



Student Projects Technical Record

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

At

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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 2016-17 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

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Introduction

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

Agastya Vision:

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

Mission of Agastya

Infuse and propagate a creative 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#sthas h.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 2 nd Edition in Bangalore
2013 - 14	Anveshana 3 rd Edition in Bangalore Anveshana Launched in Hyderabad
2014 - 15	Anveshana 4 th Edition in Bangalore Anveshana 2 nd Edition in Hyderabad
2015 - 16	Anveshana 5 th Edition in Bangalore Anveshana 3 rd Edition in Hyderabad Anveshana Launched in NCR-Delhi
2016 - 17	Anveshana 6 th Edition in Bangalore Anveshana 4 th Edition in Hyderabad Anveshana 2 nd Edition 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

PROJECTS EXHIBITED IN THE FAIR

S.N	PROJECT CODE	PROJECT TITLE	COLLEGE NAME	SCHOOL NAME
1	AS-D-01	ANANTA: HALE SOLAR DRONE	JSS ACADEMY OF TECHNICAL EDUCATION, NOIDA	RSS INTERNATIONAL SCHOOL NOIDA, UTTAR PRADESH
2	AS-D-02	ANTI-THEFT CAR LOCATION TRACKER	BHARTI VIDYAPEETH'S COLLEGE OF ENGINEERING, DELHI	GOVT GIRLS SENIOR SECONDARY SCHOOL, NITHARI
3	AS-D-03	BASE ISOLATION FOR BUILDING	SANSKAR COLLEGE OF ENGINEERING, GHAZIABAD	GOVT INTER COLLEGE, NANDGRAM, GHAZIABAD
4	AS-D-04	BLOOD ON TIME	NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY, GREATER NOIDA	GAUTAM BUDH BALAK INTER COLLEGE, GREATER NOIDA
5	AS-D-05	BODY CHARGER	MANGALMAY INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA	GAUTAM BUDH BALAK INTER COLLEGE, GREATER NOIDA
6	AS-D-06	DESALITRIC	GL BAJAJ INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA	RASTRIYA PRATIBHA VIKAS VIDYALAYA, JHANDEWALAN
7	AS-D-07	DUAL AXIS SOLAR TRACKING SYSTEM	NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY, GREATER NOIDA	RASTRIYA PRATIBHA VIKAS VIDYALAYA, JHANDEWALAN
8	AS-D-08	ECO-FRIENDLY CAR	GARGI INSTITUTE OF TECHNOLOGY, BHOPAL	MLB HIGH SCHOOL BHOPAL
9	AS-D-09	ELECTRICITY FROM PLANTS	SHARDA UNIVERSITY, GREATER NOIDA	MLB HIGH SCHOOL BHOPAL
10	AS-D-10	ELECTRONIC EYE CONTROLLER	NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY, GREATER NOIDA	GAUTAM BUDH BALAK INTER COLLEGE, GREATER NOIDA
11	AS-D-11	ELECTRONIC SHELF LABELLING SYSTEM	JSS ACADEMY OF TECHNICAL EDUCATION, NOIDA	RSS INTERNATIONAL SCHOOL NOIDA, UTTAR PRADESH

12	AS-D-12	ENERGY EFFICIENCY WITH WATER	G D GOENKA UNIVERSITY, GURGAON	RASTRIYA PRATIBHA VIKAS VIDYALAYA, JHANDEWALAN
13	AS-D-13	GAS LEAKAGE DETECTOR	BHARTI VIDYAPEETH'S COLLEGE OF ENGINEERING, DELHI	GOVT GIRLS SENIOR SECONDARY SCHOOL, NITHARI
14	AS-D-14	HOME AUTOMATION BY DTMF	NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY, GREATER NOIDA	GAUTAM BUDH BALAK INTER COLLEGE, GREATER NOIDA
15	AS-D-15	HOME AUTOMATION SYSTEM	G D GOENKA UNIVERSITY, GURGAON	RASTRIYA PRATIBHA VIKAS VIDYALAYA, JHANDEWALAN
16	AS-D-16	LED FLASHER USING MICROCONTROLLER	G D GOENKA UNIVERSITY, GURGAON	GOVT MODEL SENIOR SECONDARY SCHOOL, SECTOR-4, GURGAON
17	AS-D-17	LOW COST WATER PUMP	MATA RAJ KAUR INSTITUTE OF TECHNOLOGY, REWARI	GOVT BOYS SENIOR SECONDARY SCHOOL, REWARI
18	AS-D-18	NAVIGATION SYSTEM FOR BLIND	NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY, GREATER NOIDA	GAUTAM BUDH BALAK INTER COLLEGE, GREATER NOIDA
19	AS-D-19	PURIFICATION OF WATER	NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY, GREATER NOIDA	GAUTAM BUDH BALAK INTER COLLEGE, GREATER NOIDA
20	AS-D-20	SEWAGE TREATMENT	JAI NAARANAYAN COLLEGE OF TECHNOLOGY, BHOPAL	MLB HIGH SCHOOL BHOPAL
21	AS-D-21	SMART DUSTBIN	BHARTI VIDYAPEETH'S COLLEGE OF ENGINEERING, DELHI	GDS DAV SENIOR SECONDARY SCHOOL, PUSA ROAD DELHI
22	AS-D-22	SMART CITY	SAGAR INSTITUTE OF RESEARCH AND TECHNOLOGY, BHOPAL	MLB HIGH SCHOOL BHOPAL
23	AS-D-23	SMART KRISHI E-MONITORING SYS.	AJAY KUMAR GARG COLLEGE OF ENGINEERING, GHAZIABAD	ST PAUL ACADEMY, RAJNAGAR, GHAZIABAD, DHT SARSWATI VIDYA MANDIR, NEHRU NAGAR, GHAZIABAD

24	AS-D-24	TADPOLE DESIGN BASED CAR	SHREE GANPATI INSTITUTE OF TECHNOLOGY, GHAZIABAD	GOVT INTER COLLEGE, NANDGRAM, GHAZIABAD
25	AS-D-25	TRAFFIC CONGESTION MANAGEMENT	AJAY KUMAR GARG COLLEGE OF ENGINEERING, GHAZIABAD	KVS, KAMLA NEHRU NAGAR, GHAZIABAD, DHT SARSWATI VIDYA MANDIR, NEHRU NAGAR, GHAZIABAD
26	AS-D-26	WALKING AID GEARS (FOR BLIND)	BHARTI VIDYAPEETH'S COLLEGE OF ENGINEERING, DELHI	CO-ED SENIOR SEC. SCHOOL, C-BLOCK, MANGOLPURI
27	AS-D-27	WIRELESS HEXAPOD	GL BAJAJ INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA	GAUTAM BUDH BALAK INTER COLLEGE, GREATER NOIDA

1. ANANTA – HALE SOLAR DRONE

COLLEGE	JSSATE
GUIDE	ULLAS P
SCHOOL STUDENTS	LAVKESH 8 TH STD, RITESH KUMAR TRIPATHI, 8 TH STD, RSS SCHOOL
COLLEGE STUDENTS	MADAN MOHAN JAISWAL, NITIN KUMAR

ABSTRACT

The objective of this mission is to be implemented into a fully functional prototype upon approval for specific military and commercial use. With respect to the mission requirements, the UAV shall be able to completely recharge on-board batteries using the equipped solar panels.

HYPOTHESIS

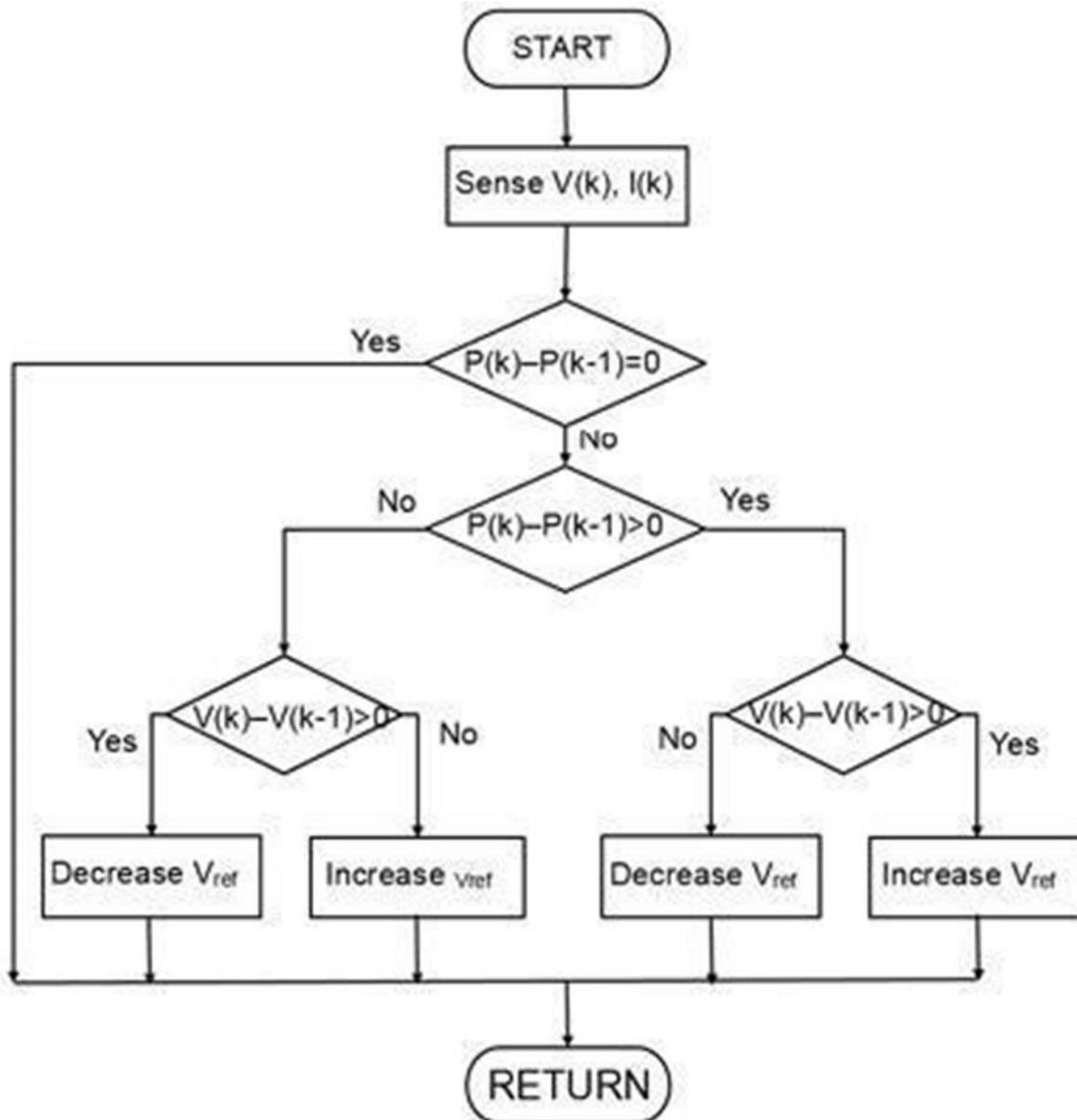
ANANTA the solar drone will use solar energy to recharge the battery of the drone. Solar energy will be generated by the solar cells installed on the wings of the drone. So by using this we can increase the flight time.

Component Name	Specification	Cost Estimation
Arduino UNO	Microcontroller – At mega 328 Power Rating – 9/12 V , 46.5mA	400
BLDC Motor (2212/12T) (1400 KV)	RPM / V – 1400 KV Max power – 220/3 W Current – 0.68 to 8 A Rotor Diameter – 22 mm Rotor Height – 12 mm No of wire turns – 12	550
Propeller	Diameter – 30cm	50

Solar Panel (Monocrystalline Silicon) (approx. 68)	Efficiency – 17-19% Max Power – 4.5W Thickness – 200 um Size – 156x156 mm ² Short Circuit Current – 8.33A	100/piece
ESC (Electronic Speed Controller)	Max Current – 30A (20% more than Motor)	400

Battery (Li-Po 3s)	Voltage – 11.1V Current Rating – 5000mAh Charging & Discharging Rate – 1C & 20C	3000
Accelerometer & Gyro sensor (MUP6050)	Voltage – 2.37V to 3.46V Current – 4.1 mA	250
Trans-Receiver (nRF24L01) (2)	ISM Band – 2.4 GHz Voltage – 1.9 to 3.6 V Current – 14 mA	250
Mini Servo Motor (4)	Voltage – 4.6 to 6 V Current – 250 mA	200
Pressure Sensor (SPX3058d)	Voltages – 5V Current – 10.6 mA	50

FLOW CHART FOR MPPT ALGORITHM



CONCLUSION

With the current desire for greener society, an alternate source of energy for air craft is needed. There are many other energy option such as bio fuel or hydrogen cell, but nothing is limitless to solar energy. In our project application of high altitude long endurance UAV potentially be very large, whether it is in weather surveillance or in border security system It can watch forest fires or track hurricanes on the ground. It can also monitor the traffic.

2. ANTI – THEFT CAR LOCATION TRACKER

COLLEGE	BHARATI VIDYAPEETH'S COLLEGE OF ENGINEERING, NEW DELHI
GUIDE	MR. ABHISHEK GANDHAR
SCHOOL STUDENTS	SANGAM, SONY KUMARI
COLLEGE STUDENTS	PRANAV MALHOTRA, AJAY RAI

HYPOTHESIS

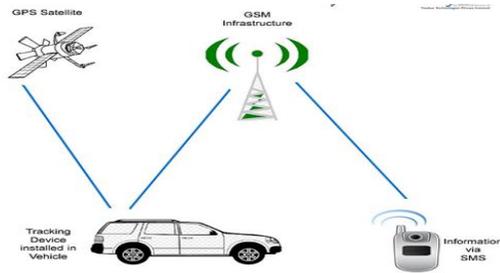
In this project the devices installed allow user to track the location of the car by using satellite tracking. This is done by using GPS module (Neo-6M), which interacts with the satellite GPS (Global Positioning System). The location is then sent to the phone by messaging through the GSM module (sim 900A).

METHOD

The process is undertaken by means of GSM (Global System for Mobile) technology which works for a uniquely identified user mobile number exclusively. The GSM module includes a SIM card to access all the functions of a cellular telecommunication.

Through this the GSM module receives calls and sms and gets activated when called or messaged from a particular number. After recognizing the number of the incoming call as certain number the GSM then integrates the incoming NMEA data through the GPS into a message containing a link. This link takes the user to Google maps with the current location of the car pointed at with blue color pointer. Once the message is created it is sent back to the owner's cell phone number.

This project is performed under the field of Embedded System using GPS-GSM interaction technology. This project contains Atmega 328p microcontroller with Arduino board, Neo-6M GPS module, Sim 900A GSM module. In this project interaction between microcontroller and GPS-GSM is done by using AT commands.



EXPERIMENT

Hardware required for this project are as follows:-

- Arduino Uno (ATmega 328 based microcontroller)

Arduino is a computer hardware and software company, project, and user community that designs and manufactures microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world. The project's products are distributed as open-source hardware and software, which are licensed under the GNU Lesser General Public License (LGPL) or the GNU General Public License (GPL), permitting the manufacture of Arduino boards and software distribution by anyone. Arduino boards are available commercially in preassembled form, or as do-it-yourself kits.



- GSM Module (Sim900A)

GSM (Global System for Mobile Communications), is a standard developed by the European Telecommunications Standards Institute (ETSI) to describe the protocols for second-generation (2G) digital cellular networks used by mobile phones, first deployed in Finland in July 1991. As of 2014 it has become the de facto global standard for mobile communications – with over 90% market share, operating in over 219 countries and territories.



- GPS Module (Neo-6M)

The GPS system operates independently of any telephonic or internet reception, though these technologies can enhance the usefulness of the GPS positioning information. The GPS system provides critical positioning capabilities to military, civil, and commercial users around the world. The United States government created the system, maintains it, and makes it freely accessible to anyone with a GPS receiver.



SUMMARY

To device equipment that when installed in a car allows us to get the location of the car at a particular instant through satellite GPS (Global Positioning System) tracking system in an android based cellular device with the help of Google maps. The process is undertaken by means of GSM (Global System for Mobile) technology which works for a uniquely identified user mobile number exclusively.

COST

Arduino: 550/-

GPS: 800/-

GSM: 800/-

Battery: 250/-

Total: 2400/-

3. SESIMIC BASE ISOLATION FOR BUILDING

COLLEGE	SANSKAR COLLEGE OF ENGINEERING AND TECHNOLOGY
GUIDE	MR. PRINCE PODDAR
SCHOOL STUDENTS	KAMAL, ABHAY
COLLEGE STUDENTS	MONU, ANJALI GAUTHAM

ABSTRACT

In this project we explain about what seismic isolation is., seismic isolators, their types, how they work and their advantages and disadvantages. In seismic isolator types there are Elastomeric bearings, Natural and Synthetic Rubber Bearings (NRB)¹ , Lead Rubber Bearings (LRB)² , Friction pendulum bearing, Supply metal Damping Devices like Buckling Restrained Brace (BRB)³ , Fluid Dampers, Viscous-Elastic Dampers, Friction Dampers, Hysteretic Dampers (Yielding Dampers).

INTRODUCTION

Seismic isolation is a technique used to reduce the effects of earthquake ground shaking on structure, their components and protect them from damaging. In this technique we use some hardwires that I will describe later to reduce structures lateral movement.

How do seismic isolators work?

These hardware reduce the period and acceleration of structure. So increase the frequency and reduce forces applied to floors according to the Newton's second law of motion

$$T = \frac{1}{f}$$

$$\sum F = m \times a$$

Acceleration vs. Period charts

The system decouples the building or structure from the horizontal components of the ground motion by interposing structural elements with low horizontal stiffness between the structure and the foundation. This gives the

structure a fundamental frequency that is much lower than both its fixed-base frequency and the predominant frequencies of the ground motion. Isolators reduce the energy of structure too.

$$E=E_k+E_s+E_h+E_v$$

E is the energy induced by the seismic shaking, E_k is the kinetic energy, E_s is the elastic strain, E_h is the hysteretic damping energy, and E_v is the viscous damping energy. The seismic isolation system is used in order to decrease the earthquake energy (E) acting on the structure e d a m p i n g by energy dissipation influences the displacement and the acceleration response . The local soil conditions have a great impact on the reliability of the base isolation. In stiff soil conditions a significant reduction in spectral acceleration is attained while in soft soil the adverse occurs.

HOW TO IMPLEMENT

We will provide the isolators in between the foundation and superstructure to overcome the earthquake problem. This will also be used as energy dissipater. It's main work is to decouple the foundation to the superstructure. Due to this less number of vibrations will pass through the foundation to superstructure during the earthquake.

TYPE OF ISOLATOR

- Elastomeric isolators
- Sliding isolators

There are many types of supplementary devices but five devices are most famous:

- 1) Buckling Restrained Brace (BRB)
- 2) Fluid Dampers
- 3) Visco-Elastic Dampers
- 4) Friction Dampers
- 5) Hysteretic Dampers (Yielding Dampers)

Place in India where base isolation is applied

1. Gujarat province in Northern India was the home of Mahatma Gandhi. It is also the site of earthquakes, one of which devastated the province in January 2001 and caused tens of thousands of casualties.

2. During the disaster the local hospital in Bhuj (420 km west state capital Gandhinagar) collapsed claiming approx. 176 lives. The New Zealand Government, as part of its international aid programmed, decided that rebuilding the ruined facility would be a suitable project for New Zealand earthquake engineering assistance.

Advantages and disadvantages of seismic isolator devices

1. There can be significant overlap between base isolator devices and damping devices since damping devices could be combined with base isolators, and also can be a part of damage-resistant designs.
2. Base isolation is not suitable for tall high-rise buildings
3. Base isolation is not suitable for building on very soft soils
4. Base isolation is most effective and suitable for low to medium rise buildings which are located on hard soils.

CONCLUSION

1. Seismic isolation is a simple technique that works by using natural forces and capacity of materials like friction or liquids compression capacity. Before using seismic isolators notice the limit of using them, project and site situations. Some isolators can be used as damage resistant parts and some of them can be used as supplementary
2. The plastic hinge location varies by the type of loading, and the change in MODAL period. It can be located at any point along the span of member as well as the end of the member.
3. Drift index and inter-story drift should be predicted using the multi-modal (SRSS) and the elastic first mode with long period for the lateral load pattern which corresponds to the average in most cases.
4. Base-isolated structure exhibit less lateral deflection, as the lateral displacement at the base never equals to zero, and less moment values than the fixed base structure.
5. The base isolation decouples the building from the earthquake-induced load, and maintain longer fundamental lateral period than that of the fixed base.

COST

S.NO	NAME AND DESCRIPTION	PURPOSE	QUANTINTY	COST
1	THERMACOL	MAKING AS WALL AND ROOF OF BUILDING	16	600
2	WOOD	BASE OF BUILDING	2	1500
3	NUT & BOLT	JOINING OF WOODEN PARTS	40	300
4	STEEL BARS	WORK AS COLUMN	8	1000
5	CRANK SHAFT	WORK AS SHAKING DEVICE	1	1000
6	MARBLES	WORK AS ISOLATORS		50
7	SPRINGS			650
Total				5100

4. BLOOD ON TIME

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GUIDE	Dr. C. S. YADAV
SCHOOL STUDENTS	DEVESH SINGH, ABHASH RAI, G.B.B.I.C NOIDA
COLLEGE STUDENTS	PRAMOD KUMAR YADAV, NITIN SINGH

ABSTRACT

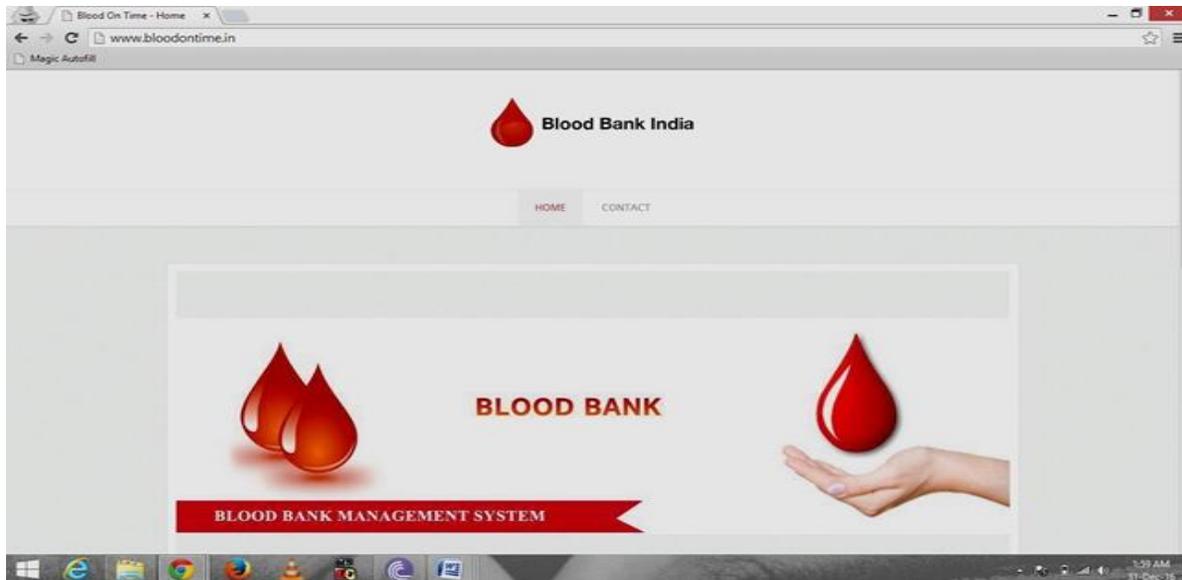
Technology is continuously growing. With the growth of technical developments, we see various types hazards due to technical failures like accidents, fires etc. These hazards cause loss of wealth and life. When any accident occurs we need instant availability of the hospitals and blood from blood bank.

Today we have all the information about blood bank but we are unable to access the quantity of blood available in blood bank for a specific blood group. In "Integrated blood bank system" we create a website (portal) where anyone can access the availability of blood in a nearby blood bank. In villages if any accident occurs, we need instant availability of the blood.

Today if we need blood from blood bank we need to visit every blood bank manually to check for availability. This new system will provide back bone to the old blood bank system. Here we provide a platform in which blood banks will have their own account on our website. They will provide data on the availability of blood on daily basis in our website. So when any one needs blood, only he will have to visit the website and he will have to fill the place details, where the blood is needed. We will provide the exact location and availability of blood in the blood bank near to him.

This system is a data base system in which the data of the blood banks will be stored. This system can save many lives looking for blood in emergency.

WEBSITE MODEL

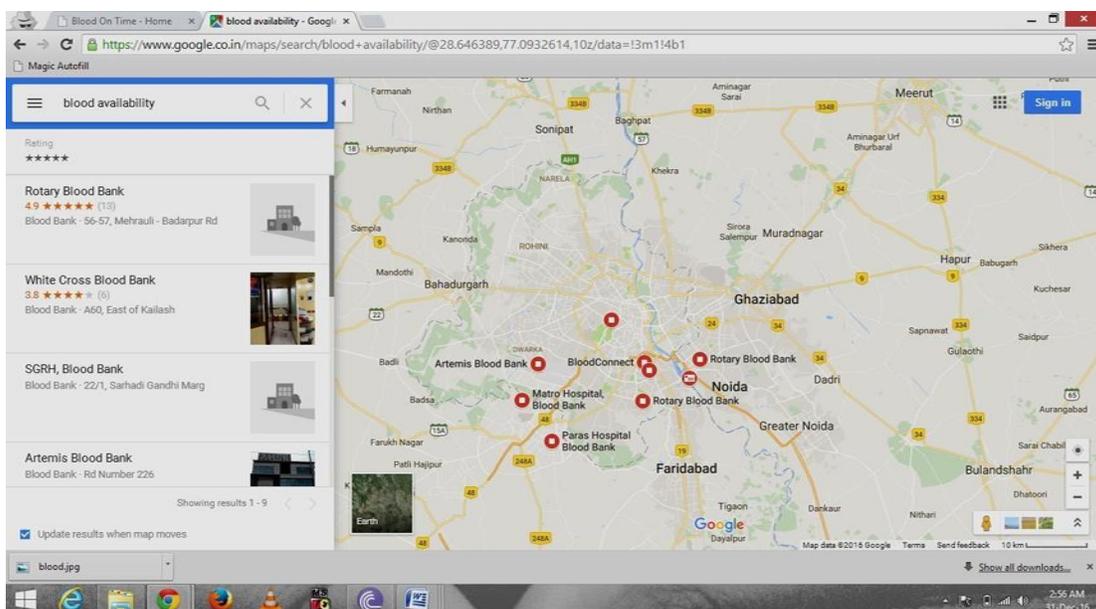


One can enter www.bloodontime.in url to enter this website.

The user has to provide their valid information which will be asked in order to access this facility.

IMPLEMENTATION

1. Website Implementation
2. Location Based Mapping System (GPS connectivity)
3. Availability Factor



Blood Type	No. of Units/ Location 1	No. of Units/ Location 2	No. of Units/ Location 3
A	200 units/AB Bank	250 Units/ AC Bank	290 Units/AD Bank
B	100 units/BA Bank	150 Units/BB Bank	180 Units/BC Bank
O	50 units/ZZ Bank	100 units/XZ Bank	90 Units/XY Bank
O+	.. and so on	.. and so on	.. and so on
O-			
A+			
..			

SCOPE OF THE PROJECT

This application is built such a way that it should suits for all type of blood banks in future. So every effort is taken to implement this project in this blood bank, on successful implementation in this blood bank, we can target other blood banks in the city. Main modules of the project: This project has the following modules, to manage all the requirements of the blood bank.

1. Blood bank details
2. Donor Details
3. Recipient Details
4. Equipment Details
5. Blood collection details
6. Blood Issued Details
7. Stock Details
8. Camp Details
9. Repots

To manage employees in the blood bank it had the following modules

1. Employee Details
2. Employee Attendance Details
3. Employee salary Generation
4. Employee Salary Payment
5. Reports

5. BODY CHARGER

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GUIDE	HARISH BHATIA
SCHOOL STUDENTS	HARIKESH SINGH & DHANANJAY SINGH
COLLEGE STUDENTS	SHAMMI KUMAR & DURGANAND CHOUDHARY

ABSTRACT

Humans are a living energy source. We produce body heat, we walk, and our blood flows throughout our body. All of these energy sources from our body can be used to generate electricity. So why have we not taken advantage of those sources, and used them, especially for people do not have access to electricity? So why waste readily available energy that is available to every human? This solution converts body heat into electricity, and makes electricity available to anyone. Now, this was quite the challenge, because your body generates a small amount of heat, and is a small temperature differential compared to air.

Each thermo-electric generator, or peltier, only generates 0.1 volts when placed against your skin. In order to increase that voltage first, three-four peltiers are wired in a series circuit, so that together they generate 0.4 volts (sodium acetate body warmer) increase temperature difference up to 20-30 degree that increases voltage to 1.0 volt. From there, a joule thief circuit is used to boost up the voltage to power a light. A joule thief can take in voltages down to 0.3 volts! If you were using this for a body heat powered USB charger, you would just use a voltage step up module to step up the voltage to 4.2 volts (sodium acetate body warmer)

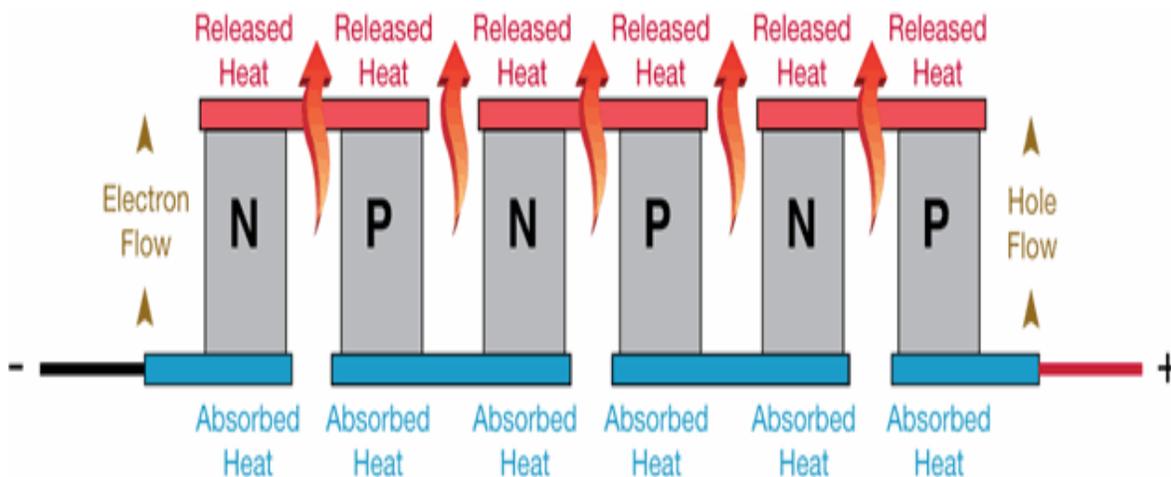
We will need our solar panel to produce more than the 6 volts they are rated at in order to charge a battery rated higher than the panel. In this case, we want to charge a 9 volt battery but our panels are only able to produce 6 volts.

SHORT PROJECT DESCRIPTION

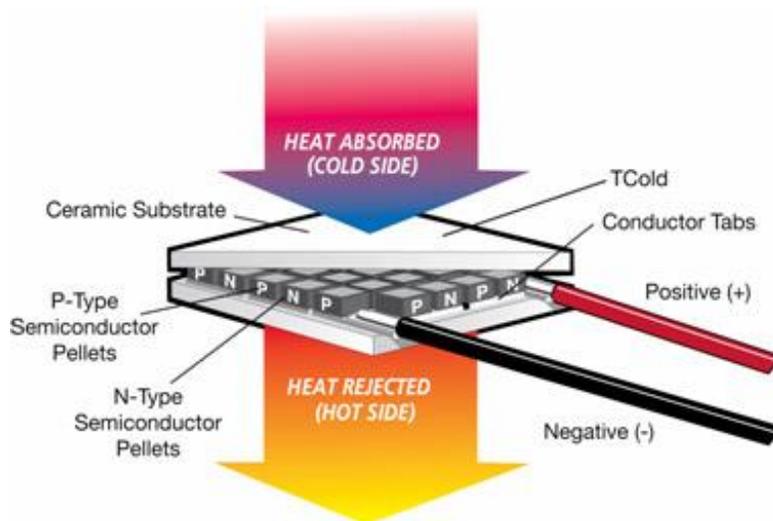
The objective of the project was to create voltage that runs charging solely on the heat of the human body. Using four Peltier tiles and the temperature difference between the body and ambient air, charger that provides voltage to phone a without batteries or moving parts is designed. The design is ergonomic, thermodynamically efficient, and only needs a 20-30 degree temperature difference to work and produce up to 1000mA and 4.3volts.

SUMMARY

When we investigate the aspect of human energy it was found out that we are like walking 100 Watt light bulbs. The goal of the project became a charger powered solely from the heat of the human body. Peltier tiles are used. If one side of these tiles is heated, and the other is cooled, electricity is produced. For this charger, we will be heating one side with the wrist (with sodium acetate body warmer), and cooling the other side of the tile with a heat sink. The calculated values of our bodies radiate 5.7mW/cm², but only 4.3 volts is needed to charge mobile phone. Both Peltier devices produced power, but only a 1000milliamperes. 4.5 V.j is required.



DC input has to be converted to AC, and then run it through a oscillator circuit with a step-up transformer .The final circuit had only 4 parts and produced a step up ratio of 100:1. For 50 mV DC from each Peltier



5 Volts AC was obtained which is sufficient for booster circuit. The final design included mounting the Peltier's on an aluminum plate which was ambient air to cool. The wrist -wrapped around Peltier's with sodium acetate solution warmed the tiles. The result was at 20-30 degree Celsius of Peltier differential. The charger worked!

RESOURCE REQUIREMENT

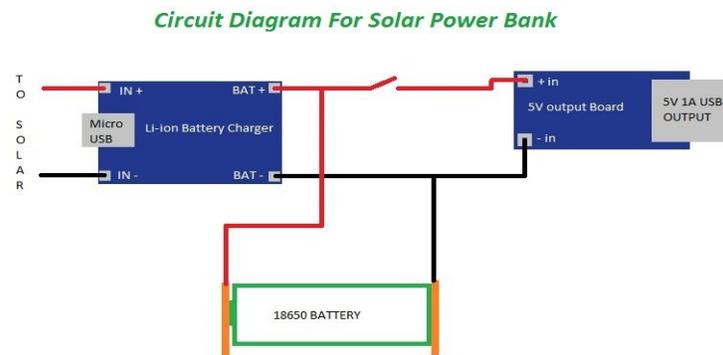
If enough heat can be captured from a human body and convert it efficiently to electricity, then it is possible to power a laptop without any batteries or kinetic energy.

With research we could not find any idea specific to the topic of the body charger at all, except for a website called the Joule Thief. The website was dedicated to low voltage transistor oscillator circuits.

Physical Charger Design: The Solar panel,

1. Solar panel has a diode on the positive side to prevent the flow of current from the battery to the cell.
2. The Positive and Negative of the solar panel is connected to the N+ and N- of the charge controller respectively.
3. The BAT+ and BAT- is connected to the Lithium Battery's Positive and Negative Respectively.
4. The Battery positive/ BAT+ is connected to a switch and the other pin of the switch is connected to the positive of the Set-up module.
5. The BAT-/ Battery negative is connected to the Set-up module's negative.

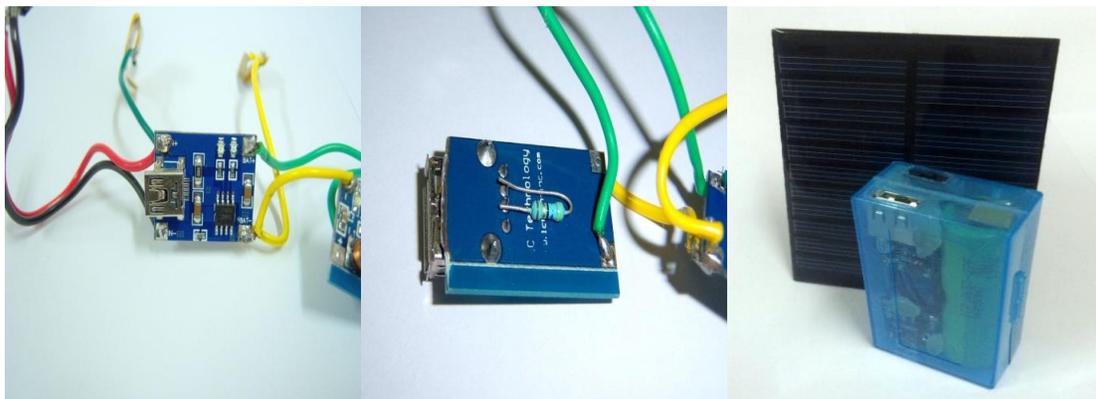
6. A resistor of value 47 ohm is soldered on the data pins of the USB output, which helps to charge iPhone phones since they need some signal to activate charging, without this iPhones wouldn't charge.
7. You can add any number of solar panels in parallel to increase the current and thereby charging faster.
8. The micro USB on the charge controller helps to charge the battery by USB outlets.



The two prototypes are, the F1 with 4 smaller tiles, and F2, with 4 larger tiles.

RESULTS

The results prove that even with all the thermal and voltage conversion losses, there was still enough power in the battery to charge mobile phone.



Cost:-Total cost of the project is Rs. 700.

6. DESALITRIC

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SCHOOL STUDENTS	VINIL VARGHESE ; SHIPRA GAUTAM
COLLEGE STUDENTS	MANYA TYAGI, SAHIL, RAJKIYA PRATIBHA VIKAS VIDYALAYA

ABSTRACT

The drinking water crisis in India is reaching alarming proportions. The need ranging from drinking to the construction of leviathans like Burj Khalifa or an A-380 requires one common resource- Water. As the resources of fresh water deplete we aim towards the ocean and Desalitric can act as the bridge to close the gap between saline water and fresh water.

HYPOTHESIS

The principle of Desalitric- Desalination of water and the production of electricity is based on the basic process of evaporation of water and using the steam hence produced to rotate a turbine which will in return generate electricity and condensing the stem back to obtain distilled water.

METHOD

The conventional method for concentrating solar energy, i.e. collecting solar energy over some large area and delivering it to a smaller one, is by parabolic-shaped mirrors. A parabola focuses rays parallel to its axis into its focal point. But, sun rays are not parallel. They can be assumed to originate at a disk which subtends the angle $q=0.0093$ radian. When a perfectly specular reflective paraboloid of focal length f and rim angle ϕ_{rim} is aligned to the sun, reflection of the rays at the focal plane forms a circular image centered at the focal point.

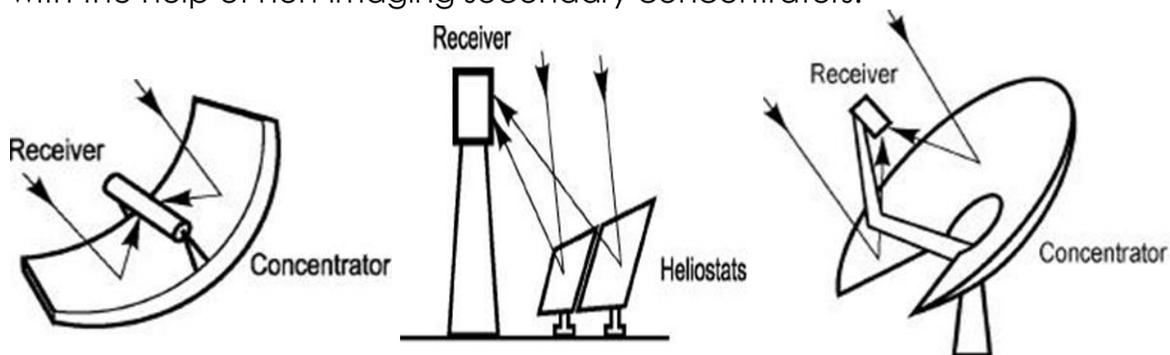
On this circle, the radiation flux intensity is maximum and uniform in paraxial solar image (the "hot spot"). It decreases for diameters larger than $f'q$ as a result of forming elliptical images. The theoretical concentration ratio C at the hot spot is defined as the ratio of the radiation intensity on the hot spot to the normal beam insolation, and is approximately

$$C = (4/\sin^2 \phi_{rim})$$

For example, for a rim angle of 45° , the theoretical peak-concentration ratio exceeds 23,000 suns, where 1 sun refers to the normal beam insolation of 1 kW/m^2 .

Three main optical configurations based on parabolic-shaped mirrors are commercially available for large-scale collection and concentration of solar energy. These are the trough, tower, and dish systems. Trough systems use linear, 2-dimensional, parabolic mirrors to focus sunlight onto a solar tubular receiver positioned along their focal line. Tower systems use a field of heliostats (two-axis tracking parabolic mirrors) that focus the sun rays onto a solar receiver mounted on top of a centrally located tower. Dish systems use paraboloid mirrors to focus sunlight on a solar receiver positioned at their focus. The total amount of power collected by any of these systems is proportional to the projected area of the mirrors. Their arrangement depends mainly on the concentrating system selected and on the site latitude. Trough systems are usually arranged in rows along the east-west direction and track the sun along the south-north direction.

The solar flux concentration ratio C typically obtained at the focal plane varies between 30-100 suns for trough systems, 500-5,000 suns for tower systems, and 1000-10,000 for dish systems. Higher concentration ratios imply lower heat losses from smaller receivers and, consequently, higher attainable temperatures at the receiver. To some extent, the flux concentration can be further augmented with the help of non-imaging secondary concentrators.



Thermal Power Plant

A thermal power plant consists of a set of 3 turbines

1. High pressure turbine
2. Intermediate pressure turbine
3. Low pressure turbine

The steam entering the turbine causes the rotation of these 3 sets of turbines which have their leaves aligned in a particular shape. These rotating leaves cause the generation of electricity by the process of electromagnetic

induction.

EXPERIMENT

SOLAR CONCENTRATORS- Solar concentrators can be defined as spherical mirrors that are used to focus the solar rays at a particular point to attain high temperature. For this purpose we use concave mirror of a specific focal length and for industrial application solar troughs consisting of a number of mirrors is preferred.



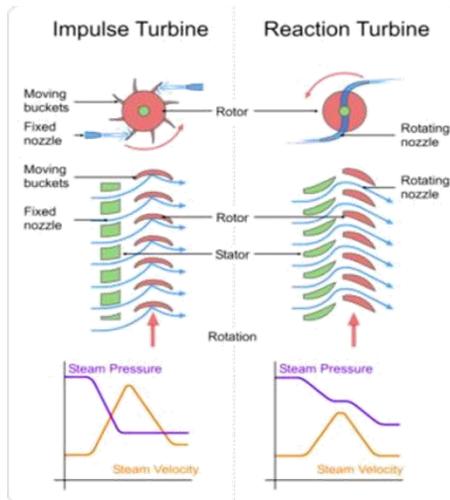
TURBINE- A turbine is a rotary mechanical device that extracts energy from a fluid flow and converts it into useful work. The work produced by a turbine can be used for generating electrical power when combined with a generator.



There are 2 types of turbines

IMPULSE TURBINE- These turbines change the direction of flow of a high velocity fluid or gas jet. The resulting impulse spins the turbine and leaves the fluid flow with diminished kinetic energy.

REACTION TURBINE- These turbines develop torque by reacting to the gas or fluid's pressure or mass. The pressure of the gas or fluid changes as it passes through the turbine rotor blades.



ELECTRIC GENERATOR- In electricity generation, a generator is a device that converts mechanical energy to electrical energy for use in an external circuit. For the working of this project we would be using steam energy produced as a result of evaporation of water. For simplicity we would be using a sub critical turbine that is the type of turbine which works below critical pressure (221.2bar)

CONDENSER- It can be defined as a device that is used to cool a particular body. Here it can be defined as a mechanism that is used to cool the hot vapors and for the same we can use coiled water cooling pipes wound around the main pipe carrying the hot vapors.

SUMMARY

This system can be very useful near the coastal regions where saline water and solar energy is present in abundance as the process can be carried out easily and for the inland regions the process of solar concentration can be carried out to boil the water which in turn purifies it as boiling removes all harmful micro-organisms.

COST

One of the major factors governing this project is its cost since this is the cost of the various devices used for this project as implementation on a large scale would require a good initial investment which can be easily obtained back by the supply of electricity back to the grid. On a small scale the project would cost an amount of 3000.

LIST OF COMPONENTS

- Solar panel
- LDR
- 10 RPM motor
- IC LM339
- IC L293d
- PCB Board
- Ply wood
- Power supply
- Registers & Capacitors

Description of components

Component	Description
Solar Panel	Convert light energy into electrical energy
LDR	Light dependent register. It works as a sensor. It offers resistance in response to light.
10 RPM motor	It is used to rotate the solar panel at very slow speed.
IC LM339	It is IC used as comparator of resistance obtained in LDR
IC L293d	It is used to drive motor.
PCB Board	It is used to implement the circuit.
Ply wood	To hold the model
Power supply	To drive motor

WORKING

Working of the "dual axis solar tracking system" is conversion of light energy into electrical energy. This phenomenon is called photovoltaic effect.

When solar panel is exposed to sun light, the sum of photons of light, are absorbed by the solar cells, which cause significant number of free electrons in the crystal. That is the reason for producing electricity due to photovoltaic effect.

The dual axis solar tracker comprises comparator IC-LM339, motor driver IC-L293d, 4 LDR which is as sensor to detect the panel position related to Sun. This provides signal to the motor driver IC-L293d to move the solar panel in the direction of Sun's position.

The use of IC-LM339 is to compare between intensity of light falling on different LDRs. The LDR which receives maximum intensity of light, the solar panel starts

rotating in that direction. The same concept is applied for vertical and horizontal rotation.

APPLICATION

- It can be used in industry.
- It can replace coal industry to get cleaner energy.
- Can be applied in remote areas.
- Street light.
- Can be used on roof tops.

ADVANTAGES

- Reliable
- Use of renewable source of energy
- Eco-friendly
- Saves more electricity
- Automation
- Advancement in technology
- Cost effective
- Easy installation
- Saves men-power

CONCLUSION

Using this, we conclude that better use of latest technology is good in many ways in terms of economy, men-power and environment.

The Solar technology has been upgrading ever since and it is a great step towards it.

8. ECO-FRIENDLY CAR USING SOLAR AND ELECTRICAL ENERGY

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GUIDE	DR.SHOHIL AKHATAR
SCHOOL STUDENTS	
COLLEGE STUDENTS	GAJENDRA GIRARE, RANJEET SHINGH DANGI

ABSTRACT

This project is mainly designed to build solar and electrical powered car. The greater community on alternative energy and its applications, as well as to build a practical solar and electrical powered car that could have real world applications upon further technological advances. This project has a strong desire to innovate and use local technology and resources. When sunlight falls on the solar panel then solar energy gets converted into electrical energy and stored in the battery, Dynamos are employed that will convert mechanical energy into electrical energy, regenerated energy from a dynamos stored in a supplement batteries and controller supplies required power to the motor. Since petrol and diesel is not required it uses solar energy which is abundant in nature.

Sunlight is now-a-days considered to be a source of energy which is implemented in various day to day applications. Solar energy is being used to produce electricity through sunlight. With the help of this technology we aim to make solar and electrical energy (using dynamo) powered car. Preliminarily our objective would be to implement our idea on a remote control toy car and afterwards with help of this prototype we can extend our future work on building an actual car powered by the solar and electrical energy which is both cost effective and of course environment friendly.

INTRODUCTION

Now-a-days, dealers of natural resources like fuel, coal etc. are facing a hard time to keep pace with the increasing demand. At one hand, there are more cars or motor vehicles are dominating the transport medium, on the other hand these cars are being dominated by the fuel. As a result, the limited resources

are being quashed by the producers and dealers to satisfy this need which is leading us to an uncertain future with having the scarcity of fuel and minerals.

This project is mainly designed to build solar and electrical powered car that is completely eco-friendly as it does not emit any harmful gases.

This project has a strong desire to innovate and use local technology and resources. Since petrol and diesel is not required, it uses solar energy which is abundant in nature and similarly it regenerates the energy through dynamo and its energy efficient.



LITERATURE SURVEY

It is necessary to understand solar energy collection and its conversion into electricity, evaluation of electrical performance, and the current efforts being made to improve conversion efficiency. It was also important to examine the actual effect of the color filters on the light input into the panel. The primary material used in the modern collection of solar energy is silicon. Even though it takes 100 times more surface area of silicon than that of other solid-state materials to collect the same amount of energy, silicon was already developed and in mass production when solar energy collection technology was developed ,and so it was the practical choice

1. However any semiconductor is acceptable. The semiconductor is part of a panel called a photovoltaic, or solar cell. This cell absorbs sunlight and transfers it into electricity, typically with a 15-20% efficiency

2. The true principle of this study (the factor observed) centers not on the inner processes involved in the energy transfer, but rather on the efficiency of the solar cell. The purpose of solar panels and solar energy collection is for the output of power, measured in Watts ($P=V \times I$, V =voltage, I =current). However, in order to study how factors affect this output, it is crucial to understand how this performance is evaluated. A study was conducted by the Florida Solar Energy

Center (1999) observing the performance of two separate solar setups for homes in Kissimmee, Florida. Analyses were done on the long-term performance and efficiency of the two systems, measuring power over time in Watt-hours. This study examines similar parameters on a smaller scale, but does not look at many of the extra angles examined by this study.

3. It examined thermal efficiency of solar panels, a factor not being considered in this study, but still presents sound examples of useful graphics, aptly demonstrated analysis equations, and a good explanation of what it all means. A scatter plot with a linear regression was displayed and used to determine the thermal efficiency coefficient, which was then compared to calculated values of the same. These are sound statistical techniques that can be applied to a variety of situations.

Efficiency is the ratio of total energy input into a machine or other system to the total energy output ($e = \text{useful energy output}/\text{energy input}$). Solar energy collection efficiency has improved as the general technology has improved, growing from the first passive collection methods (efficiency approx. 1%) to the current applicable methods (efficiency approx. 15-20%)[2]. Studies have been done toward the next advance for increased output and efficiency. The issue has been examined from several angles, both from that of maximum possible efficiency and from that of highest possible efficiency while remaining industrially feasible. It is called a magneto-hydro-dynamic (MHD) cycle, and can operate at temperatures in the range of 2000° - 2500°, up from the current limit of about 1300°. A panel with increased efficiency, possibly approaching 30%, that is still feasible for mass production.

4. His design uses a different kind of silicon, called Czochralski silicon, with oblique evaporated contacts (OECO). The contact points are metalized using low-cost aluminum and obliquely evaporated using a very simple four-step process that may prove to be feasible for mass production. These improvements being made in the technology are wonderful, but worthless unless they can be put to good use. Why should scientists bother with all the effort of improving alternative energy collection methods when the world is already quite happy with its current energy supply? Obviously, fossil fuels will only last so long, and solar energy is emerging as the heir-apparent to the oil dynasty, as the best choice economically and ecologically

5. According to the U.S. Department of Energy's "About Photovoltaic" website: "PV systems are now both generating electricity to pump water, light up the night, activate switches, charge batteries, supply the electric utility grid, and more

6. Whether you are a homeowner, farmer, planner, architect, or just someone who pays electric utility bills, PV may already touch your life in some way. The possibility of using photovoltaic to provide the energy needs of the 25,000 portable classrooms throughout Florida. Given the tremendous cost of powering these units, even with ventilation below recommended standards, an alternative was needed; but no such switch could be made without verification of its effectiveness. The energy consumption of an average classroom was observed using similar techniques to this study, but on a larger scale, and it was determined that the total energy.

PROPOSED METHOD

Sunlight is now-a-days considered to be a source of energy which is implemented in various day to day applications. Solar energy is being used to produce electricity through sunlight. With the help of this technology we aim to make solar and electrical energy (using dynamo) powered car. Preliminarily our objective would be to implement our idea on a remote control toy car and afterwards with help of this prototype we can extend our future work on building an actual car powered by the solar and electrical energy which is both cost effective and of course environment Friendly

1 When sunlight falls on the solar panel then solar energy gets converted into electrical energy and stored in the battery. Mechanical energy is most common renewable source of energy. It can be converted into various forms of energy such as electrical energy. The dynamo converts mechanical energy into electrical energy. It is implemented in our project such that it regenerates the electrical energy which is spent by the batteries to run the motor and it is stored in the battery, and supplement batteries are employed, and solar controller circuit supplies required power to the motor. The change in batteries in automated using a relay switch, which automatically switches between batteries as shown in the figure

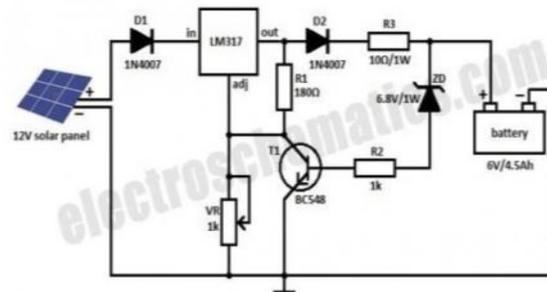
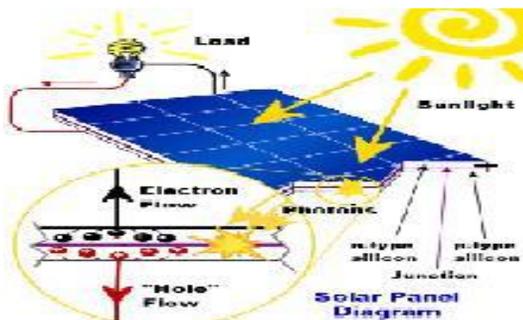
COMPONENTS USED

- Solar Panel
- Solar controller circuit

- Batteries
- DC Motors
- PIC Microcontroller 16F877
- Interfacing Circuit
- Dynamos
- LCD display

SOLAR PANEL

Solar panels are actually “boards” that collect the sun's rays, and host the whole process of transforming energy coming from the sun into electricity and power. Placing the solar panels on the car allows you to direct solar power to the motor or you can store it in a battery, depending on the car make and design. Known a century ago as home water heaters, then going through some periods of oblivion, solar panels experience today their re-birth one more time, thanks to growing popularity of solar powered electric cars. Solar panels basically wrap the whole system of solar principle, since they work as long as electrons freely flow around. They are still a little costly, but you can definitely find affordable ones, if you wish to turn your car to a solar electric car.



SOLAR CONTROLLER CIRCUIT

This charge controller was designed for high efficiency, use of common parts, and operation with common ground circuitry. The charge controller circuit has been used with solar power input. It also functions well as a battery charger when used with any current limited DC power supply such as small “wall wart” transformers or a high current supply with a series resistor. Purpose of the charge controller circuit is to cutoff the supply from the solar panel when the battery is fully charged to avoid over charging... and to start charging when battery voltage drops off a certain value... in my case the max allowed voltage is 11.5 volts and min is 12volts.

DC MOTORS

A DC motor is any of a class of electrical machines that converts direct current electrical power into mechanical power. The most common types rely on the forces produced by magnetic fields. Nearly all types of DC motors have some internal mechanism, either electromechanical or Electronic, to periodically change the direction of current flow in part of the motor. Most types produce rotary motion; a linear motor directly produces force and motion in a straight line. DC motors were the first type widely used, since they could be powered from existing direct-current lighting power distribution systems. A DC motor's speed can be controlled over a wide range, using either a variable supply voltage or by changing the strength of current in its field windings. Small DC motors are used in tools, toys, and appliances. The universal motor can operate on direct current but is a lightweight motor used for portable power tools and appliances.



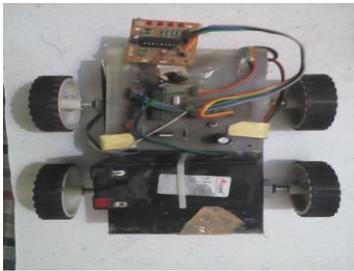
DYNAMO

A dynamo is an electrical generator that produces direct current with the use of a commutator. Dynamos were the first electrical generators capable of delivering power for industry, and the foundation upon which many other later electric-power conversion devices were based, including the electric motor, the alternating-current alternator, and the rotary converter. Today, the simpler alternator dominates large scale power generation, for efficiency, reliability and cost reasons. A dynamo has the disadvantages of a mechanical commutator. Also, converting alternating to direct current using power rectification devices (vacuum tube or more recently solid state) is effective and usually economic.

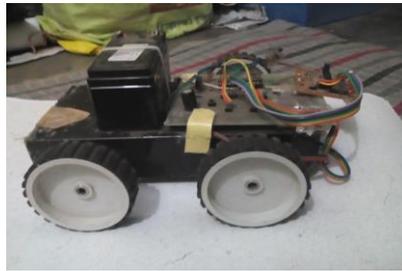


PIC MICROCONTROLLER

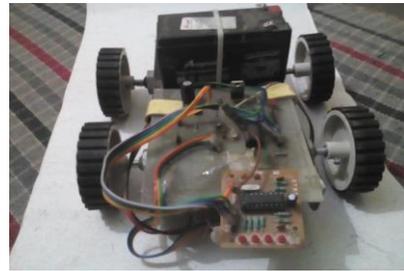
PIC 16F877 is one of the most advanced microcontroller from Microchip. This controller is widely used for experimental and modern applications because of its low price, wide range of applications, high quality, and ease of availability. It is ideal for applications such as machine control applications, measurement devices, study purpose, and so on. The PIC 16F877 features all the components which modern microcontrollers normally have. The figure of a PIC16F877 chip is shown below. The PIC16FXX series has more advanced and developed features when compared to its previous series. The important features of PIC16F877 series is given below



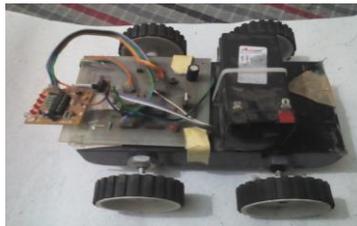
TOP VIEW



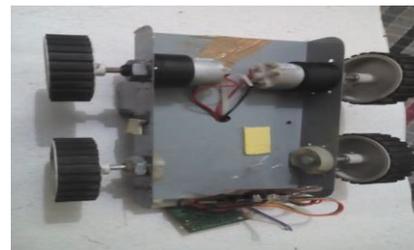
RIGHT SIDE VIEW



FRONT SIDE VIEW



LEFT SIDE VIEW



BOTTOM SIDE

9. ELECTRICITY FROM PLANTS

COLLEGE	SHARDA UNIVERSITY,GREATER NOIDA,UP
GUIDE	Dr. VENUS DILLU
SCHOOL STUDENTS	ANUJ KUMAR,SHIVALI SRIVASTAVA
COLLEGE STUDENTS	PRIYANKA, LAXMI, CHETRAM GIRLS SCHOOL

ABSTRACT

Today India is suffering from global warming activities at a very large scale. Major source of global warming is POLLUTION and it is of different types. One of the major source is method of production of electricity (by water, coal, nuclear activities).And the second source is cutting of greenery i.e., plants. Decrease in greenery is due to increase in construction. If we put together greenery and electricity means if we are produce electricity from plants then a changes can be introduce in India and the world.

Because electricity is the main need for today's life .Due to this a green revolution is introduce in India and the world. Greenery is increased at a very large scale.

HYPOTHESIS

The Plant electricity concept is based on the cooperation of plants and microorganisms to produce in situ electricity. Plants take up carbon dioxide and water and capture light energy. This energy is stored in the chemical bonds of sugars produced, using carbon dioxide and water. Part of this chemically stored energy is transferred to the roots of the plants. This energy present in the root zone can then be captured by the so-called electro-chemical active bacteria. These organisms are capable to oxidize the organic matter present in the root zone and transfer the energy rich electrons to an electrode. The energy carried by the electrons can be used as electrical energy, after which the electrons react at another electrode with oxygen to form water. The primary advantage of the Plant Power concept is that renewable, clean electricity and green electricity can be produced while the facility can be well integrated in the landscape. The aim of the project is to enhance the productivity of clean and green electricity in India.

METHOD

Here we are testing the production of electricity through a single plant of aloe vera which is in the pot, hence it produces a moderate potential. To test this potential we are using an LED i.e., Light Emitting Diodes. We are glowing LED through this potential. We know that in semiconductor we have a device named transistor. Transistor has a property which has two barriers of potential. Transistor has a material of Silicon which has a breakdown voltage of (0.6-0.7)V and for using this transistor we want two batteries. Hence we are using one DC supply and second is our plant potential, our plant breaks the barrier potential of silicon transistor.

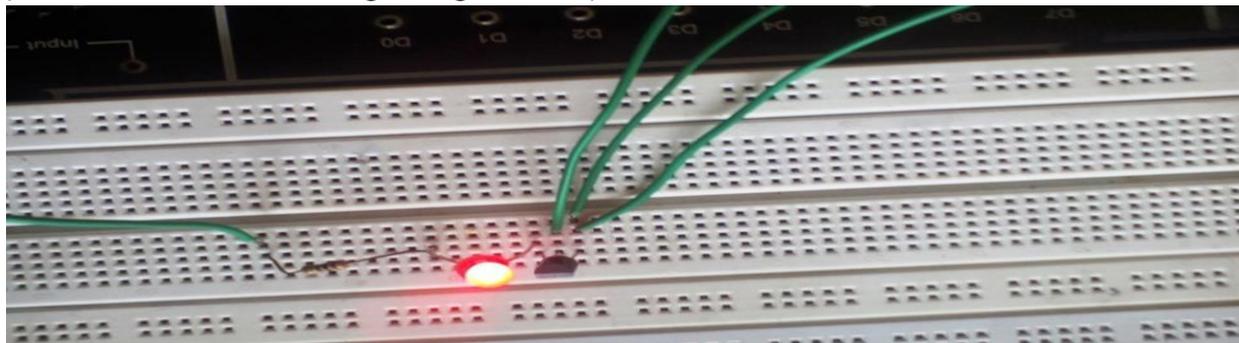
AT A LARGE SCALE

There's no need to disturb the plants that are already growing technology to make the tunnels for the tubular system non-invasively. As for the depth, the electrodes need to be within plants' root system which to harvest somewhere between around five and 30 centimeters.

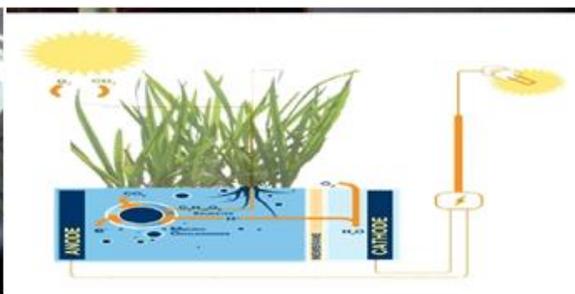
The optimum depth is something we expect to become clearer with large-scale testing, as the level of oxygen in soil changes with depth and affects how well the system works. Oxygen levels are also why the system will function better in wetlands, though testing will tell us more about whether it will work only in wetlands or if it will also be feasible to look at applications in dryer areas.

PROCEDURE

Here we are using two electrodes, one is copper which acts as anode and the other is of zinc which acts as cathode. We are digging these electrodes in the pot of plant then we are connecting it to a digital multimeter and checking the potential. Here we are getting the 1V potential.



Hence LED is glowing



FUTURE

The dream is that we are generating clean electricity around the world in any suitable wetland or wet area – including rice paddy fields, mangroves and salt marshes, which takes us to some of the most remote and impoverished parts of the world. It is in these off-grid communities that we believe the technology can make a real difference to people's lives. Other small-to-medium scale applications such as WiFi or charging mobiles, or incorporated into a green roof to generate electricity for a building as well as insulating it.

SUMMARY AND BENEFITS FROM THIS PROJECT

The concept of this renewable energy production is that living plants transform solar energy into organic compounds of which 40% or more can be released into the soil. The released organic compounds can be oxidized by electrochemically active microorganisms that use the anode of a fuel cell as electron acceptor. The electrons are reduced at the cathode with oxygen to water. In this way, day and night electricity can sustainably be produced from biomass without harvesting the plant.

Our group is focused on maximizing the power output by increasing efficiency and adapting the reactor design and operation. PLANT MICROBIAL FUEL CELL HAS No combustion gasses thus clean Solar energy thus renewable Living biomass & nutrients reuse thus sustainable 5 times more than conventional thus efficient hours per day electricity in-situ. Bioenergy without competition to food



10. ELECTRONIC EYE CONTROLLER

COLLEGE	NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
GUIDE	MRS KANIKA JINDAL
SCHOOL STUDENTS	AADITYA, ADITYA SHARMA, 9 th STD , GBBIC SCHOOL
COLLEGE STUDENTS	NEHA SUYAL, MONALI DEY

ABSTRACT

The main principle of the circuit is to ring the doorbell when there is any person at the entrance. Light on the LDR determines whether a person is present or not. When there is any object at the entrance. LDR is in dark and buzzer starts ringing and the LED starts glowing.

INTRODUCTION

Electronic eye is also called magic eye. As the automation is emerging technology these days, just imagine a door bell that automatically rings when a person is trying to enter into your home without your permission. Electronic eye is the electronic device that continuously watches if anyone is visiting your home.

TECHNOLOGY USED

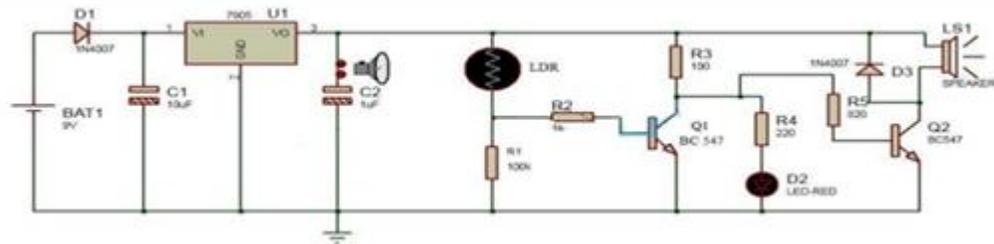
- Buzzer, LED light, diode, regulator.
- Transistors, capacitors, resistors
- LDR sensor
- LDR sense any absence of light due to obstruction, which trigger the buzzer and LED light flashing.

CIRCUIT COMPONENTS

- 1. 7805 regulator U1
- 2. Resistors R1, R2, R3, R4, R5- 100K, 1K, 220, 820
- 3. 1N4007 diode D1
- 4. Capacitors C1, C2
- 5. BC 547 transistors Q1, Q2
- 6. Light Dependent Resistors

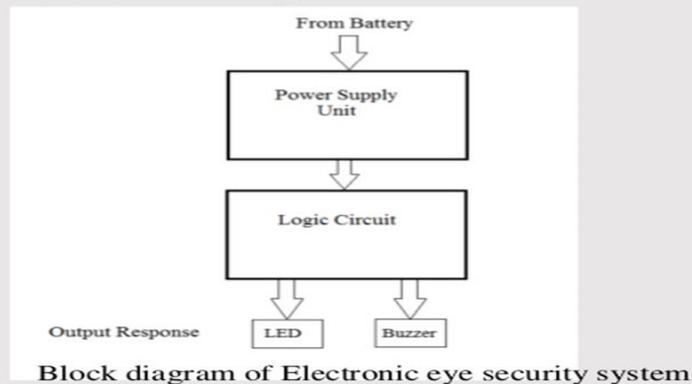
- 7. Buzzer BUZ1
- 8. Light emitting diode D2
- 9. Bread board
- 10. Connecting wires
- 11. DC 9V battery

CIRCUIT DIAGRAM :-



Circuit diagram of Electronic eye security system

BLOCK DIAGRAM :-



Block diagram of Electronic eye security system

WORKING:

This circuit can be divided into two parts. One is the power supply and the other is logic circuit. In the power supply 9V supply is converted to the 5V. The logic circuit operates the buzzer when any shadow falls on it.

Power supply circuit consists of battery, diode, regulators, capacitors. Initially a 9V battery is connected to the diode. Diode used here is P-N junction diode of IN4007 series. In this circuit IN4007 is connected in the forward bias condition. The main purpose of the diode in this circuit is to protect the circuit from negative voltages. There is a chance of connecting battery with reverse

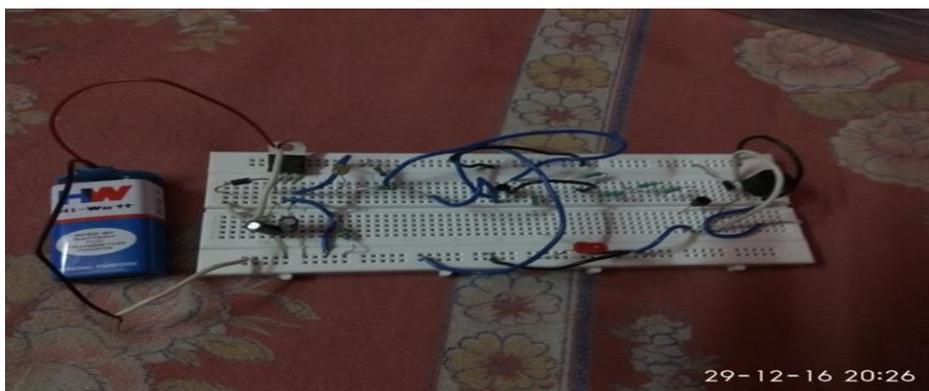
polarities which damages the circuit. So P-N junction diode connected in the forward bias allows the current to flow only in one direction and thus the circuit can be protected. There is some voltage drop across the diode. A voltage of 0.7V is dropped across the diode.

A regulator is used for regulating the output voltage of the circuit. The regulator IC used here is 7805. 78 represents the series and 05 represent the output voltage. Thus a voltage of 5V is produced at the output of the regulator. Two capacitors eliminate the ripples. Thus a constant voltage is produced at the output of regulator, which is applied to the logic circuit.

The logic circuit mainly consists of light dependent resistor, transistors, op-amp IC, and a buzzer. A 220K ohm is connected in series to the LDR. Light dependent resistor will have resistance in mega ohms when it is placed in dark. This resistance value will decrease gradually when it is placed in the light. Thus there is a variation in series resistances. When the LDR is in dark it has high resistance and produces the logic high value at the output.

When the LDR is in light, the resistance value of the LDR decreases and at the not gate it gives logic low voltage. The op-amp IC used is LM 358. This IC compares the two inputs and produces an output which is applied at the transistor. Two transistors are connected to the buzzer from these resistances. The first transistor inverts the input from the op-amp. The second transistor drives the buzzer. The diode is placed for protection. Buzzer used is 5V magnetic buzzer. It has two pins at the output. One pin is connected to the not gate and the other pin is connected to the light emitting diode. LED is used for indication only. When the output from logic gate is high, buzzer starts ringing. LED also starts blinking.

COMPONENT LAYOUT



COST

The main advantage of the electronic eye controlled security system is low cost. It is cheaper. It can be affordable by anyone. Its cost is approximately equal to Rs.250.Hence it has low cost.

ADVANTAGES

1. Easy installation
2. Used in hidden location
3. Low cost

APPLICATIONS

1. This can be used in doorbell circuits.
2. This can be used in garage door opening circuits.
3. Electronic eye can be used in security application.

PROJECT OUTCOME

The outcome of the project is workable, electronic eye controlled security system which can be practically implemented in our day to day life.

FUTURE APPLICATION

1. Voice integration in the security system
2. Image integration and processing
3. Biometric solution (thumb scan, face scan)
4. Can be used in medical for disabled and handicapped

CONCLUSION

The electronic eye controlled security system is cost effective solution for our security need of present time. The system is cheap and can be manufactured in small size, which can be placed hidden from intruders, thus safeguarding the house, cars and private properties.

11. ELECTRONIC SHELF LABELS

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GUIDE	MR. SHIVAJI SINHA
SCHOOL STUDENTS	NEELAM 8 th STD, VANDANA 9 th STD, RSS INTERNATIONAL SCHOOL
COLLEGE STUDENTS	AARUSHI CHAUDHARY, DEEPESH SINGH

ABSTRACT

The E-Commerce websites have the advantage of changing price of the product more quickly than super market & stores. Customer's now days use the Smartphone's to compare the price of product online & prefers to buy product online rather from stores if they found price less online. Many times we found that the product price mentioned on label is different from what is asked at counter. This problem can be solved by replacing paper labels by Electronic shelf labels. In order to solve the problem of low efficiency, lag and changing price tags frequently with paper labels will also reduce the labour cost & saves times. A power electronic shelf label system can be designed, making computers controlling and display screen updating information in time the communication will be two ways from the router to the labels as well as from the labels to the router then the information send by labels can confirm the data have been uploaded to the right label & can also receive the battery life of labels, product shortage, product life & many other options can be added.

HYPOTHESIS

In order to solve the problem of low efficiency, lag and changing price tags frequently with paper labels. A power electronic shelf label system can be designed, making computers controlling and display screen updating information in time. Database which is being updated frequently sends information to Router, through RF module, which is controlled and processed by MSP430 which is further transmitted through RF transceiver to Shelf label which display the result With the help of microcontroller .The whole process works on wireless transmission The Electronic Shelf Label system can improve the efficiency of the label management greatly and enhance customers'

experiences thus has a wide prospect of application. We can update the price automatically, if the market rate dips or the product is fresh available only for short duration, the product price can be reduced automatically.

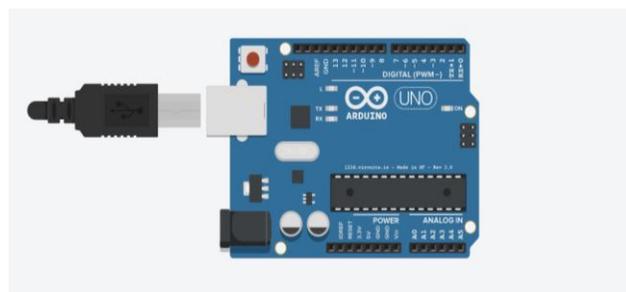
METHOD

The Electronic Shelf Label system can improve the efficiency of the label management greatly and enhance customer's experiences thus has a wide prospect of application. The wireless communication must support reasonable range, speed, battery life, and reliability. The means of wireless communication can be based on radio, infrared or even visible light communication.

The results show that the wireless communication of ESLs designed in this paper works stably and safely, the software implements the basic functions including the goods management and the label management and works well. With the increasing information technology in the supermarket and stores, ESLs will have more extensive applications and promising prospects.

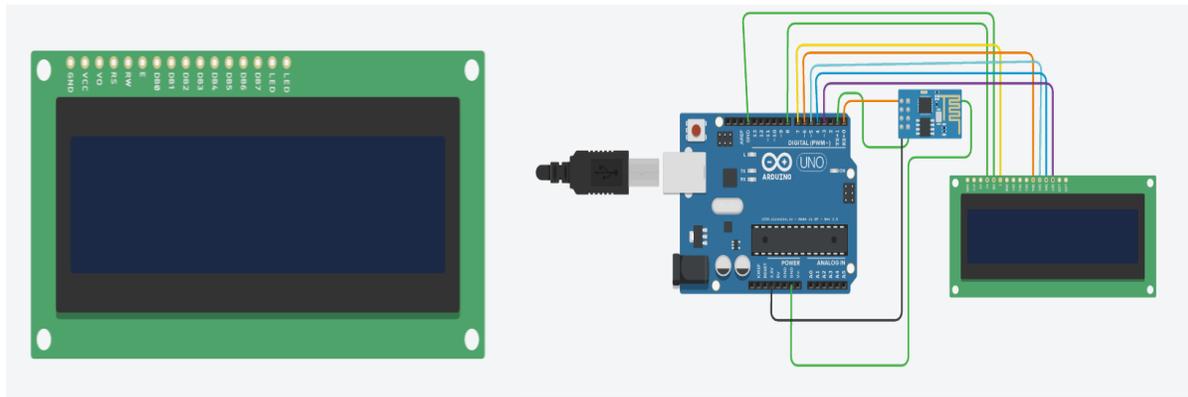
EXPERIMENT

Arduino is a computer hardware and software company, project, and user community that designs and manufactures microcontroller kits for building digital devices and interactive objects that can sense and control objects in the physical world. The project's products are distributed as open-source hardware and software, which are licensed under the GNU Lesser General Public License (LGPL) or the GNU General Public License (GPL), permitting the manufacture of Arduino boards and software distribution by anyone. Arduino boards are available commercially in preassembled form, or as do-it-yourself kits.



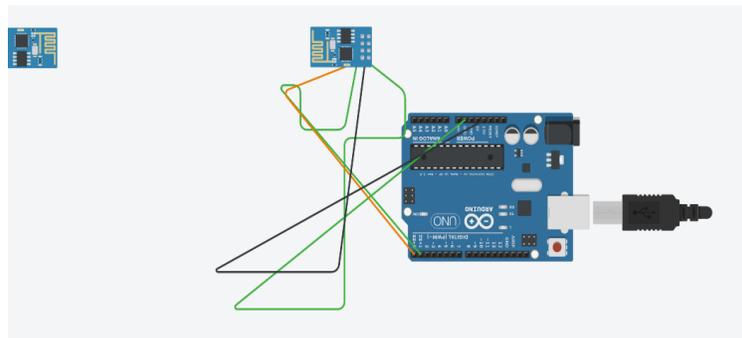
LCDs

LCDs are used in a wide range of applications including computer monitors, televisions, instrument panels, aircraft cockpit displays, and indoor and outdoor signage. Small LCD screens are common in portable consumer devices such as digital cameras, watches, calculators, and mobile telephones, including smart phones. LCD screens are also used on consumer electronics products such as DVD players, video game devices and clocks. LCD screens have replaced heavy, bulky cathode ray tube (CRT) displays in nearly all applications. LCD screens are available in a wider range of screen sizes than CRT and plasma displays, with LCD screens available in sizes ranging from tiny digital watches to huge, big-screen television set.



Circuit Diagram

Labels Circuit



Router

12. HYDROGEN POWERED VEHICLE

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GUIDE	Dr. MAYURIKA GOEL
SCHOOL STUDENTS	MAYANK SEHDEV, GURMEET SINGH
COLLEGE STUDENTS	YASH 8 TH STD, HITESH 7 TH STD, RASHTRIYA PRATIBHA VIKAS VIDYALAYA

ABSTRACT

Pollution is one of the main concerns in today's world due to an extensive use of fossil fuels. Combustion of fossil fuels has caused serious problems to the environment and the geopolitical climate of the world. Emissions like NO_x, CO, CO₂, and unburned hydrocarbons which has brought significant changes in our atmosphere including global warming and these issues needs immediate attention. With rising public concerns about the economic and ecological externalities of these pollutants in our environment, emphasis on fossil fuels dependent development of fuels has been gradually shifting from conventional towards renewable and sustainable alternative approaches. Consequently, researches have yielded new technologies. Among various alternatives available, Harnessing Hydrogen energy is being considered as one of the preferred sustainable fuel. Electrolysis of alkaline water produces hydrogen at the cathode end of a cell. Ionic solutions act as electrolytes. Objective of present work is to compare the efficiencies of a petrol engine after amalgamating it with hydrogen obtained from above mentioned process. Hydrogen gas on mixing with air fuel (petrol) mixture increases the efficiency and reduces the hazardous emissions of the vehicle.

HYPOTHESIS

The Principle of the hydrogen fuel cell is based on Electrolysis. Water molecules (H₂O) are broken into hydrogen and oxygen. The hydrogen produced further helps in improving the engine combustion by using the hydrogen as a fuel and oxygen as a medium for to it enhances the combustion and which further automatically increases the engine efficiency.

METHOD

Firstly, a vacuum chamber for the electrolysis was taken. The vacuum chamber was then filled with distilled water and two electrodes (stainless steel) are fitted inside the chamber so that its tip is at one end and rest of its part is dipped inside. Then electricity is passed through the connection between two electrodes which leads to the formation of Hydrogen at cathode end (+terminal) and formation of oxygen at anode (- terminal). The separation of water molecules occurs in the form of 2H_2 and O_2 . The gases are then collected and passed through a filter for the continuous flow of gases to the engine without causing disturbance.

EXPERIMENT

Electrolysis of water

Electrolysis of water is the decomposition of water (H_2O) into oxygen (O_2) and hydrogen gas (H_2) due to an electric current being passed through the distilled water.

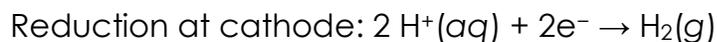
This technique can be used to make hydrogen fuel (hydrogen gas).

Principle

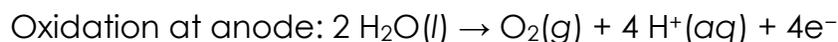
A DC electrical power source is connected to two electrodes of stainless steel which are placed in the water. Hydrogen will appear at the cathode electrons, and oxygen will appear at the anode. Assuming ideal faradaic efficiency, the amount of hydrogen generated is twice the amount of oxygen, and both are proportional to the total electrical charge conducted by the solution. Electrolysis of pure water requires excess energy in the form of over potential to overcome various activation barriers. Without the excess energy the electrolysis of pure water occurs very slowly or not at all. This is in part due to the limited self-ionization of water. Pure water has an electrical conductivity about one millionth that of sea water. Many electrolytic cells may also lack the requisite electro catalysts. Therefore to increase the efficiency of our product we have used an industrial product named cathode which contains ions to decrease the activation barrier.

Reactions

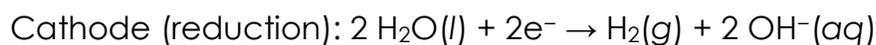
In pure water at the negatively charged cathode, a reduction reaction takes place, with electrons (e^-) from the cathode being given to hydrogen cations to form hydrogen gas (the half reaction balanced with acid):



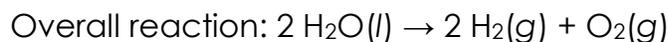
At the positively charged anode, an oxidation reaction occurs, generating oxygen gas and giving electrons to the anode to complete the circuit:



The same half reactions can also be balanced with base as listed below. Not all half reactions must be balanced with acid or base. Many do, like the oxidation or reduction of water listed here. To add half reactions they must both be balanced with either acid or base.



Combining either half reaction pair yields the same overall decomposition of water into oxygen and hydrogen:

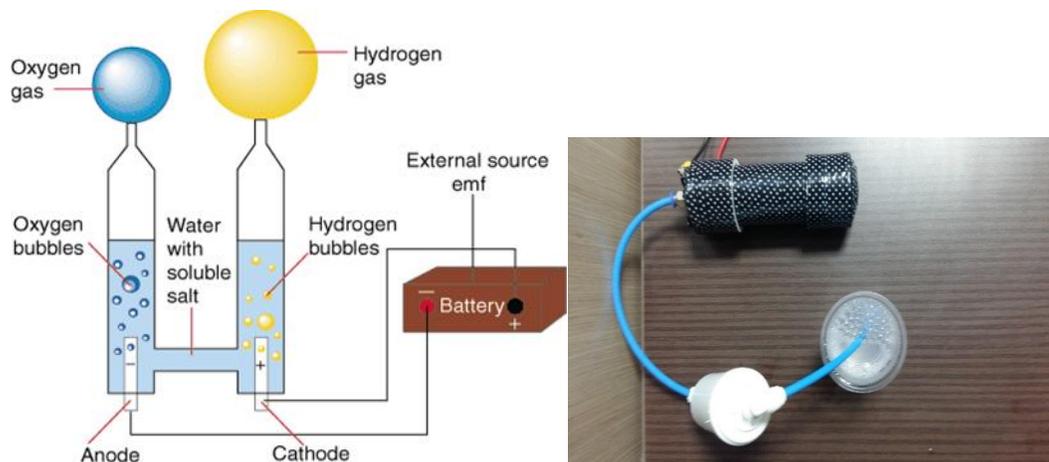


The number of hydrogen molecules produced is thus twice the number of oxygen molecules. Assuming equal temperature and pressure for both gases, the produced hydrogen gas has therefore twice the volume of the produced oxygen gas. The number of electrons pushed through the water is twice the number of generated hydrogen molecules and four times the number of generated oxygen molecules.

Our product

We created vacuum in the factory in Vaishali (Delhi-NCR) and our device will get the electricity from the alternator of the bike and the hydrogen will be supplied to the engine and because of its burning property it will provide the heat required and hence we can regulate the supply of petrol.

Diagram of electrolysis



SUMMARY

Our device is used to reduce the amount of fuel in the two wheeler vehicles up to 200cc by supplying hydrogen which is one of the cleanest fuel and can be obtained by the most abundant source of energy that is water. Our device at this level uses the distilled water which is easily available at the price of rupees 15-20 per 2 liters and hence our device is quite cheap and increases the mileage of the engine moreover when the hydrogen burns less amount of petrol is used which further leads to less amount of carbon deposited in the engine which simply leads to increasing the life of the engine.

13. GAS LEAKAGE DETECTOR AND GSM BASED ALERT SYSTEM

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GUIDE	MR. NEERAJ KUMAR
SCHOOL STUDENTS	NEHA KUMAR, NISHA JAINAB
COLLEGE STUDENTS	HIMANSHU KUMAR BISHEN, SHAKTI KUMAR

INTRODUCTION

Our project is about designing an alert system which incorporates home automation at a small level. Although there are systems that detect gas leakage and also trigger an alarm just as in our project but those systems are complex, cannot be understood by common people and if they malfunction only an expert will be able to rectify those systems whereas this is a simple project with lesser complexities.

Our project is based on home security in which leakage of gas is sensed by a gas sensor name MQ5 which basically senses leakage of gases such as CH₄ (methane) and CO₂ (carbon dioxide) and send signal after detecting the presence of gas, the microcontroller that is being used is Arduino and using Arduino ide we program the GSM module and send a message to the user and also trigger an alarm so that if anybody is near the house they are alarmed about the leakage of gas.

The field of project is Alerting and Home Automation system comparatively easier and less complex than other home automation systems. Moreover this project is a very important keeping in mind the dangers that are caused due to gas leakage.



Practical circuit diagram of GSM MQ5 gas sensor used in GSM

FEASIBILITY

Our project is very feasible as it can be made using the common electrical components, microcontroller and sensing devices. The problem with complex protection system can be costly and expert people only can work upon it but this project is comparatively less and a student can easily work upon such a project without any expertise and the most important thing about this is that it is easily installable with no internal wiring needed and just a supply. Our project incorporates the basic idea of alerting after sensing a Gas Leakage by triggering an alarm which helps the person if he is in the house but if he is not in the house we also send the person a message so that he doesn't enter the home with no knowledge of the problem.

NEED

Our project is in accordance with the security concerns related to Gas leakage. Any type of Gas leakage results in destruction of property and lives. This can happen on a large scale as well as small scale such as in home or small restaurant. Leakage cannot be stopped but if detected at an early stage its after effects can be prevented. The need of this project is justified by the day to day accidents that are happening in the society and causing the damage to money and moreover innocent lives.

SIGNIFICANCE

Our project is a low budget project that is effective in small areas. This can be modified for large scale areas by using highly advanced sensors. Our project can be employed on a small scale. On a small scale the GAS LEAKAGE DETECTOR works with very much high accuracy.

METHODOLOGY

We plan to make our project by combining a Sensing Element, a Microcontroller, a GSM Module, and an ALARM. On leakage of Gas the Gas Sensor will sense the Gas and it will send a signal to the microcontroller which will then execute certain C/C++ code which will enable the Alarm and also the GSM Module will be activated.

The GSM Module will send a set of 3 messages to the registered mobile number (with the GSM Module). In this way our project also focuses on home automation (partial).

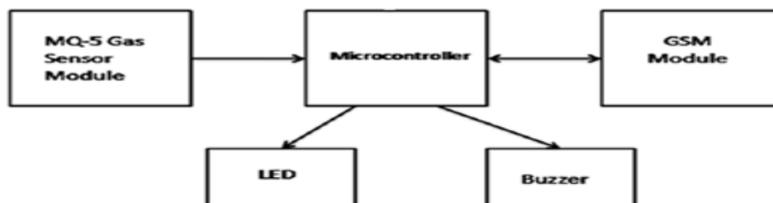
- 1) The initial step will be calibrating the MQ5 sensor that detects any gas leakage and ensuring that it is supplied power that is within its range.
- 2) The next step that will be taken is testing the GSM module and modifying its antenna according to the signal conditions and replacing it probably with an antenna that has higher range.
- 3) The alarm will have to be tested and its loudness will have to be calibrated.
- 4) The integration of exhaust fan is an experiment and it's uncertain that it may work or not so that will have to be taken care of.
- 5) The last step will be integrating all the components and code the GSM module according to the need via the microcontroller.

COMPONENTS USED

1. ARDUINO UNO MICRCONTROLLER
2. GSM 300 MODULE
3. MQ5 GAS SENSOR (LPG)
4. BREAD BOARD
5. CONNECTING WIRES
6. BUZZER ALARM

SOFTWARE USED- ARDUINO CODING ENVIRONMENT

BLOCK DIAGRAM



COST

Overall cost of the project is around 1400 Rupees, which I don't think is high enough for a smart security system. But the price will eventually be low for mass production.

14. HOME AUTOMATION USING DTMF

COLLEGE	NOIDA INSTITUTE OF ENGINEERING & TECHNOLOGY
GUIDE	KANIKA JINDAL
SCHOOL STUDENTS	AMAN MADHUKAR, 9 TH STD LOKESH PATHAK, 9 TH STD, G.B.B.I.C
COLLEGE STUDENTS	ABHISHEK KAUSHIK, AKSHAY AGARWAL

ABSTRACT

Sometimes unfortunately we may forget to switch off the appliances while going outside, sometimes we might suffer from one or other illness, and we may face the problems to switch off the appliances. Old age people also finds it difficult to switch appliances on or off according to their need. So here we bring a solution to all such problems. This project explains you how to design a simple circuit, which will on the devices remotely and devices will off automatically after the specified time interval.

Our project consists of a DTMF decoder which decodes the double tone multi-frequency generated by the telephones while we touch the keypad and these decoded value are converting into corresponding binary levels to control the switching of home appliances.



PRINCIPLE

The main principle used in this circuit is DTMF communication. When we make a call to customer care service they will ask you to press a number to provide the appropriate services. If you wonder how they are recognizing the pressed number then DTMF comes into the picture.

If you press the button in your mobile phone then a tone is generated with 2 frequencies. These 2 frequencies of the tone are row and column frequencies of that particular button. The table below shows you the row and column frequencies of a DTMF keypad.

	1209 Hz	1336 Hz	1477 Hz	1663 Hz
697 Hz	1	2	3	A
770 Hz	4	5	6	B
852 Hz	7	8	9	C
941 Hz	*	0	#	D

These generated tones are decoded at switching centre to determine which button is pressed. To decode these DTMF tones at receiver we need to have DTMF decoder. Decoder IC converts these tones into digital forms.

PROJECT DESCRIPTION

What is the Need of DTMF Decoding?

In the premature days, our telephone systems were operated by human operators in a telephone exchange room. The caller will pick up the phone, giving instruction to the operator to connect their line to the destination. It is a kind of manual switching. As more and more people entered in the telephone technology as useful communication gear, manual switching becomes a time consuming tedious task.

As technology established, pulse or dial tone technique were invented for telephone communication switching. It employs electronics and computers to support switching operations. DTMF is the ultimate technique used in any of the Mobile, Telephone communication systems

Working of DTMF decoder circuit

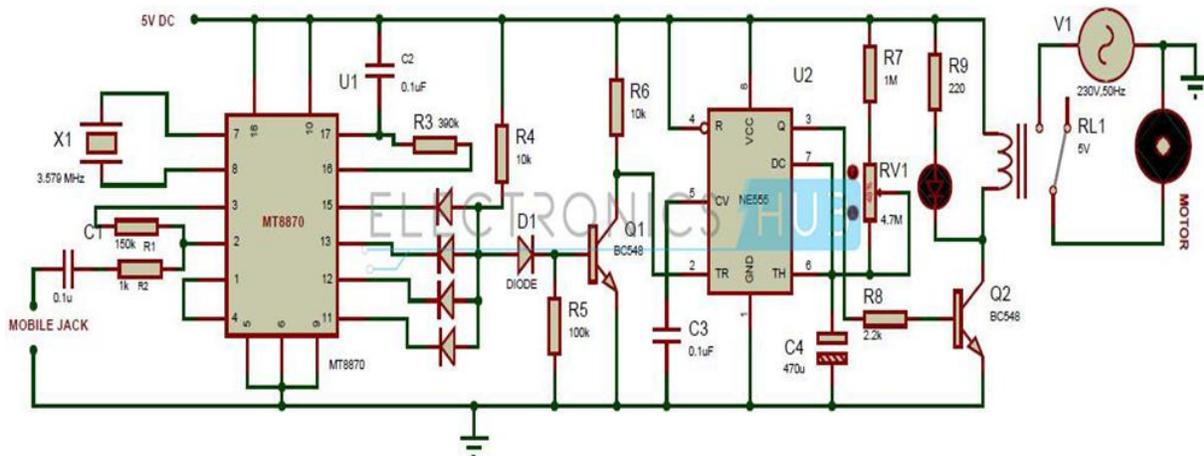
- DTMF keypads are employed in almost all landline and mobile handsets. Thus this technology is used in the telephone switching centers to identify the number dialed by the caller.
- The decoder distinguishes the DTMF tones and produces the binary sequence equivalent to key pressed in a DTMF keypad.
- The circuit uses M-8870 DTMF decoder IC which decodes tone generated by the keypad of cell phone.

- DTMF signals can be tapped directly from the microphone pin of cell phone device. Cut the microphone wire and you will get two wires red and green. The red wire is the DTMF input to the circuit.
- The signals from the microphone wire are processed by the DTMF decoder IC which generates an equivalent binary sequence as a parallel output like Q1, Q2, Q3, and Q4.

COMPONENTS USED

- MT8870
- NE 555 timer IC
- 5V Relay
- BC 548 Transistor – 2
- 3.579MHz crystal
- POT 4.7M ohm
- 2.5 mm radio jack
- LED , Resistors & Capacitors
- Connecting wires & Breadboard

CIRCUIT DIAGRAM AND ITS WORKING



In this circuit IC MT8870 (DTMF Decoder) is used along with many peripherals components as well. X1 represents an oscillator which is used to generate a reference pulse. Via mobile jack a mobile is being connected with the project which is kept on auto answer mode, so that whenever we will make a call over this phone it will be automatically answered. Whenever you make a call to the mobile which is connected at the receiver end, MT8870 IC provides a high pulse at 15th pin after receiving a valid signal. Now if you press 7 from the mobile the decoder IC will trigger the 2nd pin of 555 Timer IC. As a result the output at 3rd pin of 555 Timer IC becomes high, so that transistor Q2 starts conducting because of this LED and device on. The device on time can be

varied by varying the PotRV1 and capacitor C4. The device on time can be calculated by the formula

$$\text{TIME} = 1.1 * RV1 * C4 \text{ sec}$$

In the above circuit device become on only when all the outputs of DTMF decoder (pin 11, pin 12, pin 13 & pin 15) are high. To make all the outputs of DTMF decoder high we would need to press number 7 from the dialed mobile.

ADVANTAGES

- We can avoid wastage of power
- We can control the appliances from a long distance

BUDGETING

COST OF COMPONENTS (WITHOUT PHONE)	= Rs 270
MAINTENANCE COST (1 YEAR)	= Rs 100
TOTAL COST	= Rs 370
TOTAL COST (WITH PHONE)	= Rs 1600

WORKING MODEL



15. HOME AUTOMATION SYSTEM

COLLEGE	G D GOENKA UNIVERSITY, SOHNA ROAD, GURGAON
GUIDE	
SCHOOL STUDENTS	SRISTHI, SUBHAM JHA, 9 th STD
COLLEGE STUDENTS	PARTH MAHAJAN,

INTRODUCTION:

Home automation is the use and control of home appliances remotely or automatically. Early home automation began with labour-saving machines like washing machines. Some home automation appliances are stand alone and do not communicate, such as a programmable light switch, while others are part of the internet of things and are networked for remote control and data transfer. Hardware devices can include sensors (like cameras and thermometers), controllers, actuators (to do things), and communication systems. Remote control can range from a simple remote control to a smartphone with Bluetooth, to a computer on the other side of the world connected by internet. Home automation systems are available which consist of a suite of products designed to work together. These typically connected through Wi-Fi or power line communication to a hub which is then accessed with a software application. Popular applications include thermostats, security systems, blinds, lighting, smoke/CO detectors, and door locks. Popular suites of products include X10, Z-Wave, and Zigbee all of which are incompatible with each other. Home automation is the domestic application of building automation.

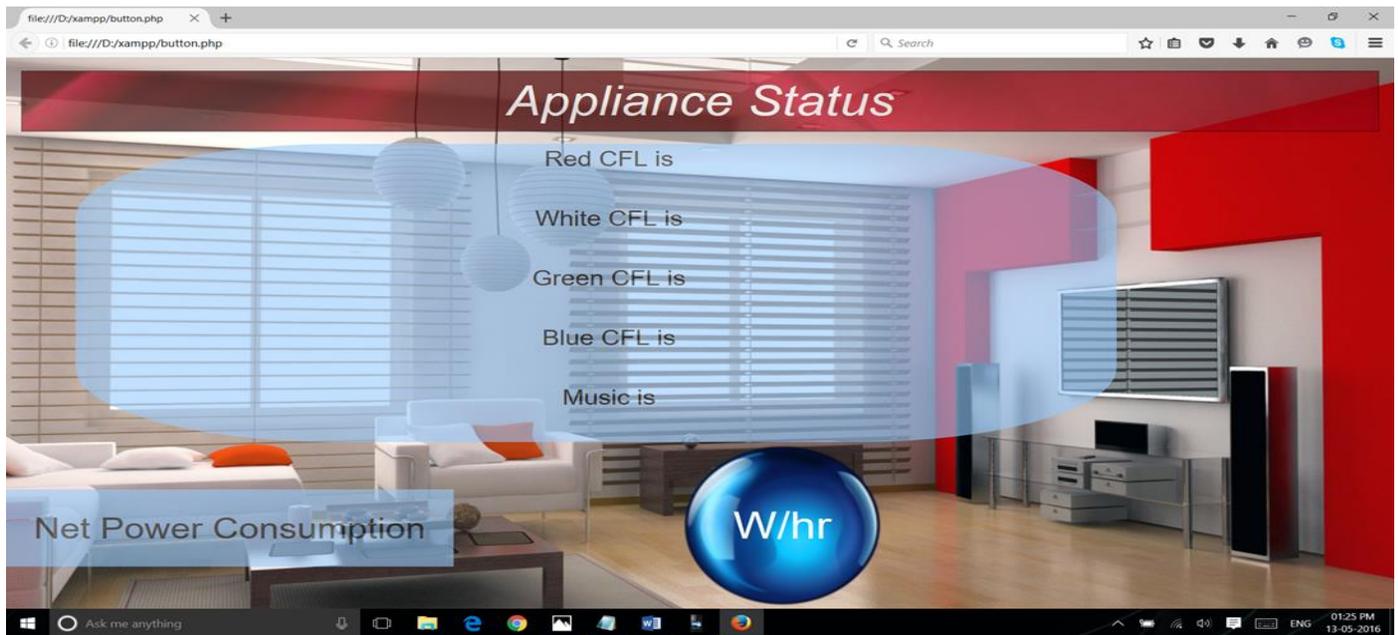
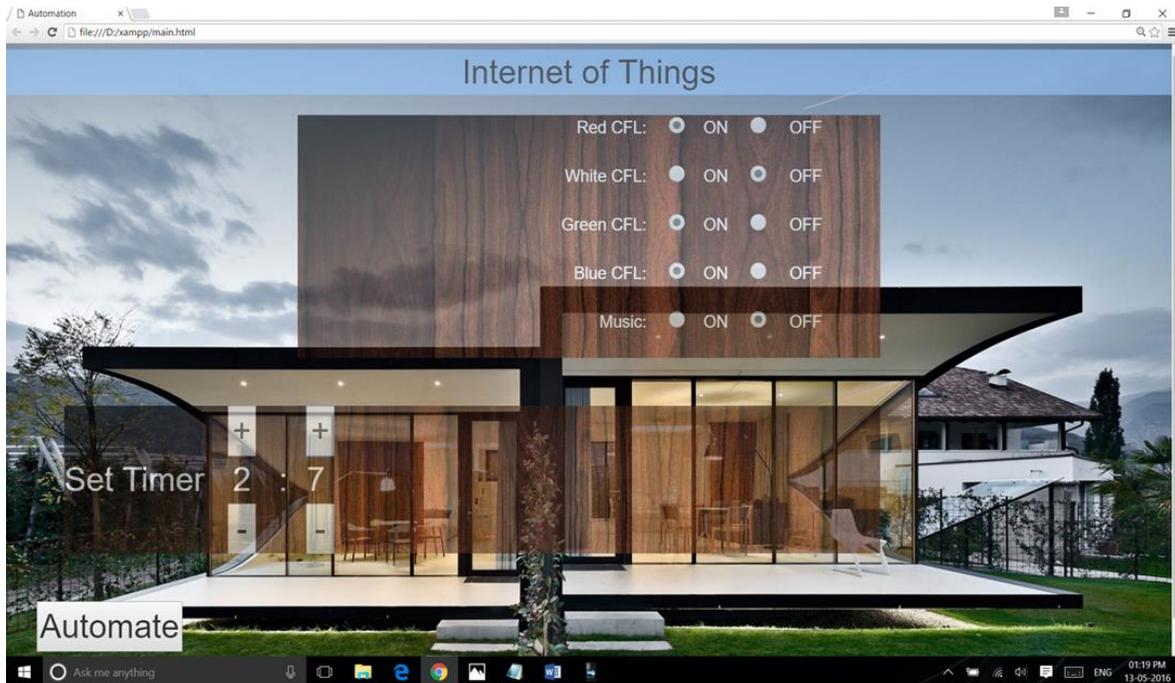
AIM OF PROJECT:

To remove traditional way of controlling our home appliances and in cooperating the latest technology and internet within our daily used things or products. A product with the help of which we can control different appliances at our homes remotely via internet with the help of external website or an application.

Features that I will try to introduce in the product:

- Remotely controlling appliances.

- Automating the switching.
- Remotely monetizing the current status of appliances.
- Limitless range for controlling and monetizing.
- Power consumption of appliances.



16. LED FLASHER USING MICROCONTROLLER

COLLEGE	GD GOENKA UNIVERSITY, SOHNA ROAD, GURGAON
GUIDE	Dr. RASHIMA MAHAJAN ; Ms. ILA MEHTA
SCHOOL STUDENTS	DEEPAK, ANMOL; 9 TH AND 8 TH STD
COLLEGE STUDENTS	CHINAR RAJU , SHRUTI GODHA

ABSTRACT

Solar resource is unlimited and the government is trying to implement the use of solar panels as an energy source in rural and sub urban areas for lighting the street lights. Solar powered Automatic Street light is a very efficient device which regulates street light working. It automatically turns on when there is dark at the dusk time and turns off at the dawn when the sun is out. Solar powered automatic street light controller is one of the applications of electronics to increase the facilities of life. The use of new electronic theories has been put down by expertise to increase the facilities given by the existing appliance. Here the facility of ordinary street light is increased by the making it controlled automatically.

HYPOTHESIS

In the era of advancement of technology and considering the environmental factors we should judiciously use solar energy wherever we can. In Solar powered automatic street light controller, there is a provision in which the energy required to run the street light is provided by the solar energy. The NE PIC 16F676 is a 14, flash-based 8pin microcontroller. For regulating the input DC supply is provided. The aim is to design and execute the advanced development in embedded systems for energy saving of the street lights. Nowadays, human has become too busy, and is unable to find time even to switch off the lights wherever not necessary. The street lights will be automatically switched on in the evening before the sun sets and are switched off the next day morning after there is sufficient light on the roads. The project gives the best solution for electrical power wastage.

METHOD

The street light will work on the voltage regulation principle, which states that the light will glow only in the night time and in the day time the driver will supply voltage to the battery for charging purpose. The main micro controller is been fed with the data and low and high cuts for the light to glow up. Firstly the battery will be connected to the circuit in the street light. Next, the panel wires will be connected. The Solar Panel will give the DC power to the circuit which means in the day the green led will glow which indicates that the battery is charging. The light will not glow till the voltage from panel reaches the voltage that had been fed to the micro controller. As the voltage from the panel reaches the voltage below the specified voltage, the charging of battery will stop and the light will glow. In foggy weather when there is no light for 3 -4 days the battery will not be in state to provide the required amperes and voltage to the circuit for light to glow up the red LED will glow , which shows that the battery is at low voltage.

DESCRIPTION OF THE COMPONENTS USED

The apparatus used are as follows:

DC luminary

DC luminary consist SMD LED's and microcontroller based circuit, which controls the operation of solar street light. SMD LED's are the main source of illumination.

Solar Panel

A panel designed to absorb the sun's rays as a source of energy for generating electricity or heating.

A photovoltaic (in short PV) module is a packaged, connected assembly of typically 6×10 solar cells. Solar Photovoltaic panels constitute the solar array of a photovoltaic system that generates and supplies solar electricity in commercial and residential applications.

Microcontroller: PICF676

It is 14 pin IC Flash based 8 bit microcontrollers. The PIC16F630/676 devices have a 13-bit program counter capable of addressing an 8K x 14 program memory space. Only the first 1K x 14 (0000h-03FFh) for the PIC16F630/676 devices is physically implemented. Its main function is to convert analog to digital.

Optocoupler 4n-35

Input-output coupling capacitance (<0.5ft) interface with common logic families is used. Connect two separated electrical component which is called an optocoupler.

MOSFET: P-55, Z-44

The working principle of MOSFET depends up on the MOS capacitor. The MOS capacitor is the main part. The semiconductor surface at below the oxide layer and between the drain and source terminal can be inverted from p-type to n-type by applying a positive or negative gate voltages respectively. When we apply positive gate voltage the holes present beneath the oxide layer experience repulsive force and the holes are pushed downward with the substrate. The depletion region is populated by the bound negative charges, which are associated with the acceptor at atoms.

MOSFET 2045

This MOSFET is used to connect the power supply between solar panel and solar battery. This MOSFET plays a very important role in solar street light system.

Capacitors

The dc circuit provides energy when rectifiers don't conduct (dc filter) or decoupling caps on board circuits.

Inductors

An inductor is a passive electronic component that stores energy in the form of a magnetic field. They are for filtering purpose.

Zener diode

A Zener diode allows current t flow from its anode to cathode like a normal semiconductor diode but it also permits current to flow in the reverse direction when its Zener voltage is reached.

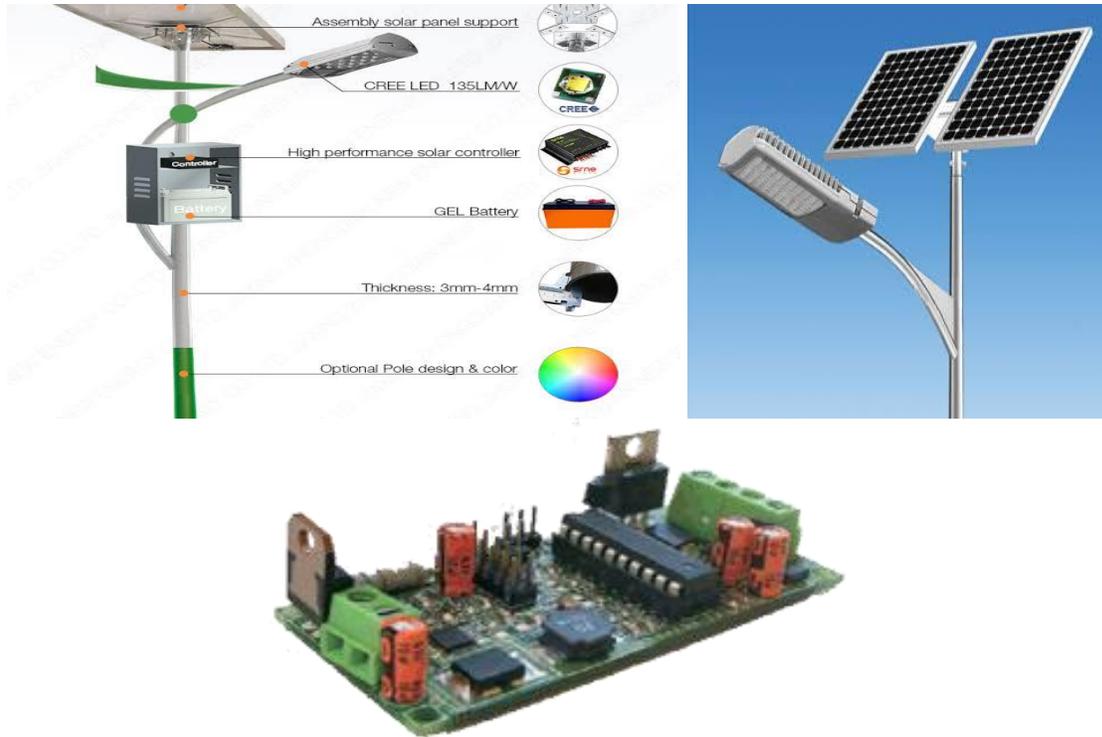
Solar Battery

In solar systems or solar street lights, solar plays a very important role, the power which is generated by solar panel is stored in these types of solar batteries for further use in breakdowns or at night time.

Terminal Blocks

A terminal block is a screw-type electrical connector where the wires are clamped down to the metal part by a screw. It is a connector which allows more than one circuit to connect to another circuit. It often contains two long aluminium or copper strips that are designed to connect different components. They are used to hold the battery and panel wires.

SAMPLE DIAGRAM FOR OUR PROJECT



COST

Our project is very economic and environment friendly. Since it will consume less electricity and utilize solar energy to provide power to street light.

SUMMARY

Solar energy is one of the most efficient renewable sources of energy which can be used for the application of Solar street lights. LED lights are an efficient way of saving the electricity by reducing the use of natural resources such as coal and other natural resources. Solar Street light are being operated in many cities and other backward areas. Although the initial cost of the system is quite high this can be a drawback. But with the advance resource management and good planning the cost of the system can be reduced by the coming time. For these reasons our project presents far more advantages.

17. LOW COST WATER PUMP

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GUIDE	MS. VANITA; HOD IN ECE DEPARTMENT
COLLEGE STUDENTS	PANKAJ ,SANJEEV;ECE STUDENTS FROM MRKIET
SCHOOL STUDENTS	GULLU POSWAL,PRIYANSHU VASHISHTA GOVERNMENT BOYS SENIOR SECONDARY SCHOOL,REWARI

ABSTRACT

Water being the important part of our life plays a very vital role in different household chores like gardening, car wash etc. For this a low cost water pump is made using waste materials which efficiently works in multiple applications.

HYPOTHESIS

The principle of low cost water pump is that it is made up of waste materials which are easily available and economic, yet very efficient. Along with this various features like timer, LCD display, motor starter using android phone etc. are added to make it workable in multiple applications.

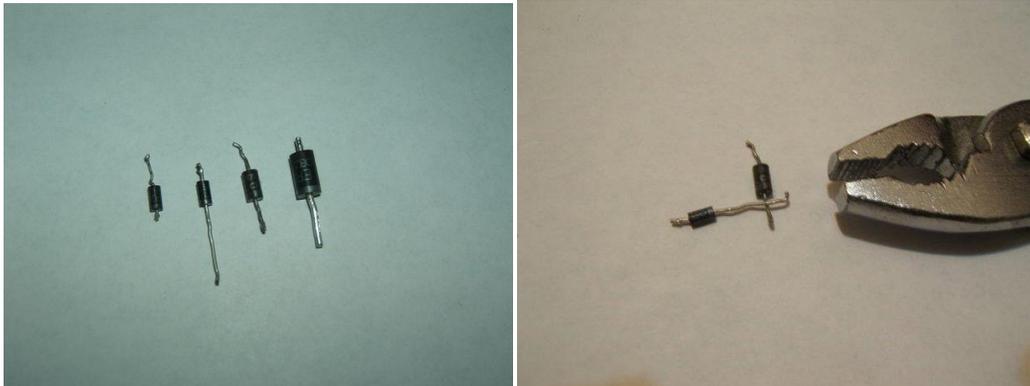
METHOD

Firstly we take an empty tin for making the required structure for protecting the motor along with the base for supporting other components used like CD-driver. The diameter of the pipe is varied to increase the pressure of the water. A timer and LCD display is attached so as to limit the amount of time for which the pump works which helps in preventing the wastage of water. Then a compressor is attached to make it workable as dryer also using the same motor. DC motors help in rotating the shaft which results in sucking up of water and building the required pressure so as the water reaches a height of upto 10-12 feet.

EXPERIMENT

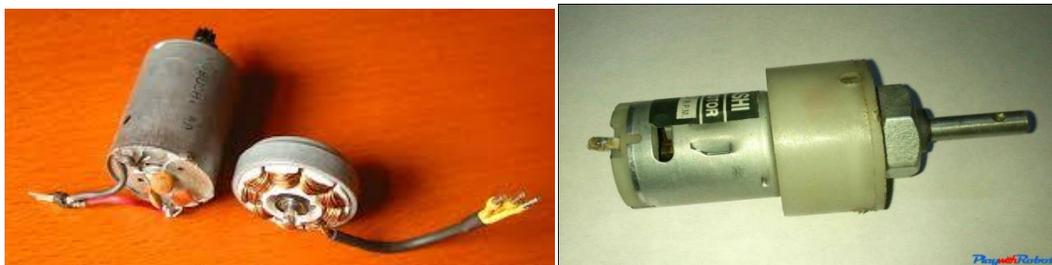
The apparatus used are as follows:

POWER DIODE: A diode bridge is a device that changes Alternating current (AC) to Direct current(DC). The difference between these two kinds is, AC is pulsed electricity switching polarities 50-60 times per second.



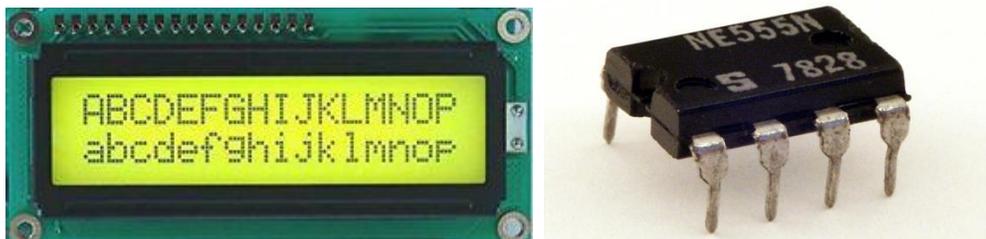
DC MOTOR

A motor helps in rotating the shaft thus helps in sucking the water.



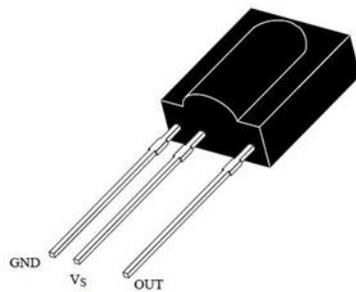
LCD DISPLAY AND TIMER

A liquid-crystal display (LCD) is a flat-panel display or other electronic visual display that uses the light-modulating properties of liquid crystals. Liquid crystals do not emit light directly. The 555 timer IC is an integrated circuit (chip) used in a variety of timer, pulse generation, and oscillator applications. The 555 can be used to provide time delays, as an oscillator, and as a flip-flop element. Derivatives provide two or four timing circuits in one package.



MOTOR STARTER USING ANDROID PHONE

The main component used here is the IR sensor circuit consisting of TSOP. Using a TSOP IR receiver we can start and stop the DC motor vehicle. However this circuit has a small disadvantage that it can't control the speed of DC car motor, rather it ON and OFF the small dc motors. Once it is ON, the motor runs with a constant speed. No speed control circuits are discussed here. The advanced version of this circuit with PWM speed controller will be posted soon. You must need a regulated power supply of 5 volt to do this one because TSOP requires 5v for its operation.



Components Required

1. 12V Battery
2. 7805 voltage regulator
3. TSOP IR receiver
4. IC 555
5. IC 7474
6. BC 548 Diode
7. 1N4007
8. Resistors (220K Ω , 100 Ω)
9. Capacitor (1 μ F)
10. DC motor

WORKING

- Maximum voltage of TSOP and 7474 is **5v**. So we are using a 7805 voltage regulator IC which provides 5V output.
- The output of TSOP is always 5V, and the output will be zero when IR rays strike on it.
- 555 timer IC is biased as a monostable multivibrator. Normally its output is 0V, provided that voltage at the 2nd pin must be greater than $1/3V_{cc}$

- When the voltage at the 2nd pin goes below $1/3V_{cc}$, output switches to high (5V) for the time interval $T=1.1RC$. After this time interval output returns to 0V.
- 7474 is a D-flip flop. It is wired in Toggle mode. i.e Q' to D input. 555 is used as clock generator here.
- When it gets a clock pulse output goes high and remains in that state till the next pulse.
- On receiving the next pulse output goes low and remains in that state till the next pulse.
- This process will continue. Output of 7474 is fed to base terminal of BC 548/BC 187.
- BC 548 is a driver transistor, when its base voltage is high current will flow through the load.
- Here DC motor is the load and it will rotate only when the base voltage is high.
- Diode Df is a freewheeling diode used to dissipate the stored energy in the inductor load.

PINOUT OF COPONENTS

- TSOP IC Pin out
- BC 187 transistor
- NE555 IC
- 7805 IC
- 7474 IC
- Capacitor
- Diode

18. PATH FINDER (NAVIGATION SYSTEM FOR BLIND)

COLLEGE	NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
GUIDE	DR. SATYENDRA SHARMA
COLLEGE STUDENTS	ARMAAN KHAN, PRAMOD KUMAR
SCHOOL STUDENTS	ARVIND KUMAR, ASHISH YADAV

ABSTRACT

Only the person in need can identify the problems faced by him. Thus, to make our project even more valuable, we have contacted with visually challenged person to understand their problems, and had tried to develop our "PATH FINDER", which enables a blind person, to interact, with the surrounding, and avoid as much as possible, with the help of some ultrasonic sensors, in collaboration with vibrators, RF trans receiver and ATmega328 microcontroller, light sensor and LED's.

HYPOTHESIS

Here, we have tried, to merge together with all the components which will not only enable them to navigate but unlike others which are already present in the market, we enhanced their security as well.

By Providing with additional features like giving direction with the help of modified Wrist Bands, which will work with modified stick for a way more secure and joyful experience.

In case, the stick is lost, misplaced or damaged, the Wrist band can then also work to ensure maximum safety and navigating as much as possible.

METHOD

Furthermore, we added 3 Ultrasonic Sensors, facing Front and sideways, which are used to detect the distance and direction. When all the raw data from the sensors are collected and calibrated with the Wrist band, then the microcontroller will take control and communicate wirelessly with a RF trans receiver module with the band and will act as a Base module to control all the systems.

EXPERIMENT

1. WRIST BANDS

The Wrist Band, mainly consist of a Microcontroller ATmega 328, RF Trans receiver and micro vibrator. The RF Receiver will receive the signal from the stick when a obstacle is there and will vibrate in accordance with the direction, whether Right or Left in the significant Band.

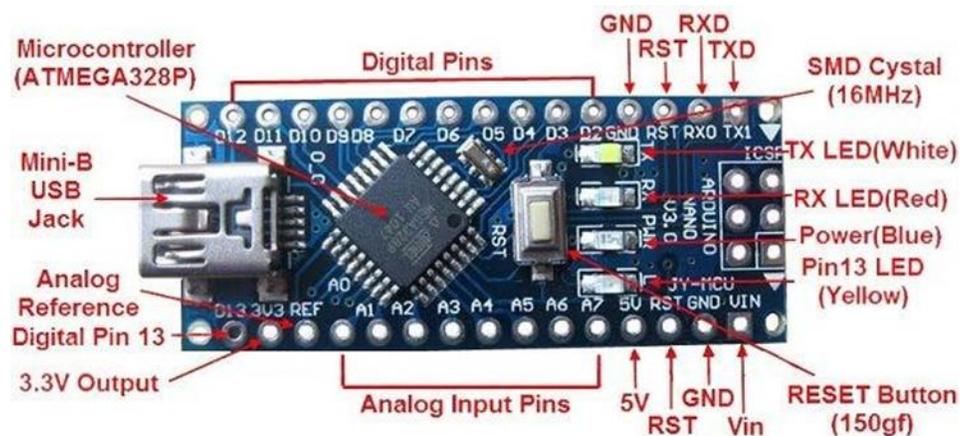
It could be operated with 3v to 7v battery, which will be long lasting enough to be charged at night and work day long.

2. WALKING STICK

The main function of Walking stick is to show the path to the person so that he may not tip over and fall. To avoid the most basic form of obstacles like walls, large objects etc.

The walking stick consists of

2.1. Microcontroller ATmega 328(Arduino Nano);



A microcontroller (or MCU for microcontroller unit) is a small computer on a single integrated circuit. In modern terminology, it is a System on a chip or SoC. A microcontroller contains one or more CPUs (processor cores) along with memory and programmable input/output peripherals. Program memory in the form of Ferroelectric RAM, NOR flash or OTP ROM is also often included on chip, as well as a small amount of RAM. Microcontrollers are designed for embedded applications, in contrast to the microprocessors used in personal computers or other general purpose applications consisting of various discrete chips.

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

2.2. ULTRASONIC SENSORS



Ultrasonic transducers are transducers that convert ultrasound waves to electrical signals or vice versa. Those that both transmit and receive may also be called ultrasound transceivers; many ultrasound sensors besides being sensors are indeed transceivers because they can both sense and transmit. These devices work on a principle similar to that of transducers used in radar and sonar systems, which evaluate attributes of a target by interpreting the echoes from radio or sound waves, respectively. Active 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. Passive ultrasonic sensors are basically microphones that detect ultrasonic noise that is present under certain conditions, convert it to an electrical signal, and report it to a computer.

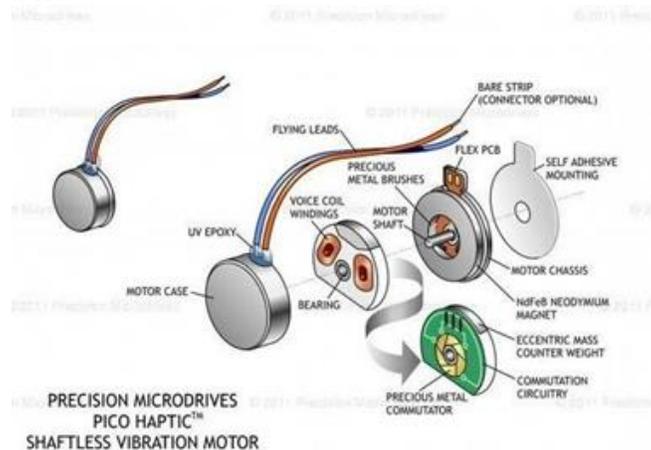
HC-SR04 is an ultrasonic ranging module that provides 2 cm to 400 cm non-contact measurement function. The ranging accuracy can reach to 3mm and effectual angle is $< 15^\circ$. It can be powered from a 5V power supply.

RF TRANSMITTER



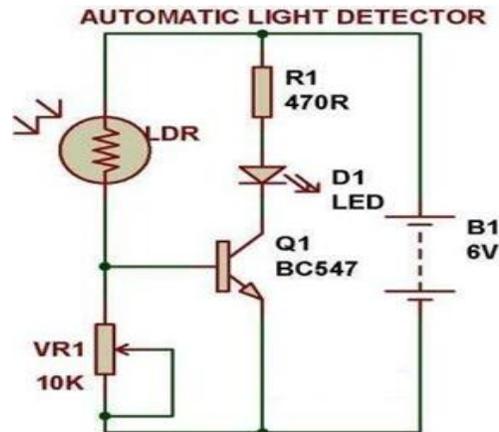
An RF module (radio frequency module) is a (usually) small electronic device used to transmit and/or receive radio signals between two devices. In an embedded system it is often desirable to communicate with another device wirelessly. This wireless communication may be accomplished through optical communication or through radio frequency (RF) communication. For many applications the medium of choice is RF since it does not require line of sight. RF communications incorporate a transmitter or receiver.

2.4. MICRO VIBRATOR



The 304-109 surface mount vibrator motor has an external footprint of 4.5mm wide, 13.6mm long and 4.5mm high and weighs in at 0.95g. This 4mm coreless cylinder motor is based on the same proven technology as the other 4mm, 6mm and 7mm types offered in the Pico Haptic range of micro vibration motors. The SMD vibrator motor, rated at 3V DC, runs at a nominal 12,000 RPM (200 Hz) while generating 0.6g (5.88m/s) of vibration. Based on a coreless three-pole design, the motor has a certified start voltage of 1.4V. Typical current draw is 70mA and the motor has a typical vibration efficiency of 2.7g/W. With a typical noise output of 50dBA, the motor is quiet for vibration standards and has a standard operating temperature of -20C to 60C.

2.5. LED's AND LIGHT SENSOR



A Light Sensor is something that a robot can use to detect the current ambient light level - i.e. how bright/dark it is. There are a range of different types of light sensors, including 'Photoresistors', 'Photodiodes', and 'Phototransistors'

Some Features

The stick will be modified according to the need.

The ultrasonic sensors will detect the distance of the obstacles and will send the data to microcontroller.

The wrist band can work alone, if the stick is damaged or lost.

SUMMARY

This project will eliminate a blind person to bother someone else, and can be self-dependent and a more secure way than just having a stick, also enhances their safety.

COST

The overall cost of the project is about Rs. 2000

19. PURIFICATION OF WATER AND PH METER

COLLEGE	NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY
GUIDE	Dr. SATYENDRA SHARMA
COLLEGE STUDENTS	YASH GAUTHAM, SIDDHARTH NAGAR
SCHOOL STUDENTS	SHIVAM SRIVASTAVA, SHIVE BANSAL

ABSTRACT

Drinking water crisis in India is reaching alarming proportions. It might be very soon attain the nature of global crisis. Hence, it is utmost importance to preserve water. in many houses both rural and urban areas people are drinking polluted water with the help of which they are causing many health diseases .With the help of our project people could drink purified water and they could also know the ph value of water to check the acidity and basicity of water.

HYPOTHESIS

To purify the water we would use simple filtration process in which we would treat the water in different layers of sand, gravels and activated charcoal and ph meter will be made with the help of ph arduino (microcontroller) which will display the actual reading in the LCD display

METHOD

water purifier

Take 2l coca cola bottle and cut it into two parts. now fill it with sand, gravels and activated charcoal .allow the dirty water to pass in these layers after some time you would see that purified water is coming ,follow this step 3-4 times and then boil the water to kill bacteria and germs from the water .

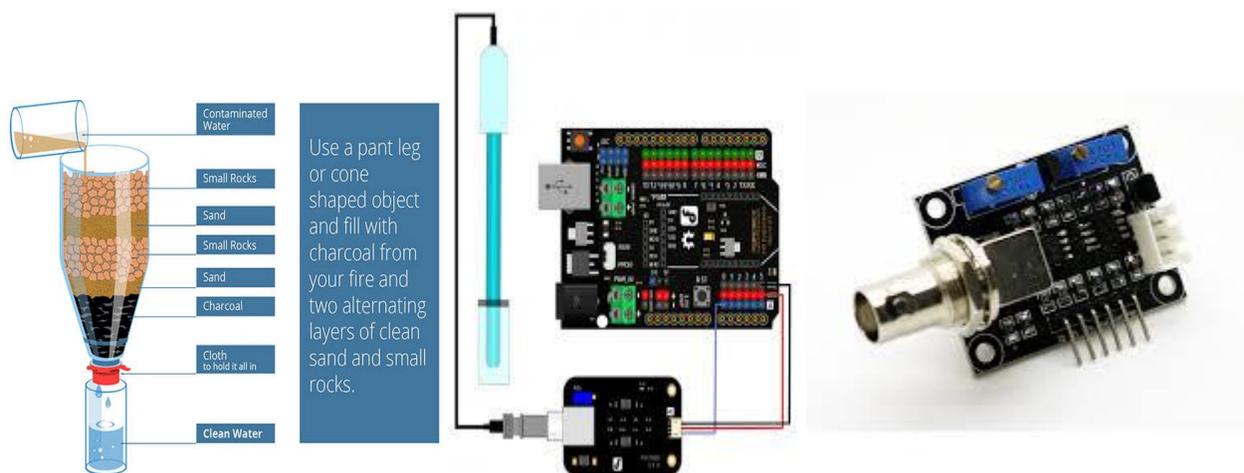
ph meter

To make ph meter we need some components like arduino UNO, ph sensor, LCD display, connecting wires and some useful programs.

EXPERIMENT

The apparatus used are as follows,

- ACTIVATED CHARCOAL
- SAND
- GRAVELS
- FILTER PAPER
- BOTTLE
- ARDUINO UNO
- PH SENSOR
- LCD DISPLAY
- CONNECTING WIRES
- SWITCHES
- POWER SUPPLY (5V-9V)



SUMMARY

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

If it is used on the large scale people could get aware of the actual importance of water and also they could be able to get purified water which will help cure with water borne diseases.

Water purifier is simple to install, technology used in it to make is quite advance but if we follow correct steps then even a common man can install it.

COST- Water purifier and ph meter is cheap in cost as compare to other purifier as in commercial purpose it cost more than Rs 5000 But, our project is approx Rs1500-2000 because the components which are used are quite expensive.

20. SEWAGE TREATMENT PLANT

COLLEGE	LNCT, RGPV, BHOPAL
GUIDE	DR. P.K SHARMA
COLLEGE STUDENTS	
SCHOOL STUDENTS	DEEPAK YADAV,NITESH SAHU

ABSTRACT

Users must concentrate their Sewage/Wastewater treatment process to ensure that it complies with regulatory guidelines. The main purpose of Sewage treatment process is to remove the various constituents of the polluting load: solids, organic carbon, nutrients, inorganic salts, metals, pathogens etc. Effective wastewater collection and treatment are of great importance from the standpoint of both; environmental and public health. Sewage/Wastewater treatment operations are done by various methods in order to reduce its water and organic content, and the ultimate goal of wastewater management is the protection of the environment in a manner commensurate with public health and socio-economic concerns. In this article, Sewage/Wastewater treatment techniques, factors affecting selection and design Sewage/Wastewater systems are discussed briefly.

KEY WORDS - Sewage, waste water treatment.

INTRODUCTION

Sewage/Wastewater is essentially the water supply of the community after it has been fouled by a variety of uses. From the standpoint of sources of generation, wastewater may be defined as a combination of the liquid (or water) carrying wastes removed from residences, institutions, commercial and industrial establishments, together with such groundwater, surface water and storm water as may be present. Generally, the wastewater discharged from domestic premises like residences, institutions and commercial establishments is termed as "Sewage/Community wastewater". It comprises of 99.9% water and 0.1% solids and is organic because it consists of carbon compounds like human waste, paper, vegetable matter etc. Besides community wastewater/sewage, there is

industrial wastewater in the region. Many industrial wastes are also organic in composition and can be treated physiochemical and/or by micro-organisms in the same way as sewage¹.

Why should Sewage/Waste water be treated before disposal?

Sewage/Wastewater treatment involves breakdown of complex organic compounds in the wastewater into simpler compounds that are stable and nuisance-free, either physiochemical and or by using micro-organisms (biological treatment). The adverse environmental impact of allowing untreated wastewater to be discharged in groundwater or surface water bodies and/or land is as follows

(i)The decomposition of the organic materials contained in wastewater can lead to the production of large quantities of malodorous gases.

(ii) Untreated wastewater (sewage) containing a large amount of organic matter, if discharged into a river/stream, will consume the dissolved oxygen for satisfying the biochemical oxygen demand (BOD) of wastewater and thus, deplete the dissolved oxygen of the stream; thereby, causing fish kills and other undesirable effects.

(iii) Wastewater may also contain nutrients, which can stimulate the growth of aquatic plants and algal blooms; thus, leading to eutrophication of the lakes and streams.

(iv)Untreated wastewater usually contains numerous pathogenic, or disease causing microorganisms and toxic compounds, that dwell in the human intestinal tract or may be present in certain industrial waste. These may contaminate the land or the water body, where such sewage is disposed. For the above-mentioned reasons, the treatment and disposal of wastewater, is not only desirable but also necessary.

EXPERIMENTAL UNIT OPERATIONS AND PROCESSES IN SEWAGE TREATMENT

The degree of treatment can be determined by comparing the influent wastewater characteristics to the required effluent wastewater characteristics after reviewing the treatment objectives and applicable regulations. The contaminants in wastewater are removed by physical, chemical and biological means. The individual methods usually are classified as physical unit operations, chemical unit processes and biological unit processes. Although these operations and processes occur in a variety of combinations in treatment systems, it has

been found advantageous to study their scientific basis separately because the principles involved do not change.

PHYSICAL UNIT OPERATIONS

Treatment methods in which the application of physical forces predominates are known as physical unit operations. Screening, mixing, flocculation, sedimentation, floatation, filtration and gas transfer are examples of physical unit operations.

CHEMICAL UNIT PROCESSES

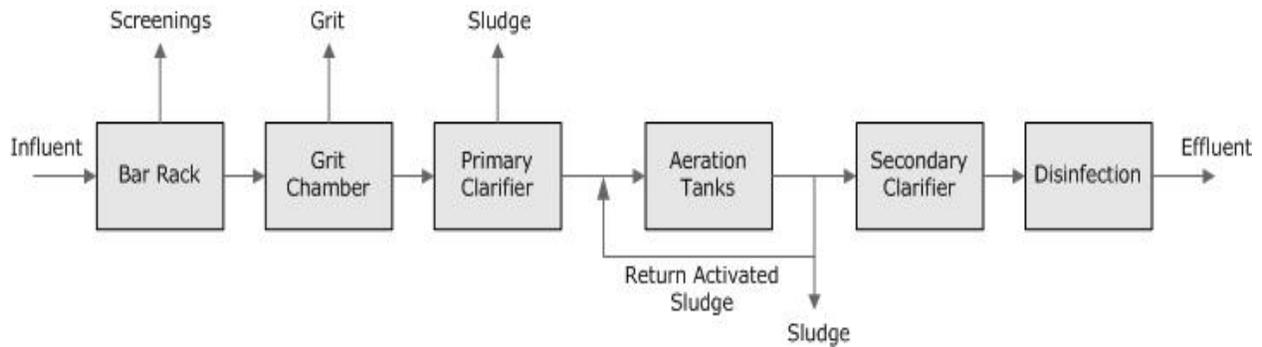
Treatment methods in which the removal or conversion of contaminants is brought about by the addition of chemicals or by other chemical reactions are known as chemical unit processes. Precipitation and adsorption are the most common examples used in wastewater treatment. In chemical precipitation, treatment is accomplished by producing a chemical precipitate that will settle. In most cases, the settled precipitate will contain both the constituents that may have reacted with the added chemicals and the constituents that were swept out of the wastewater as the precipitate settled. Adsorption involves the removal of specific compounds from the wastewater on solid surfaces using the forces of attraction between bodies.

BIOLOGICAL UNIT PROCESSES

Treatment methods in which the removal of contaminants is brought about by biological activity are known as biological unit processes. Biological treatment is used primarily to remove the biodegradable organic substances (colloidal or dissolved) in waste water. Basically, these substances are converted into gases that can escape to the atmosphere and into biological cell tissue that can be removed by settling. Biological treatment is also used to remove nutrients (nitrogen and phosphorus) in wastewater.

CLASSIFICATION OF SEWAGE/WASTE WATER TREATMENT METHODS

The unit operations and unit processes mentioned above are grouped together to provide various levels of treatment described below



PRELIMINARY WASTE WATER TREATMENT

Preliminary wastewater treatment is the removal of such wastewater constituents that may cause Sci. Revs. Chem. Commun.: 1(1), 2011 21 maintenance or operational problems in treatment operations, processes, and ancillary systems. It consists solely of separating the floating materials (like dead animals, tree branches, papers, pieces of rags, wood etc.) and the heavy settle able inorganic solids. It also helps in removing the oils and greases, etc. This treatment reduces the BOD of the wastewater, by about 15 to 30%. Examples of preliminary operations are:

- Screening and combination for the removal of debris and rags.
- Grit removal for the elimination of coarse suspended matter that may cause wear or clogging of equipment.
- Floatation / skimming for the removal of oil and grease.

PRIMARY WASTEWATER TREATMENT

In primary treatment, a portion of the suspended solids and organic matter is removed from the wastewater. This removal is usually accomplished by physical operations such as sedimentation in Settling Basins. The liquid effluent from primary treatment, often contains a large amount of suspended organic materials, and has a high BOD (about 60% of original). Sometimes, the preliminary as well as primary treatments are classified together, under primary treatment. The organic solids, which are separated out in the sedimentation tanks (in primary treatment) are often stabilized by anaerobic decomposition in a digestion tank or are incinerated. The residue is used for landfills or as a soil conditioner. The principal function of primary treatment is to act as a precursor to secondary treatment.

SECONDARY WASTEWATER TREATMENT

Secondary treatment involves further treatment of the effluent, coming from the primary sedimentation tank and is directed principally towards the removal of biodegradable organics and suspended solids through biological decomposition of organic matter, either under aerobic or anaerobic conditions. In these biological units, bacteria will decompose the fine organic matter, to produce a clearer effluent. The treatment reactors, in which the organic matter is decomposed (oxidized) by aerobic bacteria are known as Aerobic biological units; and may consist of

Filters (intermittent sand filters as well as trickling filters)

- Aeration tanks, with the feed of recycled activated sludge (i.e. the sludge, which is settled in secondary sedimentation tank, receiving effluents from the aeration tank)
- Oxidation ponds and aerated lagoons. Since all these aerobic units, generally make use of primary settled sewage; they are easily classified as secondary units. The treatment reactors, in which the organic matter is destroyed and stabilized by anaerobic bacteria, are known as anaerobic biological units and may consist of
- Anaerobic lagoons, Septic tanks, Inhofe tanks, etc.

Out of these units, only anaerobic lagoons make use of primary settled sewage, and hence, only they can be classified under secondary biological units. Septic tanks and Inhofe tanks, which use raw sewage, are not classified as secondary units. The effluent from the secondary biological treatment will usually contain a little BOD (5 to 10% of the original), and may even contain several mg/L of DO. The organic solids/ sludge separated out in the primary as well as in the secondary settling tanks are disposed of by stabilizing under anaerobic conditions in a Sludge digestion tank.

TERTIARY/ADVANCED WASTEWATER TREATMENT AND WASTEWATER RECLAMATION

Advanced wastewater treatment also called tertiary treatment is defined as the level of treatment required beyond conventional secondary treatment to remove constituents of concern including nutrients, toxic compounds, and increased amounts of organic material and suspended solids and particularly to kill the pathogenic bacteria. In addition to the nutrient removal processes, unit operations or processes frequently employed in advanced wastewater treatment

are chemical coagulation, flocculation, and sedimentation followed by filtration and chlorination. Less used processes include ion exchange and reverse osmosis for specific ion removal or for the reduction in dissolved solids. Tertiary treatment is generally not carried out for disposal of sewage in water, but it is carried out, while using the river stream for collecting water for re-use or for water supplies for purposes like industrial cooling and groundwater recharge.

Nutrient removal or control the removal or control of nutrients in wastewater treatment is important for several reasons

- Wastewater discharges to confined bodies of water cause or accelerate the process of eutrophication.
- Wastewater discharges to flowing streams tax oxygen resources for the removal of nitrogenous BOD thereby depleting the aquatic life.
- Wastewater discharges when used for groundwater recharging that may be used indirectly for public water supplies could cause health problems like blue baby diseases in children.

The nutrients of principal concern are nitrogen and phosphorus and they can be removed by biological, chemical, or a combination of processes. In many cases, the nutrient removal processes are coupled with secondary treatment, for example, metal salts may be added to the aeration tank, mixed liquor for the precipitation of phosphorus in the final sedimentation tanks, or biological denitrification may follow an activated sludge process that produces a nitrified effluent.

TOXIC WASTE TREATMENT/SPECIFIC CONTAMINANT REMOVAL

Physiochemical treatment such as chemical coagulation, flocculation, sedimentation, and filtration reduces many toxic substances such as heavy metals. Some degree of removal is also accomplished by conventional secondary treatment. Wastewaters containing volatile organic constituents may be treated by air stripping or by carbon adsorption. Small concentrations of specific contaminants may be removed by ion exchange.

Factors affecting selection and design of sewage/ wastewater treatment systems

The collection, treatment and disposal of liquid waste (sewage) are referred to as Sewerage. Sewage systems include all the physical structures required for

collection, treatment and disposal of the wastes. In other words, discharged waste waters that are collected in large sewerage networks, transporting the waste from the site of production to the site of treatment comprise Sewage treatment networks (Sewerage system). The most important factors that should be borne in the mind before the selection and design of any sewage/ wastewater treatment system are

ENGINEERING FACTORS

- Design period, stage wise population to be served and expected sewage flow and fluctuations.
- Topography of the area to be served, its slope and terrain; tentative sites available for treatment plant, pumping stations and disposal works.
- Available hydraulic head in the system up to high flood level in case of disposal into a river or high tide level in case of coastal discharges.
- Groundwater depth and its seasonal fluctuations affecting construction, sewer infiltration.
- Soil bearing capacity and type of strata to be met in construction.
- On site disposal facilities, including the possibilities of segregating sewage and sewage and reuse or recycling of sewage water within the households.

ENVIRONMENTAL FACTORS

- Surface water, groundwater and coastal water quality where wastewater has to be disposed after treatment,
- Odor and mosquito nuisance which affects land values, public health and well-being, and
- Public health considerations by meeting the requirements laid down by the regulatory agencies for effluent discharge standards, permissible levels of microbial and helminthic quality requirements and control of nutrients, toxic and accumulative substances in food chain.



PROCESS CONSIDERATION

- Wastewater flow and characteristics
- Degree of treatment required
- Performance characteristics
- Availability of land, power requirements, equipment's and skilled staff for handling and maintenance.

COST CONSIDERATION

- Capital costs for land, construction, equipment's etc.
- Operating costs including staff, chemicals, fuels and electricity, transport, maintenance and repairs etc.

CONCLUSION

The ultimate goal of wastewater management is the protection of the environment in a manner commensurate with public health and socio-economic concerns. Based on the nature of wastewater, it is suggested whether primary, secondary and tertiary treatment will be carried out before final disposal. Understanding the nature of wastewater is fundamental to design appropriate wastewater treatment process, to adopt an appropriate procedure, determination of acceptable criteria for the residues, determination of a degree of evaluation required to validate the procedure and decision on the residues to be tested based on toxicity therefore, it is necessary to ensure the safety, efficacy and quality of the treated wastewater.

21. SMART DUSTBIN

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GUIDE	Mr. SANDEEP BANERJEE
SCHOOL STUDENTS	ROHAN NATIYAL, 9 TH STD, RITIK MISHRA, 9 TH STD
COLEGE STUDENTS	VINIT KUMAR AND APOORV SURANA

ABSTRACT

The Smart Dustbin consists of two compartments which are put together economically. The waste is distinguished automatically by the dustbin based on the type of waste. The dustbin distinguishes between biodegradable and non-biodegradable waste based on input from the user.

A Motorised flap mechanism is used on top of the dustbin to put the waste in different compartments based on the commands given by the user through two buttons installed on top of the dustbin. The compartments are equipped with Ultrasonic sensors to detect the amount of waste present in the dustbin and the data is collected by the microcontroller. If any of the compartments of dustbin reaches full mark, the Motorised flap won't let any more waste to enter into the dustbin and user will be warned with a sound from a buzzer.

The dustbin also has a display on the dustbin to show the data about the garbage produced in a specified span of time.

Dustbin is paired to a system using RF module and automatically inform the authority that the dustbin has reached full and needs to be emptied.

HYPOTHESIS

With the initiatives like 'SWACCH BHARAT ABHIYAN' and 'CLEAN INDIA GREEN INDIA' people are encouraged to adapt new ways of working which produce minimal waste. But waste management is also an important measure towards success of such initiatives. Smart dustbin is one such step.

A major problem faced in public dustbins in India is maintenance. Dustbins are piled up to the top and the garbage starts accumulating around it. Also both biodegradable and non-biodegradable wastes are put in same dustbin making it difficult for waste management authorities to distinguish biodegradable waste for processing.

In our country, most of the waste is burned whether it is biodegradable or non-biodegradable. People all over the world know how important it is to move on to non-conventional sources of energy like biodegradable waste energy, solar energy, wind energy, tidal energy etc. But biodegradable energy is not being harnessed properly in India due to waste management issues discussed above.

Smart Dustbin does the work of distinguishing waste and monitoring the level of waste at primary level so that authority does not have to do it later.

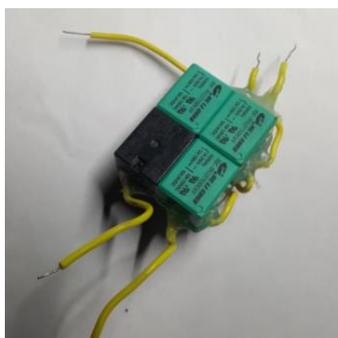
METHOD

Components used -

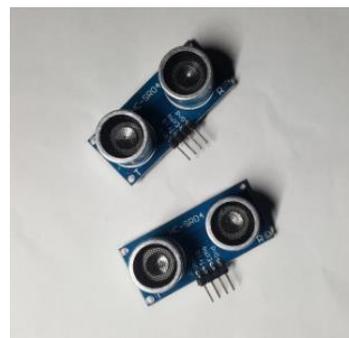
- Geared DC Motor
- Driver for motor
- Ultrasonic Sensors
- LCD screen
- Arduino Uno Microcontroller
- RF module
- Buzzer
- LEDs and push buttons
- Wires and DC Power Supply



DC Motor



Motor Driver



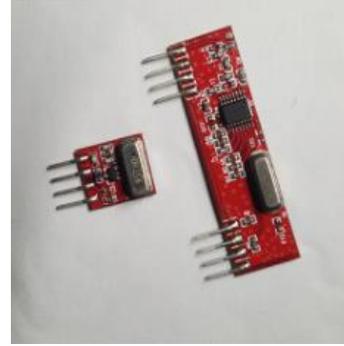
Ultrasonic Sensor



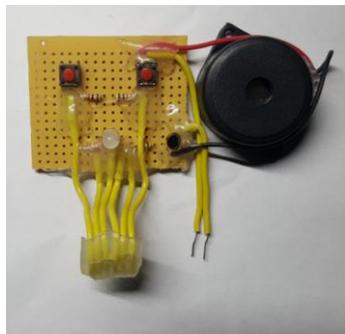
LCD Display



Arduino Uno



RF Module



Buttons, Led, Buzzers



Power Supply

WORKING

When the user puts garbage on a flap on the top of dustbin, garbage won't get into dustbin until the user presses either of the two buttons that is one for biodegradable waste and other for non-biodegradable waste. The machine will then check the amount of garbage in the chosen compartment. If the garbage is reaching full, the flap won't open and a warning will be given to the user in form of a sound sequence from a buzzer.



A panel on a side of dustbin consists of

1. 2 Push buttons
2. 1 RGB led
3. 1 buzzer

RGB led is used to indicate 3 operations:

1. Red - Non Biodegradable waste
2. Green - Biodegradable Waste
3. Blue - When Idle

The amount of garbage in the compartments will be detected by using two ultrasonic sensors on the opposite side of the flap. Sensors will tell the empty distance to the controller which will then calculate the volume ratio of the two compartments.

The Display used is a 16X2 LCD Panel with backlight. It is connected to the microcontroller. It shows data in two types

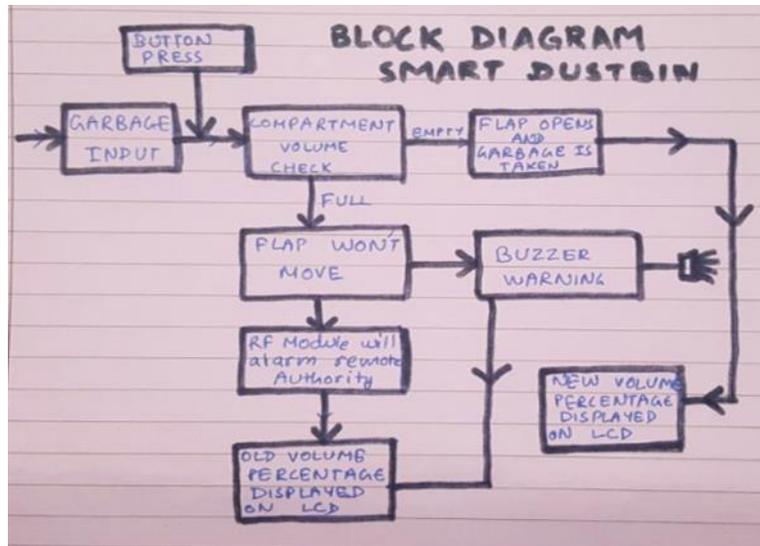
1. It shows current amount of garbage in each compartment in form of percentage.
2. It gives stars to both Biodegradable and Non biodegradable waste based on their production in a week or a defined span of time.

The axis of flap is connected to the shaft of a geared DC Motor run by a Motor Driver. The flap determines its mean position by detecting a ground wire on side of the dustbin. The body of the dustbin can be changed easily by just changing the shape of flap and attaching all the other electronics components at the side of any of the dustbin which makes this system universal.

The RF module can be used in various applications for connecting the dustbins

1. It can be used to connect to a remote alarm system to notify the management authority that the dustbin is full and needs to be emptied.
2. It can be used to connect various dustbins in a public place to a computer for management purpose. This adds to the security of dustbins also, that is the authority will instantly get to know when someone will steal the dustbin because dustbin will no longer be detected by the receiver.
This feature can very well help the government of India in tackling the local thieves who steal government property like dustbins, electrical equipment's for a little amount of money.

In Smart Dustbin the RF Module is used to connect to a remote light system which glows with two colours (for indication of different compartments) to notify the concerned authority that the dustbin is full. Dustbin will also send a dustbin ID in case of multiple dustbins



SUMMARY

The Smart Dustbin is an easy solution to the problem of distinguishing Biodegradable and Non-Biodegradable waste in the initial stage of waste disposal. It also contains some user interacting features which encourage people to use Dustbin instead of throwing garbage anywhere. Connecting it to remote system makes it even more suitable to be used in public places.

COST

This complete machine costs around Rs 1400 with RF module and remote alarming system which is best suited for public places like malls. Without RF module and remote alarm system, it costs Rs 940 which is best for residential use.

Geared DC Motor	Rs 50
Driver for motor	Rs 70
Ultrasonic Sensors	Rs 220
LCD screen	Rs 100
Arduino Uno Microcontroller	Rs 350
RF module	Rs 110
Buzzer	Rs 20
LEDs and push buttons	Rs 10
Wires and DC Power Supply	Rs 50

The system can be made even better with a GPS module system for ultra-remote monitoring. But it adds a lot to the total cost of the system. Also a Metal detector mechanism can be added for sensing metal pieces in biodegradable waste and warn the user because in some cases, people feed their biodegradable waste to cattle and toxic metal pieces in their food can be harmful.



22. SMART CITY

COLLEGE	UNIVERSITY POLYTECHNIC, RGPV, BHOPAL
GUIDE	DR. R. K. SHRIVASTAVA
SCHOOL STUDENTS	
COLLEGE STUDENTS	SHIVAM TRIPATHI, MAYUR

ABSTRACT

Cities are engines of growth for the economy of every nation, including India. Nearly 31% of India's current population lives in urban areas and contributes 63% of India's GDP (Census 2011). With increasing urbanization, urban areas are expected to house 40% of India's population and contribute 75% of India's GDP by 2030. This requires comprehensive development of physical, institutional, social and economic infrastructure. All are important in improving the quality of life and attracting people and investments to the City, setting in motion a virtuous cycle of growth and development. Development of Smart Cities is a step in that direction.

In the approach to the Smart Cities Mission, the objective is to promote cities that provide core infrastructure and give a decent quality of life to its citizens, a clean and sustainable environment and application of 'Smart' Solutions. The focus is on sustainable and inclusive development and the idea is to look at compact areas, create a replicable model which will act like a light house to other aspiring cities. The Smart Cities Mission of the Government is a bold, new initiative. It is meant to set examples that can be replicated both within and outside the Smart City, catalysing the creation of similar Smart Cities in various regions and parts of the country.

TARGET

The aim of the project is, therefore, to support standardization processes to help promote the sustainable development of cities and communities and to involve the main stakeholders and actors in these processes. In this context, the project is

essential for bridging the gap between users (and the parties concerned, e.g. the cities) on the one hand and those who develop the standards on the other hand. Moreover, the project is intended as a contribution to establishing an Austrian position to be adopted when participating in international standardization processes.

The core infrastructure elements in a Smart City would include:

- i. adequate water supply,
- ii. assured electricity supply,
- iii. sanitation, including solid waste management,
- iv. efficient urban mobility and public transport,
- v. affordable housing, especially for the poor,
- vi. robust IT connectivity and digitalization,
- vii. good governance, especially e-Governance and citizen participation,
- viii. sustainable environment,
- ix. safety and security of citizens, particularly women, children and the elderly, and
- x. health and education.

SMART CITY FEATURES

- i. Promoting mixed land use in area-based developments— planning for 'unplanned areas' containing a range of compatible activities and land uses close to one another in order to make land use more efficient. The States will enable some flexibility in land use and building bye-laws to adapt to change;
- ii. Housing and inclusiveness — expand housing opportunities for all;
- iii. Creating walkable localities — reduce congestion, air pollution and resource depletion, boost local economy, promote interactions and ensure security. The road network is created or refurbished not only for vehicles and public transport, but also for pedestrians and cyclists, and necessary administrative services are offered within walking or cycling distance;
- iv. Preserving and developing open spaces — parks, playgrounds, and recreational spaces in order to enhance the quality of life of citizens, reduce the urban heat effects in Areas and generally promote eco-balance;

- v. Promoting a variety of transport options — Transit Oriented Development (TOD), public transport and last mile para-transport connectivity;
- vi. Making governance citizen-friendly and cost effective — increasingly rely on online services to bring about accountability and transparency, especially using mobiles to reduce cost of services and providing services without having to go to municipal offices; form e-groups to listen to people and obtain feedback and use online monitoring of programs and activities with the aid of cyber tour of worksites;
- vii. Giving an identity to the city — based on its main economic activity, such as local cuisine, health, education, arts and craft, culture, sports goods, furniture, hosiery, textile, dairy, etc;
- viii. Applying Smart Solutions to infrastructure and services in area-based development in order to make them better. For example, making Areas less vulnerable to disasters, using fewer resources, and providing cheaper services.



CONCLUSION

Hence the smart city is very useful in modern time by which we stabilize our residential, social and all other stimulation like a developed countries places. So by smartness of city all of the things of a country grow up speedy and human can survive their all efforts.

23. SMART AGRICULTURE SYSTEM

COLLEGE	AJAY KUMAR GARG ENGINEERING COLLEGE GHAZIABAD
GUIDE	Dr. INDERJEET KAUR
SCHOOL STUDENTS	MANAV KASHYAP (St. PAULS ACADEMY, GHAZIABAD) SATYAM CHAUHAN (DURGAWATI HEMRAJ TAH SARASWATI VIDYA MANDIR, GHAZIABAD)
COLLEGE STUDENTS	MANOJ KUMAR, KOMAL PATEL, POOJA KAIN, KHUSHBOO KUMARI

ABSTRACT

Agriculture plays a vital role in development of the country. Issues concerning agriculture have been always hindering the same. One of the solutions to this problem is Smart Krishi e-Monitoring System by modernizing the current traditional methods of agriculture. Hence this project aims at making agriculture more effective using sensor and other technologies. In our project, we are using sensors namely Soil moisture sensor, Humidity sensor, Temperature sensor, Rain sensor and water pump. The highlighting feature of this project includes smart Wi-Fi and Bluetooth module that can be connecting with PC or Smart Phone. With the help of this approach which provides real-time information about the lands and crops, we can benefit farmers to make right decisions. It includes smart irrigation when the moisture of the soil becomes less, the water pump is automatically started.

HYPOTHESIS

The proposed model and pragmatic plan deals with the development of 'Smart Krishi e-Monitoring System' which is an organized 'Electronic' monitoring scheme in the Agriculture sector that aims to bring a digitized sphere in monitoring the agricultural lands.

The objective of this project is to help farmers monitor their agriculture lands by using his mobile phone. IoT sensors are capable of providing farmers information about crop yields, rainfall and soil nutrition are invaluable to production and offer precise data which can be used to improve farming techniques.

This project is useful for the upcoming younger generations as they are unaware of the agricultural parameters and how it is to be measured. With the help of this project they can monitor their lands through their mobile phones and they can take necessary steps at the right moment.

DESCRIPTION OF TECHNOLOGY

1. In this project we are using Arduino Uno prototyping platform as it supports Wi-Fi connect feature and the sensors (Moisture Sensor, Temperature Sensor, Humidity sensor, Rain sensor) which will be placed in the field and able to monitor amount of rain falling on the plants, Temperature and Humidity level and the moisture content in the soil. When the moisture content in the soil is too low, the system will give command to switch ON the motor and water the soil.

2. Based on the moisture content, the Water Pump will be automatically Switched ON for watering the plant.

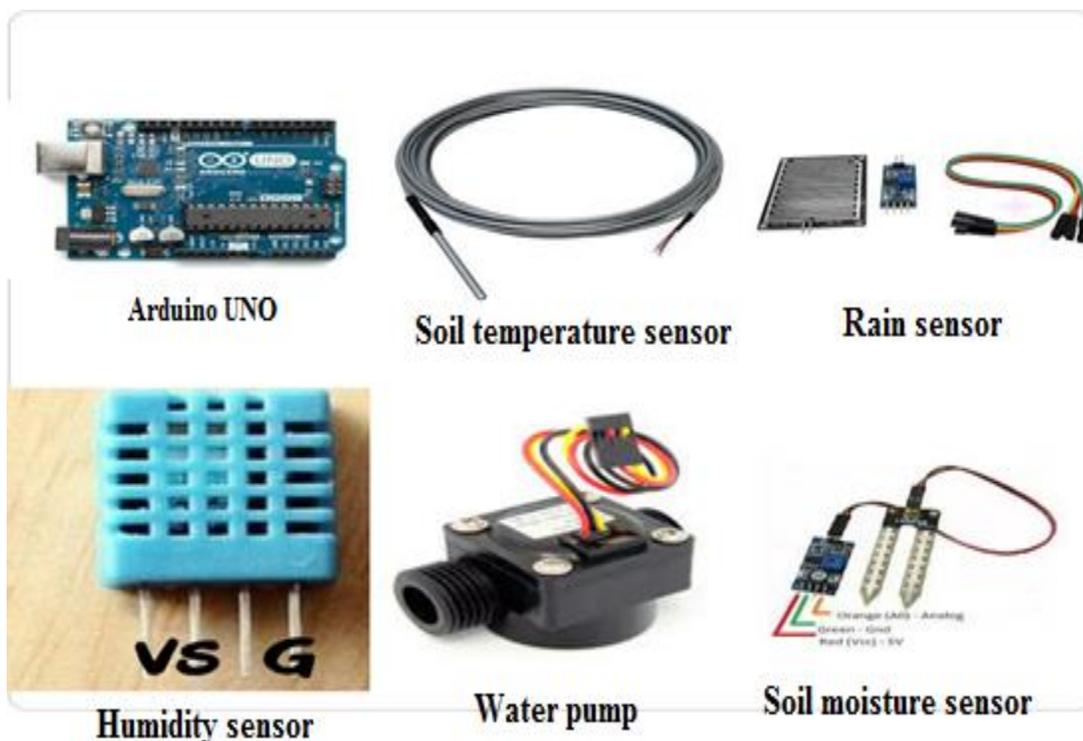
3. 'Smart Krishi e-Monitoring System' monitors the real time farming processes with critical historical data, such as weather events, climate changes, resources' availability, economics, product information.

The data obtained from the sensors will be display at the LED where the farmer can monitor the status of his land. Based on the moisture content, the Water Pump will be automatically Switched ON for watering the plant. Finally the Notification message will be sent to the Farmer's mobile, the amount of water flowing to the land. This Project enables precision agriculture in order to maximize food production, minimize environmental impact and reduce costs. This proposed idea of turns out to be an eye-opener to the world considering the realistic and innovative prospects offered in the domain.

METHOD

The proposed system comprises of sensing unit, monitoring unit and wireless unit. The sensing unit comprises of different types of sensors such as temperature, soil moisture, humidity sensor and rain drop sensor. Monitoring unit consists of the Arduino UNO, Arduino software (IDE). The system is described in details as follows:

- A. Arduino UNO is used for building electronics project and IDE makes it easy to write code and upload it to the board.
- B. A breadboard is used to build and test circuits.
- C. Soil moisture sensor (VH400) measures the water contents in the soil.
- D. Soil temperature sensor (D518B20) measure the temperature of the soil.
- E. Humidity sensor (DHT11) determines the humid environment around the crop and the temperature of the environment.
- F. Rain sensor use for detect rain drop and tells us if rains less or increase in the field.
- G. Water pump will automatically start if the moisture of the soil is less.



EXPERIMENT

In the process of making our project, we analyzed 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. Sensing and measurement by sensors that are used for obstacle detection. Sensor technologies in the Agriculture sector that observed soil moisture, temperature, humidity, rainfall and based on the moisture content, the Water Pump will be automatically Switched ON for watering the plant.
2. Researched and performed experiments to find the best method that should be adopted for self-guidance system.
3. Studied the sensors capable of providing farmers with information about crop yields, rainfall, temperature and soil moisture are invaluable to production and offer precise data which can be used to improve farming techniques.

BENEFITS

1. This Project enables precision agriculture in order to maximize crop production, minimize environmental impact and reduce costs.
2. Reduce operational time of farmers.
3. Reduce labor costs.
4. It solved agricultural sector issues.
5. Increased agricultural product quality and incomes.
6. Save water and reduce waste of fertilizer.

SUMMARY

Measuring soil moisture is important in agriculture to help farmers manage their irrigation systems more efficiently. Not only are farmers able to wisely use water to grow a crop, they are able to increase yields and the quality of the crop by better management of soil moisture during critical plant growth stages. Embedded system for automatic irrigation of an agriculture field offers a potential solution to support site-specific irrigation management that allows producers to maximize their productivity while saving the water.

COST OF THE PROJECT

The overall cost of project is 4000 rupees.

PROTOTYPE AND PICTURE



24. TADPOLE DESIGN BASED CAR

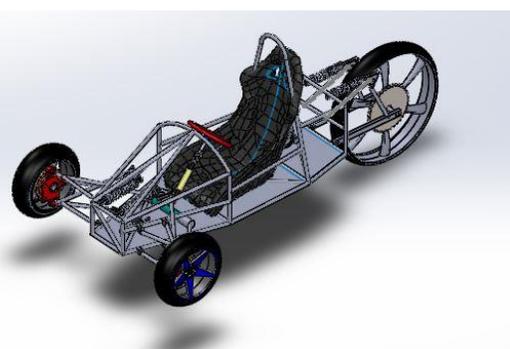
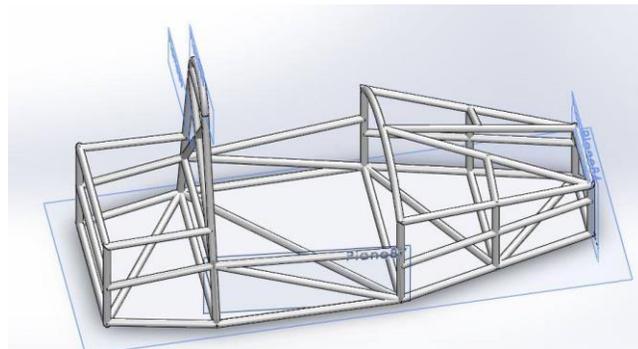
COLLEGE	SANSKAR COLLEGE OF ENGINEERING AND TECHNOLOGY, GHAZIABAD
GUIDE	Mr. NITIN PARASHAR
SCHOOL STUDENTS	YOGESH KUMAR, TANISHQ GAUTAM, 9 th STD, GOVERNMENT INTER COLLEGE NANDGRAM
COLLEGE STUDENTS	MRITYUNJAY SINGH BAHAL, PRAVEEN MALIK

ABSTRACT

We are making a car based on tadpole designing ie, two wheels on the front side and one on the rear side. This kind of arrangement provides better dynamic stability, aerodynamics and power train as compared to delta (one wheel on the front and 2 wheels on the rear side) design

INTRODUCTION

Due to rapid industrialization and development of the economy the expectation of the customer and their ability and willingness to pay for the product has changed drastically. Everyday new products are being launched and new niche markets are developing. To meet out this change and expectation and to maintain the value of the product the companies has to undergo continues process of product up gradation incorporating both technical and cosmetic changes. This design provides better dynamic stability, aerodynamics and power train which aims at safety, less bulky and higher performance of vehicle. If compared with four wheeler vehicle, the turning radius is much less because of which this design is beneficial for lower societies where roads are not of broad sizes and also for busy roads.



ENGINE

An internal combustion engine (ICE) is an engine where the combustion of a fuel occurs with an oxidizer (usually air) in a combustion chamber that is an integral part of the working fluid flow circuit. In an internal combustion engine the expansion of the high-temperature and high-pressure gases produced by combustion apply direct force to some component of the engine. The force is applied typically to pistons, turbine blades, or a nozzle. This force moves the component over a distance, transforming chemical energy into useful mechanical energy.

TIRE SELECTION

The selection of tire on the basis of following factors

1. Power available from engine
2. Loading
3. Tire weight
4. Acceleration
5. Performance

SUSPENSION

The suspension system is the system that serves as a linkage between the chassis and the wheels and the components include: shock absorber, wishbones, rocker arm, push rod, etc. The loads on the suspension system cause due to sudden brake, acceleration and cornering at very high speed so design is to done for suitable stiffness & geometry of our vehicle and find a frequency for better rigidity & stability possibilities as per the requirement of the event. The design goals of the suspension system were; dramatically improve vehicle handling, Increase the ride height and total wheel travel, Improve durability of components and simplify the manufacturability of the system.

STEERING SYSTEM

The objective of steering system is to change the direction of our vehicle in response to driver's command as input, according to the requirement. The design parameters include turning radius, steering ratio, steering arm length, rack & pinion ratio and caster angle.

BRAKING SYSTEM

The braking system is the system which prevents the motion, slowing or stopping a moving object. Applying braking physically means to decelerate a vehicle that is applying force opposite to the direction of its velocity. The braking system works in this way: "We apply force on the pedal, this force by us on the pedal pushes the fluid in the master cylinder, which then travels up to caliper, the caliper grabs the disc rotating with the tire, with this force and this force provides brake disc a torque, which ceases its rotation, the same torque is applied on tire also, as the brake disc is rigidly connected with the tires. Due to this torque, the tire acts on the ground with a certain force, and the ground reacts with the same force".

COST

S.No.	MECHANISM	COST
1	Engine & Transmission	Rs. 12,000.00
2	Steering System	Rs. 6,000.00
3	Suspension System	Rs. 5,000.00
4	Electrical System	Rs. 5,000.00
5	Chassis	Rs. 15,000.00
6	Braking	Rs. 10,000.00
7	Tire & Wheel Assembly	Rs. 15,000.00
8	Miscellaneous	Rs. 12,000.00
	TOTAL	Rs. 80,000.00



25. TRAFFIC CONGESTION MANAGEMENT

COLLEGE	AJAY KUMAR GARG ENGINEERING COLLEGE, GHAZIABAD
GUIDE	Prof. MAMTA BHURY
COLLEGE STUDENTS	ANKUR KUMAR, ANKUSH JAIN, SHASHANK GUPTA, SAJIV SINGH
SCHOOL STUDENTS	ISHAN FARIDI, 8 TH STD, SHIVAM GAUTAM, 10 TH STD – KVS KAMLA NEHRU NAGAR, GHAZIABAD

ABSTRACT

Traffic congestion is one of the major issues that is faced in the modern cities. It results from rapid urbanization and has a negative influence upon the society. A typical traffic congestion occurs when the number of vehicles on the road increase, following which we observe problems like slow speeds, longer trip times and increased vehicle queuing. This problem is only deteriorating as the number of vehicles is increasing day by day. This project addresses the immediate need of a traffic congestion management system which can improve the traffic efficiency and reduce travel time.

Traffic Congestion Management system will help in predicting and controlling the traffic. It will make use of Machine Learning technology in R programming language and Big Data analysis.

HYPOTHESIS

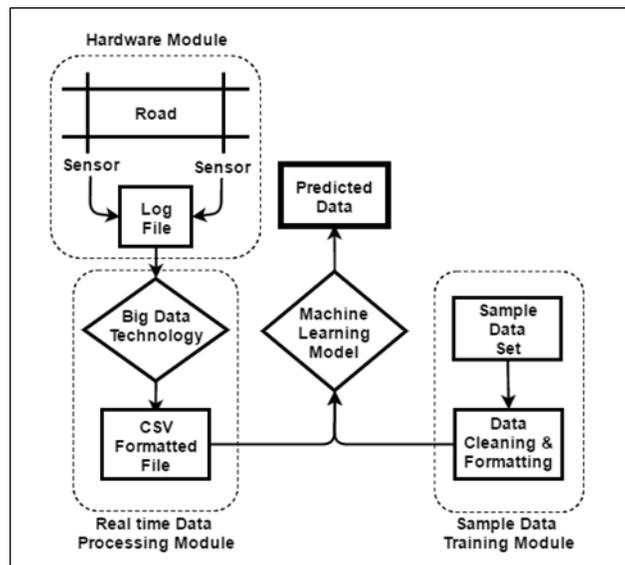
This Machine Learning based traffic congestion management system is not a typical traffic monitoring system. Instead, it will predict the traffic conditions for a particular road intersection by studying the traffic patterns from previously recorded data of that intersection. Hence, the entire project can be divided into two major stages.

The first stage involves development of the Machine Learning system and its training using sample data sets. The second stage involves deploying the Machine Learning system on a live intersection. A variety of vehicle sensing technologies like piezoelectric sensors, infrared sensors, inductive loops, pneumatic tubes etc. can be integrated with the system to obtain real time raw data and then it can be processed using Big Data technology to obtain the desired format of data set for analysis on Machine Learning system.

After the above two stages, the traffic congestion management system is ready to make predictions based on the observed trends and patterns.

METHOD

The proposed system has been divided into four modules viz. Sample Data Training Module, Real Time Data Processing Module, Hardware Module and the Machine Learning Model. All these modules are connected to the Machine Learning Model. The following figure illustrates the system architecture of proposed system.



1. Sample Data Training Module: It consists of a sample dataset and techniques to clean and format the data according to the need of the Machine Learning Model.
2. Hardware Module: It consists of sensors and microprocessor which will help in gathering the real time data and generate a log file with the raw data.
3. Real Time Data Processing Module: It will employ Big Data processing and analysis techniques. The data obtained from the sensors will be placed into the Hadoop distributed file system (HDFS). The data is then cleaned and aggregated using Big Data analysis to obtain useful data and generate a comma separated values file (CSV) which is sent to the Machine Learning model.
4. Machine Learning Model: It is the main module which receives data from all the other models. This module will make the traffic predictions. It's programmed in R Language.

EXPERIMENT

The system has been tested with a sample data set which was recorded in 2005 at Glendale on 101 North Freeway Los Angeles, California, USA. It is close to the Dodger's Stadium (a baseball team) and it reported unusual traffic.

- Sensing Technology Used – Inductive Loops
- Dataset Characteristics – Multivariate, Time-Series
- Duration – 25 weeks (288 times a day, 50400 entries)

Data Variables:

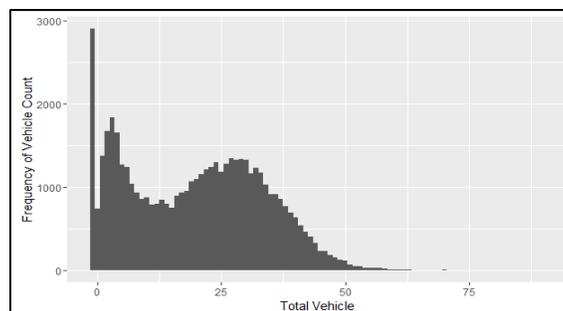
- Time Stamp – at an interval of 5 minutes.
- Vehicle Count – it is the number of vehicles per time interval (of 5 minutes).
- Weekend – this variable holds a value of 0 or 1 (it is 1 for Saturday & Sunday).
- Average Speed – this variable holds the average speed of total vehicles passing per time interval (5 minutes).

Feature Engineered Data Variables:

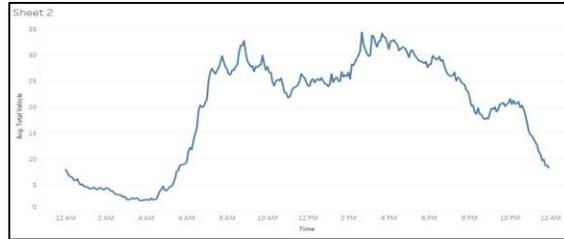
- Holiday – this variable holds a value of 0 or 1 (it is 1 for festivals & holidays).
- Traffic Density – based on the vehicle count, the traffic density can be classified as light, normal, heavy or critical.

Following are the various representations of data that can be used to study the trends in data set.

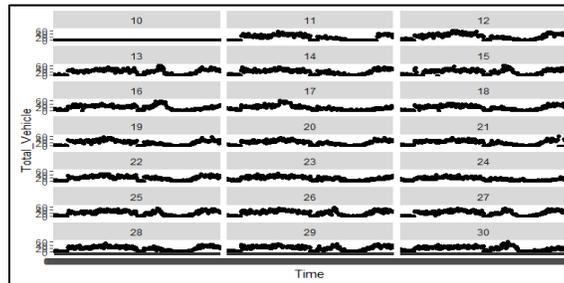
1. A graph illustrating the frequency distribution of vehicle count. This represents how many times a particular count of vehicles has been achieved.



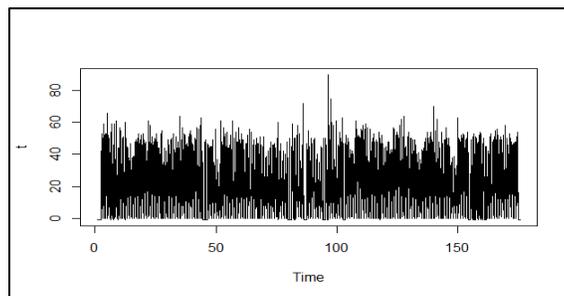
2. A graph illustrating the average total vehicles on road at particular time durations during a single day.



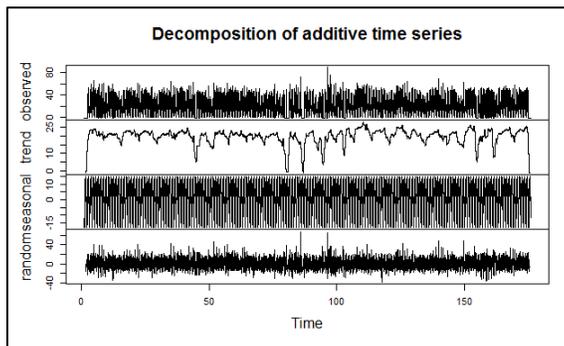
3. A graph illustrating the average total vehicles on road at particular time durations during a single day for 3 weeks.



4. This graph illustrates the vehicle count on road at particular time durations per day for the entire data set. However, only 200 entries are visible.

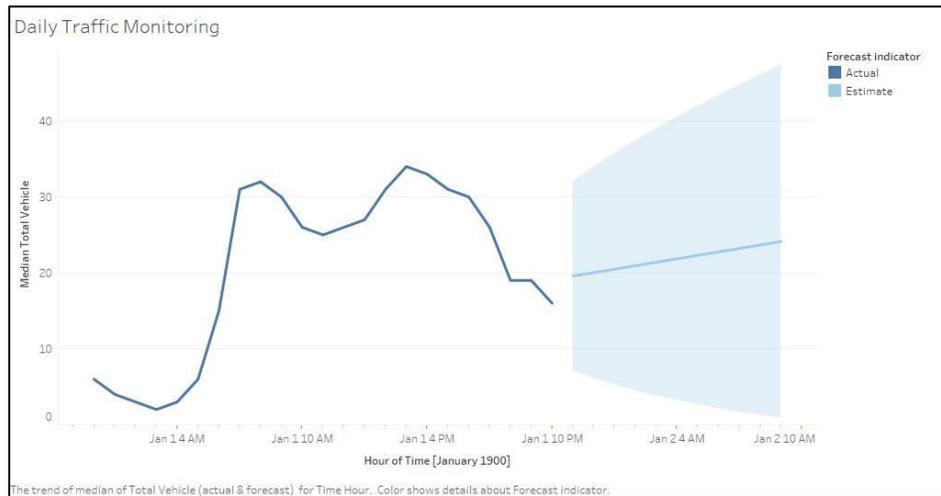


5. For forecasting or predicting the traffic, first we extract the trend, seasonality and error for the give time series dataset. The Seasonal Trend Decomposition using Loess (STL) is an algorithm that was developed to help to divide up a time series into three components namely: the trend, seasonality and remainder.



RESULT

Once the data analysis has been performed, the system begins forecasting the traffic conditions for the location using an Auto Regressive Moving Average Time Series model or ARMA model which has been used in the system. Following is the forecast performed by the traffic congestion management system.



SUMMARY

The traffic congestion management system will recognize the traffic trends in a particular area according to the data obtained from the sensors over time. By applying the machine learning model (one of the ARMA models), the system will predict traffic conditions of the area and notify the user accordingly. The end product will be a web portal, on which the user can enter their destination and they will obtain the real time traffic updates of the different intersections on their route where the sensors are installed.

COST

The cost of software is virtually ZERO since it has been developed by us. And any existing sensing technology that is being used by the government at present can be used with this system. However, for testing purpose, a minimum of Rs. 3000 is required to setup some basic sensors.

26. WALKING AID GEARS (FOR VISUALLY IMPAIRED)

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ABSTRACT

This project aims towards the walking aid of visually impaired people. In this project we are basically trying to actuate a vibration when any hindrance is observed by the sensor. This will alarm the person about any nearby obstacle. In this project we are making smart shoes for detection of obstacles at lower level as well as smart gloves for the detection of obstacles at higher level. The significance of gloves is that after wearing them the person need not carry the stick which was earlier carried for detection of any hindrance in the path.

HYPOTHESIS

This will be made possible by connecting and calibrating sensors with microcontrollers. Detection of variation in sensor and generating the signal is basic principle of the project. Sensors should be very specific to fit in smart shoes and smart gloves easily. The indicators used should be of type which blind people can easily detect.

COMPONENTS USED

Arduino uno and Arduino Nano: They are used as microcontrollers that control and direct the ultrasonic sensors vibration motors, etc. Arduino has atmega 328 IC. It controls all the operations. Arduino Nano works exactly same as Arduino uno, only difference between them is of size.

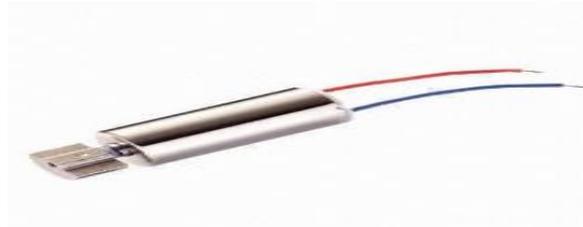


Ultrasonic sensor: - This sensor is used to detect an object present and sends the signal about the object to the microcontroller. Ultrasonic sensors depend on two separate devices, an ultrasonic transducer and a detector. An ultrasonic transducer is any device that converts energy into an ultrasonic 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. It uses a 2000 Hz frequency for the operation.

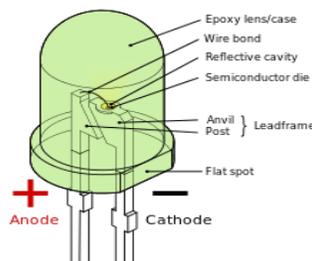


Water Sensor: - In this sensor, it uses the principle of conductivity of water and sends the signal to vibration motor activating it.

Vibration Motor: - It is a type of motor which has a weight on shaft and when shaft rotates vibrates the shoes and gloves alerting the person accordingly. These vibrations can be easily felt by the blind person and hence vibration motor becomes an indicator.



Light Emitting Diode: - It is a pn junction diode which emits light when it is forward biased by applying the voltage across it. This led alerts the person coming in front of the person. Led in this project is controlled by Arduino microcontroller.



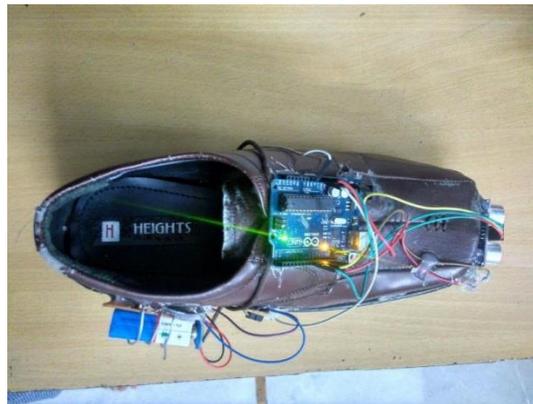
TECHNICAL DETAILS

The gear comprises of shoes and gloves in which electronic components are installed. The electronic components comprises of three basic modules, sensors, microcontrollers and indicators. The sensors used are Ultrasonic sensors. The microcontroller used is Arduino Nano. The indicator used is vibration motor.

The sensor (Ultrasonic sensor) is used to detect the distance of the obstacle that can obstruct the path of the person. As the signal is detected, it sends the signal to the microcontroller (Arduino Nano). Arduino Nano will further modulate the signal accordingly and gives a signal to the vibration motor. This indicator (vibration motor) alerts the person and helps the person to take further action accordingly.

The two gears used will help the person to detect the height of the object. The smart gloves used detect the higher obstacles. The smart shoes detect the obstacles of smaller height. This will help the person to take according action. This will also help the person to decide whether he can climb over the obstacle or not.

The indicators are fitted both in glove and shoes. Depending on the type of obstacle the corresponding sensor will give the signal and microcontroller will accordingly activate particular indicator.



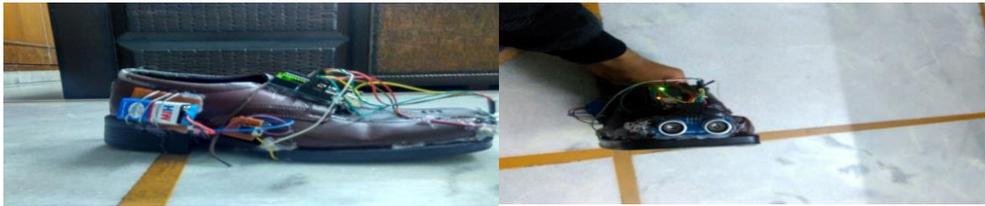
WORKING

In this project the main parts are a pair of shoes and gloves. The working of both the parts is very similar. Basically the working of this module starts with detection of an object by ultrasonic sensor. And the sensor works in a way that first it sends ultrasonic waves through transmitter and then after the waves reflects back, due

to the object. Then the ultrasonic sensor receives them and later time of the whole process is calculated. As the sensor is aware of the speed of the waves, it can easily find the distance of the object. The distance is sent to the micro controller, which interprets the data and further decides the action to be taken.

If the distance sent is greater than 40cm, then no action is taken. But if the distance sent is less than 40cm, then the micro controller takes further action like starting the vibration motor. If distance is 30-40cm then vibration motor will vibrate single time. If distance is 20-30cm then vibration motor will vibrate two times .If distance 10-20cm then vibration motor will vibrate three times. If distance is less than 10cm, then vibration motor will vibrate four times.

In this gear there is a second motor also, which is placed at the back of the shoe. This motor will vibrate, whenever the person steps onto water. As soon as foot is on the water then there is an open connection, which completes and the motor starts to vibrate. This will help the person to walk carefully and will help the person from slipping.



The second part of this gear consists of a glove. In this glove the basic working is same as that of the shoe, but instead of the motor that vibrates due to water, there are LEDs placed which will light up whenever someone comes nearby so that the person coming can notice the blind person and will pass carefully.

The purpose of gloves is that when any object which is hollow from the bottom, and thus cannot be detected by the shoes. For these types of objects, gloves will work and the person will be careful while passing by.

The whole module works on 5v supply. But a 9v battery is available more commonly. Therefore we are using a 9v battery and through 7805 IC. The voltage is stepped down through 7805 IC to 5v level.

COST OF PROJECT

1. Cost of pair shoes: - 1500 rupees
2. Cost of pair gloves: - 500 rupees
3. Total cost of project: - 2000 rupees

27. WIRELESS HEXAPOD

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COLLEGE STUDENTS	PRIYA RANI, ROHIT KUMAR, SHIVAM KAUSHALYA

ABSTRACT

The necessity to utilize the robot cannot be denied since there are a lot of natural disasters occur everywhere around the world. The robot that can be used in this situation may be a remotely controlled by human or moves autonomously. Hexapod robot is one of the robots used in such situation because of its stability and flexibility during the motion on any type of surface. Hexapod robot is a robot that has six legs to walk or move. Since the robot has many legs, the robot is easily programmed to move around because it can be configured to many types of gait such as alternating tripod, quadruped and crawl. There are various designs of hexapod with certain function and advantages. The purpose of the hexapod robot is for military purpose and many more which depend upon the users. On the flat surface as well as on incline surface, the robot will move using its legs. The decision for the robot to use its six legs is based on the sensory devices and algorithm develops at the controller attached to the robot.

Keywords: Autonomous, Programmable, Hexapod

INTRODUCTION

A six-legged walking robot should not be confused with a Stewart platform, a kind of parallel manipulator used in robotics applications.



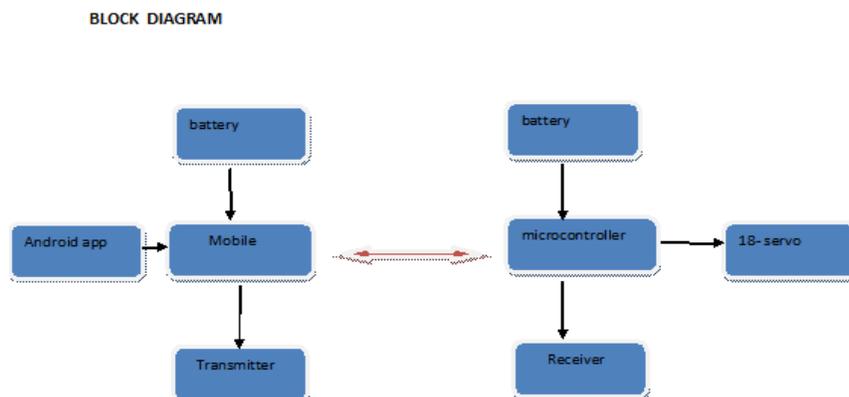
Beetle hexapod

A **hexapod** robot is a mechanical vehicle that walks on six legs. Since a robot can be statically stable on three or more legs, a hexapod robot has a great deal of flexibility in how it can move. If legs become disabled, the robot may still be able to walk. Furthermore, not all of the robot's legs are needed for stability; other legs are free to reach new foot placements or manipulate a payload.

Many hexapod robots are biologically inspired by hexapod locomotion. Hexapods may be used to test biological theories about insect locomotion, motor control, and neurobiology. There are six legs, a chassis, a roll cage, and an engine. The engine runs and powers the hydraulics. All of the hydraulics are hooked up and working properly. There is still some work left to be done on the electronics. All six legs have a sealed Leg Controller enclosure with a Beagle bone Black inside. The Beagle bones have custom perf board capes. Each cape carries a Dual MC33926 Motor Controller, which can drive four PWM channels to control two pistons. The current plan is to drive the Knee and Thigh joints with those two channels, and add three more boxes located on the chassis to drive the Thigh joints. All of the Leg Controller boxes are wired up to the network switch. We can plug a laptop into the switch and talk to all the Beagle bones in the legs. The Beagle bones don't have software to closed loop control yet, but we can SSH in and directly set the PWM outputs to move the Knee and Thigh joints.

COMPONENT USED IN HEXAPOD

- ARDUINO.
- ATMEGA 256.
- Servo Motor
- Power supply
- Android app
- Bluetooth module



CIRCUIT DIAGRAM OF HEXAPOD

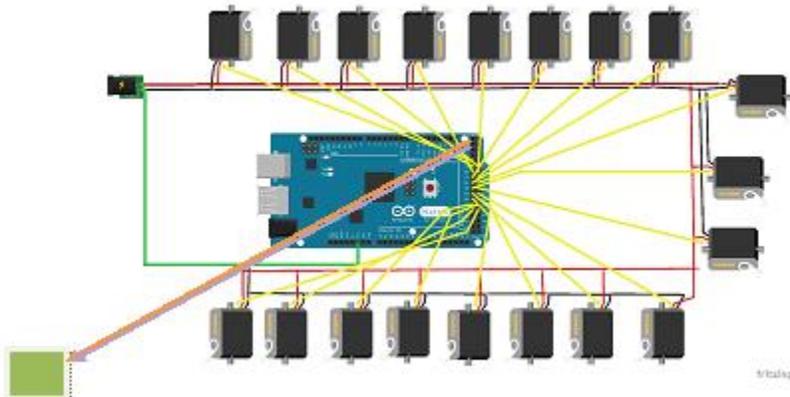
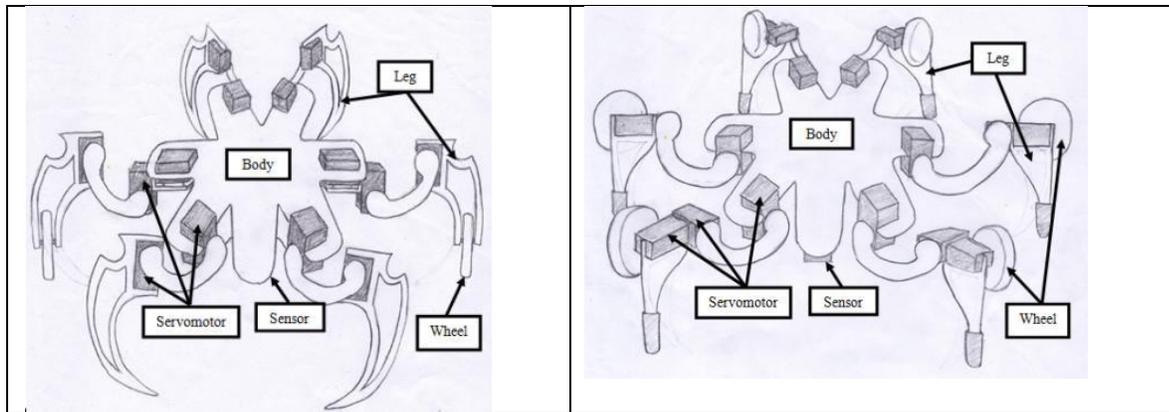


TABLE OF HEXAPOD

<p>Design1.</p> <p>Labels: Body, Leg, Servomotor, Sensor</p>	<p>Design 2.</p> <p>Labels: Body, Leg, Servomotor, Sensor</p>
<p>Design3.</p> <p>Labels: Body, Leg, Servomotor, Sensor</p>	<p>Design4.</p> <p>Labels: Body, Leg, Servomotor, Sensor, Wheel</p>



ADVANTAGES

The current paradigm in design and manufacturing involved integration of numerous hardware and sophisticated software in order to create An unique product of extremely high accuracy . The objective of this integrated product is to enhance quality and reliability, reduce the cost and overall cycle time, and increase flexibility. Hexapod is a dramatic departure from conventional mechanism design; it offers many new attributes for the most manufacturing processes.

- **Six degree of freedom**

The hexapod consists of six struts which expand and contact between the movable platform, which carries a spindle, and the fixed platform. Coordinated motion of these six struts enables the spindle to move in any direction. In addition to the traditional motion in orthogonal axes, X,Y, and Z, this device also is able to move in the rotary complements of pitch, yaw, and roll. This advantage allows the spindle to reach unusual angles and geometrical features.

- **High precision and accuracy**

In contrast to the conventional multi-axis positioning tools, the hexapod technique requires all six struts to alter their lengths if a change of the platform in only one axis is required. On the other hand, if only one strut alters its length, all six coordinates (X, Y, Z, q, a, j) will change. The twelve multi- degree-of-freedom joints must assure precision movement. Unlike other multi-axis positioning devices, in which any change in one coordinate influences the position of the pivot point and the other coordinates, the hexapod can compensate itself automatically. Through the sophisticated

software, the coordinate transformations and individual velocity /coordinate information are transmitted to each motor controller axis.

DISADVANTAGES

As any new design, hexapod has turned up some problems some of them have been addressed, and some still need further developments and refinements.

- **Friction**

Friction in the ball joints is a crucial problem for the hexapod. That the friction coefficient is about 0.8, and that is enough to exert some axial deflection on the struts that influences the accuracy and repeatability. Using a ceramic coating and special lubricant, the modified struts are down to 0.2 friction coefficient

- **Length of the struts**

The length of the struts affects the accuracy of the machine. When the length increases, the accuracy decreases dramatically (possibility of bending).This problem has been overcome by mapping each screw before installing in the machine.

- **Dynamic thermal growth**

This problem has appeared also in the serial linkage mechanism. That with the increase in the speed of the spindle, there is a dramatic increase in the dynamic thermal growth. One way to overcome that hurdle is by monitoring the struts in real time employing one dimension finite element analysis that activates an automatic error compensation routine built into the software and based on the known growth rate of the struts.

- **Calibration**

The accuracy of the parallel- mechanism is not only dependent upon an accurate control of the length of its links but also on knowledge of its geometrical characteristics. According to the fabrication tolerances many factors will play a role in the final accuracy of the machine. Up to 132 parameters must be specified to describe the geometrical characteristics of the mechanism which seems to be very difficult to adjust all parameter. Therefore the calibration of the hexapod is still an open problem.