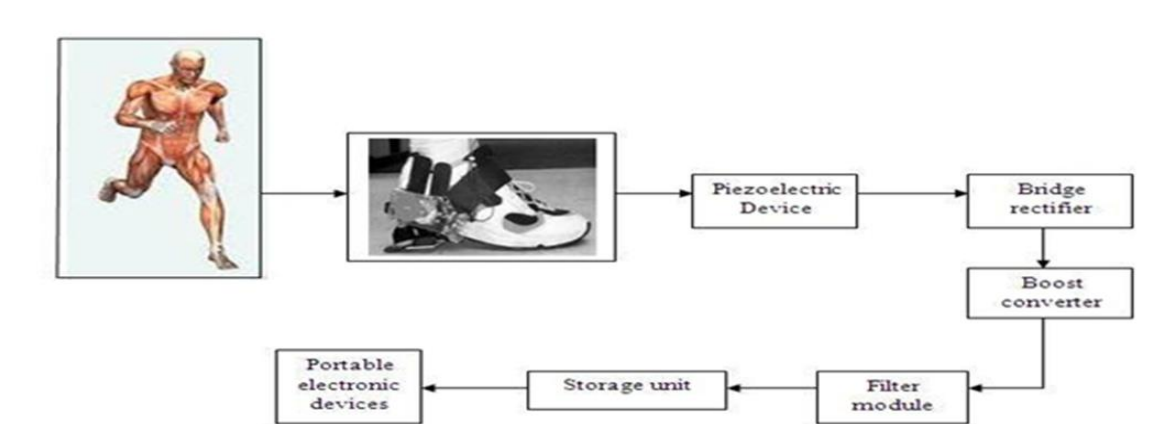
- Power supply
- Battery discharging
- Availability of power source

METHOD:

In Biomechanics, the ground reaction force, GRF is the force exerted by the ground on the body in contact with it. For example, a person standing motionless on the ground exerts a contact on it which is equal to the person's weight and at same time an equal and opposite GRF is exerted by the ground on the person .Thus, as the human starts walking, this GRF increases which generates power in greater amount. The utilization of waste energy of foot power with human locomotion is very much relevant for highly populated countries in places like roads, railway

stations, bus stands, temples, etc. The human bio-energy if made possible for utilization, will be a very useful energy source.

EXPERIMENT



Although small electronic devices are mostly powered by batteries, there is an increasing number of wireless sensors using energy harvesters instead of batteries. For consumers of electronic devices, there are different emerging technologies that are under research or in commercialization stages. Harvesting energy from humans is particularly useful for not only common people, but also for soldiers' portable electronic equipment. These harvesters produce energy from human's kinetic energy, thermal energy or body biological processes

SUMMARY

5V output is obtained while walking which is later boosted up by the DC to DC boost converter. This boost converter gives the 15V voltage output, which can be used to charge the mobile phone (requiring 3.7V) in real time. Thus, in all we conclude that with this process, we can extract the energy from the human feet, convert it into electric energy and use it in real time application of charging the devices

COST: ₹ 1000-1200



19. “Roshni”: Inert waste and Gravitation pull to generate electrical energy

COLLEGE: G D GOENKA UNIVERSITY, GURGAON
GUIDE: Dr. ANINDITA ROY CHOWDHURY (ASSISSTANT PROFESSOR)
SCHOOL STUDENTS: RITIK RAJ, SONU
COLLEGE STUDENTS: PARVESH TANEJA, SIDDHARTH SAINI

HYPOTHESIS

“Roshni”: Inert waste and Gravitation pull generate electrical energy”.

Our aim was to make an alternate source of energy from which we can glow a LED bulb with **Non-Conventional, Renewable** source of energy, **Gravitational Energy**. Power is still a **scarcity in many rural corners** of developing countries. So, we aim at a project which may be a solution during power cut in these rural areas.

We knew that gravity of earth could help us in generating electricity but we didn’t know how to extract this energy from gravitational pull of earth. Our project is a working model on how we can generate electricity using the power of gravity.

Till now we only know some Non-conventional, Namely-

- Solar power
- Hydro-electric power (dams in rivers)
- Wind power
- Tidal power
- Ocean wave power
- Geothermal power (heat from deep under the ground)
- Ocean thermal power (the difference in heat between shallow and deep water)
- Biomass (burning of vegetation to stop it producing methane)
- Biofuel (producing ethanol (petroleum) from plants)

There can be more sources of renewable energy which are still to be found. Hazardous kerosene lamps are still used in many parts of our countries. Poor households typically spend at least 10 percent of their income on kerosene, as much as \$36 billion a year worldwide, according to the World Bank.

The World Bank estimates that, as a result, seven hundred million women and children inhale smoke equivalent to smoking 2 packets of cigarettes every day.

Majority of adult, female lung-cancer victims in developing nations are non-smokers.

The burning of Kerosene for lighting also produces 244 million tonnes of Carbon Dioxide annually.

INTRODUCTION TO GRAVITY LIGHT

Gravity Light is a gravity-powered lamp for use in developing or third-world nations, as a replacement for kerosene lamps. It uses a bag filled with rocks or earth, attached to a cord, which slowly descends.

Lot of inert waste which otherwise have no use and are usually dumped into landfills can be collected in sacks to give the requisite weight and hung over a pulley at the extreme elevated point in the room. Using the gravitational pull of the earth at no extra cost, electricity can be generated using a mechanical system that **would convert mechanical energy into electrical energy**.

Electricity thus generated can be used to charge a battery, mobile phones, or glow an LED during power cuts in rural areas.

For operation, pull the rope attached to weight to raise it above the ground, higher the weight more will be the energy supply.

The gradual downward motion of the weight would ensure continuous constant supply of current to run low power devices. These devices can be connected through the **USB port provided** in the machine.

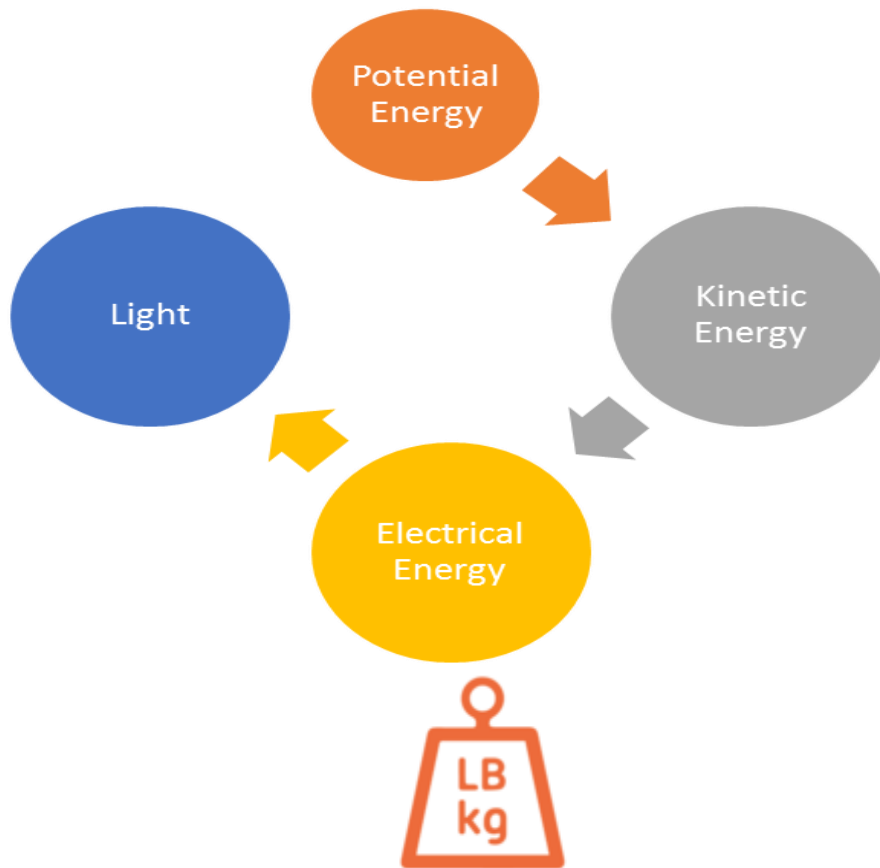
The speed of this motion can be changed to trade-off with output power thus offering an adjustment between power and run-time. The estimated operation time of the machine varies from **10 to 30 minutes** in a single-run depending on the configuration.

Thus, low power devices like mobile phones, USB LED, battery, and other devices can be powered during the power cuts. This is especially useful at the time of **unforeseen disaster/calamity** when power cuts are prolonged even for days with no source of electricity.

ADVANTAGES

1. Gravity Light is unique - it **doesn't need batteries or sunlight** and costs nothing to run.
2. It takes **seconds** to lift the weight that powers Gravity Light creating **20 minutes of light** on its descent.
3. Gravity Light provides:
 - a. **Instant light, any time.**
 - b. It takes just a few seconds to lift the weight that powers Gravity Light. There's no need to charge in advance, it's ready when you need it.
 - c. **No running costs.**
 - d. Gravity Light pays for itself within weeks of switching from a kerosene lamp.
 - e. **No sun or costly solar panels needed.**
 - f. No batteries are required in Gravity Light electric city can be stored indefinitely, without the risk of batteries degrading.
 - g. With no need for the sun, it can be used whatever the weather outside and works even at night when there is no sun.

WORKING GRAVITY LIGHT



Potential Energy

Gravity Light is installed to provide a 6ft/ 1.8m drop of a 12-15 kg weight. This weight is lifted and on release starts falling very slowly (about 1mm / second).



Kinetic Energy

This movement powers a drive sprocket, which rotates very slowly with high torque (force). Wheel rim acts as a big gear and the pulley and sprocket as small thereby multiplying the number of rotations.



Electricity and Light

This generates just under a tenth of a watt, a deciwatt, to power an on board LED and ancillary devices. Given the ever-increasing efficiency of LEDs, this produces a light over 5 times brighter (lux) than a typical open-wick kerosene lamp.

Once the weighted bag reaches the floor, which depends on how high it was installed, it is simply lifted to repeat the process.

Gravity Light Specifications



Power Output (15kg Load)

High: 0.10W
Med: 0.075W
Low: 0.05W

LED

Power (max): 124mW

Product Dimensions

Weight: 0.8kg
H: 7ft, W: 2ft, D: 3ft

Load Weight

Minimum: 8.0kg
Maximum: 20kg

Comparison of Gravity Light with Solar Powered lighting

A commonly held view is that solar powered lighting is the answer to these problems in the developing world. However a number of conflicting factors combine to complicate matters. Solar panels produce electricity only when the sun shines, so the energy needs to be stored in a battery to produce the light when it becomes dark. The amount of energy stored is dependent on the size of the panel, the size of the battery, and how much (if any) sun has shone.

However batteries, panels and lights are expensive, and beyond the reach of people with no savings. Solar lighting projects continue to provide lighting for thousands of people in the

developing world, but the spread is slow because the cost is too high for individuals, so they need to be bought and installed by communities instead.

Lower cost self-contained lamps are becoming more widely available, but batteries are the weak link, because they are expensive and deteriorate through use and over time. Very often, when buying a low cost solar lamp with an inbuilt rechargeable battery, a full third of what you're paying for is the battery, and you will need to replace it every few years. Assuming you can get a new battery. The capacity is often reduced to save money which limits the use time, after which there is no light.

With Gravity Light, however, it only takes a few seconds to lift the weight, which creates enough energy for half an hour of light, whenever it is needed. It has no batteries to run out, replace or dispose of. It is completely clean and green.

Because there are no running costs after the initial low cost purchase, it has the potential to lift people out of poverty, allowing them to use the money they have saved to buy more powerful solar lighting systems in the future.

<i>S. No.</i>	<i>Parameters</i>	<i>SOLAR LIGHT (Solar Energy)</i>	<i>Gravity Light (Gravitational Force)</i>
1.	Space Consumption	Consumes a lot of space(Solar Panels)	Consumes lesser space
2.	Cost	Higher cost (Solar Panels)	Lesser Cost
3.	Dependencies	Depends on Sun	Depends on gravity
4.	Batteries	Compulsory	Optional
5.	Maintenance Cost	High	Negligible

CONCLUSION/SUMMARY

A new technology might be very helpful in certain situations as an alternate power source which can be built from scrap materials for domestic energy consumption. Hence, experimental project is successful and can be implemented with further cost cutting,

COST

The actual model setup for this project is immovable i.e. it could be hanged on the wall. So, for display we made Steel Structure which is about three-fourth of the cost of model.

Bill Of Material			
S.No	Material	Quantity	Rate(In Rupees)
1	Dynamo	1	1000
2	Square Pipe(1.5 inch)	12feet X 2	1500
3	Rim	1	300
4	Sproke	1	
5	Chain	1	
6	Pulley (A Groove)	1	100
7	Belt	1	
8	Levelling Screw	4	
9	Weight	15 Kg	
10	Ball Bearing	2	
11	Red Oxide(Primer)	1/2 lit.	
12	Paint	1/2 lit.	
Total			2900

20. Designer Brick from Construction Site Waste

COLLEGE: G D GOENKA UNIVERSITY, GURGAON
GUIDE: Dr. ANINDITA ROY CHOWDHURY (ASSISSTANT PROFESSOR)
SCHOOL STUDENTS: PRADEEP CLASS 10, VISHNU, CLASS 9, GOVT. BOYS SENIOR SECONDARY SCHOOL, SOHNA
COLLEGE STUDENTS: ARUN KUMAR TAYAL, HEMANT JOSHI

ABSTRACT

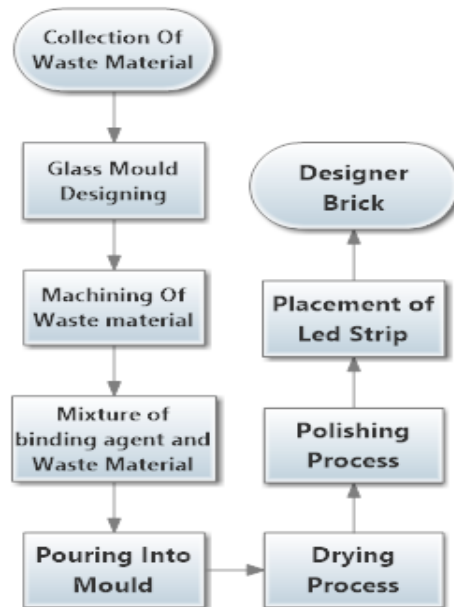
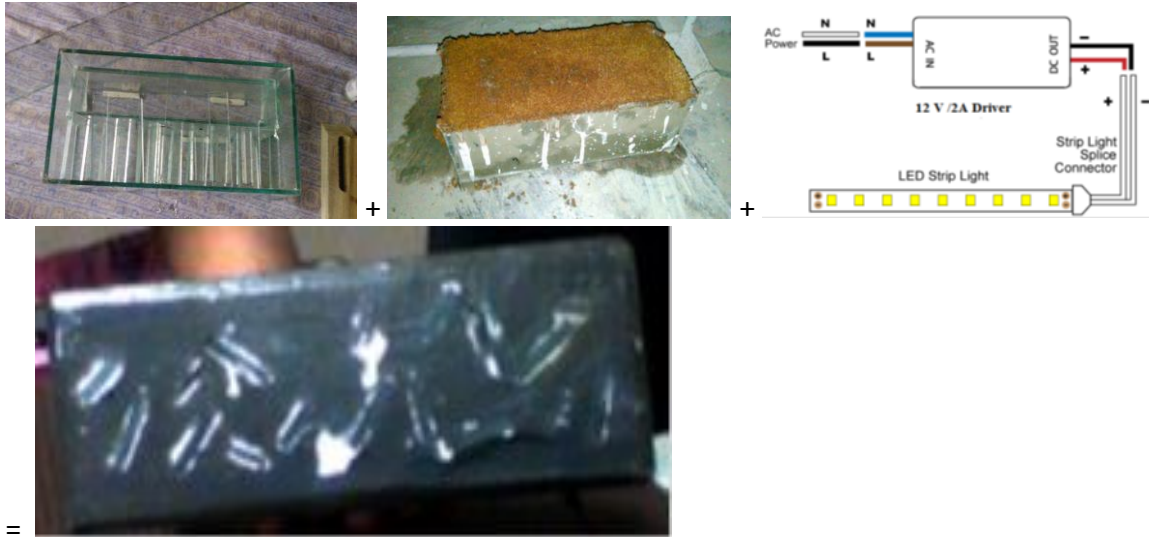
A variety of waste materials is generated at a construction site which is referred as inert. Dumping such waste materials in a landfill do not generate any further useful by-product like gas or fertilizer. Here, the aim is to reuse and recycle waste materials generated at construction site to make a designer brick. It has been tested to be hard and durable to serve the purpose of being used as a part of a wall. An electric circuit has been installed inside the brick which lights up the LED strip in the brick. This mode of production of designer brick follows the cradle-to-cradle approach and helps in better sustenance of the environment.

HYPOTHESIS

Population, urbanization and affluence contribute to the generation of waste. Waste generated is usually broadly categorized as 'solid waste' or 'waste water'. Municipal solid waste refers to nonhazardous solid waste from a city, town or village that requires periodic collection and disposal. Construction and demolition waste is not considered to be a part of municipal solid waste. It constitutes about 20% of the total solid waste generated. It has been proposed to reuse and recycle the waste materials generated at construction site and produce a designer brick. The waste generated is thus, reclaimed and reused in making value added product. This would in turn help to maximize economic and environmental benefit.

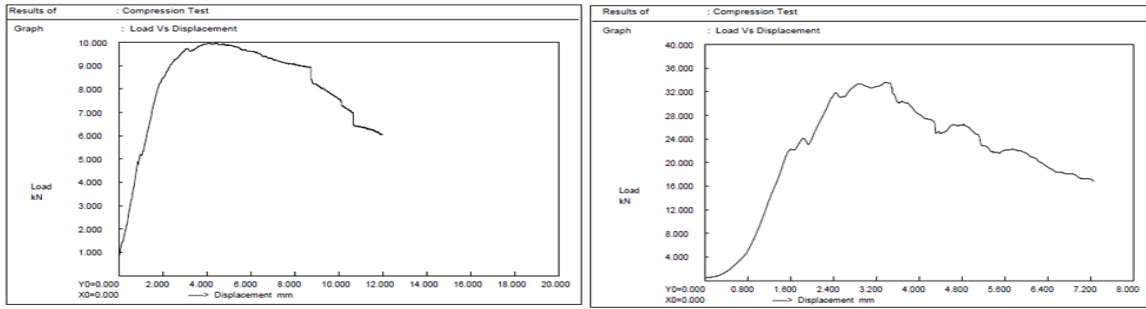
METHOD:

Various materials discarded at a construction site are used to create a designer brick. Fallen plaster, plaster of Paris, wall putty, ash and clayey substance obtained during floor polish were first accumulated. Wooden shredding and small pieces, glass cuttings were also collected. Different power tools and accessories were available at the site itself. After this a mould was designed as per the size of the standard brick, Waste material was grinded into fine powder and mixed with binding agent, then the mixture was poured in the mould. It was dried for six hours and then the brick was polished. The designed circuit was then placed in the hollow part of the Designer Brick.



EXPERIMENT

The designer brick had a mass of 1.52 kg. Its length, breadth and height were 8.75 inches, 4 inches and 3 inches respectively. A dummy finished product of designer brick was put to Compression Test using the FMI make Universal Testing Machine, Model - TFUC-100 kN, Sr. No. 2011/150. It showed that the product could bear a maximum force of 9.9 kN. The graph of Load Vs Displacement Curve is given below in Fig. 7. The brick made is hard enough as there were no impressions left on its surface when pressed with finger nails, which is a good way to assess the surface hardness. A common brick of mass 3.72 kg can bear a maximum load of 22 kN (Fig. 8). However, the load bearing capacity of 9.9 kN of the proposed brick is sufficient for its intended designer purpose. It is to be noted that construction site waste materials have been reused and recycled for making a 'designer brick' which is intended to be used for making a non-load bearing partition or projection wall to enhance the look and ae



SUMMARY

The waste materials generated at a construction site can be collected and transformed into a ‘Designer Brick’ based on the principle of reuse and recycle which could add value to a room or give an enhanced look to a stage show. Thus, the construction site waste has been utilized for making a product that can add value to the same or other construction project. At no extra cost of machinery, the construction companies can make an attempt to manage their waste better without much of a waste disposal logistics or cost. This method of recycling is referred to as cradle-to-cradle system. Usually, there is a linear progression of materials from input to output and in the process the material is either consumed or disposed as waste. This course is usually termed as cradle-to-grave. Cradle-to-cradle approach is an eco-efficient way towards sustainability. This mechanism generates positive possibilities and thus, allows for economic growth. As life evolved on earth, the planet has developed a mechanism of reusing the same material and thus, has sustained itself for billions of years. So mimicking the rules of the biosphere may help the individuals and industries to manage waste in a better way.

Producing Designer Bricks would lead to growth of business for the construction company as well; facilitating environmental sustainability.

As a future scope of the project, a wall made of designer bricks is planned. We are working on it. This wall will show us equalizing effect with the change in frequency of the running music in the background.

COST

<i>Cost of One Designer Brick</i>	
<i>Material</i>	<i>Cost</i>
Wasted plaster of paris	Nil
Wooden shredding	Nil
Wasted plaster	Nil
Pure plaster of paris	12
Black cement	1
Latex	2
Fevicol SH	5
LED strip	25
TOTAL	45
One Time Cost Involvement for Multiple Bricks	
Glass Sheets for Mould	250
Glass Cutter	120

22. Mitti Fridge

COLLEGE: MANGALMAY INSTITUTE OF ENGINEERING AND TECHNOLOGY
GUIDE: Mr. ANKIT SAXENA
SCHOOL STUDENTS: HARSHIT SHARMA, VINIT SHARMA, CLASS 10, BIHARILAL INTER COLLEGE DANKAUR, GAUTAM BUDDHA NAGAR
COLLEGE STUDENTS: ASHWANI KUMAR, SARITA VERMA< VICKEY KUNDAL

ABSTRACT

This report discusses about the modification of old technique of preserving food items. Simple innovation like this could have a significant impact on the places where a person is not able to preserve their food items for long time with the conventional electric refrigerator. It would also enable them to preserve their products long enough to sell at urban markets where prices are much more amenable to them. This work is the extension of the pot in pot refrigeration technique. Use of this simple refrigeration mechanism would mean that food can be store and sold even in remote areas with the greatest demand.

All renewable items are utilized to complete the work which is also the need of the hour. Mitti fridge is based on a simple principle of physics: the water contained in the sand between the two pots evaporates towards the outer surface of the larger pot where the drier outside air is circulating. By virtue of the laws of thermodynamics, the evaporation process automatically causes a drop in temperature of several degrees, cooling the inner container, destroying harmful micro-organisms and saving perishable food inside. Cost is the major factor of every project so a strict procedure is followed to constraint the cost of the work. Mitti fridge is so convenient to carry even for camping where you need a fridge to keep your food preserve. Mitti fridge does not use any kind of electricity and wiring for its functioning. This is an eco-friendly system with low cost as comparison to available in market.

HYPOTHESIS

A Mitti fridge is based on the basics of pot-in-pot refrigerator or zeer (Arabic) is an evaporative cooling refrigeration device which does not use electricity. It uses a porous outer earthenware pot, lined with the sand, contains an inner pot within which the food is placed, the evaporation of the outer liquid draws heat from the inner pot. The device can be used to cool any substance. This simple technology requires only a flow of relatively dry air and a source of water. Mitti fridge uses simple principle of physics: the water contained in the sand between the two pots evaporates towards the outer surface of the larger pot where the drier outside air is circulating. By virtue of the laws of thermodynamics, the evaporation process automatically causes a drop in temperature of several degrees, cooling the inner container.

HISTORY

Old kingdom of Egypt around 2500 BC is assumed to use technology of evaporative cooling. Frescos show slaves fanning water jars, which would increase air flow around the porous jars and aid evaporation, cooling the contents. Many earthenware pots were discovered in Indus Valley Civilization around 3000 BC which were probably used for storing as well as cooling water similar to present day ghara or matki used in India.

Despite being developed in Northern Africa, the technology appears to have been forgotten with the advent of modern electrical refrigerators. In Spain, botijos are popular. A botijo is a porous clay container used to keep and to cool water; they have been used for centuries. and are still relatively widespread. Botijos are favoured most by the low Mediterranean climate; locally, the cooling effect is known as “botijo effect”.

In the 1890s gold miners in Australia developed the Coolgardie safe, based on the same principles.

In rural northern Nigeria in the 1990s Mohamed Bah Abba developed the pot-in-pot preservation cooling system, consisting of a small earthenware pot placed inside a larger one. and the space between the two filled with moist sand. The inner pot is filled with vegetables and covered with a wet cloth.

Abba, hired skilled pot makers to mass-produce the first batch of 5000 pot-in-pots. He received Rolex award for enterprise in 2001 and used his award to make the invention available throughout Nigeria.

After the millennium several international NGOs started to work on the dissemination of this technology in various African countries: Practical action in Sudan and Humanity first in Gambia and Movement e.g. in Burkina Faso.

METHOD AND CONSTRUCTION

Mitti fridge is constructed by placing a rectangular clay pot within a larger pot with wet sand in between the pots as shown in figure 1.





Fig.1. Process of construction “MITTI FRIDGE” installed with solar light.

COST AND SUMMARY

Cost of construction is kept very less. The overall cost is about 2500 Indian rupee which is far lesser than the cost of mud fridges available in market commercially. Moreover this fridge also provides 2 litre capacity of water storage which is not seen in the commercially available mud fridges.

The unique feature of this construction is its solar operated light which turns ‘OFF’ when door closes and ‘ON’ on vice-versa as we generally found on commercially available electric fridge. So this can be carried and used in area with no electricity.

23. Safety Car

COLLEGE: MANGALMAY INSTITUTE OF ENGINEERING AND TECHNOLOGY
GUIDE: Mr. HARISH BHATIA
SCHOOL STUDENTS: DIGANT PAWAN DIXIT, ANUJ TIWARI, CLASS 10, BIHARILAL INTER COLLEGE DANKAUR, GAUTAM BUDDHA NAGAR
COLLEGE STUDENTS: SHAMMI KUMAR, ANKIT SINGH

ABSTRACT

From the experimental investigation it may be concluded that technical advancement of a car makes it safe. The safety feature like as impact unlocking, starting only seat belt and emergency message alert after impact, make a car safer. This technical advancement make a car safer for human and death which happens due to door jammed and no information about accident may be reduced. These features help us to safe drive or accident free drive.

We tested this car in many formats on way all the tests very well. After the tests we come to the conclusion that using this technology in today” car is possible to save more and more life.

Main advantage of the system is women safety in cars and taxies. Today it is very important features as per women safety concern.

HYPOTHESIS

If I can use crash sensor instead of push button, It is flexible for our system and help in making our system efficiently. Our system is support every four wheeler vehicles using crash sensor.

METHOD

1. Automatic door open after crashed.
2. Send an emergency message with the location.
3. To Make Seat Belt compulsory to tie.
4. Made women safer.
5. Smoke and fire indication through emergency message.
6. ON /OFF car through mobile.

EXPERIMENT

1 .Automatic door open after crashed:-

10% of the death is because of the gate jammed after crash. Incase car catches fire and the person stuck inside and die because of the suffocation and also caused by not getting first aid on time.

2. Send an emergency message with the location:-

When our beloved ones are driving so far from us or travelling without our knowledge or met with an accident, an SMS is sent by the car automatically to their relatives.

3. To Make Seat Belt compulsory to tie:-

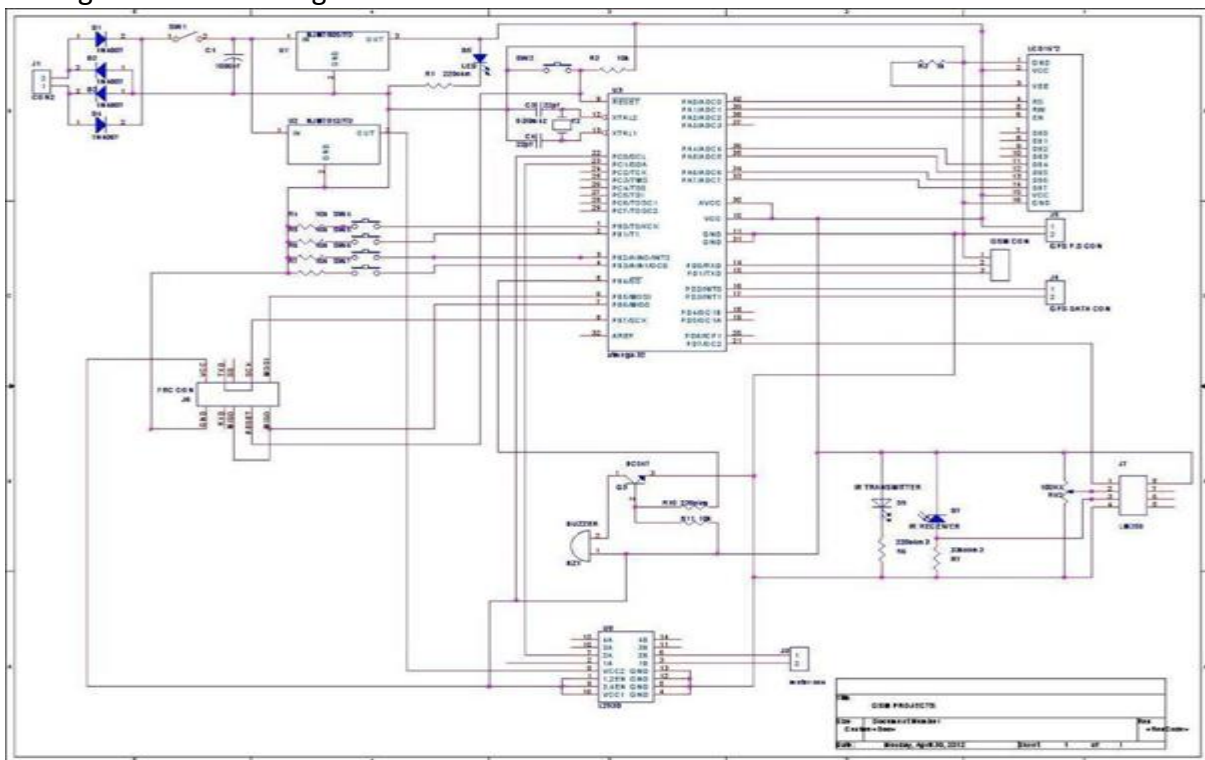
50% of death in car is because of not wearing seat belt. We have made a system which does not allow the car to start till you tie up the seat belt. If you remove seat belt the ignition stops or turn off itself.

4. Made Women Safer:

43% of Women are raped in car or four-wheeler. We have tried to make women safer to travel in taxis and buses. We use panic button to provide safety to women. Through the panic button emergency message is delivered to the nearest police station.

5. To indicate the smoke, alcohol & fire.

Through the fire sensor, alcohol sensor and smoke sensor indication of fire, alcohol & smoke through is known through the mobile SMS.



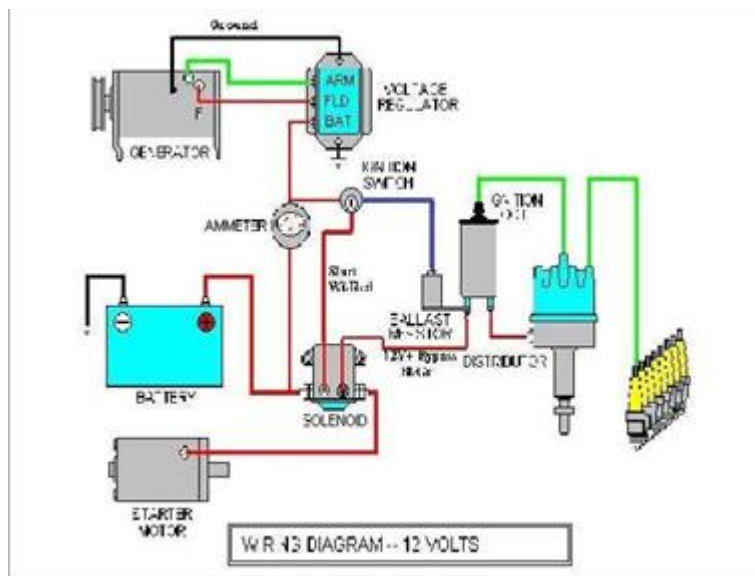
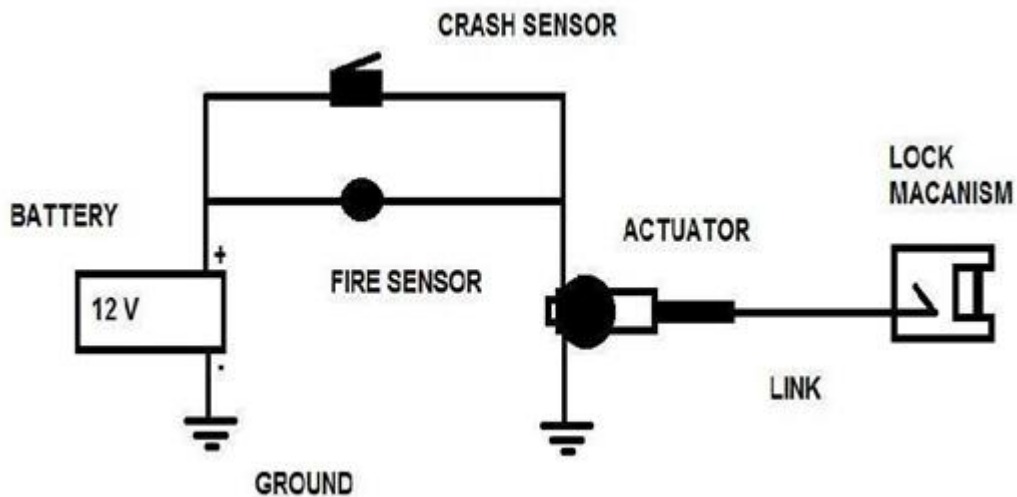
SUMMARY

I chose to investigate that thousands of people are died in road accidents due to some reasons:

- 1. Looked at the car after accidents die due to suffocation
- 2. Ambulance not available on time
- 3. Medical facilities not available on time
- 4. Serious head injury

These reasons of death are overcome by using our flexible system. This reduces 47% - 48% death rate.

AUTOMATIC DOOR OPEN SYSTEM



FUTURE SCOPE

This project also deals with the design & development of a theft control system for an automobile, which is being used to prevent or control the theft of a vehicle. The simulations of the circuit design and its implementation is done using PROTEUS software. This system is designed to improve vehicle security and accessibility. With the use of wireless technology vehicle owners are able to enter as well as protect their automobiles with more passive involvement.

26. Using of Rain Water for Domestic Use or for Recharging the Ground Water

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ABSTRACT

As we all know water is very important for our livelihood, without water life would be impossible. We know that 2/3 of earth is covered with water but mostly of salty water which is of no use. Even we have plenty of water but only about 0.003% water is available with us as fresh or unpolluted water. In India water crisis are occurring slowly as the ground water falls significantly year by year. If the groundwater table continues to fall then a day will come when water will not be available for the future generation.

So to avoid such problem we came with idea of saving rain water and letting it used in domestic purpose or used in recharging of groundwater. This process is called as RAINWATER HARVESTING. In this process we accommodate the rain water in a sump tank by collecting the water falling on the terrace through pipes passing through filter.

In our project we tried to encourage the people for opting the technique of rainwater harvesting. In our project we created a model of building from which water collected from its terrace is passed through the filters twice through pipes and then collected in a sump tank and after which with the help of motor the water is sprinkled in the garden. Motor we used in our project is of 10volts.

HOW TO IMPLEMENT

Implementing this technique is quite easy and the cost estimated in this process is negligible as compared to the cost of construction of building. In this technique a slope is created on a terrace and the water is passed to the filters through pipes with contain a mesh gauge on his opening. Then the filter of different types helps in cleaning the water. The filter which are to be used are based on the type of demand we have. These filters help in cleaning the water by removing impurities from it. Then after cleaning the water passes to sump tank with the help of pipes n collected there.

This water can be used either in domestic purpose or for recharging the groundwater table. This water can be used even for drinking just by passing it through the water purifying

machine. Even after all this process if some impurity is left in the water then it will not harm the body.

Places in India where rain water harvesting is applied

- In the state of Tamil Nadu, rainwater harvesting was made compulsory for every building to avoid ground water depletion. It gave excellent results within five years, and every state took it as role model.
- In Rajasthan, rainwater harvesting has traditionally been practiced by the people of the Thar Desert. There are many ancient water harvesting systems in Rajasthan, which have now been revived.
- At present, in Pune (in Maharashtra), rainwater harvesting is compulsory for any new housing society to be registered.
- In state of Kerala, rainwater harvesting is applied recently

Amount of water can be saved

Suppose an area of 100sqm. Taking the average annual rainfall in Delhi as 600 mm, and assuming 70% harvesting efficiency (as some rainwater will be lost due to evaporation, collection etc.), we can calculate the amount of water harvested thus:

Volume of water harvested = $100 \times 0.6 \times 0.7 = 42,000$ liters

CONCLUSION

By implementing rain water harvesting the water can be saved for future generation.

SUMMARY

Implementation of rainwater harvesting save both water and energy as it does not contain any sort of energy. All the process happens under gravitational flow.

The pictorial representation of the idea is gives as below:

