



Student Projects Technical Record

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

At

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Organised by

Agastya International Foundation

In support with

Synopsis

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FOREWORD

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

So, what is the real problem?

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

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

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

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

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

Roddam Narasimha, FRS

DST Year-of-Science Professor

Engineering Mechanics Unit

Jawaharlal Nehru Centre for Advanced Scientific Research

ABOUT AGASTYA

ABOUT AGASTYA INTERNATIONAL FOUNDATION

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Introduction

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

Agastya Vision:

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

Mission of Agastya

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

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

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

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

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

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



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

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

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

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

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

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



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Third Party Impact Studies:

MHRD study on 2048 children from 256 schools

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

Best Practices Foundation study of 1348 children in Karnataka

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

Achievements and Recognitions

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

Looking Forward...

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



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

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

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By clicking on the following links you can

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

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

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

ABOUT SYNOPSYS

Corporate Background

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

- See more at:

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

ABOUT ANVESHANA

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

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

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

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

Engineering colleges will participate as teams with 2 members. The teams will select 2 students from nearby underprivileged schools (Govt. and Govt. aided schools) to **mentor** them to design and build models or projects around an identified social problem. In the process school children would directly get the opportunity to work together with more qualified under-graduates, and a chance to 'learn' the basic principles (along with hands-on skills on diverse products and interesting processes). The interaction with Juries and dignitaries would be a life-time experience for them to cherish. The school students thus will be exposed to entire planning, designing and building process of the models and in turn will get educated in the scientific and engineering concepts behind the models in Anveshana-2020. (**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

Started the journey from 2011 and continuing till today



PROJECT SCREENING COMMITTEE

MG Subramanian

MG Subramanian is an Advisor to Agastya International Foundation. He enjoys going around project sites-namely colleges where Anveshana 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 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

PROJECT EXHIBITED IN THE FAIR

S.N.	PROJECT CODE	PROJECT NAME	COLLEGE NAME/SCHOOL NAME
1	AS-D-G-01	Auto Switching of Gas Stove	ABES Engineering College, Ghaziabad
			Govt Sarvodaya Kanya Vidyalaya, No-2, Shakarpur, Delhi
2	AS-D-G-02	Purifying Water using Sunlight	Ajay Kumar Garg Engineering College Ghaziabad
			Composite School, Lathmar Colony, Ghaziabad
3	AS-D-G-03	Wildfire Prediction and Detection	Ajay Kumar Garg Engineering College Ghaziabad
			Composite School, Lathmar Colony, Ghaziabad
4	AS-D-G-04	Save Polar-Use Solar	Bharati Vidyapeeth's College of Engineering, Delhi
			Govt Co-ed Senior Secondary School, Paschim Vihar, Delhi
5	AS-D-G-05	M.E.G. Train	Bharati Vidyapeeth's College of Engineering, Delhi
			Govt Co-ed Senior Secondary School, Paschim Vihar, Delhi
6	AS-D-G-06	Heart Disease Diagnosis by Machine Learning	Bharati Vidyapeeth's College of Engineering, Delhi
			Govt Co-ed Senior Secondary School, Paschim Vihar, Delhi
7	AS-D-G-07	Magic Fruit Cleaner	GD Goenka University, Gurugram
			Govt Middle School, Dumdama, Sohna-Gurugram
8	AS-D-G-08	Diagnosis of Cancer in Early Stage	Global Institute of Technology, Jaipur
			Govt Secondary School, Sector-19, Pratap Nagar, Jaipur
9	AS-D-G-09	AEGIS	GL Bajaj Institute of Technology and Management, Greater Noida
			Rajkiya Balika Inter College, Sector-51, Noida
10	AS-D-G-10	Green Leaf Disease Prediction by Resbery PI	GL Bajaj Institute of Technology and Management, Greater Noida
			Govt Sarvodaya Kanya Vidyalaya, No-2, Shakarpur, Delhi
11	AS-D-G-11	Water Dropper	GL Bajaj Institute of Technology and Management, Greater Noida
			Rajkiya Balika Inter College, Sector-51, Noida
12	AS-D-G-12	Water Recycler	GL Bajaj Institute of Technology and Management, Greater Noida
			Rajkiya Balika Inter College, Sector-51, Noida
13	AS-D-G-13	Water Tank Cleaning System	Hitech Institute of Engineering and Technology, Ghaziabad
			Govt Sarvodaya Bal Vidyalaya, Laxmi Nagar, Delhi

14	AS-D-G-14	Electronic Water Efficient Flushing System	Hitech Institute of Engineering and Technology, Ghaziabad
			Govt Sarvodaya Bal Vidyalaya, Laxmi Nagar, Delhi
15	AS-D-G-15	Bio Plastic	IMS Engineering College, Ghaziabad
			Composite School, Kaila Balak, Ghaziabad
16	AS-D-G-16	Pragyan Rover	IMS Engineering College, Ghaziabad
			Composite School, Kaila Balak, Ghaziabad
17	AS-D-G-17	Autonomous Farming Bot	Indraprastha Engineering College, Shahibabad
			Govt Sarvodaya Kanya Vidyalaya, Arambagh Lane, Delhi
18	AS-D-G-18	Mouse Events Control Using Hand Gesture	JSS Academy of Technical Education, Sector-62, Noida
			Rajkiya Balika Inter College, Sector-51, Noida
19	AS-D-G-19	Commercial Bin	JSS Academy of Technical Education, Sector-62, Noida
			Govt Sarvodaya Kanya Vidyalaya, No-2, Shakarpur, Delhi
20	AS-D-G-20	Advanced Garbaging Machine	Krishna Engineering College, Mohan Nagar, Ghaziabad
			Govt Sarvodaya Bal Vidyalaya, No-2, Shakarpur, Delhi
21	AS-D-G-21	Landslide Detection System	Maharaja Agrasen Institute of Technology, Delhi
			Govt Sarvodaya Kanya Vidyalaya, Jwalapuri, Amalvas, Delhi
22	AS-D-G-22	Vertical Farming using Heliostats	Maharaja Agrasen Institute of Technology, Delhi
			Govt Sarvodaya Kanya Vidyalaya, Jwalapuri, Amalvas, Delhi
23	AS-D-G-23	Multi Functionality of Plants	Maharaja Agrasen Institute of Technology, Delhi
			Govt Sarvodaya Co-ed Vidyalaya, Sector-8, Rohini
24	AS-D-G-24	Sign Language Transalator	Maharaja Agrasen Institute of Technology, Delhi
			Govt Sarvodaya Co-ed Vidyalaya, Sector-8, Rohini
25	AS-D-G-25	Eco-Friendly Refrigerator	Mangalmay Institute of Engineering and Technology, Greater Noida
			Govt Sarvodaya Kanya Vidyalaya, Arambagh Lane, Delhi
26	AS-D-G-26	Edible Spoons	Mangalmay Institute of Management and Technology, Greater Noida
			Govt Sarvodaya Kanya Vidyalaya, No-2, Shakarpur, Delhi
27	AS-D-G-27	Water Waste Management	Noida Institute of Engineering and Technology, Greater Noida
			Chetram Sharma Girls Inter College, Sector-45, Noida

28	AS-D-G-28	Multi Toolhead Machine	Noida Institute of Engineering and Technology, Greater Noida
			Chetram Sharma Girls Inter College, Sector-45, Noida
29	AS-D-G-29	Pain Reliever Machine	Poornima College of Engineering, Jaipur
			Govt Secondary School, Sector-19, Pratap Nagar, Jaipur
30	AS-D-G-30	SAPASS	Sagar Institute of Research and Technology, Bhopal
			Sagar International School, Bhopal
			Billabong High School, Bhopal
31	AS-D-G-31	Washing Water Purifier System	Sagar Institute of Technology and Research, Bhopal
			Sagar Vidya Niketan, Sikandarabad, Bhopal
32	AS-D-G-32	Green AC Powered System	Sagar Institute of Technology and Research, Bhopal
			Sagar Vidya Niketan, Sikandarabad, Bhopal

1. AUTO SWITCHING OF GAS STOVE

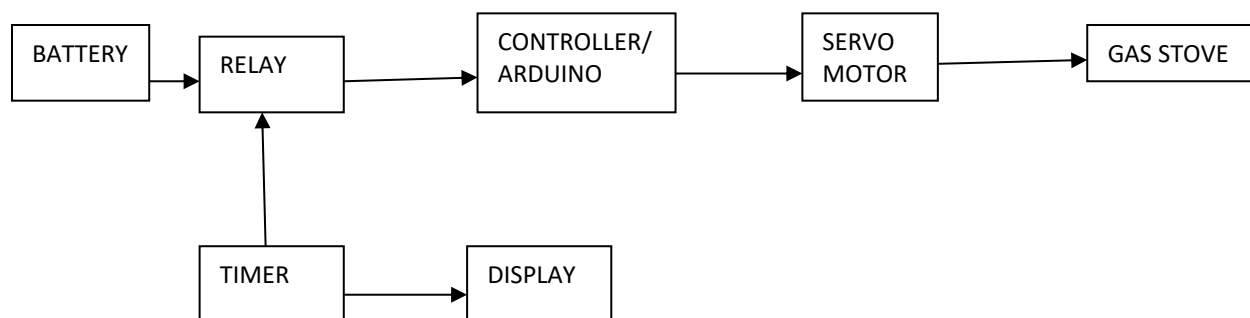
COLLEGE	ABES ENGINEERING COLLEGE, GHAZIABAD
GUIDE	MS SHILPA SHAMBI
COLLEGE STUDENTS	AGAM SACHDEV, ANSHUL TYAGI
SCHOOL STUDENTS	KANIKA NEGI, PRACHI
SCHOOL	GOVT. SARVODAYA KANYA VIDYALAYA, NO-2, SHAKARPUR, DELHI

INTRODUCTION:

As we generally see in our homes, during cooking when the food is preparing and we involves in doing another work as well, so we forgot to close the knob of the gas stove, which will lead to mishappening.

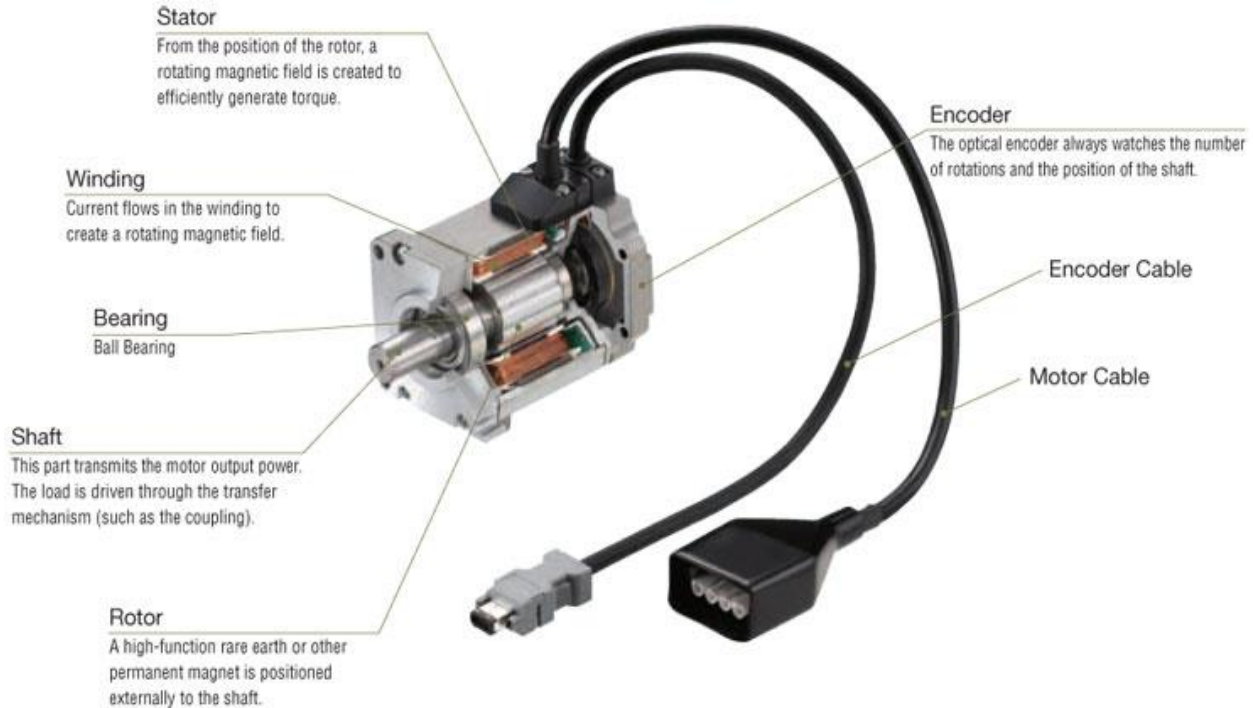
So, our project is a solution to this problem. We design a circuit which automatically switch off (close) the knob of the gas stove. It may also reduce the expenditures on the fuel. In which we use basic electrical and electronics concepts like control system etc. and electrical and electronics devices like relays, motors, Microcontroller, etc. We can use this device as a safety device in our homes.

BLOCK DIAGRAM:



SERVOMOTOR:

A servomotor is a [rotary actuator](#) or [linear actuator](#) that allows for precise control of angular or linear position, velocity and acceleration. It consists of a suitable motor coupled to a sensor for position feedback. It also requires a relatively sophisticated controller, often a dedicated module designed specifically for use with servomotors.



1) DC Servo Motor

The motor which is used as a DC servo motor generally have a separate DC source in the field of winding & armature winding. The control can be archived either by controlling the armature current or field current. Field control includes some particular advantages over armature control. In the same way armature control includes some advantages over field control. Based on the applications the control should be applied to the DC servo motor. DC servo motor provides very accurate and also fast respond to start or stop command signals due to the low armature inductive reactance. DC servo motors are used in similar equipment and computerized numerically controlled machines.

2) AC Servo Motor

AC servo motor is an AC motor that includes encoder is used with controllers for giving closed loop control and feedback. This motor can be placed to high accuracy and also controlled precisely as compulsory for the applications.

Frequently these motors have higher designs of tolerance or better bearings and some simple designs also use higher voltages in order to accomplish greater torque. Applications of an AC motor mainly involve in automation, robotics, CNC machinery, and other applications a high level of precision and needful versatility.

WORKING PRINCIPLE OF SERVOMOTOR:

A unique design for servo motors is proposed in controlling the robotics and for control applications. They are basically used to adjust the speed control at high torques and accurate positioning. Parts required are motor position sensor and a highly developed controller. These motors can be categorized according the servo motor controlled by servomechanism.

If DC motor is controlled using this mechanism, then it is named as a DC servo motor. Servo motors are available in power ratings from fraction of a watt to 100 watts. The rotor of a servo motor is designed longer in length and smaller in diameter so that it has low inertia.

ARDUINO:

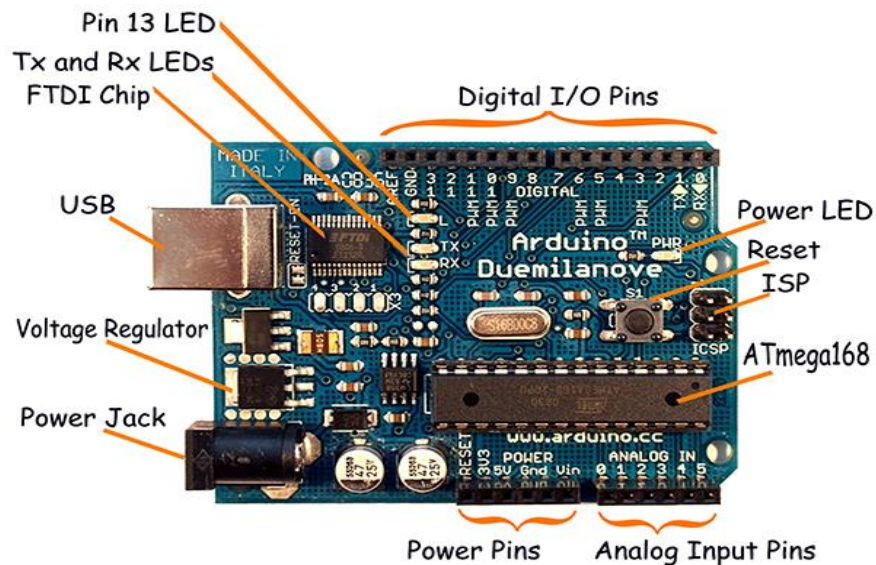
Introduction

Arduino is an open-source platform used for building electronics projects. Arduino consists of both a physical programmable circuit board (often referred to as a microcontroller) and a piece of software, or IDE (Integrated Development Environment) that runs on your computer, used to write and upload computer code to the physical board.

The Arduino platform has become quite popular with people just starting out with electronics, and for good reason. Unlike most previous programmable circuit boards, the Arduino does not need a separate piece of hardware (called a programmer) in order to load new code onto the board -- you can simply use a USB cable. Additionally, the Arduino IDE uses a simplified version of C++



WHAT'S ON THE BOARD?



There are many varieties of Arduino boards that can be used for different purposes. Most Arduinos have the majority of these components in common:

Power (USB / Barrel Jack)

Every Arduino board needs a way to be connected to a power source. The Arduino UNO can be powered from a USB cable coming from your computer or a wall power supply that is terminated in a barrel jack. In the picture above the USB connection is labeled (1) and the barrel jack is labeled.

The USB connection is also how you will load code onto your Arduino board. More on how to program with Arduino can be found in our Installing and Programming Arduino tutorial.

Pins (5V, 3.3V, GND, Analog, Digital, PWM, AREF)

The pins on your Arduino are the places where you connect wires to construct a circuit probably in conjunction with a breadboard and some wire. They usually

have black plastic 'headers' that allow you to just plug a wire right into the board. The Arduino has several different kinds of pins, each of which is labeled on the board and used for different functions.

1. **GND** : Short for 'Ground'. There are several GND pins on the Arduino, any of which can be used to ground your circuit.
2. **5V & 3.3V** : As you might guess, the 5V pin supplies 5 volts of power, and the 3.3V pin supplies 3.3 volts of power. Most of the simple components used with the Arduino run happily off of 5 or 3.3 volts.
3. **Analog** : The area of pins under the 'Analog In' label (A0 through A5 on the UNO) are Analog In pins. These pins can read the signal from an analog sensor (like a temperature sensor) and convert it into a digital value that we can read.
4. **Digital** : Across from the analog pins are the digital pins (0 through 13 on the UNO). These pins can be used for both digital input (like telling if a button is pushed) and digital output (like powering an LED).
5. **PWM** : You may have noticed the tilde next to some of the digital pins (3, 5, 6, 9, 10, and 11 on the UNO). These pins act as normal digital pins, but can also be used for something called Pulse-Width Modulation (PWM). We have a tutorial on PWM, but for now, think of these pins as being able to simulate analog output (like fading an LED in and out).
6. **AREF** : Stands for Analog Reference. Most of the time you can leave this pin alone. It is sometimes used to set an external reference voltage (between 0 and 5 Volts) as the upper limit for the analog input pins.

Reset Button

Just like the original Nintendo, the Arduino has a reset button. Pushing it will temporarily connect the reset pin to ground and restart any code that is loaded on the Arduino. This can be very useful if your code doesn't repeat, but you want to test it multiple times. Unlike the original Nintendo however, blowing on the Arduino doesn't usually fix any problems.

Power LED Indicator

Just beneath and to the right of the word "UNO" on your circuit board, there's a tiny LED next to the word 'ON'. This LED should light up whenever you plug your

Arduino into a power source. If this light doesn't turn on, there's a good chance something is wrong. It is time to re-check your circuit.

TX RX LEDs

TX is short for transmit, RX is short for receive. These markings appear quite a bit in electronics to indicate the pins responsible for serial communication. In our case, there are two places on the Arduino UNO where TX and RX appear, once by digital pins 0 and 1, and a second time next to the TX and RX indicator LEDs.

These LEDs will give us some nice visual indications whenever our Arduino is receiving or transmitting data (like when we're loading a new program onto the board).

Main IC

The black thing with all the metal legs is an IC, or Integrated Circuit. Think of it as the brains of our Arduino. The main IC on the Arduino is slightly different from board type to board type. This can be important, the IC type (along with your board type) before loading up a new program from the Arduino software. This information can usually be found in writing on the top side of the IC.

Voltage Regulator

The voltage regulator is not actually something you can (or should) interact with on the Arduino. But it is potentially useful to know that it is there and what it's for. The voltage regulator does exactly control the amount of voltage that is let into the Arduino board. It as a kind of gatekeeper; it will turn away an extra voltage that might harm the circuit. Of course, it has its limits, Arduino to anything greater than 20 volts.

HARDWARE AND SOFTWARE COMPONENTS:

- ARDUINO UNO MICROCONTROLLER
- C programming
- PCB
- RELAY
- TIMER
- SEVEN SEGMENT DISPLAY
- GAS STOVE

OBJECTIVE AND SCOPE:

We design a circuit which automatically switch off (close) the knob of the gas stove. In which we use basic electrical and electronics concepts like control system etc. and electrical and electronics devices like relays, motors, Microcontroller, etc. We can use this device as a safety device in our homes.

It captures both Urban and Rural areas because everyone use gas stove, so that the first thing which comes in our mind is safety. It may also reduce the expenditures on the fuel (LPG), also saves energy and food.

COST OF THE PROJECT:

The model focuses on energy efficiency and resources conservation. It reduces the wastage of food and provides safety occurring due to fire explosion in the kitchen.

In real time, the implementation of the AUTO SWITCHING OF THE GAS STOVE comes out to be in FIVE THOUSAND RUPEES ONLY (including microcontroller, servomotor, gas stove)

OUTCOME:

The outcome of this project, saves energy and food and to avoid mishappening like fire explosion. The purpose of this model is to provide safety system and also saves the food which can useful to others.

2. WATER PURIFICATION USING SUNLIGHT

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COLLEGE STUDENT	LAKSHYA BHARDWAJ
SCHOOL STUDENTS	SATENDRA, KRISHNA
SCHOOL	COMPOSITE SCHOOL, LATHMAAR COLONY, GHAZIABAAD

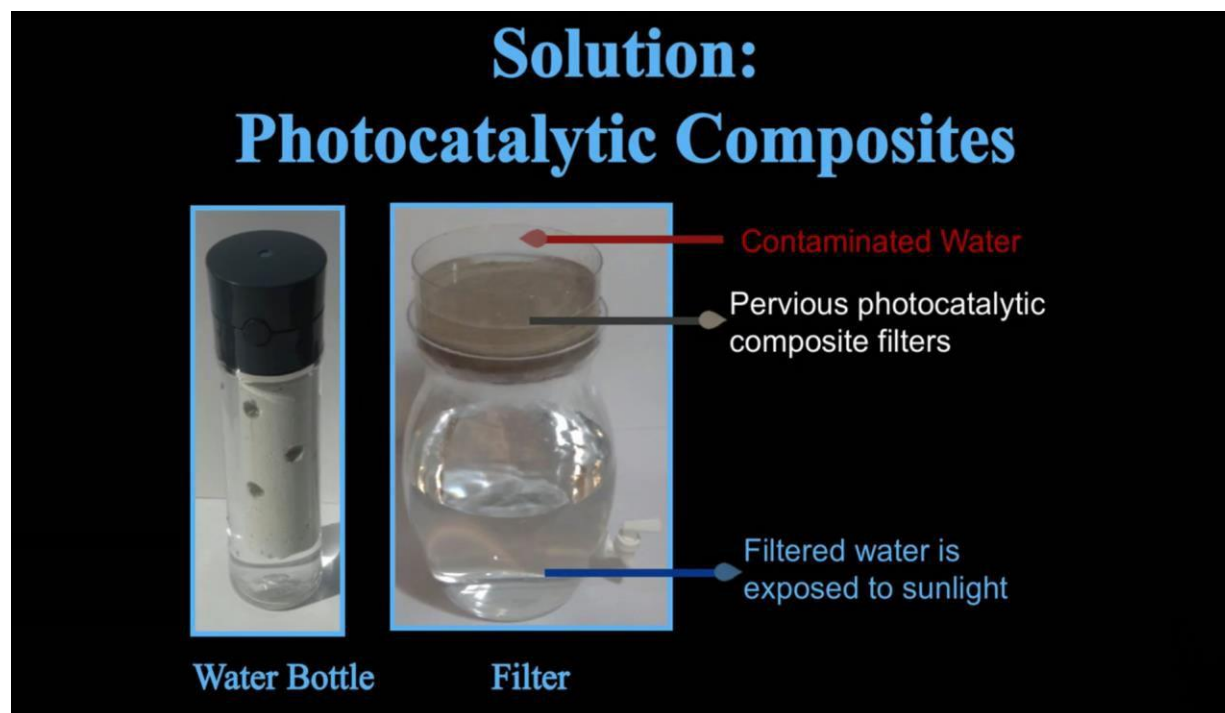
ABSTRACT:

As we strive for a green and environmentally-friendly world, conventional techniques for water purification must move towards green and sustainable alternatives. Realizing this need for eco-friendly, sustainable, cost-effective, and efficient water purification systems, the proposed project consists of lightweight and settable photocatalytic compositions, comprised of photocatalysts, sand, and a hydraulic cementing binder. We have also developed methods to deploy and use the lightweight and settable photocatalytic composition in systems for purifying water. The photocatalyst used in the lightweight and settable composition may be either a single photocatalyst or combination of photocatalysts, which are selected from a wide range of such materials.

INTRODUCTION:

Access of safe drinking water was declared as a human right by the United Nations but remains a challenge for rural and urban India. Depleting ground water, lack of proper rainwater harvesting and rising contamination in the ground water due to sewage and industrial effluent discharge is posing fresh challenges for the Indian cities, especially in low-income or resettlement colonies, which are struggling to get safe and affordable water.

This project is all about lightweight and settable photocatalytic compositions and solid composites and their use in water purification. The compositions are comprised of photocatalysts such as titanium dioxide (TiO₂) and zinc oxide (ZnO), sand, and a hydraulic cementing binder.



The lightweight and settable photocatalytic compositions can be formed into lightweight photocatalytic solid composites and structures by mixing with water and moist curing.

We've also used relatively simple, fast, and cost-effective methodologies to photodope the TiO₂ - ZnO compositions and composites with silver (Ag), to enhance and extend the photocatalytic activity from the ultraviolet into the visible light spectrum. The lightweight and settable TiO₂-ZnO and Ag-TiO₂-ZnO compositions are used in making solids, structures, coatings, and continuous or semi-continuous water purification panels for purifying contaminated water.

SALIENT FEATURES:

- Relatively much faster water purification than other similar methods
- High overall efficiency of bacterial deactivation
- Also does the organic degradation in water
- Has almost infinite lifetime
- Only requires sunlight to perform water purification

- No use of harmful materials in its making
- Highly cost-effective and cheaper
- Can be easily deployed anywhere in any size and shape

OBJECTIVE AND SCOPE:

There are mainly 2 types of impurities in water drinking systems and reserves.

- Biological impurities
- Colloidal Impurities.

Biological impurities in water are caused by the presence of living organisms. These include algae, protozoa, pathogens, bacteria, viruses, microbes, and parasites in contaminated water.

Colloidal impurities in water include organic waste products and amino acids. This problem occurs due to contact with suspended matter and elements like sand, rocks and organic matter flowing in rivers, streams and lakes that renders water undrinkable or non-pure.

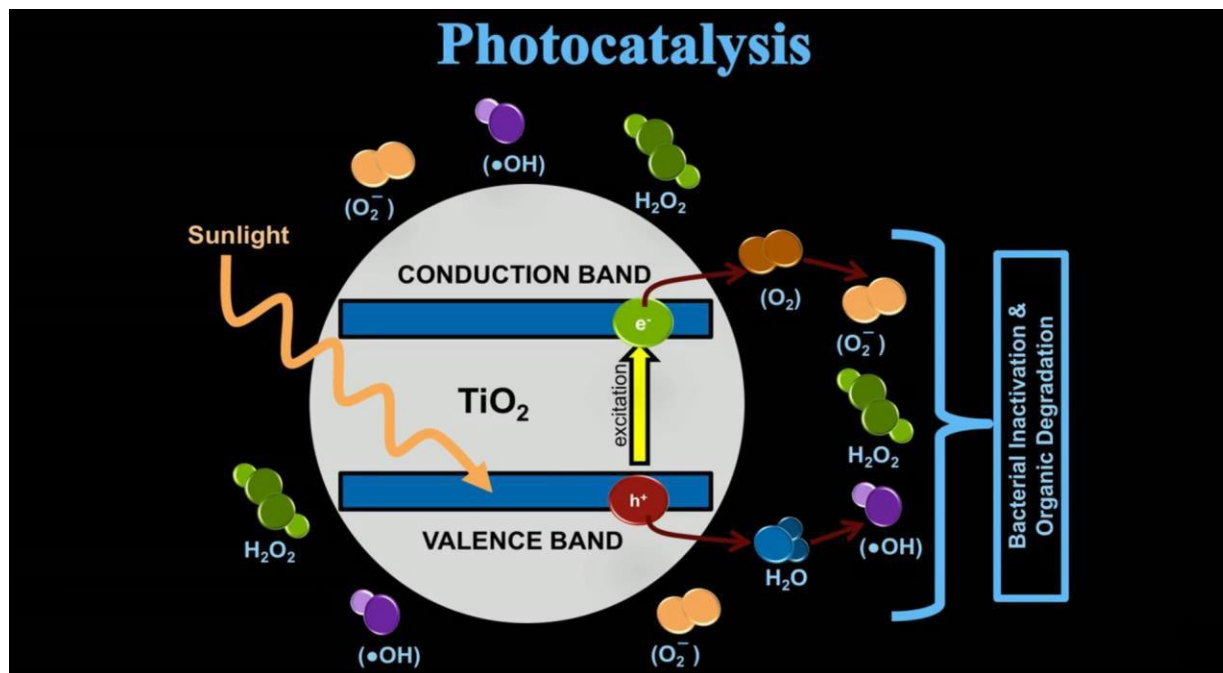
Ultraviolet radiation from the sun (UV-A, wavelength of 315-400 nm) is a safe and cost-effective means to purify water infected by microbiological pathogens such as bacteria. Since the more harmful UV-B and UV-C radiation from the sun are blocked by the atmosphere, solar disinfection, commonly referred to as SODIS, that primarily uses UV-A radiation is very slow. In recent years photocatalysts such as TiO₂ and ZnO, have been used to accelerate the photocatalytic SODIS process.

Supporting 16% of the world's inhabitants is daunting enough, but it is even more so when recognizing that population is crammed into an area one-third the size of the United States. Then consider that India only possesses 4% of the world's fresh water and the crisis can be more fully realized. In rural as well as urban areas, this solution can be easily implemented and is very much needed as early as possible.

METHODOLOGY:

A photocatalyst is a substance, that when activated by light radiation (UV-A radiation and/or visible light, in the present invention), increases the Rate of a

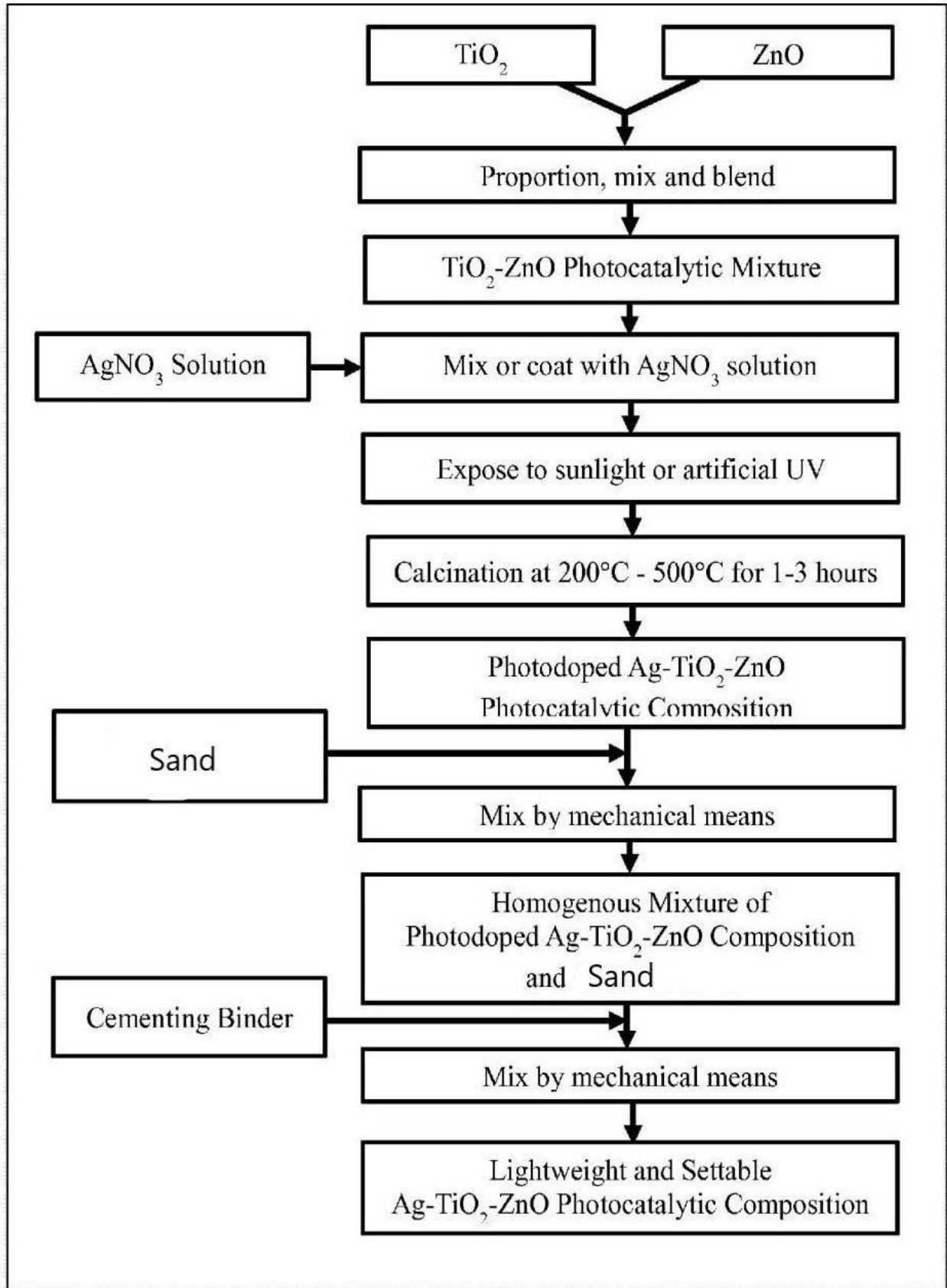
reaction, without itself being consumed in the reaction. Anatase crystalline TiO_2 and ZnO are photocatalysts that are activated by UV-A radiation from the sun. Doping TiO_2 with Ag is known to extend the photocatalytic range of TiO_2 , from UV into the visible light spectrum. Ag is also a well-known bactericide that can aid in water purification.

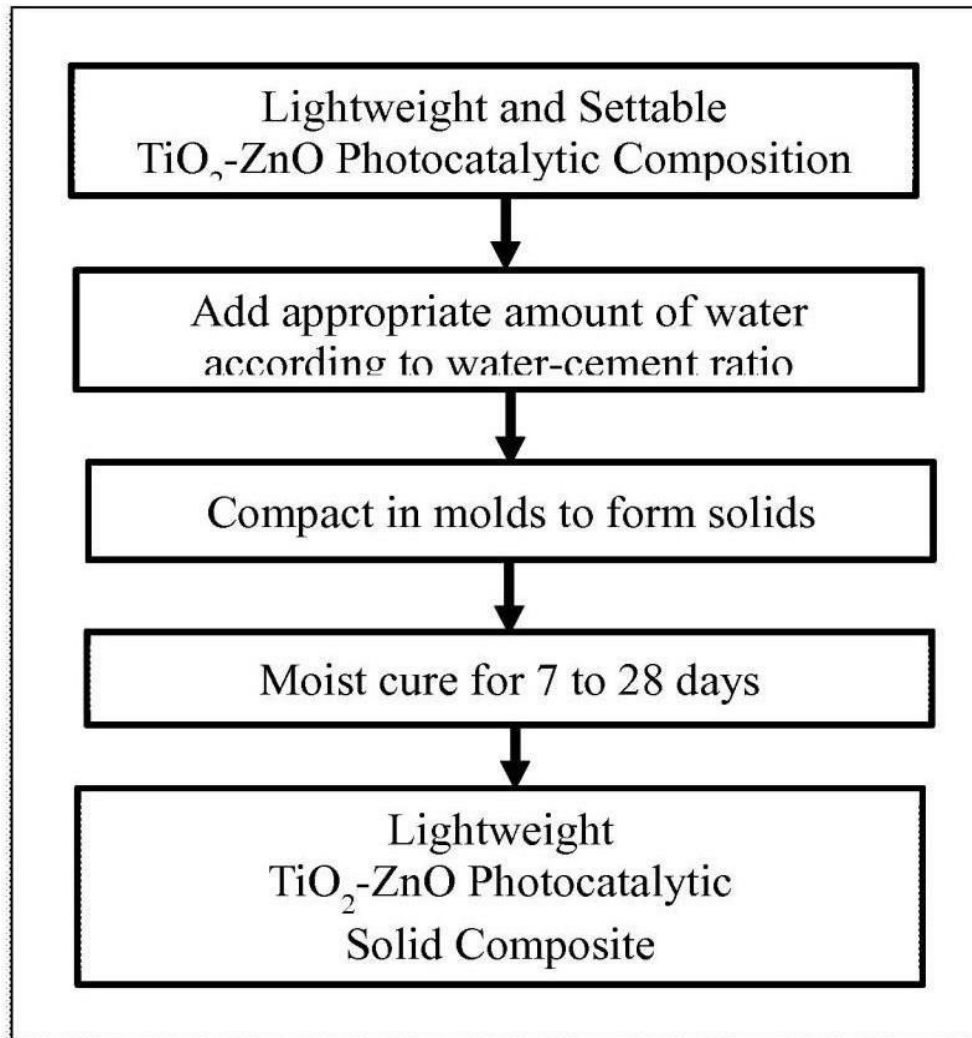


When UV-A radiation strikes these photocatalysts, electrons from the valence band are energized into the conduction band (e^-) thereby leaving holes or positive charges in the valence band. Some of the electrons and holes may recombine, but most combine with oxygen and water to create reactive oxygen species such as super oxides (O_2^-), hydroxyl radicals ($\bullet\text{OH}$) and hydrogen peroxide (H_2O_2).

These reactive species are responsible for the photo-killing of bacteria, reduction of heavy metals, and oxidation (and degradation) of organics into harmless species. The highly reactive oxygen species destroy pathogens by damaging cellular membranes, lipids, proteins and mitochondria. They also disrupt their DNA, alter their structure and prevent them from replicating.

Below here is the block diagram of the manufacturing of our entire photocatalytic composition giving us the final composite -





Basic Components Required:

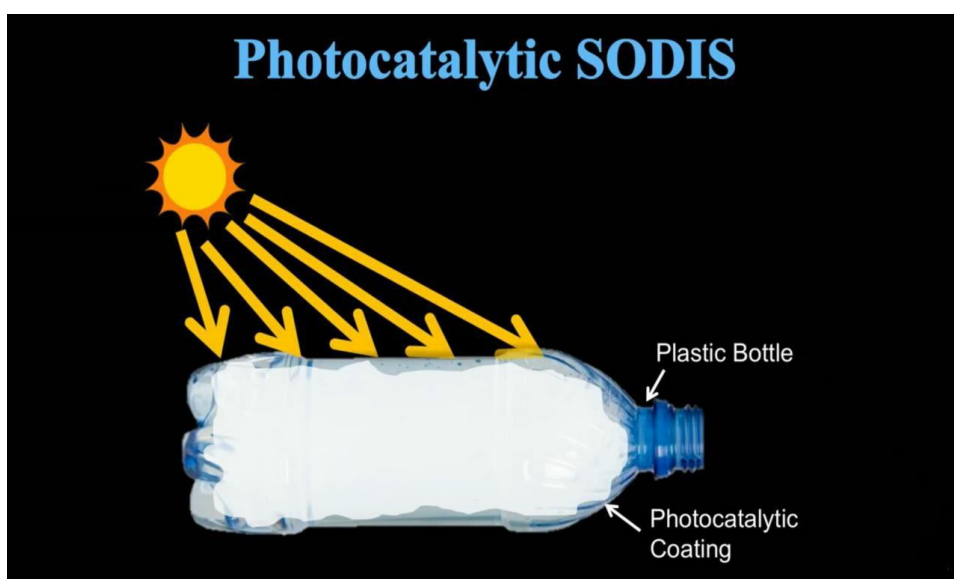
- Zinc Oxide (ZnO)
- Titanium Dioxide (TiO₂)
- Silver Nitrate (AgNO₃)
- Sand
- Cement
- Deionized Water
- Tubular Furnace

- Mortar & Pestle
- Beakers and flasks
- Ceramic boats or brick

Comparative Study:

Current water purification techniques include filtration, chemical means such as chlorination, ozonation, aeration, reverse osmosis, and ultraviolet (UV) radiation using UV-C lamps (operating at wavelength in the range 100-280 nm). Some of the above for mentioned water purification techniques use lamps and require electricity to operate, some use slow physical separation processes, and others use chemicals that generate compounds leading to secondary pollution and even leave water with a bad smell and after taste. There is a pressing need for green, sustainable, easy to use, inexpensive and effective technologies for water purification.

The conventional SODIS process used at most of the places is also very slow and ineffective. The use of photocatalysts during these processes is done in an incorrect way, as in most of the cases, the photocatalysts such as TiO_2 and ZnO mix with water and people end up drinking them, which does not fulfil our main purpose. This composite solves this problem effectively by blending its right proportions with the cementing binder.



Cost of the Project:

The cost of the composite disc will vary depending upon its size, but due to its almost infinite lifetime, the total usable cost will be almost negligible. Materials used for mechanical filtration are almost easily accessible and are free of cost. So poor people can easily use this filtration system at almost negligible cost to purify water, just using sunlight.

Our proposed idea is a perfect solution, as it solves the problem of water purification at a very cheaper rate. It can be easily implemented anywhere at smaller or larger scale, depending on the requirement.

We can easily change the components of our sediment filter after a certain period of time and usage. Composite disc doesn't get decomposed and has a very longer life, so we don't need to worry about it.

For making a small disc to be placed in a beaker or similar size pellets (inclusive weight-20gm) will cost less than two hundred rupees. The long term cost is almost negligible as its lifetime is almost infinite.

Social Impact:

The lightweight photocatalytic solid composites developed using this idea can be easily deployed in several different ways to avoid the drawbacks of conventional TiO_2 enhanced SODIS methods (namely the blocking of UV rays and washing off after repeated use).

In one embodiment, various substrates or solids can be coated with the lightweight and settable photocatalytic compositions and may be placed in contact with contaminated water in vessels or containers that are transparent to UV and visible light (such as PET water bottles), and exposed to sunlight or artificial, until the contaminated water is purified.



In another embodiment, lightweight photocatalytic concrete water tanks may be constructed with the lightweight and settable photocatalytic composition mixed with concrete, or existing water tanks can be coated with the light-weight and settable photocatalytic composition. Contaminated water may then be treated in the photocatalytic tanks by exposure to sunlight (or artificial light) to purify water, before use, or even before being discharged to lakes, streams, rivers and other water bodies. This could reduce the use of harsh chemicals for treating water.

In yet another embodiment, the lightweight photocatalytic solid composite can be deployed in a continuous or semi-continuous water purification system that could be built as a small residential point-of-use system, or built on a larger scale for batch water purification. A photocatalytic water purification panel can be constructed out of UV and visible light transparent tubes such as PETG, acrylic, glass, or any other tubes that are transparent to UV and visible light.

Conclusion:

Water treatment is often necessary if surface water supplies, and sometimes groundwater supplies, are to be available for human use. Because the vast majority of cities use one water distribution system for households, industries, and fire control, large quantities of water often must be made available to satisfy the highest use, which is usually drinking water.

With this water purification method, we can provide clean drinking water at small or even large scale to the people in need. Subsequent exposure of the water to sunlight inside beaker containing composite disc will result in complete deactivation of coliform bacteria and degradation of organics. We can form these composite discs in any shape and size that we want, so we can also use them in water tanks to clean large amount of water within a few hours, simply using sunlight.

3. WILDFIRE PREDICTION AND DETECTION

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SCHOOL STUDENTS	AASMIN, ANJALI
SCHOOL	COMPOSITE SCHOOL , LATHMAR COLONY, GHAZIABAD

ABSTRACT:

Worried about the devastating conditions of AMAZON FORESTS? Do you want to take preservative steps to protect such a beautiful and dense forest? Destructive wildfires result in billions of dollars in damage each year and are expected to increase in frequency, duration, and severity due to climate change. The current state-of-the-art wildfire spread models rely on mathematical growth predictions and physics-based models, which are difficult and computationally expensive to run. The main aim of this project is to save wildlife or forest from initiating the wildfires. Though forest fires are natural process but taking the case of the current situation global warming is the major cause for the survival of life and forest fires are one of the huge issues to make the temperature increases by huge amount which intern increases the global warming

INTRODUCTION:

Wildfire is a complex phenomenon but it can be predicted before it can occur using the past data on the moisture content of wildlife area and the wildfire that took place in the past.

When the moisture content of the downed branches and leaves in the forest is 0 percent, it is categorized as dead fuel. When fuel moisture content is high, fires do not ignite readily, or at all, because most of the fire's heat energy is used up trying to evaporate and drive water from the plant for it to burn. When the fuel moisture content is low, fires start more easily and can spread rapidly, as all of the heat energy goes directly into the burning flame itself.

The predicted system will be integrated with the local condition to get a better predicted score for the upcoming wildfire .In case; our system predicts any chances of wildfire the system would send an alarming message to the concerned authorities to prevent any chances of wildfire.

SALIENT FEATURES:

1. Sensors based monitoring(IR and Level)
2. Live Streaming of the data
3. Automated alert
4. Good wireless range
5. IOT based
6. Machine Learning used
7. Less cost of installation
8. Less maintenance cost
9. Live monitoring of fire through camera
10. Emergency alarms for the fire happenings
11. Live probability of the fire
12. Predicts the water consumption to extinguish fire

OBJECTIVE AND SCOPE:

The basic and general objective of the project is to protect the flora and fauna from going to the extinct, because they are only responsible for the balance in the food chain and also give much oxygen to the whole world.

Also to reduce the pollution in the society plants and trees are helping us that mean they are protecting us from the pollution and hazards, so they need to be implanted and protected immediately.

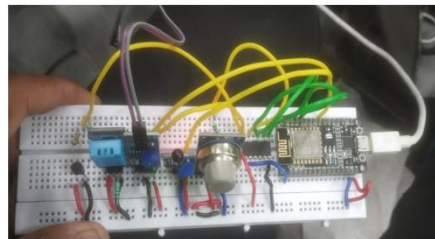
To gain the assurance of the sustainable development plant trees and protecting them from deforestation I the major issue in the day today life. Protecting trees is more important from the planting new trees.



One of the major causes for the issues that are stated above is forest fire and this will reduce the flora and fauna complete at an instant of time. So one has to take the major decisions to protect them.

The proposed model and device will predict and detect the wildfires and give alert to the concerned authorities of the prediction of the wildfire. Every year millions of acres of land burst in the forest fire also some species that are not invented yet can also sometimes burst in the fires caused there,

The model also gives the predicted water consumption for the burned forest. So to reduce the water consumption to extinguish the fire. And to detect the fire in that area 24hr surveillance from the cameras is also implemented at the forest.



METHODOLOGY:

A. Collecting Data

Collecting data of about 50 years of wildfire data from a government source and also collecting actual wildfire data from a small real time prototype using Arduino and temperature, humidity as well as moisture sensors. Soil moisture sensor will be used for collecting data related dead fuel moisture.

B. Pre Processing and Feature Engineering

This is an approach in which data set is pre-processed and analyzed to generate pattern and summarize the main characteristics by visual methods such as graphical or tabular representation and based on available old features and the domain knowledge of data,

C. Training and Prediction

Features are given as input to train the intelligent system which works on the concept of classification model like XGBoost model or other models like XGBClassifier which also enables us to include other features like precipitation, humidity, temperature etc. Now after training the machine, an area wise prediction about the chances of wildfire is done. Based on the value produced by trained machine the prediction of wildfire can be done and the output values are stored in the database for further use.

D. Collecting actual values

A setup that will help to collect real time values of moisture(of dead fuel) and some other factors affecting wildfire like Humidity, Temperature and soil moisture will be measured and fed to the machine learning model from time to time. In order to increase the accuracy of our prediction this step is crucial since it helps to predict future values of wildfire probability based on the most recent correct observed values.

E. Developing an Easy to use Interface (Web/App)

After all these steps an easy to use interface will be developed so that the concerned authorities will be able to use these predictions to prevent any upcoming disaster. This interface will allow them to initiate strict actions sitting anywhere. This simple app can also be used to alert any nearby living locals so that even they can know about any chances of upcoming wildfire which would have cost their lives.

Experiment:

Since wildfire is a complex phenomenon, it does not depend entirely only on the previous year of data. Various other factors like temperature, atmospheric pressure, soil moisture, humidity etc also plays a prominent role in determining the rainfall.

BMP-180 Pressure Sensor

A pressure sensor can detect atmospheric pressure and temperature. This project uses these sensors to record atmospheric pressure.

DHT11 Humidity Sensor

DHT11 sensors can be used to record the humidity at a particular place. It is easily available and cheap and thus can be for recording the value humidity at regular interval of time.

LM35 Temperature Sensor

DHT11 sensors can be used to record the temperature at a particular place. It is easily available and cheap and thus can be for recording the value temperature at regular interval of time.

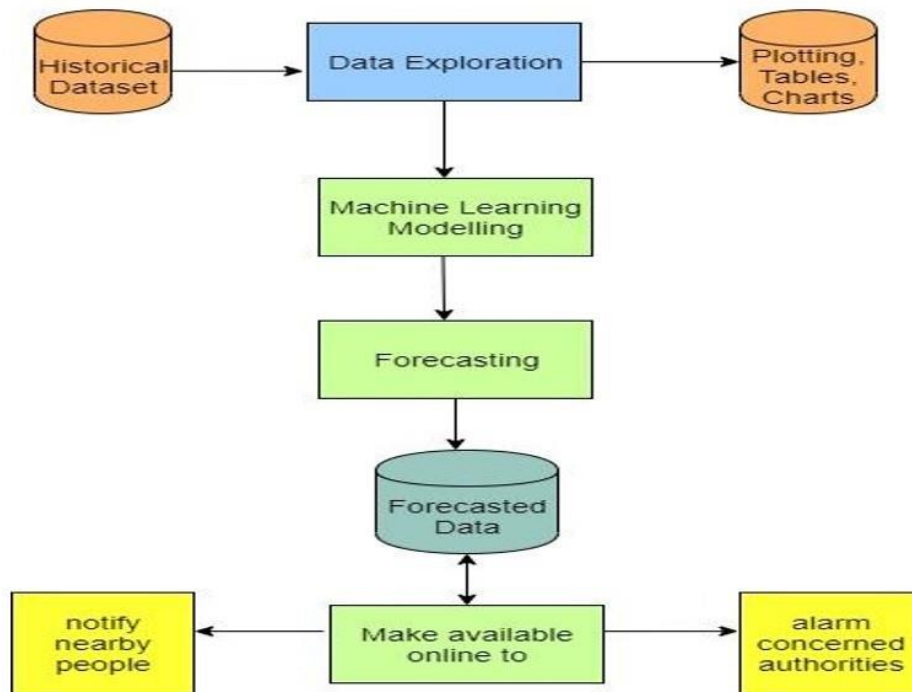
Soil Moisture Sensor

This sensor measures the moisture in the soil and moisture content of the downed branches and leaves. When connected to Arduino or a similar device However they have a shorter lifespan.

Node MCU

Node MCU designs use a variety of microprocessors and controllers. The boards are equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits. The boards feature serial communications interfaces, including Universal Serial Bus (USB) on some models, which are also used for loading programs from personal computers. The micro controllers are typically programmed using a dialect of features from the programming languages C and C++. In addition to using traditional compiler tool chains, the Arduino project provides an integrated development environment (IDE) based on the processing language project.

FLOWCHART:



COST OF THE PROJECT:

The focus area is Wildlife and forests and the environmental issues like pollution.

The device includes all the necessary sensors ICs and microcontrollers for the detection of the wildfire.

In the real time the cost of Fire prediction and detection device is eight hundred rupees only per device.

SOCIAL IMPACT:

Pollution is increasing day by day and which creates health issues and other chaos to the society.

Planting trees will help to reduce these risks to the society and the world too.

But moreover securing the trees and plants from deforestation and is one of the major cause to be worked on.

Water consumption for the fire to be extinguished can be predicted which also reduces the water supply and water consumption.

Prediction can also make the forest people aware about the forest fire so that they have the time to prepare themselves for the fire.

For further implications the alert can also be sent to the people living at that particular area.

Protection of flora and fauna is done.

CONCLUSION:

This project as a whole will predict the initial conditions which can lead to a devastating forest fire, which will be enormously helping to the forest authority or the rescue team to reach at that location.

In this way we will be able to protect our flora and fauna. Trees are the only source nowadays which can protect us from global warming and air pollution. This project at the large will help the forest department to reach the location and take necessary actions.

4. SAVE POLAR-USE SOLAR

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SCHOOL STUDENTS	TEENA, HEENA SONI
SCHOOL	GOVT. CO-ED SR. SEC. SCHOOL, PASCHIM VIHAR, DELHI

ABSTRACT

The proposed "USE SOLAR- SAVE POLAR" is an incorporative research model which is designed keeping in view the need to switch to alternative sources of energy. The mission is to establish India as a global leader in solar energy which was once initiated by Former Prime Minister Manmohan Singh in 2010. It is an innovative model which involves variation in different layers of a solar panel and incorporation of technologies like Quantum Technology and Nano Technology. It reduces maintenance cost thus being cost effective and provides higher efficiency.

KEYWORDS- Nano Technology, Quantum Technology, QDSC, SiO₂ and TiO₂ Nano-composite polymer

INTRODUCTION

All over the world there is significant increase in usage of Solar Energy. Solar energy is a renewable resource that embraces the three dimensions of sustainable development. It is truly a renewable source of energy and can be harnessed in all areas of the world. Also, we cannot run out of solar energy, unlike traditional sources of energy.

The overlapping aspects of sustainable development are: **Environmental, Economic, and Social**. Our proposed model 'SAVE POLAR-USE SOLAR' has got a self-explanatory title. Its primary aim is to save the earth by using the Renewable sources of energy rather than conventional sources of energy.

The project is economic and social in nature. It has got several advantages which is unbeatable such as **environment friendly, abundant & secure, grid independent, no dependence on fossil fuels** and **varied use**. The most important concern now-a-days is Global Warming, our project promotes “**GREEN & CLEAN ENERGY**”.

The project's principle is to:

- Increase efficiency.
- Reducing fossil fuel dependency.
- Lower utility bills.
- Increasing energy security.
- Pocket Friendly.

SALIENT FEATURES

The solar panel has following features:

1. Anti-fogging effect.
2. Self-cleaning tendency.
3. Increased efficiency.
4. High optical transmission.
5. Transparency.
6. Flexibility.
7. Excellent Durability.
8. Compact.
9. Reduced Cost.
10. High Voltage Generation.

OBJECTIVE AND SCOPE

Our model is generating solar energy with increased efficiency which has tremendous scope in India. The geographical location of India (a tropical country) stands to its benefit for generating solar energy. Since majority of population live in rural areas there is much scope for solar energy being promoted in these areas. This solar panel is boost to various projects such as “**The Jawaharlal Nehru National Solar Mission** “(JNNSM), Gujarat's pioneering solar power policy.

It has got various applications in both urban and rural sectors such as:

- Solar lanterns.
- Street lighting systems.

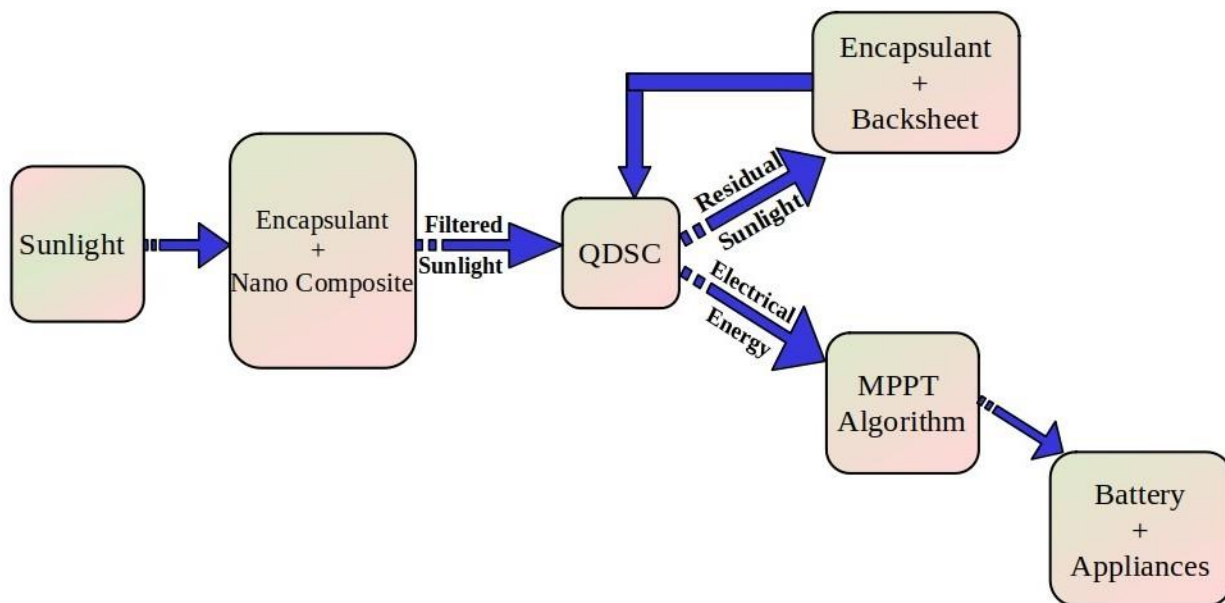
- Solar cars.
- Solar water pumps.
- Weather monitoring.
- Highway emergency call systems.
- Automatic meteorological station etc. in areas where it is difficult to lay power lines.
- Navigational signals
- Portable power sources for televisions, calculators, watches, computer card readers, battery charging and in satellites etc.

Thus, India as a developing country has massive plan for Solar Energy generation that may not only fulfill the deficit of power generation but also contribute largely in Green Energy Production to help to reduce the Climatic Changes globally.

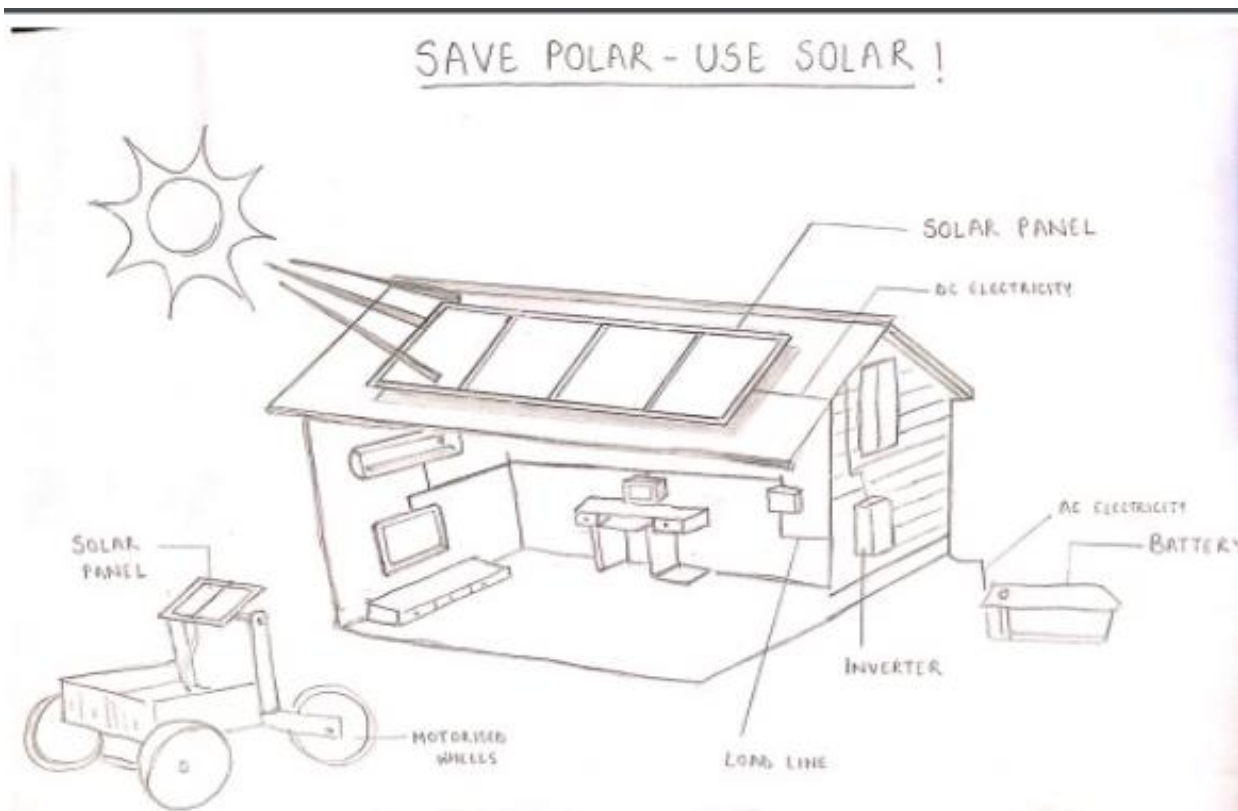
METHODOLOGY

To understand the architecture of the proposed system, a complete flowchart is drawn.

The Terms used in the flow chart are: MPPT (maximum power point tracking), QDSC (Quantum Dot Solar cell).



BASIC STRUCTURE OF SOLAR PANEL AND MODEL



HARDWARE COMPONENTS

1. Frame.
2. SiO₂ and TiO₂ Polymeric layer.
3. Encapsulant- PMMA/TiO₂ Nanocomposite.
4. Quantum Dot Solar cells.
5. Junction Box.
6. Generator.
7. Battery.

SOFTWARE AND TECHNOLOGICAL COMPONENTS

- Quantum Technology.
- Nano Technology.
- Matlab Algorithm.

COMPARITIVE STUDY

The proposed model is better than the existing systems on the following grounds:

- In the present scenario, the general Solar panel don't have self-cleaning tendency, generate low voltage, is unabridged, fog-dust accumulates time to time, low optical transmission. But in our model we have made various improvements such as:
 - Self-cleaning tendency as it is made up of nano composites.
 - Anti-fogging effect as we have used nano polymers.
 - Excellent Optical Transmission due to less reflection and absorption.
- In case of cloudy days, as the efficiency of our model is increased, it can provide electricity for more days then the existing model.
- To understand it in a better way, a tabular representation showing the advantages is drawn:

Features	Traditional System	Proposed System
Optical Transmission	Low	Moderate
Anti-fogging effect	NO	YES
Self Cleaning Tendency	NO	YES
Efficiency	Low	Moderate
Dust Accumulation	YES	NO
Voltage Generation	Low(110V)	High(220V)
Pocket Friendly	YES	NO

SOCIAL IMPACT

Our model's aim is to maximize the earth's resources and conserve them. Many social benefits can result from the use of solar energy.

Job Creation:

Workers needed to plan, develop and implement the project which will create numerous job opportunities thereby fulfilling the solar energy facilities to generate electricity and in turn help to decrease the unemployment rate.

Solar energy means healthier air:

Generating energy from solar panels emits very little pollution into the air, and thus solar energy is a much cleaner source of energy than the burning of fossil fuels. , if areas decide to use solar energy to generate electricity, the shift will help diminish the effects of global warming which in turn can make the citizens and workers more healthy.

Solar saves on gas and fuel:

The price of sunlight is zero. It is a renewable resource. Unlike fossil fuels, sunlight is never going away. One can count on it every day.

Solar saves life:

Renewable energy helps us at the times of need: The costs associated with climate change are growing and include rising health care costs, destruction of property, increased food prices and more. Wide scale adoption of solar and other renewable energy must continue so we can address the negative societal and economic impacts of dirty fossil fuels.

COST OF PROJECT

Cost of manufacturing of the existing model is around **one lac rupees**. After subsidies, it costs around **fifty thousand rupees**.

In our substitution model, nano technology is used which is comparatively cheaper and cost of manufacturing is less. The machinery cost of the existing model is higher than what we are presenting. Our model will cost around **seventy thousand rupees** which after subsidies will be around **thirty thousand rupees**.

Also according to the latest allocated budget towards solar sector is **3004 crore rupees**. Considering this we do have a big picture in front of us as India's potential to be a solar power driven country.

CONCLUSION:

We concluded that in energy deficient country like India, where power generation is costly, solar energy is the best alternate means of power generation. The Proposed model caters to these **FOUR** National missions namely:

MAKE IN INDIA – Automated machinery can be setup completely here.

RENEWABLE ENERGY – This is an inexhaustible source of energy and the best replacement to other non-renewable energies in India.

CLEAN INDIA – As the electricity generation is highly dependent on Thermal energy which generates Pollution, Our Model provides a solar alternative.

START-UP INDIA – Our Further plan for the model is not only a business plan but also will create job opportunities.

5. M.E.G TRAIN

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ABSTRACT:

M.E.G TRAIN means **MAGNETO ELECTRICITY GENERATIVE TRAIN**. It is an innovative project which is eco-friendly with low maintenance cost and it is an efficient way of generating and transmitting electricity. This project can be better alternative than other power generation methods like solar energy which has costly setup and has high cost maintenance. This will help us to produce electricity 24X7 hours from the train. And it can be setup at many places like Maharashtra which has almost 91 train tunnels, and also in Uttarkhand and Jammu & Kashmir which will have India's longest railway tunnel on Rishikesh-Karnprayag route (almost 15.1km long). This can help us to produce electricity in large amount and supply it to places where demand is more than supply. This project will also be a boost to our economy.

KEYWORDS – EMF (ELECTROMOTIVE FORCE), INDUCTION, MAGNETIC FIELD

INTRODUCTION:

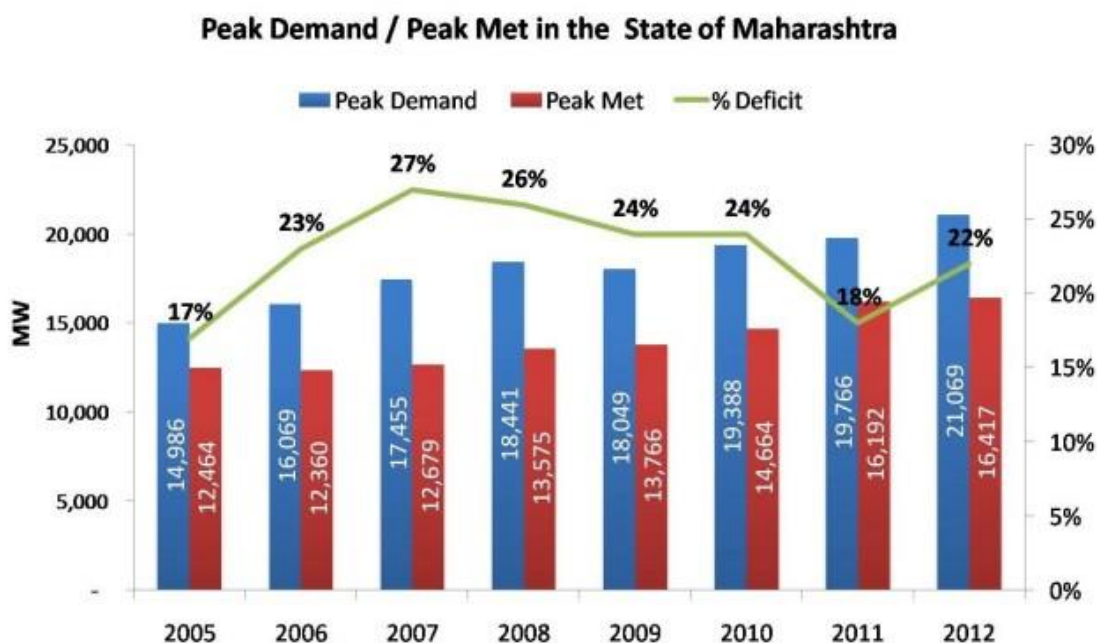
Due to the crucial condition which our country faces in power generation sector, this project focuses on generating power non-conventionally. Maharashtra, the largest power generating state of India, suffers from power shortage as per the news of Times Of India dated on 10 October, 2018 that while daily demand of power stood at **19,500 MW** as of Monday, supply stood at **15,000 MW**, resulting in a shortfall of **4,500 MW**. And for Uttarakhand also as per the **Central Electricity Authority (CEA)**, the anticipated demand of the energy for Uttarakhand for the year 2011-12 is **10480 MU** and the available energy is **8363 MU**; while the peak demand of the state is 1600 MW and the availability is of **1430 MW**.

Not only in generating electricity, will this project be efficient in transmitting as well thus solving the major problem of electrical engineers. As the train can be used for transmitting electricity from one place to another, by storing energy generated in batteries and then transporting the batteries with help of trains

WHY IS THIS PROJECT REQUIRED IN INDIA?

Maharashtra, the largest power generating state of India ,suffers from power shortage

As per the news of *Times Of India* dated on 10 october,2018 that while daily demand of power stood at **19,500 MW** as of Monday, supply stood at **15,000 MW**, resulting in a shortfall of **4,500 MW** .



Coming soon: India's longest railway tunnel on Rishikesh-Karnprayag route

The rail link will connect pilgrimage towns Devprayag, Srinagar, Rudraprayag, Gauchar Karnprayag with five districts of Dehradun, Tehri Garhwal, Pauri, Rudrapryag and Chamoli.

The line will have 105 km or 85% of the project inside tunnels with a **15.1 km tunnel, longest in the country.**

Around 22% of electricity produced in India is lost in distribution

Data

Updated: July 10, 2018 05:19 PM IST

Odisha lost around 38.2 percentage electricity during distribution and transmission in May 2018, worst performance among all states for which data is available.

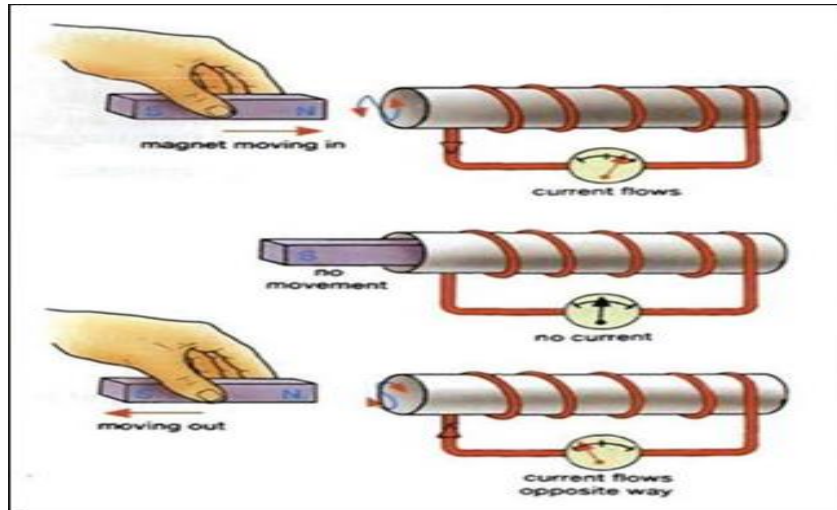
Odisha is followed by Madhya Pradesh (37.7 percentage) and West Bengal (31.44 percentage).

BENEFITS

- ❖ Generation of power unconventionally
- ❖ Eco friendly
- ❖ Energy produced will be transmitted to the industrial, commercial and household areas
- ❖ Low maintenance cost
- ❖ Reduces electricity bill
- ❖ Easy transmission
- ❖ Solution to the crisis of power generation
- ❖ Large area for setup not required
- ❖ Power generation at working time of the train , no additional input by train is required
- ❖ Weather independent unlike solar panels

WORKING PRINCIPAL: FARADAY'S LAW OF ELECTROMAGNETIC INDUCTION

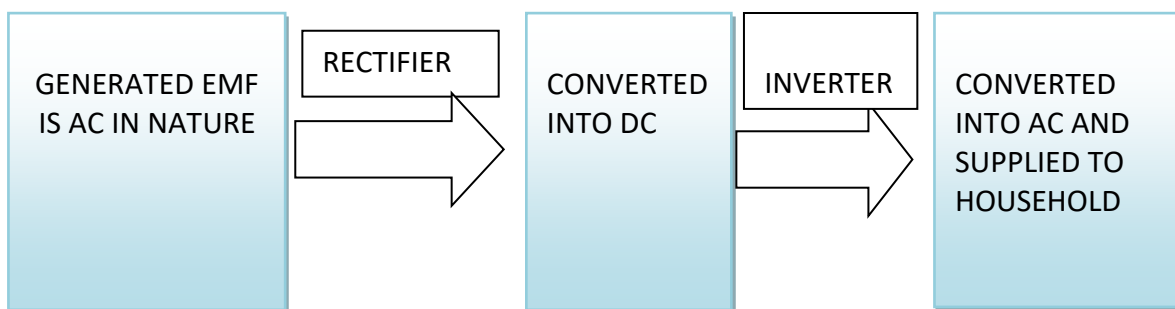
When a conductor is placed in rotating magnetic field then EMF is induced in the conductor by Faraday's law of electromagnetic induction. The direction of produced EMF is given by Fleming's right hand rule. It states that, when we put the conductor in the rotating magnetic field then first finger shows the direction of line of force, thumb indicates the direction of conductor motion & middle finger indicates the direction of induced EMF (or current) and the fingers are perpendicular to each other.



BASIC WORKING

By applying principal of electromagnetic induction power is generated when train passes through the tunnel , inside the tunnel coiling of copper wire is done and magnet is installed on the train , as the train moves inside the tunnel then emf (electromotive force) is generated .The electricity generated is ac (alternating in nature)with variable frequency so it is first converted into dc using rectifier and then converted from dc into ac using inverter as electricity supplied in household is AC. To prevent the magnetic properties affect the surroundings when the train is not inside the tunnel, a covering box with flaps is made of aluminium and inner layer is covered with rubber. The opening and closing of the flaps is controlled using arduino UNO microcontroller and stepper motor. When the train reaches near the tunnel the flaps are opened by pressing the button and when train exists from tunnel the flaps are closed by pressing button.

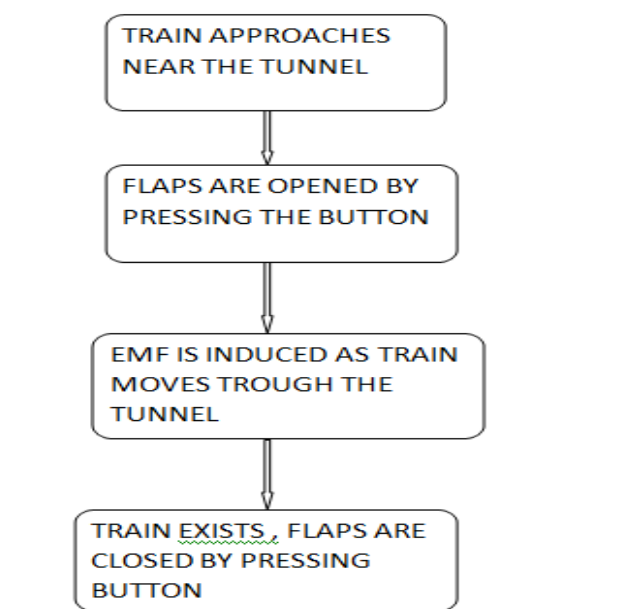
CONVERSION OF GENERATED ELECTRICITY



HARDWARE COMPONENTS USED

- ❖ ARDUINO UNO MICROCONTROLLER
- ❖ STEPPER MOTOR
- ❖ RECTIFIER
- ❖ INVERTER
- ❖ LED(Light Emitting Diode)
- ❖ BATTERY
- ❖ SWITCH
- ❖ 26-30 GAUGE ENAMELED COPPER WIRE
- ❖ NEODYMIUM MAGNETS

FLOWCHART FOR FUNCTIONING OF FLAPS



CONCLUSION

The project M.E.G TRAIN is not only innovative project but will prove to be revolutionary if carried out in future. As in India maglev trains will be running in future whose platform will be overhead and if we build tunnels on these platforms then we would be able generate massive amount of electricity and with transmission will be easy as trains could be used for transporting batteries(in which we store energy) and as in future we expect even cars and other vehicles to run on electricity and batteries , electricity will become more significant as everything be it cooking or transportation is slowing moving from petrol , LPG and diesel to using electricity and chargeable batteries and maybe in future more applications of electricity will be created.

6. HEART DISEASE DIAGNOSIS USING MACHINE LEARNING

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SCHOOL	GOVT. CO-ED SR.SEC. SCHOOL, PASCHIM VIHAR, DELHI

INTRODUCTION:

Cardiovascular disease (CVD) is increasing daily in this modern world. According to the World Health Organization (WHO), an estimated 17 million people die each year from cardiovascular disease, particularly heart attacks and strokes.

It is, therefore, necessary to record the most important symptoms and health habits that contribute to CVD. Various tests are performed prior to diagnosis of CVD, including auscultation, ECG, blood pressure, cholesterol and blood sugar. These tests are often long and long when a patient's condition may be critical and he or she must start taking medication immediately, so it becomes important to prioritize the tests.

Machine learning is now an emerging field due to the increasing amount of data. Machine learning makes it possible to acquire knowledge from a massive amount of data, which is very heavy for man and sometimes impossible.

OBJECTIVES AND SCOPE:

Machine learning has high potential for exploring the hidden patterns in the data sets of the medical domain. These patterns can be utilized for clinical diagnosis for widely distributed in raw medical data.

This ensures that the data is collected in an organized form. This collected data can be integrated to form a hospital information System. Data mining technology provides a user oriented approach to novel and hidden patterns in the data.

From the analysis of World Health Organization, they estimated 12 million deaths occur worldwide, every year due to the Heart diseases. If the disease is predicted well in advance, it can save a person before they enter the critical stage of the disease and can provide important insights to doctors who can then adapt their diagnosis and treatment per patient basis.

METHODOLOGY:

To initiate with the work, we can use different types of techniques and algorithms. In this paper, machine learning techniques are used to increase the accuracy rate. In machine learning technique we can use the following algorithm:

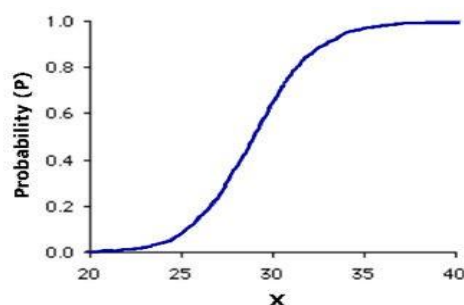
LOGISTIC REGRESSION:

Logistic Regression is a statistical analysis technique that is used for predicting the data value based on the prior observation of the data set. The logistic regression model predicts the dependent data variable by analyzing the relationship between one or more existing independent variables. Logistic Regression is one of the important tools for prediction, which can also be used for classifying and predicting the data based on the historical data.

This takes the real input values and output values between the 0 and 1 for logistic function. This is interpreted as taking log odds and having the output probability. Generally sigmoid function is used to map predictions to probability it is defined as: Logistic Function:

$$h_{\theta}(x) = \frac{1}{1 + e^{-x}}$$

x = test data features θ = coefficients



Whenever a test data is passed it calculates the value based on the parameters stored in the model. It calculates the probability of each class label. We return the maximum probability value of the class label x_i .

PROPOSED SYSTEM:

The main aim of the system is to compare and check various data sets of patients, collected by hospitals and other medical research facilities, and determine probability of the heart disease to a particular patient.

This is achieved by importing the data and splitting it into 2 parts:

1. Training set
2. Testing set

The proposed system should include data set that is classified into whether the patient has a heart disease or not according to the attributes present in the data. Next, the system will then import the training set and try to create a model, using logistic regression algorithm, which will try to predict whether a patient has a heart disease or not.

Once training has been completed and the model is completely prepared, we then apply this model to the testing set of the previously split data. The accuracy of model is then calculated, which will determine whether to implement this model for the purpose of prediction.

Now, once the model has been trained and tested we can utilize it to determine whether patients have a heart disease or not based on their medical reports and history.

DATA SET:

In this project, we use the heart disease data from machine learning repository of UCI. We have total 1025 instances of which 526 instances belonged to the healthy and 499 instances belonged to the heart disease. 14 clinical features have been recorded for each instance.

S. No.	CLINICAL FEATURES	ATTRIBUTES
1	Age (in years)	age
2	Sex (1 = Male ; 0 = Female)	sex
3	Chest Pain (1= typical angina; 2= atypical angina; 3=non-anginal pain; 4=asymptomatic)	cp
4	Resting Blood Pressure(in mm Hg on admission to the hospital)	trestbp
5	Serum Cholesterol in mg/dl	chol
6	Fasting Blood Sugar > 120 mg/dl (1: >120 mg/dl; 0: <120mg/dl)	fbs
7	Resting Electrocardiographic measurements (0 = normal; 1= ST-T wave abnormality; 2 = showing probable or definite left ventricular hypertrophy by Estes' criteria)	restecg
8	Maximum Heart Rate achieved	thalach
9	Exercise Induce Angina(1 = True; 0 = False)	exang
10	ST segment depression induced by exercise	oldpeak
11	Slope of peak exercise ST segment (1 = upsloping;2= flat; 3= down sloping)	slope
12	Number of major vessels(0-3 colored by fluoroscopy)	ca
13	Thalassemia (0= normal; 1= fixed defect; 2= reversible defect)	thal
14	Whether the person is suffering from heart disease or not (1 = True; 0 =False)	target

CONCLUSION:

There are different data mining techniques that can be used for the identification and prevention of heart disease among patients.

In this project, Logistic Regression with Newton's Conjugate Gradient classification algorithm is found to be the most suitable classifier to be used for prediction of heart disease due to its high accuracy in prediction of outcomes. In the future, we need to experiment with additional data mining and optimization techniques for the purpose of reduction of attributes required to predict the heart disease.

7. MAGIC FRUIT CLEANER

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ABSTRACT:

Our health is not dependent just on the food we eat, but also the products we use for home care. Because our skin absorbs these chemicals that interfere with body functions, increase body toxins and this leads to illnesses and diseases. There's a better and greener way to a cleaner home offered by nature. This natural method is simpler, more effective and pocket-friendly.

KEYWORDS-Bio-enzyme, fruit peels, cost-effective, eco-friendly, home cleaner

INTRODUCTION

One of the most worrying issues that the world is facing today is of water pollution. Industrial and household waste is dumped in lakes causing frothing of lakes and severely affecting the flora and fauna.

One kind of waste that is overlooked is the lethal chemicals present in floor cleaners, toilet cleaners and detergents used in day-to-day working of household and industries. They are insidious in their attack on the environment. Whether in minute quantities in terms of the residue left in the bottles or the larger amounts that are flushed every week, the toxins accumulate day after day and house by house.

An organic and environment-friendly way to fight it is to reuse the kitchen waste and produce in-house magical cleaner. This will help in replacing the commercially available cleaners for kitchens, bathrooms and household floors. Fruit peel magic cleaner is a natural alternative to the chemical cleaners. It is an organic solution produced by fermentation of fruits, vegetables, sugar, and water. This cleaner uses the good bacteria to digest wastes, soils, stains and bad odours. The bacteria do this by producing enzymes specifically designed to break down certain molecules (waste and soils) into smaller pieces.

Fruit peel magic cleaner is quite easy to make! The materials required are: Citrus fruit peels, Jaggery, water and a wide mouthed container.

Apart from being a low-cost natural cleaner, this magic potion also possesses powerful antibacterial properties. It is effective in the elimination of various pests that relentlessly attack orchards, vegetable gardens, and residential areas, and help in the fight against mosquitoes and flies. It is also a valuable organic fertilizer and harmless pesticide and herbicide. The use of this natural solution will contribute to the preservation of not only the environment but also the entire planet.



SALIENT FEATURES:

1. Cost effective
2. Eco-friendly
3. Pocket friendly
4. Toxin free
5. Bio-cleaner
6. Fruit enzymes
7. Maintenance free and easy to handle
8. Effective strong cleaner
9. Waste management

OBJECTIVE AND SCOPE

The **goal of the project** is to **create “natural alternative to the commercially available harmful cleaners”**.

BENEFITS OF YOUR PROJECT TO THE SOCIETY: An organic and environment-friendly way to fight it is to reuse the kitchen waste and produce in-house

cleaner. This will help in cutting down costs incurred due to purchase of various cleaners.

Currently, the commercially available cleaners are a cocktail of chemicals that are toxic for our health and environment. They cause indoor air pollution and also lead to several ill effects on health like – respiratory irritations, allergy, sneezing, watery eyes, headaches, asthma, skin infections, hormonal imbalances, chronic conditions like diabetes, thyroid and even cancer. They also impact the environment negatively. When washed down our drains, they end up polluting local water bodies and even contaminating ground-water quality. Further, buying these chemicals adds to the plastic wastage.

The proposed model is highly significant as it comprises of natural kitchen wastes like fruit and vegetable peels for making a bio-cleaner. It's an effective, natural and 100% safe alternative to regular household cleaners, bleach, phenol and other harmful chemical solutions. They are useful in wiping floors, kitchen countertop, washing bathrooms, disinfecting the toilet bowl, and many more.

METHODOLOGY :

The methodology of the proposed project is simple and easier.

1. Collect the kitchen wastes like vegetable peels or fruit/citrus peels.
2. 1:3:10: one part jaggery, three parts citrus peel, and ten parts water, by volume should be collected in the large air tight container and mix well.
3. Mark the date you started the process on the container and leave it in a dark place.
4. The solution will start fermenting – releasing gases. Just open the lid, release the accumulated gases.
5. Your fruit-enzyme will be ready three months from the start date.
6. Filter out the liquid and Bottle the fruit-enzyme in bottles and use it in place of your regular household cleaners.

TECHNICAL SPECIFICATIONS:

The proposed project requires air-tight container (12x12x12 cm) for the preparation.

COMPARITIVE STUDY

The proposed model is better than the existing systems as it is an efficient way to reuse the kitchen waste and replace the chemical cleaner in their homes

and society around them. Students will also learn about the technique of organic decomposition and production of enzymes.

Currently, the commercially available cleaners are a cocktail of chemicals that are toxic for our health and environment. They cause indoor air pollution and also lead to several ill effects on health like – respiratory irritations, allergy, sneezing, watery eyes, headaches, asthma, skin infections, hormonal imbalances, chronic conditions like diabetes, thyroid and even cancer. They also impact the environment negatively. When washed down our drains, they end up polluting local water bodies and even contaminating ground-water quality. Further, buying these chemicals adds to the plastic wastage we create

The proposed model is highly significant as it comprises of natural kitchen wastes like fruit and vegetable peels for making a bio-cleaner. It's an effective, natural and 100% safe alternative to regular household cleaners, bleach, phenol and other harmful chemical solutions. They are useful in wiping floors, kitchen countertop, washing bathrooms, disinfecting the toilet bowl, and many more. The model supports sustainable waste management and puts the peels to a better use by reusing them. The proposed idea is step towards contributing in the Govt. scheme “Swachh Bharat Abhiyan”.

COST OF THE PROJECT

The research model focuses on low-cost natural cleaner; this magic potion also possesses powerful antibacterial properties. It is effective in the elimination of various pests that relentlessly attack orchards, vegetable gardens, and residential areas, and help in the fight against mosquitoes and flies. It is also a valuable organic fertilizer and harmless pesticide and herbicide. It is significantly cost-effective, user friendly, eco-friendly and harmless.

In real time, the cost of the FRUIT PEEL MAGIC CLEANER comes out to be INR 25 for every 10 liters.

SOCIAL IMPACT:

This magic potion possesses powerful antibacterial properties. It is effective in the elimination of various pests that relentlessly attack orchards, vegetable gardens, and residential areas, and help in the fight against mosquitoes and flies. It is also a valuable organic fertilizer and harmless pesticide and herbicide. The use of this natural solution will contribute to the preservation of not only the environment but also the entire planet.

Another interesting variant of the model can be produced by adding fragrant flowers offered to deity the previous day. The addition of flowers has two-fold contribution, firstly, the flowers are being re-used and secondly, the cleaner has a scented fragrance.

Thus, the proposed model can be used as revenue generating, sanitation and a business model.

CONCLUSION:

The proposed model is highly significant as it comprises of natural kitchen wastes like fruit and vegetable peels for making a bio-cleaner. It's an effective, natural and 100% safe alternative to regular household cleaners, bleach, phenol and other harmful chemical solutions. They are useful in wiping floors, kitchen countertop, washing bathrooms, disinfecting the toilet bowl, and many more. The model supports sustainable waste management and puts the peels to a better use by reusing them. The proposed idea is step towards contributing in the Govt. scheme "**Swachh Bharat Abhiyan**".

8. DIAGNOSIS OF CANCER IN EARLY STAGE

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SCHOOL	GOVT SECONDARY SCHOOL, PRATAP NAGAR, JAIPUR

Abstract:

The project titled as “Diagnosis of cancer in early stage” is focusing on the detection of blood cancer at its initial stages.

The cancer is the genuine problem which requires to be curried at its early stages, so we focus on designing an electronic circuit which will be used to determine the electrical properties of the blood and hence can be used to show the magnitude of conductivity through the normal and cancer blood cells.

Circuit Equipment:

Microcontroller, Screen/Display, Electrodes, Rectifier, Diode, Resister, Capacitor, SMPS (AC to DC), Conductivity meter.

Introduction:

Cancer is the name given to a collection of related diseases. In all types of cancer, some of the body’s cells begin to divide without stopping and spread into surrounding tissues.

Cancer can start almost anywhere in the human body, which is made up of trillions of cells. Normally, human cells grow and divide to form new cells as the body needs them. When cells grow old or become damaged, they die, and new cells take their place.

When cancer develops, however, this orderly process breaks down. As cells become more and more abnormal, old or damaged cells survive when they should die, and new cells form when they are not needed.

Cancerous tumours are malignant, which means they can spread into, or invade, nearby tissues. In addition, as these tumours grow, some cancer cells

can break off and travel to distant places in the body through the blood or the lymph system and form new tumours far from the original tumour.

Unlike malignant tumours, benign tumours do not spread into, or invade, nearby tissues. Benign tumours can sometimes be quite large, however. When removed, they usually don't grow back, whereas malignant tumours sometimes do. Unlike most benign tumours elsewhere in the body, benign brain tumours can be life threatening.

Types of Cancer

There are more than 100 types of cancer. Types of cancer are usually named for the organs or tissues where the cancers form. For example, lung cancer starts in cells of the lung, and brain cancer starts in cells of the brain. Cancers also may be described by the type of cell that formed them, such as an epithelial cell or a squamous cell.

Common name of cancer

1. Blood Cancer
2. Brain Cancer
3. Lung Cancer
4. Oral Cancer
5. Breast Cancer
6. Colon and Rectal Cancer
7. Kidney Cancer
8. Leukaemia Cancer
9. Liver Cancer
10. Melanoma Cancer
11. Non-Hodgkin Lymphoma Cancer
12. Pancreatic Cancer
13. Prostate Cancer
14. Thyroid Cancer

Blood Cancer

Blood cancers affect the production and function of your blood cells. Most of these cancers start in your bone marrow where blood is produced. Stem cells in your bone marrow mature and develop into three types of blood cells: red blood cells, white blood cells, or platelets. In most blood cancers, the normal blood cell development process is interrupted by uncontrolled growth of an abnormal type of blood cell. These abnormal blood cells, or cancerous cells, prevent your blood from performing many of its functions, like fighting off infections or preventing serious bleeding.

There are three main types of blood cancers:

- **leukaemia**

This type of cancer found in your blood and bone marrow, is caused by the rapid production of abnormal white blood cells. The high number of abnormal white blood cells is not able to fight infection, and they impair the ability of the bone marrow to produce red blood cells and platelets.

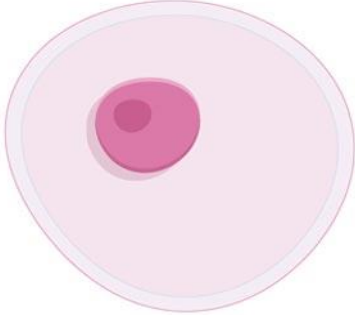

- **Lymphoma**

This type of blood cancer that affects the lymphatic system, which removes excess fluids from your body and produces immune cells. Lymphocytes are a type of white blood cell that fight infection. Abnormal lymphocytes become lymphoma cells, which multiply and collect in your lymph nodes and other tissues. Over time, these cancerous cells impair your immune system.

- **Myeloma**

This type of cancer of the plasma cells. Plasma cells are white blood cells that produce disease- and infection-fighting antibodies in your body. Myeloma cells prevent the normal production of antibodies, leaving your body's immune system weakened and susceptible to infection.

Difference between Normal Cell and Cancer Cell:

	Normal Cell	Cancer Cell
		
Cell shape	Uniform	Irregular
Nucleus	Spheroid shape, single nucleus	Irregular shape, multi-nucleation common
Chromatin	Fine, evenly distributed	Coarse, aggregated
Nucleolus	Single, inconspicuous nucleolus	Multiple, enlarged nucleoli
Cytoplasm	Large cytoplasmic volume	Small cytoplasmic volume
Growth	Controlled	Uncontrolled
Maturation	Mature into specialized cells	Remain immature and undifferentiated
Blood supply	Normal angiogenesis (occurs during development/ healing)	Tumor-induced angiogenesis
Oxygen	Fevered (for aerobic respiration) but will undergo anaerobic respiration if required	Not required (thrive in hypoxic conditions), favor anaerobic respiration
Location	Remain in their intended location	Can spread to different locations in the body (metastasis)

Cell and Tissue:

The cell is the smallest structural and functional unit of life. There is no living creature existing on the planet earth without the cell. Therefore, it is referred

to as a fundamental unit of a life. Every function of the body is executed through these minute cells.

In simple terms, tissues can be defined as a group of cells with similar shape and function are termed as tissues. They form a cellular organizational level intermediate between the cells and organ system. Organs are then formed by combining the functional groups of multiple tissues.

Future Scope:

In this project used for detection of blood cancer automatically are reviewed. As blood cancer is one of the most dangerous disease caused due to exceeds in the number of white blood cells. Due to lack of proper treatment it could be a fatal disease. So, it must be diagnosis early. For future work, use of soft computing will be considered as a classification tool. Soft computing is based on nature inspired techniques, so it also provides most prominent results.

Symptom Care and Symptom Management Research:

The Division supports research in three areas: prevention or treatment of acute or chronic symptoms and morbidities related to cancer, its treatment and caregiving (symptom management research); effects on quality of life from cancer, its treatment and caregiving (quality of life research); and end-of-life psychosocial issues, caregiving and treatment strategies (end-of-life research).

Study interventions are aimed at improving quality of life for patients facing problems related to a life-threatening cancer diagnosis, or at preventing and relieving suffering during cancer therapy by means of early identification, assessment, and treatment for pain and other physical, psychosocial, and spiritual problems. Investigator-initiated research includes areas from foundational studies to further understand symptoms through clinical trials. Through NCORP, clinical trials are underway to evaluate therapies to prevent or ameliorate a broad range of symptoms and/or toxicities associated with cancer its treatment and caregiving. Other studies funded separately are investigating a range of treatment effects on health-related quality of life and a variety of influences on the end-of-life cancer experience.

Hardware and Software components:

Microcontroller:

A microprocessor contains a complete digital processor, which includes at least the arithmetic logic unit and associated registers. Large, modern

microprocessors need huge heat sinks and fans and can draw over 100A of current. The reduction of power dissipation is a major thrust of current development, now that so many microprocessors are used in portable equipment, whose battery should last for as long as possible. A microprocessor needs many other components to support it.

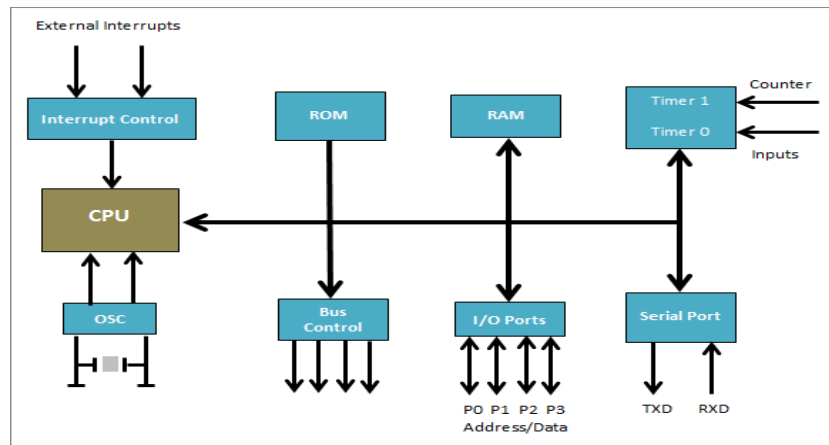


Figure 1 Basic Component of Microcontroller

SMPS (switch mode power supply):

A switched-mode power supply is an electronic power supply that incorporates a switching regulator to convert electrical power efficiently. Like other power supplies, an SMPS transfers power from a DC or AC source to DC loads, such as a personal computer, while converting voltage and current characteristics.



Figure: 2 SMPS

Screen/Display:

Unlike normal development boards interfacing an LCD to ARDUINO is quite easy. Here we don't have to worry about data sending and receiving. We just have to define the pin numbers and it will be ready to display data on LCD.



Figure: 3 LED Display

Programming:

```
#include "msp430g2553.h"
int flag = 0;

unsigned int volt,volt_1,amp,amp_1,temp,volt1;

unsigned int IntDegC;

unsigned int result[12];//= {0,0,0,0,0,0,0,0};

#define LCD P1OUT

#define RS_LOW      P2OUT &= ~BIT6

#define RS_HIGH     P2OUT |= BIT6

#define EN_HIGH     P2OUT |= BIT7

#define EN_LOW      P2OUT &= ~BIT7

//#define Charge_on      P2OUT |= BIT4

//#define Charge_of      P2OUT &= ~BIT4

//#define Charge_Full    P2OUT |= BIT5

//#define Charge_low     P2OUT &= ~BIT5
void lcd_build(unsigned char , unsigned int , unsigned int *, int);
unsigned int left_Brac[]={0x1f,0x10,0x10,0x10,0x10,0x10,0x10,0x1f};
unsigned int right_Brac[]={0x1f,0x01,0x01,0x01,0x01,0x01,0x01,0x1f};
unsigned int left_Line_Brac[]={0x10,0x10,0x10,0x10,0x10,0x10,0x10,0x10};
unsigned int right_Line_Brac[]={0x01,0x01,0x01,0x01,0x01,0x01,0x01,0x01};
unsigned int left_L_half_Brac[]={0x10,0x10,0x10,0x10,0x10,0x10,0x10,0x1c};
unsigned int right_L_half_Brac[]={0x01,0x01,0x01,0x01,0x01,0x01,0x01,0x07};
unsigned int upper_Brac[]={0x1f,0x00,0x00,0x00,0x00,0x00,0x00,0x1f};
```

Conclusion:

The idea behind the project is quite different and simple. The equipment and testing method are simple. This project is quite realistic as it represents the accurate and true value of life.

This concept may be one of the ways of finding the solution of such huge problem. It can be one of the important steps and quite simple idea in compensating the need of most common and genuine problem of the world. This project gives most efficient solution of the problem. The electronic plays a great role in developing the circuit which meets the needs of various biological problems.

9. AEGIS

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COLLEGE STUDENTS	ANVESHKA AGRAWAL, HARSHIT TIWARI, YASHICA SHARMA, SHIVEN PANDEY
SCHOOL STUDENTS	KHUSHBOO YADAV, KHUSHI TIWARI
SCHOOL	RAJKIYA BALIKA INTER COLLEGE, SECTOR-51, NOIDA, UP

OVERVIEW:

With the help of this device we aspire to eradicate the intermediate wastage of energy. This small wastage when saved can be used for cost efficient solution to our increasing electricity bills.

This device will work on existing appliances that are in day to day use such as fans, tube lights, LED bulbs, AC's, and other household appliances. The device works on heat detection technique, that activates the appliances if there are active detection and deactivates when there are passive detections. It helps to save electricity for shorter intervals where the intermediate period between person's absences is used to turn off electrical appliances.

INTRODUCTION:

The world is moving towards an age of automation fused with day to day lives of people, where the uses of smart devices reduce human effort and involvement in operating and maintaining home appliances.

A large portion of energy wastage is taking place due to human errors and negligence at places where the need of electricity finds no relevancy.

This device aims to reduce electricity consumption by monitoring intermediate transitions at a specific place with the help of a camera and a sensor that detect active or passive presence of an individual

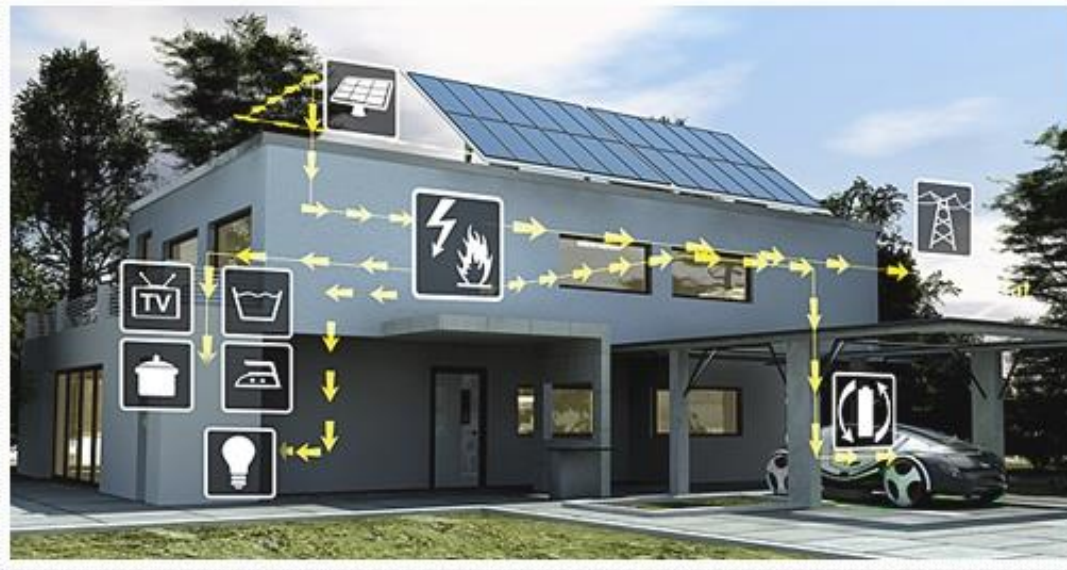


FEATURES:

- Sensor based start/stop device
- No need of any network
- Operates without the use of a remote or mobile application
- Camera module based human detection
- Works on existing infrastructure
- Cheaper than similar existing devices
- Easy to use
- One time installation

AREAS OF APPLICATION:

- 1) This device can be used in schools, colleges, industries, factories, offices as well as homes where several rooms can be connected with one master system that directs switching of the appliances inside the room in case of human presence.
- 2) The initiatives of 'Smart Homes' and 'Smart Cities' can be inducted with this device at mass levels
- 3) Modern safety systems can be merged with this device for advance and wide range of monitoring



COMPARITIVE ANALYSIS:

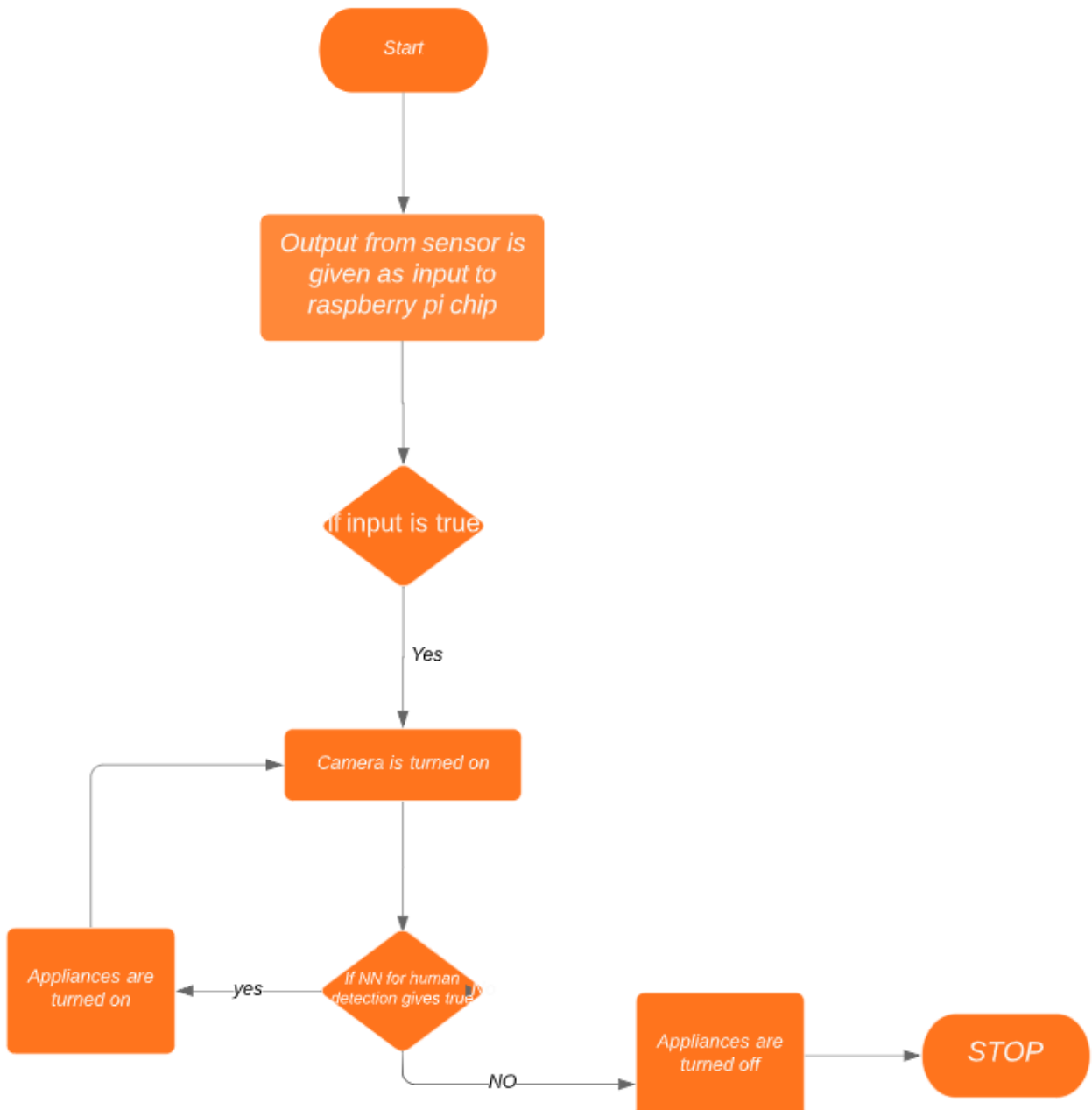
This study is a feature based study, done to demarcate the differences that lie between existing similar devices in the market and AEGIS.

Also it helps to quickly know about the pros and cons related to each of the variety of device. Our aim is to develop such a device that yields maximum output in minimum human effort.

FEATURES	EXISTING DEVICES	AEGIS
Connectivity	Using Network	Without Network
Complexity	High	Low
Reaction time	Delayed	Instant
Cost	High	Low
Additional Infrastructure	Required	Not Required
Sensor based	Completely	Partially
Use of counters	Yes	No

FLOWCHART:

It is a depiction of the procedural flow of information through the system setup of components present in the device. The sequence of processes thus informs us about the steps involved.



PROJECT IDEA AND INTENDED GOALS:

The world is in need of efficient energy consumption options. A large chunk of population today has no or very little access to electricity, whereas there also exist huge amount of energy wastage where it is readily available.

With increasing demands there has been increase in unnecessary energy consumption both a small and large level, where a major part of total wastage caused is due to unintentional human errors.

With the help of this device we aspire to eradicate this very wastage. This small wastage when saved can be used for a better cause and will also provide cost efficient solution to our increasing electricity bills.

This device will work on existing appliances that are in day to day use such as fans, tube lights, LED bulbs, AC's, and other household appliances. The device works on heat detection technique, that activates the appliances if there are active detection and deactivates when there are passive detections.

It helps to save electricity for shorter intervals where a person leaves the room/house/office/classroom/workplace etc and returns after a while; the time in between his/her absence in the room can be used to turn off the appliances and to turn on as and when he/she enters the room/house/office/classroom/workplace etc. As we know every drop counts, so does each unit of electricity.

By these small measures towards energy efficient tomorrow, we can fulfill our sustainable development goals.

10. GREEN LEAF DISEASE DETECTION USING RESBERRY PI

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ABSTRACT:

The proposed GREEN LEAF DISEASE DETECTION USING RESBERRY PI talked about a framework utilizing raspberry PI to detect and prevent plant disease from spreading.

The recognition of leaf ailment is essential and a critical theme for research, because it has the advantages of monitoring crops in the field in the form and thus automatically detects symptoms of disease by image processing.

The term disease refers to the type of plant damage. Automatic detection of symptoms of disease is useful for upgrading agricultural products.

INTRODUCTION:

Agriculture is the backbone of India. As India is a developing country, its economy mainly depends on agriculture. India experiences variety of climates ranging from tropical in the south to temperate in the north

Due to the unpredictable climatic changes, there is lack of nutrients and minerals to the crops. This leads to deficiency diseases which in turn affects the crop productivity. These kind of borne diseases are very dangerous as they affect large farming.

The best approach to overcome requirement of labor as well as the reduction of errors is smart way of monitoring the plant through image processing techniques.

Detection of plant diseases can be easily done through leaves as they are the prominent and delicate part of a plant.

DISEASES:

Leaf miners are the insect family at larval stage. They feed between upper and lower part of the leaf.



Fig1: Leaf miner disease

Hence we can develop a technique using image processing to detect the disease, to classify it. This will avoid human interference and hence lead to précised unprejudiced decision. Due to insect on very much amount in plant, it is severely damaged. On a single Leaf the number of maggots can be six. Therefore, it can severely damage the leaf of plant. It can restrict plant growth, leads to reduced yields.

Generally, whatever our observation about the disease is just used for the decision of the disease. A symptom of plant disease is a visible effect of disease on the plant. Symptoms can be change in color, change in the shape or functional changes of the plant as per its response to the pathogens, insects etc.



Fig 2: Yellow Spot Disease

SYSTEM DESIGN:

The module which is used here is Raspberry PI, which is a single board computer. The advantage of using Raspberry PI is that it is a fast processor with low power consumption. It is highly reliable with compactness. Here we use object oriented Programming language which is Python as it is a high Level scripting based programming language. The main advantage of using python as a coding language is that the python interpreter and the extensive standard Library are available both in source or binary form without charge for all major platforms.

ARCHITECTURE OF THE SYSTEM:

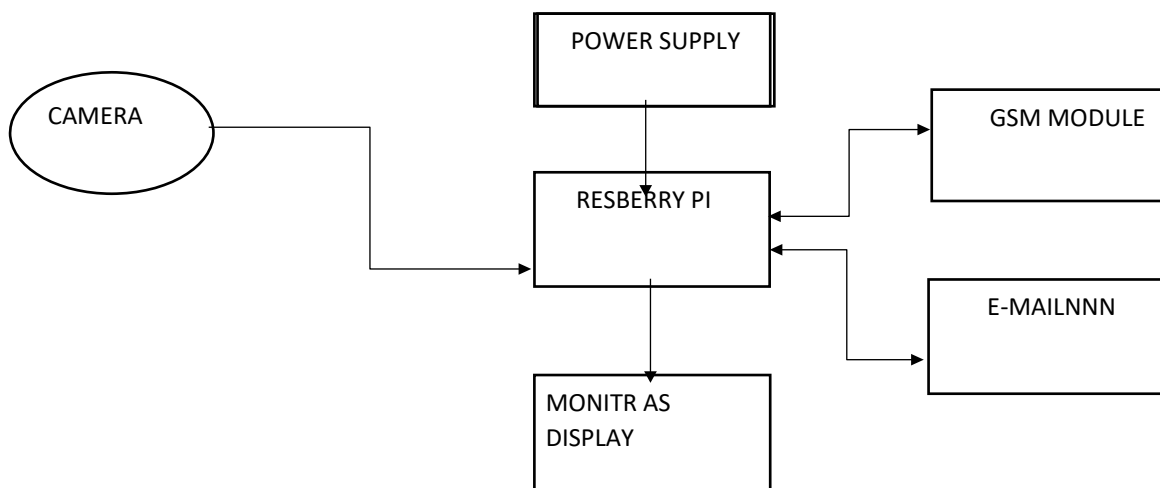


Fig. 3: Block Diagram

BLOCK DIAGRAM DISCRPTION:

1. Power Supply
A 5V, 1A control supply is required for this framework. The exceptional association is accommodated the raspberry pi demonstrate B. The power supply can be given by utilizing that USB association.
2. Camera
Used to catch a yield picture, it is legitimately associated with the Pi 3 Model B raspberry. There are two different ways to associate the camera to the Pi 3 display B raspberry. The first is by means of USB port and the second is a 15pin header for raspberry Pi3 camera interface.
3. Raspberry Pi
Raspberry Pi is a little PC like module. The camera caught picture will be sent to the Raspberry Pi. Using Open CV library; Raspberry Pi forms the picture and recognizes it.

4. GSM
Used to send the SMS to the framework proprietor, this message is the name of the infection the processor identifies.
5. Screen as presentation
The screen shows the name of the infection identified and the name of the pesticide.
6. Email
The email will be sent to the framework proprietor. This email contains the identified infection and the pesticide's name.

FLOW DIAGRAM:

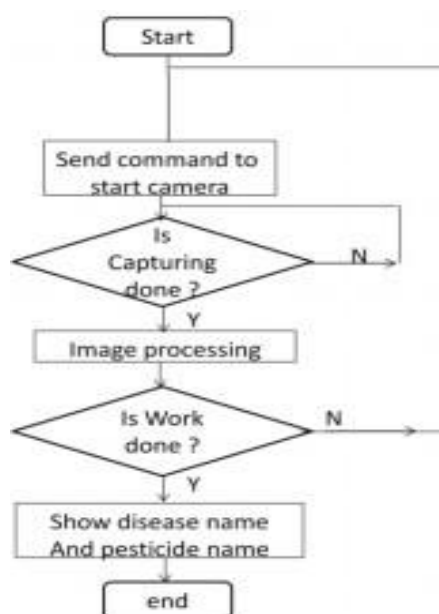


Fig4: flow diagram of disease detection

ALGORITHM:

1. Capture the RGB format image.
2. Produce structure of shading change.
3. Convert RGB shading regards to the predefined space in that structure.
4. Apply K means image segmentation Grouping.
5. Green pixel masking (green channel masking).
6. Eliminate the masked cells within the infected cluster edges.
7. Convert the RGB to HIS infected cluster.
8. SGDM matrix generation for H and S.
9. To calculate its features, call GLCM function.
10. Texture statistics computing
11. Recognition configures k - m (classifier).

TECHNOLOGIES:

Open CV

OpenCV represents Computer Vision Open Source. It contains the library of programming capacities for is AI programming. Open CV is required for picture handling applications continuously. OpenCV is created generally in C, C++ and its guideline interface is in C++ language, yet regardless of all that it holds a less no matter how you look at it yet wide C language interface.

Python

In modest Python, simple to learn. It is required for raspberry Pi – related Code programming. Python is a language that supports both as packages and modules. Besides the standard library, it also has a Python interpreter. They are available to all platforms free of charge in both source and binary form, and can be unreservedly disseminated to everyone. Python is a language scripting that empowers line - by - line execution of the code.

EXPECTED RESULT:

Leaves of illnesses are chosen for recognition as fine buildup, fleece mold, dark Dot. The server makes the database for solid leaves and sick Leaves. To contrast the pictures and wiped out and solid leaves, this is essential.

The sort of illness is along these lines arranged by examination. Figure 6, Figure 7, Figure 8 demonstrates the normal yield, which incorporates for the most part portioned picture, grayscale picture, removed picture highlight of Fig 5.



Fig.5: Downy mildew



Fig. 6: Segmented image



Fig 7: Grayscale image

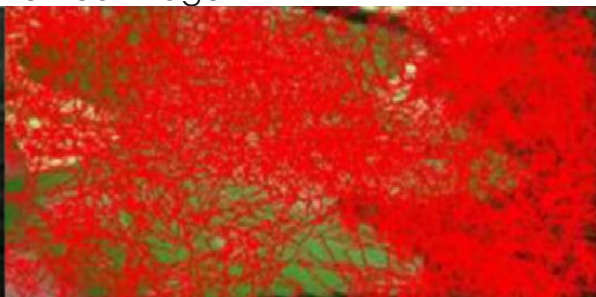


Fig 8: Feature extracted image

COST OF THE PROJECT:

The objective of this work is the detection, classification of leaf diseases using image processing tools and all information about the Disease is sent to the farmer's mobile phone through the GSM module.

In real time, the implementation of the GREEN LEAF DISEASE DETECTOR comes out to be FIVE THOUSAND rupees only. (Including Resberry Pi, Camera, GSM module, Display, Power supply etc.)

CONCLUSION:

There are essentially three fundamental kinds of Leaf ailment, Bacterial, Fungal and Viral. The precision of plant ailment recognition is essential in plant ailment location, however the procedure ought to be rapid in the meantime Work can be stretched out by utilizing quad copter at field level to catch pictures of the leaves of the different plants in the farm. For further handling, this framework can be associated with the server. The point of this work is to identify, group leaf ailments utilizing picture preparing instruments and send all data about the sickness through the GSM module to the farmer's mobile phone.

11. WATER DROPLER

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ABSTRACT

Project is an innovative way to reduce the water usage in daily life by modifying basic shower construction. Project "**WATER DROPLER**" based on basic everyday science. It increases the total area covered by the water stream of shower by using high pressurized water and making it to exit from small opening (orifice). This creates a cloud like formation in it surrounding because of which a lesser water is required for wetting same area as compared to that of conventional shower. As lesser amount of water is required so the energy required to heat it.

KEYWORD: orifice, increased wetted surface area

INTRODUCTION

Water has many uses but it have no substitute. As population is increasing so does our lifestyle and this change have caused exhaustive usage of water resources and energy requirement's which causing resources to exhaust is.

Today if we closely observe situation of water scarcity then, generally it not scarcity of water that is causing all problem but it's ineffective way of usage. In many cities we are facing situation of almost zero ground water level.

"**WATER DROPLER**" is an effective to employ the idea of saving in daily life in very effective manner without compromising with daily lifestyle and comfort.

Project consists of new shower head construction along with automatic on/off on the basis of motion of human body.



SAILENT FEATURES :

1. Increased wetting area.
2. Uses solar energy.
3. Lesser water requirement.
4. Less Maintenance requirement and easy installation.
5. Use less amount of water.
6. Automatic on/off the basis of motion of human body.
7. Easy to install.
8. Cost effective.

OBJECTIVE AND SCOPE

Proposed project is an innovative to reduce usage of water. Its basic goal is to reduce the water usage in daily life by reducing wastage and putting an effective way of using it.

It showers head that have many faucets as outlet. The cross-section of these faucets is reduced and when high pressure water comes out of it, there is cloud like formation. Because of this wetting area (contact area of skin) of water is increased.

It also consist of ultrasonic sensor which controls the on/off of the outlet of water based on the distance from shower head.

While bathing, we use soap/shampoo and during using generally the shower remains open and this increases wastage and WATER DROPLER help to eliminate this also.

Proposed project can have very significant impact on society. Implementing this project in real life can reduce the water usage by 78% as compared with present shower head.

METHODOLOGY

Project is inspired from high pressure car washing plants. It uses pressurized water to exit from a small cross-sectional.

On exiting from such small outlet water droplets creates a cloud like formation and their by increasing the overall wetting area as compared with ordinary shower outlet stream.

It also consist of an ultrasonic sensor which is contacted to a Arduino board which start/stop water flow as based on the position of body in front of it.

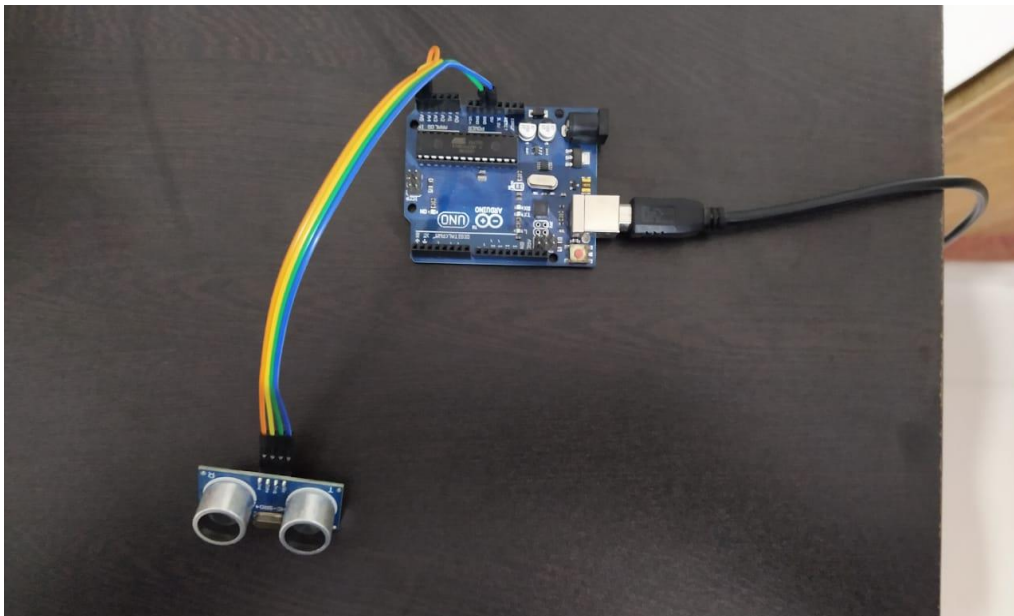
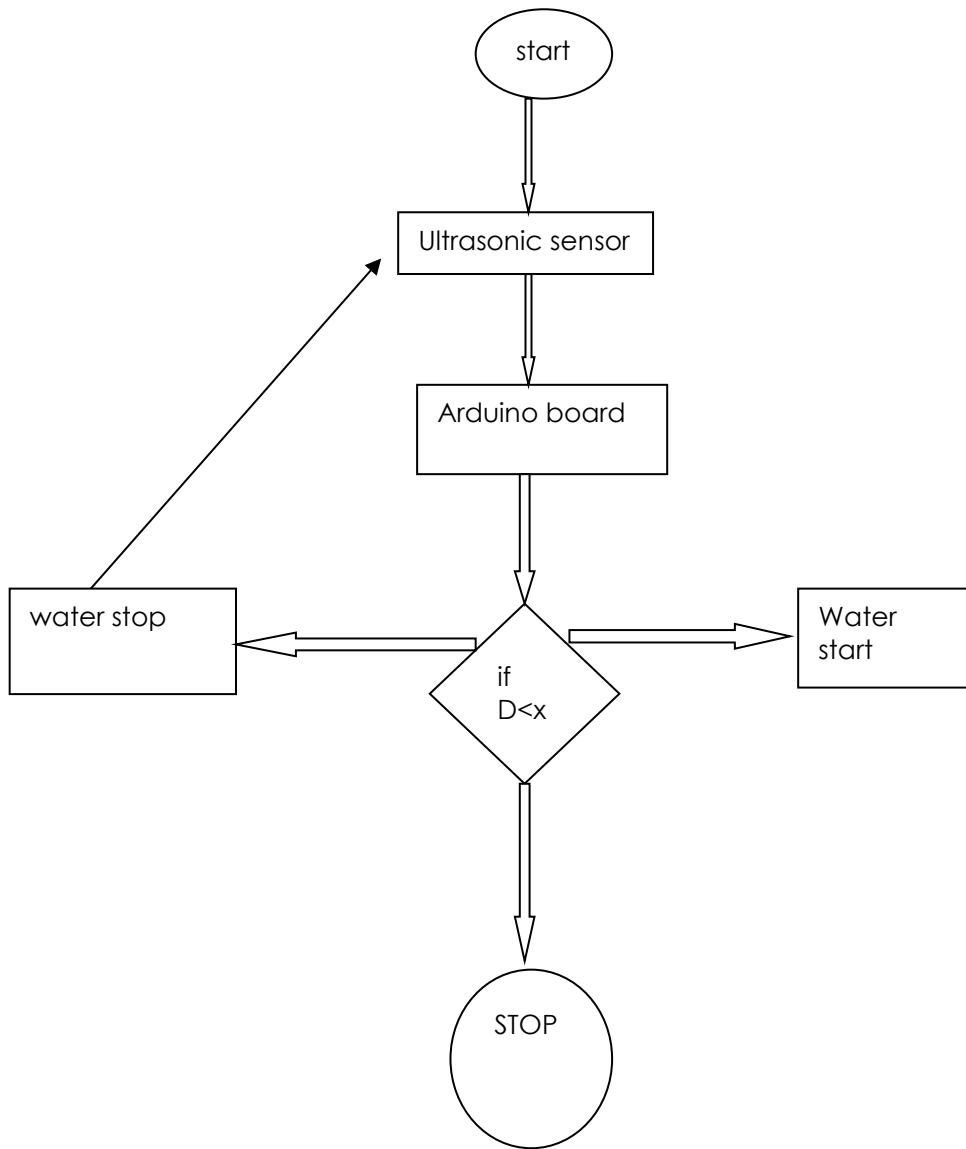
As while bathing when we use shampoo/soap during bathing, generally peoples doesn't turn off the shower which also contributes towards wastage of water.

After initial switch on it operates water flow start/stop automatically

This shower contains an ultrasonic sensor as we need to use soap we just need to take an step backward, as this motion is sensed by sensor it stop the water and as user takes an step forward it again sense it and start water outlet.

Finally after use it can be turned off and for again using we just need to turn it.

Simple programming used for calibrating ultrasonic sensor is shown in following block diagram:



TECHNICAL SPECIFICATION

Features of the Arduino UNO:

- Microcontroller: ATmega328.
- Operating Voltage: 5V.
- Input Voltage (recommended): 7-12V.
- Input Voltage (limits): 6-20V.
- Digital I/O Pins: 14 (of which 6 provide PWM output)
- Analog Input Pins: 6.
- DC Current per I/O Pin: 40 mA.
- DC Current for 3.3V Pin: 50 mA.

Shower head dimensions

Length: 6 cm

Diameter: 10 cm

Materials used: brass, PVC pipes.

COMPARITIVE STUDY

The proposed model is better than existing system on following ground:

Presently during shower most of water is wasted instead of getting used. About 10liters/min of water is required, while during soap using water flows without getting used. But proposed project can reduce water usage by 78%.

Presently all technology is available but proper integration in one single product is not present this task is done by proposed model.

To understand it in a better way, a tabular representation showing the advantages is drawn:

FEATURES	TRADITIONAL SYSTEM	PROPOSED MODEL
Water requirement	Comparatively high	Comparatively low
Initial cost	less	More
Automated flow control	No	Yes
Wetted area of water stream	Less	Large

COST OF PROJECT

Proposed focuses on more efficient usage of water and reducing the wastage of by using automated flow control and increasing wetting area of water outlet.

Initial cost of the project is somewhat is higher but on long run because of water saving and energy saving is cover-up initial and prove to more suitable product for usage.

Presently the cost for making a working model comes out ONE THOUSAND FIVE HUNDRED RUPEES only (including sensor, microcontroller, shower head etc.). For installation extra FIVE HUNDRED RUPESS. Hence around TWO THOUSAND RUPEES is required for ready to use model.

SOCIAL IMPACT

According to survey about 80% of water during showering goes waste and effectively usage cannot be achieved.

As presently around 10L/min water is used while in this too much of water goes waste so this project can change this situation.

Proposed model can reduce this water requirement and also increases the wetted area of outlet water and hence increases the effective isage of water by forming a cloud like formation.

Proposed reduces water usage up to 78% and also almost most of is effectively used.

Overall cost can be reduced further on mass production and it became part of every house so **proposed project can be used revenue generating, effective water using and water saving business model.**

CONCLUSION

Every problem does not need new solution and sometimes combining small things into single entity can do wonders and proposed model is a perfect example for this.

12. WATER RECYCLER

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ABSTRACT

The proposed WATER RECYCLER is a research which has been designed keeping in mind water scarcity in the highly humid areas. It is an innovative model that will provide useful water at reasonable cost by utilizing atmospheric water present in the form of vapour. This model involves automatic processing, have low maintenance cost and no harm to the environment which make it a self-sustained model.

Keywords: Self-sustained, desiccator.

INTRODUCTION

Population Explosion, depletion of water resources, concern regarding conservation of energy, high humidity, and self- sustainability are the major factors responsible for devising a proven model to meet up the increasing demand of water and to provide solution to the water scarcity in highly humid areas.

Proposed model THE WATER RECYCLER is based on the adsorption property of the desiccator called silica gel. Moisture from the air will be adsorbed through the silica gel. Further silica gel is heated upto a certain temperature and formed vapours will be condensed to provide water.



Silica gel

SALIENT FEATURES

- Easy installation
- Manually operated
- No waste as byproduct
- Can be solar activated

OBJECTIVE AND SCOPE

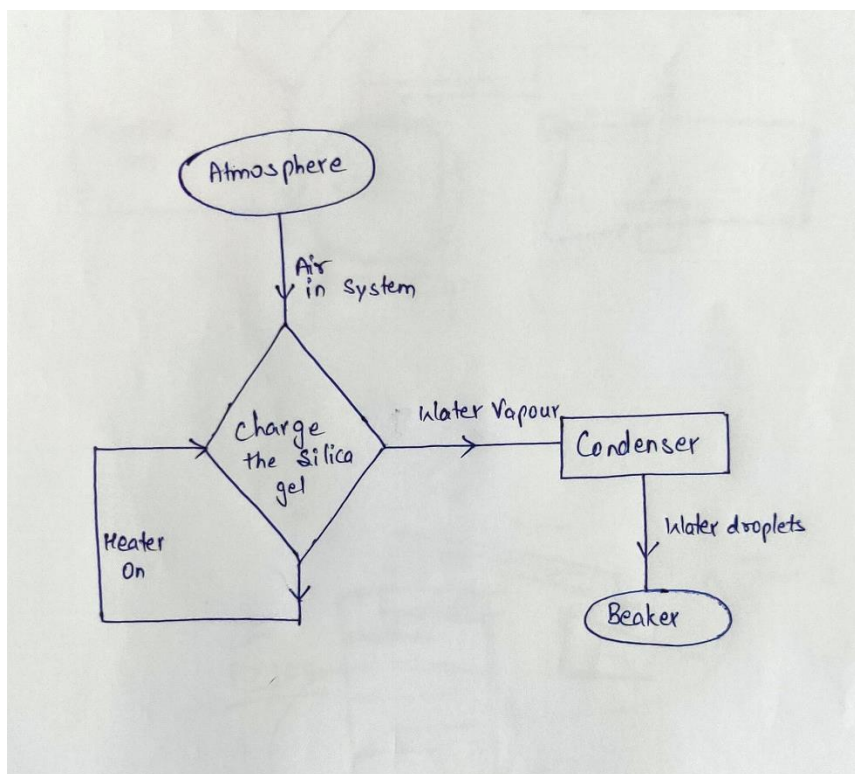
Basically, the project's goal is to provide useful water by utilizing atmospheric water present in the form of moisture at affordable cost. In the present scenario, water is very costly and the pure water is not affordable by everyone especially in village areas. This project will reach to everyone as it is cost effective, easy to setup and operate by everyone.

This proposed model is highly significant as it can be employed to the mission of SAVE WATER as atmospheric moisture is utilized in the model and pure water is right to everyone. The main scope of this model is in the high humid areas as the whole project is based on the humidity range of the atmosphere.

METHODOLOGY

1. Here are some simple points to understand the methodology of this project. Firstly we have to charge the silica gel by putting the gates of the apparatus open and let the air in the apparatus. The air will spread in the whole system and the silica gel gets charged by it in a certain time.
2. Then we will close the gates of the apparatus and start the heater in the system for some time (approx. 15 min). The water present in the silica gel extract from it by heating it to approx. 120 degrees.
3. This water will get convert in the vapor form and get superheated in the system and we will allow the vapor to pass the hole provided at the lower end of the apparatus.
4. This vapor will pass thought the condenser of helical shape which allow the vapor to get condense and convert it in to water droplets.
5. Finally we can collect the water in the beaker and we can use it in many ways in daily life.

To understand the procedure of the proposed system a complete flowchart is shown below:



COST OF THE PROJECT

This model is sustainable, easy to install and have low maintenance cost. Grants are provided for conducting such researches by the government of India. The estimated cost of this project is 3000/- including silica gel and the set up.

CONCLUSION

Water scarcity is the lack of fresh water resources to meet water demand. It affects every area and was listed in 2019 by the World Economic Forum as one of the largest global risks. This project is an initiative for the high humid areas to meet up the fresh water demand at affordable cost.

13. WATER TANK CLEANING SYSTEM

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ABSTRACT:

When it comes to purifying all the water in your home, whole house filters are the most convenient system. But what about the water we use directly from house water tank? It is full of toxic salts, dirt and only be washable once or twice in a year. So, this productive idea can reduce its cleaning duration as well as various water related problems for maintaining your health and hygiene. WTC system can clean the whole tank and can provide you soft water, keep you clean & healthy by using filtered water through it.



INTRODUCTION:

Since, we are dealing with the extreme conditions of pollution whether it is soil, water, air etc. Water is undoubtedly the most important part of our lives and is something one cannot do without. We have to bring these resources into their pure natural state. Technically, for water cleaning, we've build many kinds of filters such for drinking water-RO, Tap filters etc. But what if we get clean filtered water directly from water tank in our houses? It would be incredible to use-

- We get soft water instead of hard water.
- It won't affect your skin anymore.
- Cloths will not get fade.
- It can be used to cook food and wash vegetables & fruits in healthy way.
- It won't affect the utensils anymore.

We shall have no better conditions in the future if we are satisfied with all those which we have at present. Water is a basic need and this is why it's important that you and your family have access to clean water all the time. When you move into a new home, one of the things that need to be checked is if you have a clean water source, whether it is from a rainwater tank, groundwater or surface-water source. Water alone can be a medium for many germs and contaminants, much more a dirty rainwater tank. Even if you have a filtration system installed at home, it may not completely remove particles and impurities especially if your water tank is not clean. This product can clean the water just when you want.

SALIENT FEATURES:

- Filter disc is very reliable.
- Automated up/down motion of filter.
- DC motor is used to carry out this motion.
- Relay is used to provide the AC connection directly to the motor.
- The motor rotates bi-directional to drop and lift the filter disc.
- Thick filter sheet is used for filtration.
- Brushed wiper is used to wipe the dirt from the disc.
- Outlet is provided to throw the sludge out of the tank.
- Sludge collector collects the dirt.
- Internal circuit works on digital signal.



OBJECTIVES & SCOPE:

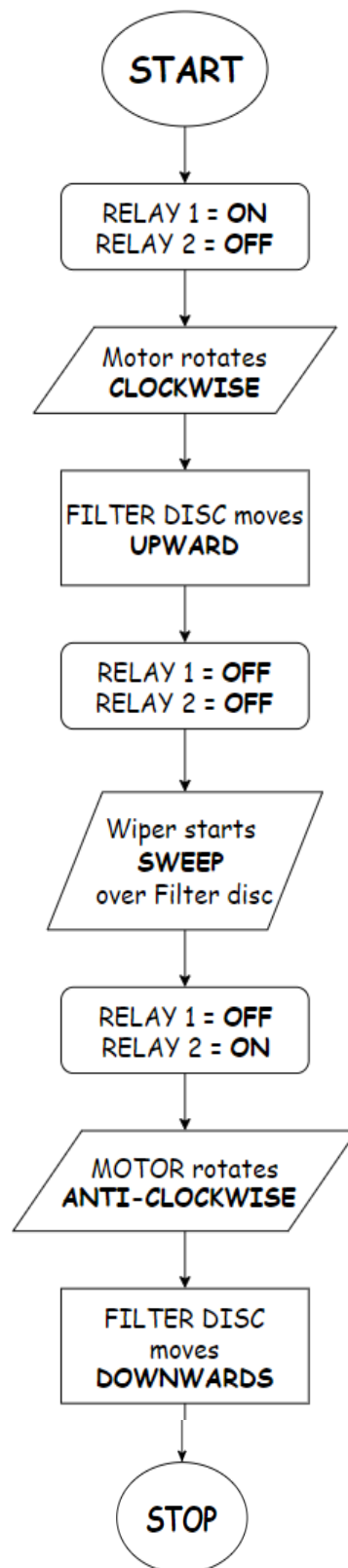


Basically, **the objective of this product is to provide filtered, hygienic, soft water directly from house tank to taps also it makes easier to clean your tank without any physical help.** In this product it is not essential to empty the whole tank and jump into it for cleaning. It can easily clean it for you as a piece of cake.

In the present scenario, **Water is undoubtedly the most important part of our lives and is something one cannot do without.** Not only does it quench our thirst but is also important as far as cooking, personal hygiene and cleaning is concerned. While it is true that water replenishes us, removes toxins from the body and helps us in uncountable ways but at the same time, a lot of diseases are also caused if one consumes water in its impure form. This is why it is important that the water that we drink or cook food in is absolutely clean and pure. This is why it is very important to clean the water tanks installed in our houses on the regular basis.

Water filtration systems may not prove 100% effective if water tank is not clean. While it is true that most of us have water filtration systems installed in our houses and workplaces, but they may not prove 100% effective if the water coming from the tanks is not clean. They may prove effective against only certain kinds of particles and impurities but may not help prevent infections and thus certain kinds of water related diseases. So, this tank cleaning system has the efficiency to clean the tank for you on regular basis.

METHODOLOGY:



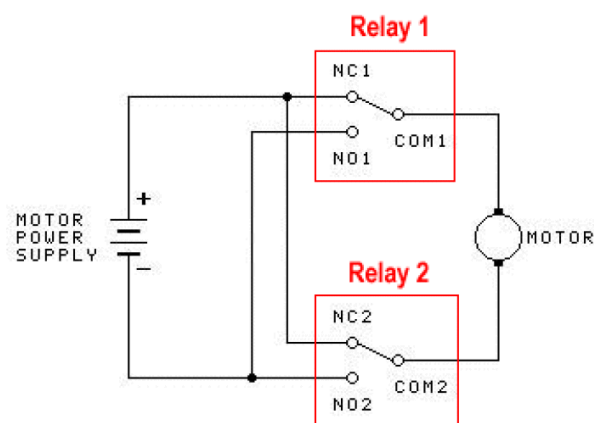
The whole system working can easily be understood by above flow chart.

HARDWARE AND SOFTWARE COMPONENTS-

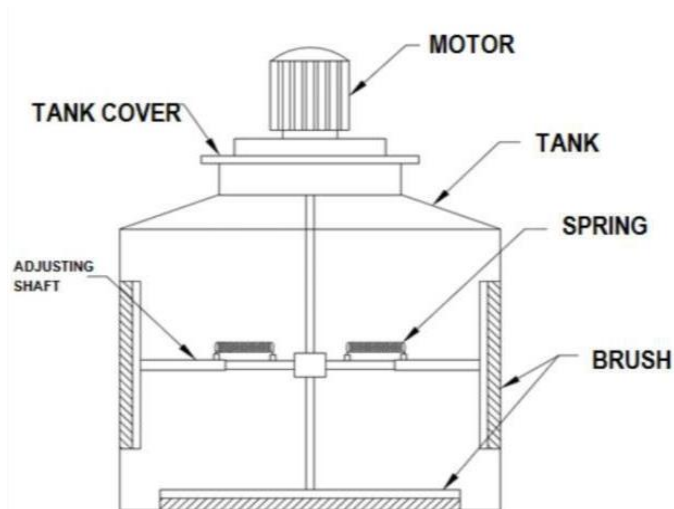
- Arduino UNO
- Relays
- 12V DC motor
- Arduino IDE code
- 12V Adapter
- 5V Servo motor

These components are assembled in such a way i.e. to make an ease to filter the water from water tank automatically.

What is happening in the whole system? The system is designed according to their priorities of working. The motor pins are connected with each relay separately, which provide the directions to the motor accordingly and the out pins of both relays are connected with arduino pin 9 & 10.



And the servo motor is connected at pin 3. Vcc(+) and ground(-) connection as per suitable. The brush is connected with servo to clean the filter disc.



COST:

In real time operation, this system can include the cost up to 10000. It includes the various supportive measures and equipment so that it can provide you filtered and clean water in your taps. You can freely use that water directly in food cooking. And it will be prevents the utensils, pipelines to corrode in your houses.

SOCIAL IMPACT:

- It is an established fact that 45% of India's populations especially that of URBAN area do not clean their water tank at all and also the face its affect.
- WTC system is an environmental friendly technology and is applicable in all the three sectors namely-Residential, Commercial and Health care.
- The aim of this system is to create awareness regarding proper hygiene maintenance healthy lifestyle, automation, reduce pollution, proper waste management and usage of smart technologies.
- The project's goal is also to create "Advanced intelligence society" just like Smart cities. This water cleaning system can easily be used in urban societies, houses apartments, where problems like lack of time to clean the tank, pipelines are getting corrode again and again.
- Also, WTC SYSTEM can be used a source of revenue by implementing this model on the houses/hospitals/apartments/schools or other commercial places.

14. ELECTRONIC WATER EFFICIENT FLUSHING SYSTEM

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ABSTRACT

The proposed ELECTRONIC WATER EFFICIENT FLUSHING SYSTEM is an interdisciplinary research model which is designed keeping in view of national flag ship program like “swach bharat” “swasth bharat” and “make in India”. It is an innovative sanitation model which involves continuous unmanned operations of the toilet seat, hygienic facilities and automated flushing system. It is provided for the efficient waste management technique which makes the self-sustained model.

KEYWORDS

Self-sustained, water efficient, vacuum suction, strain gauges and moisture sensor.

INTRODUCTION

Population explosion, concern regarding conservation of energy and hygiene maintenance, urbanization, environmental pollution, depletion of resources, changing life style and technology and self-sustainability are the major cause of devising a process model to address the ensuring demand and provide a permanent solution.

Electronic water efficient flushing system is based on vacuum suction technology which sucks the human solid waste and transfer them from toilet seat to the underground waste tank, along with it. There will be a water spray and a hot air spray unit.

All these units will be controlled on the basis of output of the sensor like strain gauge, moisture sensor, TSOP sensor etc. and all these things will be controlled ARDUINO UNO BOARD.

All these equipment will work together and provide us a hygienic toilet seat, better disposal of waste with minimum usage of water and minimum usage of technology.



SILENT FEATURES

- Disposal of feces into underground waste tank through vacuum suction.
- Additional spraying of water for better hygiene.
- Spray of hot air to eliminate the moisture from the seat.
- Automatic flushing via help of sensors.
- Efficient use of water.
- Proper and complete hygiene.
- Ideal to use in AREA FACING WATER SCARCITY.
- No maintenance required.
- In case of solid waste, vacuum suction in it, water spray and hot air spray all works one by one.
- In case of liquid waste, only water spray and then hot air spray works.

OBJECTIVE AND SCOPE

Basically the goal of this project is to create the toilet system which will be using minimum possible amount of water to flush the waste so that water resources can be conserved which is very precious and need to be conserved at any cost. Secondly the project is being designed to enhance the hygiene of the users as our toilet seats will be equipped with various sensors which will be controlling all 3 units (vacuum water spray, hot air spray) with the help aurdino. All these technologies will be automatically flushed the waste material; consumers don't have to press any button to flush the waste. Hence 100% hygiene can be achieved.

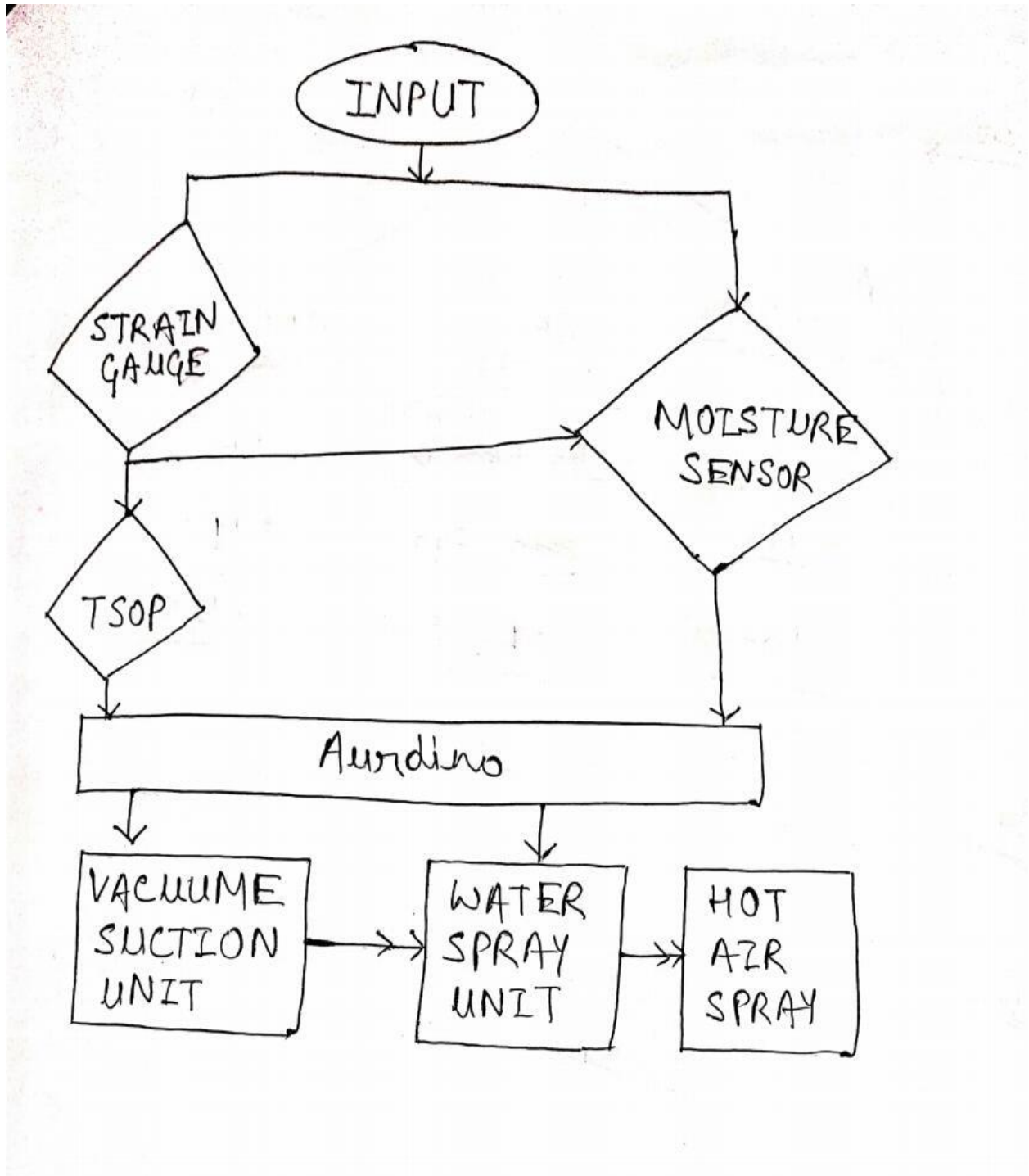
In the present scenario, solid waste, feces and liquid waste in the toilet seats are being flushed by the help of water which result into the wastage of large amount of water as in ordinary toilets it uses about 10 to 12 L of water in a single flush. Why to waste this much amount of water when we can do the same thing with very less amount of water and vacuum suction force.

We could implement this system in household societies then we will be able to save lot of water.

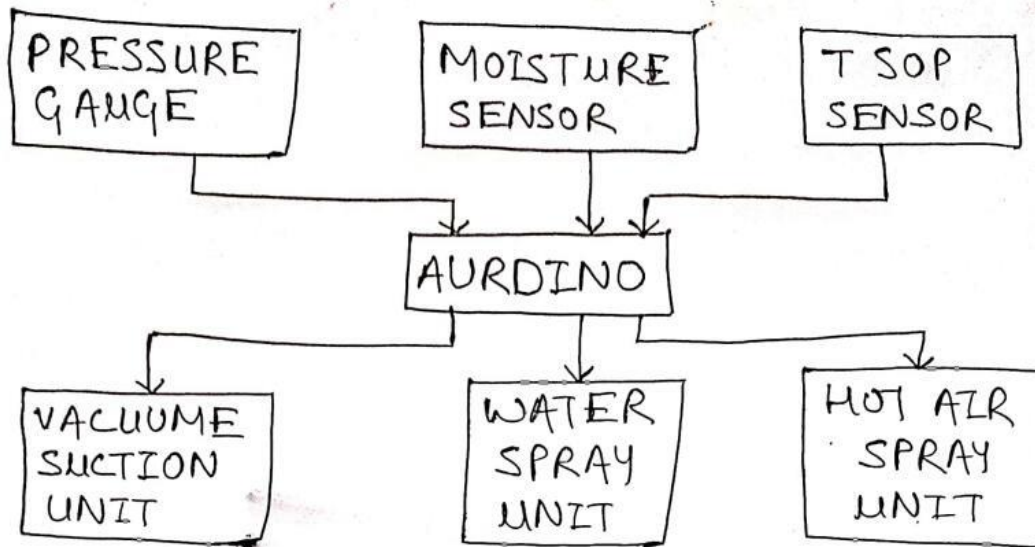
Second biggest problem in toilets now a days is to maintain hygiene as it is been observed that some people don't flush toilets properly {intentionally or unintentionally}. So to deal with this problem we are using various sensors on the toilet seat like strain gauge (load cell), moisture sensor and TSOP SENSORS. On the basics of output these sensors we will be able to detect the type of waste and according to that aurdino will activate one of or two units among the three and hence proper hygiene will achieve.

METHODOLOGY

To understand the architecture of the propose system, the Complete flow chart is drawn below:



The programming of Aurdino is done according to the following block diagram:



Thus the proposed system methodology can be easily understood from above mentioned flow chart.

HARDWARE AND SOFTWARE COMPONENTS:

- AURDINO UNO
- PRESSURE GAUGE
- MOISTURE SENSOR
- TSOP SENSOR
- RELAY MODULE
- VACUUM PUMP
- WATER PUMP
- HAIR DRYER
- TOILET SEAT
- AURDINO PROGRAMING
- TOILET SEAT
- ANALOG DIGITAL CONVERTER
- AURDINO ADAPTER

TECHNICAL SPECIFICATION

Vacuum, water pump air dryer will be working at 220 V A.C.

Pressure gauge, analog digital converter, moisture sensor, TROP sensor and ARDINO UNO will be working on 5V.

Comparative studies:

The proposed model is better than the existing system on the following grounds:

The model will be conservation water on the large amount scale, as traditional system uses only and only water to flush out the human waste and our model will be using vacuum suction, power analog with this model will be more hygienic then ordinary model and hence it will be enhancing custom usages experience.

As ordinary system there is push button provided to flush out the human waste. While on the other hand this model will be equipped with sensors and hence all the flushing mechanics will be fully automated, there will be no button to active the flushing action. Therefore better hygiene conditions are achieved.

COST OF PROJECT

If we look at the every single component and sum up all of them we got total amount 20 to 22k. This model will be more economical if we scale the no. of toilets at particular society. We can connect several toilets.

CONCLUSION:

The proposed working model of electronic water efficient flushing system:

SWACHAH BHARAT: since in will improve hygienic level.

SWASTH BHARAT: As toilet seats will be cleaned all the time so the user will be prevented from hazardous diseases.

MAKE IN INDIA AND DIGITAL INDIA: This model is fully automated and hence promotes above agendas.

It is the perfect example for MISSION FOR MODELS WILL LEAD TOWARD MODEL FOR MISSIOIN.

15. BIOPLASTIC

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GUIDE	DR. INDU BHATT
COLLEGE STUDENTS	AMAN KUMAR SINGH, BIJIT BORGHAIN
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SCHOOL	COMPOSITE SCHOOL, KAILA BALAK, GHAZIABAD

ABSTRACT:

The production of starch based bioplastics from cassava peel reinforced with microcrystalline cellulose using sorbitol as plasticizers were investigated. Physical properties of bioplastics were determined by density, water uptake, tensile strength and Fourier Transform Infrared Spectroscopy. Bioplastics were prepared from cassava peel starch plasticized using sorbitol with variation of 20; 25; 30% (wt/v of sorbitol to starch) reinforced with microcrystalline cellulose (MCC) Avicel PH101 fillers with range of 0 to 6% (wt/wt of MCC to starch). The results showed improvement in tensile strength with higher MCC content up to 9,12 mpa compared to non-reinforced bioplastics. This could be mainly attributed to the strong hydrogen bonds between MCC and starch. On the contrary, the addition of MCC decreased the elongation at break, density and water uptake. Fourier Transform Infrared Spectroscopy showed the functional groups of bioplastics, which the majority of O-H groups were found at the bioplastics with reinforcing filler MCC that represented substantial hydrogen bonds. The highest tensile strength value was obtained for bioplastic with MCC content 6% and sorbitol content 20%. With good adhesion between MCC and starch, the production of bioplastics could be widely used as a substitute for conventional plastics with more benefits to the environment.

KEYWORDS- Starch, Biodegradable, Environmental impact, Recycling, Economical

INTRODUCTION:

Packaging plays a significant part in recent years as over 67 million tonnes of packaging waste resulting in environmental concerns. This provokes many different processing, for example the using of additives such as fillers, colourants and plasticizers to produce polymers as packaging applications.

Environmental, economic and safety challenges have caused many scientists to invent biodegradable polymers as a substitute for petrochemical based polymers. This biodegradable polymers or bioplastics indicate more eco-friendly environment than the conventional plastics which lead to environmental issues [2]. But there is still a lack in the development of bioplastics as its high cost of production leads to certain limitations. An alternative for a low cost and renewable substrate has been proposed by using agriculture waste (AW) [3]. In addition to performance and abundant sources, starch from agriculture waste is the solution for an alternative. Starch as biodegradable polymer becomes reasonable material for the production of bioplastics because of its low cost [4]. Therefore, production of bioplastics is the breakthrough innovation to solve the environmental issues by using renewable and degradable natural resources and to provide more cost effective bioplastics.

Raw materials for bioplastics originate from natural constituents such as polysaccharides (e.g. starch, cellulose, chitin and lignin), proteins (e.g. gelatin, casein and wheat gluten) and lipids (e.g. plant oils and animals fats) [1]. In Indonesia, development of starch based bioplastics has a big potential, because starch can be easily obtained by majority of Indonesia's plants. One of the most abundant sources for starch production in Indonesia is from cassava. Cassava processing results in organic waste such as cassava peel that can be used as bioplastic matrix for its high starch content. However, bioplastic based on starch still has many disadvantages like poor mechanical properties and high moisture adsorption, therefore an alternative is used to improve its properties [5]. Reinforcing fillers such as cellulose has proven to be the most promising material.

Microcrystalline cellulose used as reinforcement filler for starch based edible films was analyzed by Psomiadou et al. (1996). The results showed higher strength and elongation and lower water vapour transmission rate (WVTR) of bioplastics. Microcrystalline cellulose Avicel PH 101 is used as reinforcing filler because it offers higher density of hydroxyl groups on its surface that is available for hydrogen bonding [5]. Utilization of organic waste such as cassava peel for production of starch based bioplastic can help reducing the environmental damages that are caused by conventional plastics. Higher value bioplastics can be obtained by improving their properties with the most abundant and biodegradable reinforcing filler like cellulose. The goal of this work is to study the properties of bioplastics from agriculture waste. Effects of reinforcement fillers and plasticizers on bioplastics are also examined.

SALIENT FEATURES:

1. Require less time to degrade
2. Potentially a much lower carbon footprint.
3. Lower energy costs in manufacture. They do not change the flavor or scent of the food contained
4. They do not contain additives that are harmful to health, such as phthalates or Bisphenol A
5. Bioplastics are biodegradable
6. If something made of Bioplastics is buried in the ground, microorganisms will break it down into carbon dioxide and water
7. When plastics made from petroleum are burned, they release the carbon dioxide contained in the petroleum into the atmosphere, leading to global warming.
8. In this context, renewable resources are becoming a more viable and promising alternative for the plastics industry
9. Bio plastics are a form of plastics derived from plant sources such as sweet potatoes, sugarcane, hemp oil, soya bean oil and corn starch.
10. Bioplastics are environmentally friendly because, compared with traditional plastics, their production results in the emission of less carbon dioxide, which is thought to cause global warming
11. They are also biodegradable, meaning that the material returns to its natural state when buried in the ground.
12. The use of bio plastics offers significant advantages not only in an ecological sense but also in an economic sense.
13. Enzymes are used to break starch in the plants down into glucose, which is fermented and made into lactic acid.
14. If something made of Bioplastics is buried in the ground, microorganisms will break it down into carbon dioxide and water

OBJECTIVE AND SCOPE

To produce Bioplastic from waste food material rich in cellulose and starch as a substrate e.g., banana peels, potato peels, Cassava peel starch etc.

To increase the following properties of Bioplastics to make it usable in various forms:

- a) Tensile Strength
- b) Durability
- c) Thermal Resistance

To contribute towards mitigation of environment pollution caused by single use plastics.

Further Research can be carried out for better understanding of the Process and thereby improving the Quality of the Product. Other commonly available starch sources can be explored. Food wastes like mango seeds and corn kernels also have high starch content. Hence these can also be utilized as a raw material for synthesis of polymeric films. So far we have conducted the experiment using only one set of concentrations (0.5 N NaOH & 0.5N HCl). Varying the concentration of the reagents might alter the properties of the polymeric films obtained. This project focussed primarily on tensile strength measurement. Other standard tests like Izod Impact Test, Dart Impact Test etc. should also be conducted. Synthesis of polymeric films can also be carried out after extraction of starch from banana peels instead of processing it as a whole to see if it improves the polymeric properties. The banana peels consists of many different components apart from starch. Currently only the reaction with starch has been considered. The interaction of all the other components with the reagents may also have an effect which must also be quantified.

METHODOLOGY:

Production of Cassava starch based bioplastic:

Materials:

Starch derived from cassava peel was obtained from Traditional Market Medan, microcrystalline cellulose (MCC) Avicel PH101 was obtained from Pusat Penelitian Kelapa Sawit Medan with particle size 50 μm , and sorbitol 99% was obtained from Rudang Jaya Medan.

Preparation of Cassava Peel Starch:

Cassava peel (100 gram) obtained from waste container at local traditional market was washed with clean water before shredded to small pieces. The shredded cassava peel was later peeled and placed in mixing blender and soaked in water for about 100 ml. After mixing process, starch slurry was

filtered and later placed in tank for settling that took at least 30 minutes. Starch sediment was separated from the slurry and then washed again with distilled water. After the second settling, starch sediment was dried using oven with temperature 70 °C for removal of free water. Starch was sieved with strainer 100 mesh/inch for better homogeneous size.

Bioplastic Preparation:

Solution containing 0, 2, 4 and 6% wt/wt of fillers to starch was prepared by dispersing 200 ml distilled water and sorbitol with concentration varied from 20, 25 and 30% wt/v of plasticizer to starch. Solution was placed into ultrasonic homogenizer KUDOS tank and processed for about 50 minutes. After ultrasonication, solution was removed from the tank. Starch (10 gram) was added to the solution and heated using hot plate while stirred until it gelatinized (70 °C). After mixing, the solution was cast onto flat and dried with temperature 60 °C for 24 hour. Once set, bioplastic was cooled to ambient temperature before peeled off the flat.

Bioplastic Characterizations:

Tensile Strength and Elongation at Break: Tensile strength was measured with GoTech Universal Testing Machine using the standard of ASTM D882-91. Tensile strength value was obtained from the observed data. Elongation at break is an indication of bioplastics flexibility and is expressed as a percentage. Elongation at break was calculated as follows:

$$\text{Elongation at break } (\epsilon) = \text{extension} \times 100 / \text{gauge} \quad (1)$$

Density: Density of bioplastic was investigated by the standard of ASTM D792-91 on film with size approximately 5x5 cm. The film's mass was measured using analytical balance. Density was calculated as follows:

$$\text{Density} = \text{mass (gr)} / \text{volume (cm}^3\text{)} \quad (2)$$

Water Uptake: Water uptake was investigated by cutting film with size approximately 2x2 cm and then weighed the mass. Film was put into a container filled with distilled water for 24 hour. After immersion in water, film was removed from the water and weighed to measure the wet weight.

Water uptake was calculated as follows:

$$\text{Water uptake} = \text{wet weight} - \text{dry weight} / \text{wet weight} \times 100\% \quad (3)$$

Fourier Transform Infrared Spectroscopy (FT-IR): Functional groups of bioplastics were analyzed by using IR Prestige-21 Shimadzu. The analysis using FT-IR represented spectrum data in graphic and wave numbers of each data that provided functional groups of bioplastics.

Results:

Tensile Strength and Elongation at Break:

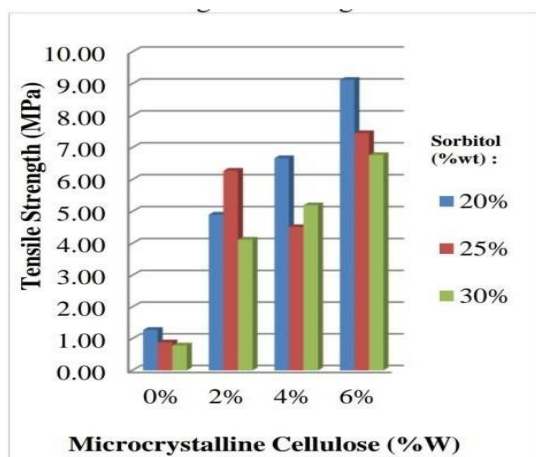


Figure 1. Tensile strength of starch based bioplastic reinforced with MCC Avicel PH101 using sorbitol as plasticizer.

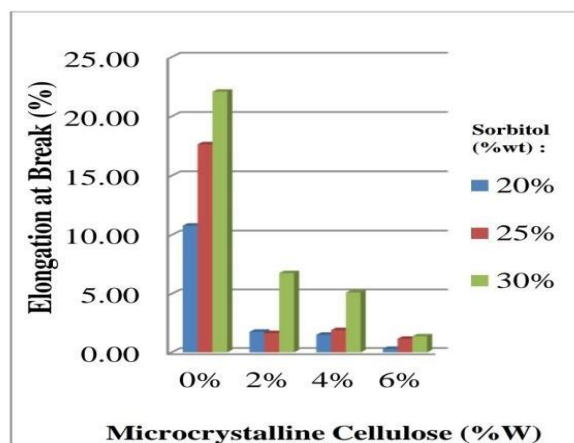


Figure 2. Elongation at break of starch based bioplastic reinforced with MCC Avicel PH101 using sorbitol as plasticizer.

Figure 1 shows the results of tensile strength and elongation at break as a function of MCC content for plasticized starch based bioplastic. It indicated that tensile strength increased with the increasing of MCC content. Results showed an increase of tensile strength from 0 to 6% MCC content for bioplastics with 20 and 30% sorbitol. The improvement of bioplastic properties can be attributed to good interfacial adhesion that can form strong 3D hydrogen bond network that is occurred between starch matrix and MCC fillers [5]. Thus, bioplastic with MCC content 6% and 20% sorbitol provided the maximum tensile strength for 9,12 MPa. A drop in tensile strength value is shown for bioplastic with MCC content 4% and sorbitol content 25%. It is possibly due to higher content of MCC contributed to retarding the intermolecular interaction thus resulting in aggregates and heterogeneous film structure [5]. Plasticizer is necessary for production of bioplastics to increase its flexibility and workability, on the other hand addition of plasticizer results in lower hardness [8]. Thus higher sorbitol content resulted in lower tensile strength. It should be noted that increasing the sorbitol content up to 30% resulted in lower tensile strength. However, for bioplastics with sorbitol content below 30%, a primary concern that there is sometimes not enough

plasticizing effect and starch molecules become brittle [9]. This could be seen on bioplastics with MCC content 2 and 4% for 25% sorbitol.

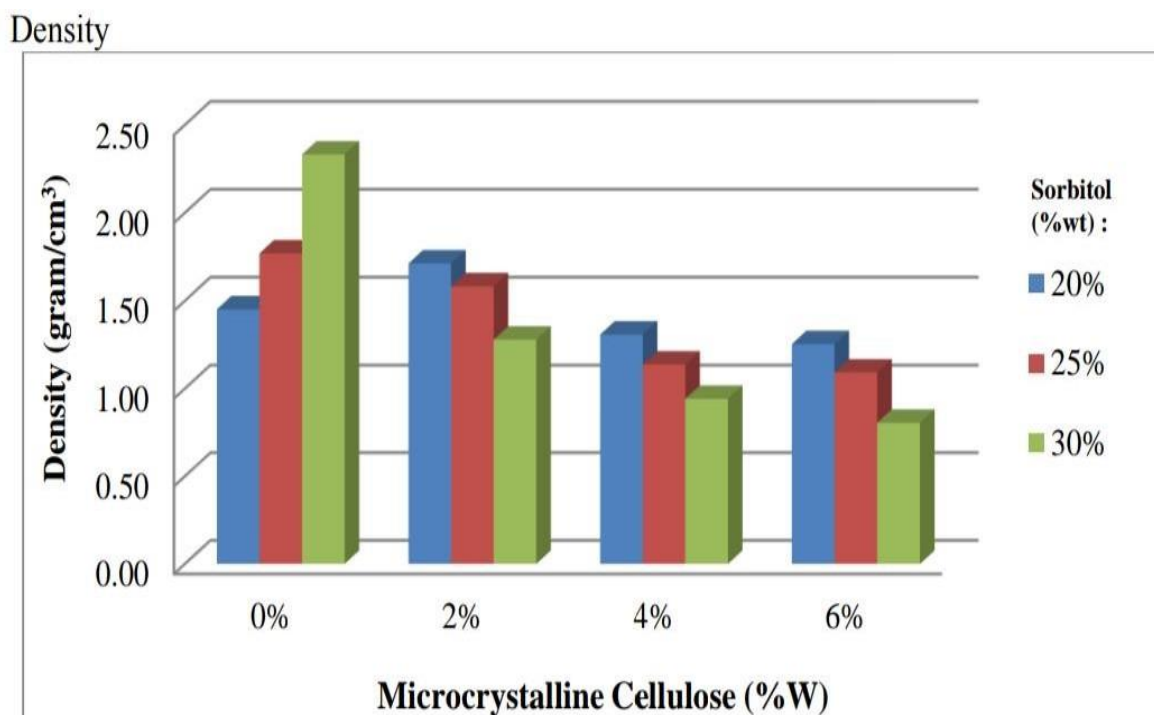
Contrary to tensile strength value, figure 2 shows the results of elongation at break as the addition of MCC content decreased the value the elongation at break. Meanwhile, addition of plasticizers to bioplastics have the opposite effect on elongation at break. Results showed a decrease in elongation at break with the increasing MCC content from 0 to 6%. It is possibly due to hydrogen bond [5] between hydroxyl group (O-H) from starch and hydroxyl and carboxyl group (COOH) of cellulose.

This bonding resulted in a higher strength and lowered break. Plasticizers give elastic properties to plastic and have the ability to weaken the intermolecular hydrogen bond and increase spacing [10]. An increase in elongation at break with higher sorbitol content was linked to the addition of plasticizers that act as the compatibilizer to improve the interaction between matrix and fillers.

However, bioplastic with MCC content 2% and 25% sorbitol provided an increase in elongation at break. This could be attributed to an antiplasticisation effect. Myllarinen et al. (2002) reported that film with sorbitol content below 27% has the tendency to strong interaction between starch and sorbitol which resulted in decreasing mobility of system. Antiplasticisation effect also results in rigid and brittle plastic. The highest elongation at break value was observed at bioplastic with MCC content 0% and 30% sorbitol.

Base on the values obtained in figure 1 and figure 2, the results show the relationship between the addition of reinforcement fillers and hand, plasticizers improved the brittleness by increasing sorbitol's content but resulted in lower tensile strength plasticizers to the mechanical properties of bioplastics. While the addition of MCC as reinforcement fillers represented an improvement in tensile strength with increasing value, elongation at break showed otherwise. This indicates that MCC is used to strengthen materials but results in more brittle plastics.

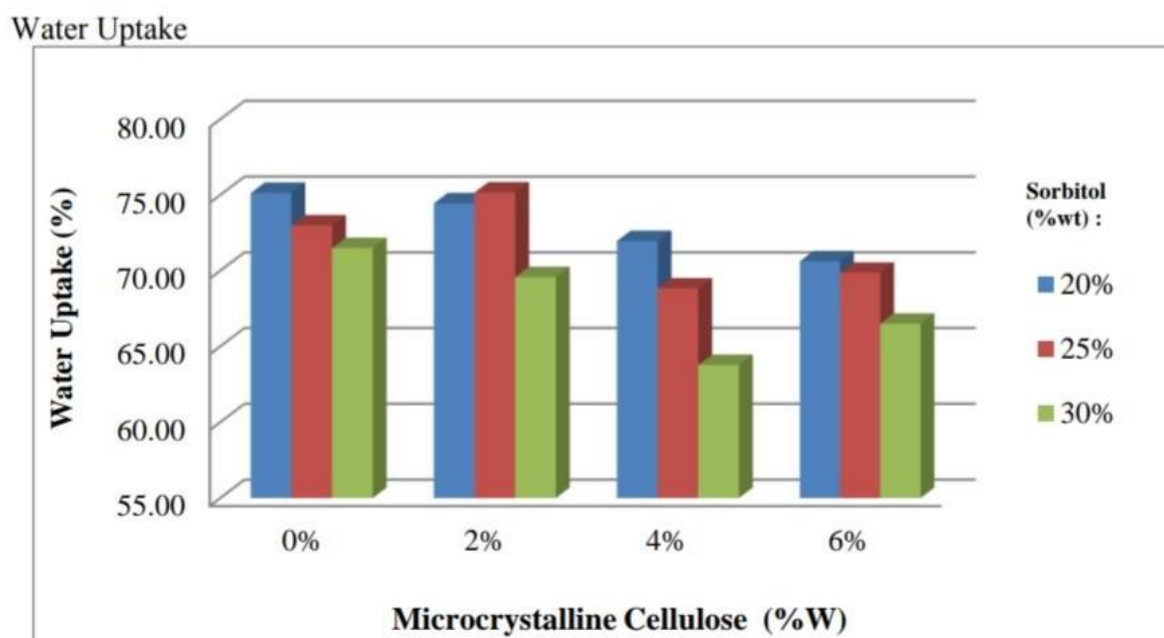
Figure3. Density of starch based bioplastic reinforced with MCCAvicel IPH101 using sorbitol as plasticizer.



The effect of MCC content on density of plasticized starch based bioplastic is shown in Figure 3. Density increased for bioplastics with 0% MCC, on the other hand density of bioplastics decreased as the content of MCC increased from 2 to 6%. Bierley et al. (1988) conveyed that plastics with lower density tended to have open structure which can be penetrated by fluids, such as H₂O, O₂ or CO₂.

The results showed that addition of MCC triggering in lower density. This could be attributed to decrease in crystallinity index of MCC after ultrasonic treatment as reported by Zhang et al. (2013). Decrease in crystallinity leads to an increase in amorphous fraction. Higher amorphous fraction attributes to lower polymer's mass because of the un-uniformity and less dense molecules that result in lower density. Plasticizers also effect the density of bioplastics as increasing plasticizers content causes network to swell and results in the decrease of network density [14]. The highest density value was found at bioplastic without reinforcing MCC and 30% sorbitol content.

Figure 4. Water uptake of starch based bioplastic reinforced with MCCAvicelPH101 using sorbitol as plasticizer.

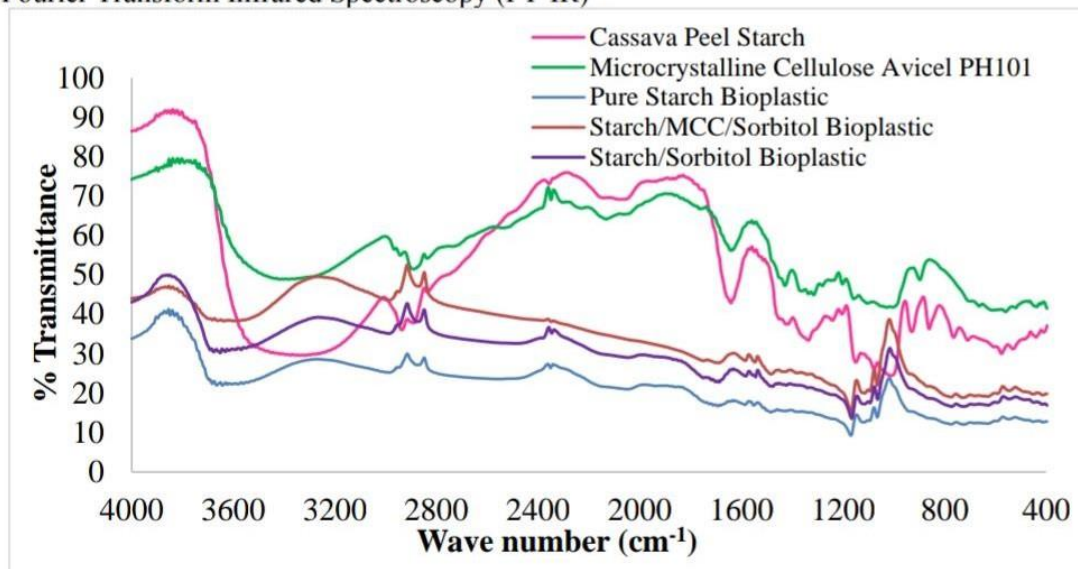


The effect of MCC content on water uptake of plasticized starch based bioplastic is shown in Figure 4.

Water uptake decreased as the content of MCC increased for bioplastics with MCC content 0, 4 and 6%. Furthermore, starch was more sensitive to water because of its hydrophilic nature than cellulose [15]. On the other hand, an increase in water uptake was found for bioplastic with MCC content 2% and 25% sorbitol. Cellulose has strong hydrogen bond and characteristic that has the difficulty to bond with water. However, the excess addition of cellulose has the capability to increase water absorption because the intramolecular hydrogen bonding. An increase in water uptake could not fully homogeneous and resulted incorporated particles. This could be attributed to the less handled ultrasonication process.

Figure 5. FTIR specs of cassava peel starch, MCC, pure starch bioplastic, starch/MCC/sorbitol bioplastic and starch/sorbitol bioplastic

3.4. Fourier Transform Infrared Spectroscopy (FT-IR)



The analysis of FT-IR shows the characteristic peaks from bioplastics. FT-IR is used for its indirect analytical method to study molecular structures [16] and has the capability to measure functional groups in greater speed and greater sensitivity [17]. The interaction between bioplastic's components can be identified from FT-IR spectra. If components form immiscible blends, then no appreciable changes can be found in FT-IR spectra. However, if the components are compatible, chemical interaction exists between their chains culminating in the change of FT-IR spectra [18].

Figure 5 shows the results of characteristic peaks of cassava peel starch, MCC, pure starch bioplastic, starch/MCC/sorbitol bioplastic and starch/sorbitol bioplastics. The rose colored line represented characteristic peaks for cassava peel starch. It could be observed that the hydrogen bond $-OH$ stretching at 2835 cm^{-1} and the $C-H$ stretching at 709 cm^{-1} . Characteristic peak at 1242 cm^{-1} indicated $C-O$ bending of $C-O-H$ group [9]. The green colored line represented characteristic peaks for MCC with $-OH$ bending at 3383 cm^{-1} . The peaks at 1002 cm^{-1} , 1103 cm^{-1} and 1157 cm^{-1} were attributed to $C-O$ stretching. The bending peak of $C=C$ bond appeared at 1639 cm^{-1} . The blue colored line represented pure starch bioplastic's characteristic peaks. For $-OH$ stretching and bonding appeared at 2877 cm^{-1} and 3649 cm^{-1} respectively. Characteristic peaks at 1111 cm^{-1} and 1176

cm⁻¹ indicated C-O stretching. The maroon colored line represented starch/MCC/sorbitol bioplastic's characteristic peaks. It could be observed that the C-O stretching at 1064 cm⁻¹, 1118 cm⁻¹ and 1168 cm⁻¹. The peaks at 2870 cm⁻¹ and 2989 cm⁻¹ indicated –OH stretching while peak at 3633 cm⁻¹ indicated –OH bonding. The purple colored line represented starch/sorbitol bioplastic's characteristic peaks. For –OH stretching and bonding appeared at 2877 cm⁻¹ and 3668 cm⁻¹ respectively. The peaks at 1107 cm⁻¹ and 1172 cm⁻¹ indicated C-O stretching.

The addition of MCC and sorbitol aims to modify starch matrix. Lower wave number results in stronger hydrogen bond [9] as C-O peak of starch/MCC/sorbitol bioplastic is wider than the pure starch bioplastic. This means that the strong hydrogen bonding exist between C-O of starch and –OH of MCC. Furthermore, the addition of sorbitol can improve the intermolecular interaction.

Production of Potato starch based bioplastic:

The methodology of producing the bioplastics is as follows:

1. 15g of dried potato starch was diluted with 150ml distilled water in a 500ml beaker.
2. The beaker was brought on a heater plate including a magnetic stirrer.
3. A magnet stick was added in the beaker and let stirring at 2r.p.m.
4. 18ml of 0.1M HCl was pipetted in the mixture and the same amount of 0.1M NaOH was added for neutralization.
5. 12ml of 1% glycerol was added.
6. The heater was switched to 100oC.
7. The mixture was allowed to heat for about 15 mins and the stirrer was brought to 3 r.p.m. as the mixture was hardening. The mixture took about 1 hour to form an opaque gel.
8. The gel was spread on a mold of 2 mm thickness.
9. The sample was allowed to dry

COST OF THE PROJECT:

Approximately RS. 750-1000/- FOR Prototype buildup

SOCIAL IMPACT:

Although bioplastics save more nonrenewable energy than conventional plastics and emit less GHG compared to conventional plastics, bioplastics also have negative environmental impacts such as eutrophication and acidification. To help mitigate environmental pollution caused by single use plastic. Reducing plastic waste. Saving land pollution

CONCLUSION:

The cassava peel starch/MCC bioplastics increased in tensile strength from 0,88 MPa for pure starch bioplastic to 9,12 MPa. Contrary to tensile strength, a decrease in elongation at break was reported. The improvement in bioplastics with reinforcing MCC could be attributed to the strong hydrogen bond between hydroxyl groups of the interface of both MCC fillers and starch matrix. This formation is also influenced by the percolation mechanism. Density of bioplastics decreased as MCC content increased. Furthermore, addition of MCC content decreased water uptake of bioplastics. The incorporation of MCC particles into starch matrix resulted in agglomerates that caused deflections in bioplastics. FT-IR spectra provided information about hydrogen bond through its characteristic peak. Bioplastic with the highest tensile strength assumed to have better characteristics than the other bioplastic was found at MCC content 6% and 20% sorbitol.

The Institute of Building Structures and Structural Design (ITKE) at the University of Stuttgart (Germany) has worked on fibre reinforced polymers, bionics and the development of new building materials. Architect Carmen Köhler is investigating the applicability of natural fibre reinforced biopolymers in the construction industry. In contrast to fibre glass-reinforced polymers, natural fibre-reinforced polymers are considerably lighter, emission stable and breathable. "Construction material that is breathable at the same time as preventing moisture from penetrating, is also of major interest in architectural terms," said Carmen Köhler explaining that she finds the material suitable for facades and insulations. The groups of researchers are currently investigating polylactide, cellulose acetate and other materials. Selection criteria are price, temperature stability and the potential use of additives during processing.

16. PRAGYAN ROVER

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SCHOOL STUDENTS	IQRA, ANAM
SCHOOL	COMPOSITE SCHOOL, KAILA BALAK, GHAZIABAD

ABSTRACT:

A Pragyan rover is a motor vehicle that travels across the surface of the planet upon arrival. Rovers have several advantages over stationary landers: they examine more territory, they can be directed to interesting features, they can place themselves in sunny positions to weather winter months, and they can advance the knowledge of how to perform very remote robotic vehicle control. Pragyan will overcome obstacles using the rocker bogie (a design that has no springs or stub axles for each wheel, allowing the rover to climb over obstacles). Our purpose this project is to design and develop a rover by increasing the stability and operational speed of the system by expanding its support polygon, making it more stable and adaptable while moving at high speed, but keeping its original robustness against obstacle.

OBJECTIVES:

1. To improve speed of the rover.
2. To make a robust rover.
3. To optimize the speed of the rover.

The rocker bogie design allows the chassis to climb over any obstacles, such as rocks ,ditches, sand, etc that are up to double the wheel's diameter in sure while keeping all wheels on the ground maximum time. As compared to any suspension system, the tilt stability is limited by the height of the centre of gravity and the proposed system has the same.

INTRODUCTION

1. Exploration (yeah who would have known). Learning about the planets, moons around us with landers and orbiters. This is active.
2. Astronomy (yeah it's also a type of exploration). The ability to see deeper and farther with higher resolution with much greater detail in the atmosphere, the air causes planets and stars to flicker causing a blurred image. They found ways around the flicker, but it is still not as clear as an image taken from space. This is active.
3. Materials Engineering. Some materials in microgravity can grow extremely large crystals that have physical properties that are different and useful to industry. Experimental Stage. This could open up avenues for industry in orbit.
4. Drugs. Some drugs can only be created in the absence of gravity. Experimental Stage.
5. Tourism. Many rich people have been everywhere on Earth, and want to go somewhere new. Many desire the opportunity to go to space. Down payments have been made by many individuals to various corporations for both orbital, and suborbital flights.
6. Mining. The ability to acquire raw materials from the moon, Mars, and asteroids would be invaluable to both industry, and exploration. This idea is only on paper, but expected to happen. No plans are in place.
7. Colonization. The moon, Mars, Ceres and the moons of Jupiter are all colonizable to a point. All of these colonies would require a closed environment. Much planning has been made. Transportation is not available.
8. Communication. Hundreds of cell, radio and other type of communication satellites orbit above our world. This has proliferated, and is the largest number of active satellites in orbit.
9. Earth Location Satellites. GPS first example. The air force is launching its 2nd generation satellites, and China is putting up its own constellation.
10. Weaponizing. Establishing military satellites, for spying, communications, location, weapons, and defenses can be put in orbit. This is very early stage, and is frowned on by the world.

OBJECTIVE AND SCOPE

Search for and characterize a variety of rocks and soils that hold clues to past water activity. In particular, samples sought will include those that have minerals deposited by water related processes such as precipitation, evaporation, sedimentary cementation, or hydrothermal activity.

Determine the distribution and composition of minerals, rocks, and soils surrounding the landing sites.

A Pragyán rover is a motor vehicle that travels across the surface of the planet upon arrival. Rovers have several advantages over stationary landers: they examine more territory, they can be directed to interesting features, they can place themselves in sunny positions to weather winter months, and they can advance the knowledge of how to perform very remote robotic vehicle control.

Pragyán will overcome obstacles using the rocker bogie (a design that has no springs or stub axles for each wheel, allowing the rover to climb over obstacles). Our purpose this project is to design and develop a rover by increasing the stability and operational speed of the system by expanding its support polygon, making it more stable and adaptable while moving at high speed, but keeping its original robustness against obstacle.

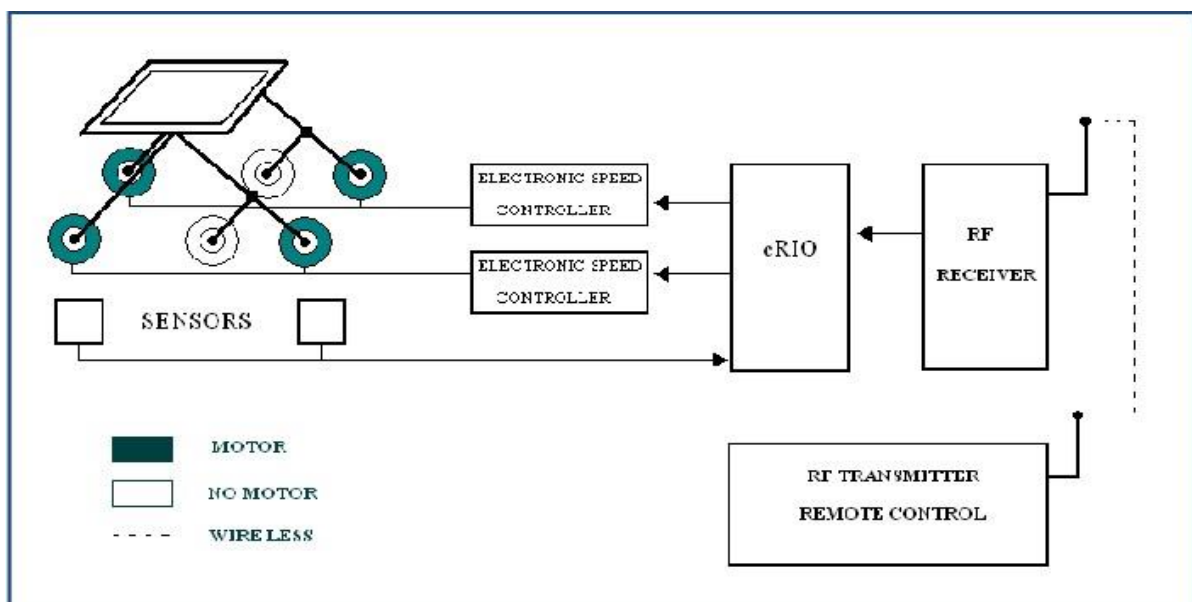
The rocker bogie design allows the chassis to climb over any obstacles, such as rocks, ditches, sand, etc that are up to double the wheel's diameter in sure while keeping all wheels on the ground maximum time. As compared to any suspension system, the tilt stability is limited by the height of the Centre of gravity and the proposed system has the same.



HARDWARE SPECIFICATIONS:

1. PVC pipe :Length: 6 feet, size: 1" (25mm)
2. 90-degree PVC Elbow : Quantity: 6 pieces, size: 1" (25mm)
3. 45-degree PVC Elbow : Quantity: 6 pieces, size: 1" (25mm)
4. PVC cap :Quantity: 2 pieces, size: 1" (25mm)
5. Metal or Hard plastic plate : Quantity: 4 pieces, size: 10 cm long
6. Hose Clip PVC Pipe Clamp :Quantity: 6 pieces, size: 1" (25mm)
7. Robot wheel with Hex Brass Coupling :Quantity: 6 pieces, Dimeter: 125mm
8. 12V DC Metal Gear Motor : Quantity: 6 pieces, speed: 30 RPM
9. 12V DC Battery (Green thing in video) :Quantity: 1 pieces, type: Lead Acid
10. RF 2.4Ghz Multi Channel Remote " wireless remote control for 2 DC Motor
11. Telephone Spiral wire
12. Nuts and bolts

BLOCK DIAGRAM:



Block diagram of Rocker Bogie System

Learning associated with this project for young learners and conclusion:

1. They can get an idea how these missions are performed.
2. They can develop interest in this field by exploring more in this.
3. They can develop passion of doing something out of the box.

17. AUTONOMOUS FARMING BOT

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SCHOOL	GOVT. SARVODAYA KANYA VIDYALAYA, ARAMBAGH LANE, DELHI

ABSTRACT:

The agrarian business is a standout amongst the most critical industry for giving fuel to our survival. An important role is being played by the robots in the field of agriculture for farming purposes autonomously. The undertaking speaks to a thought which will help Indian ranchers where a robot (A. F. B.) is intended to help agriculturists for agrarian purposes for our survival. It is mainly designed to minimize the labor of farmers in addition to accuracy of work and increase the speed. Here, an unequivocally working and a multitasking robot have been created, remembering the belief system that various little autonomous machines could be more productive than conventional substantial tractors and human exertion. Autonomous farming bot is a multifunctional robot that performs three noteworthy capacities typically required in Agriculture field i.e. Ploughing, Seed dispensing or spreading the fertilizer and harvester. Autonomous farming bot comprises of a control unit which chooses field estimation in length and breadth in the feat. After size determination of the field, a set capacity enters in the board permits choosing modes like Plowing, Seed circulation and Harvester. This is a working undertaking that has been totally amassed properly tried and employments Mechanical/Electrical/Electronic segments according to the necessity of the model of Autonomous farming bot.

KEYWORDS-Self Sustained Agriculture, Remote monitoring

INTRODUCTION

Agriculture is the backbone of India but Indian agricultural techniques are old and outdated. Still, many places are there in India where very primitive ways and techniques are used. Dairy animals plough is utilized as a strategy

for development at an expensive scale by Indian farmers. Utilization of substance composts, high yielding assortments of seeds, tractors, and substantial machines are being utilized on an unimportant scale. Apply autonomy if presented in agricultural industry will assist and help our farmers to a certain degree. It significantly assumes an essential part of modern, restorative, military applications and some more.

Agriculture applies autonomy in the utilization of automation in frameworks, for example, farming, ranger service and fisheries keeping in see the major components of ascending of cost, inaccessibility of skilled labor and the absence of water assets. Applying computerization and automation to the field will enormously help in advanced creation in the industry which will help agriculture like ploughing, seed dispensing and harvesting, etc. will aid farmers in giving better results of productivity. Presently farmers are not getting better results because of non-use of robots in all agriculture functions. Conventional methods depend on manpower manually for dragging, lifting, weed control, fruit picking is being utilized in India. Farmers are inclined to work in the harmful environment while spraying chemicals and pesticides. While tractors that compact the muddy land as they are heavy and large and cannot move in terrain conditions, these techniques neglect to distinguish the harvest and soil in close closeness.

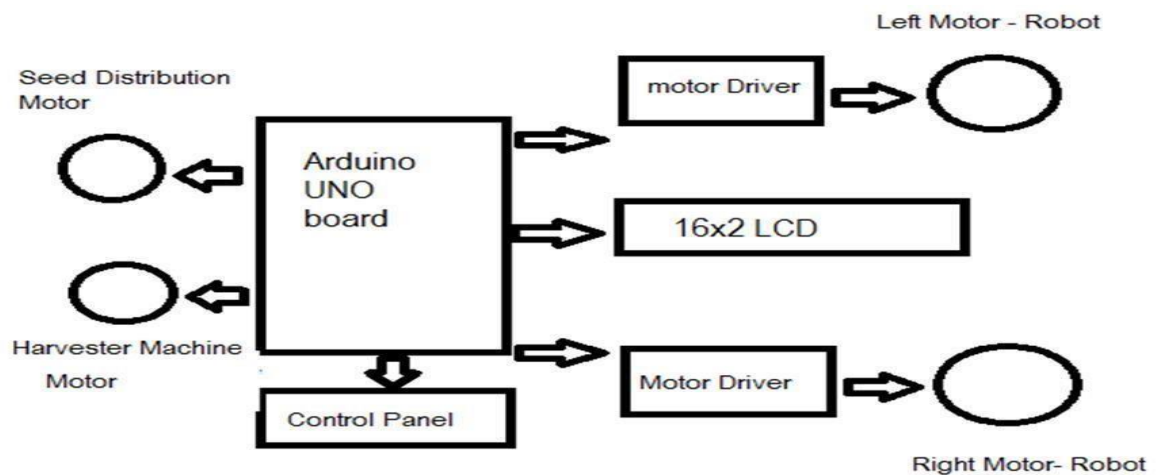
A robotized and innovative agrarian framework (which utilizes field robot) is exemplified from above issues. Robots can work restlessly in all conditions according to the indicated program to perform required exercises with computerized help. The big advantage of lightweight robots is that they do not compact the muddy land as that of large machinery does. High-tech Automation with a camera fitted Field Assisting Robot in agriculture is a very simple technique where many instruments are coupled together which makes it easy for a farmer to irrigate and to keep an eye on the path on which the robot runs.

SALIENT FEATURES:

1. Sensors based monitoring (IR and Level)
2. Mobile and Solar Activated
3. Automated Water and Fertilizer Sprinkler According to field requirement.
4. Automatic Waste segregator in installed unit.
5. Water usage minimization through sensors
6. Less Maintenance and easy installation
7. Remote Monitoring

8. Location through Android app
9. Provision for Proper waste management and disposal

METHODOLOGY:



To understand the architecture of the proposed system, a complete flowchart is drawn.

Follow of proper instructions and made to move in a proper path. The mode of operation is given below:

Mode 1

This mode is the seed dispensing mode and, in this mode, the seeds get dispensed in the soil along with the obstacle monitoring. A 3V 4280 RPM DC motor is connected to the back of robot where the dispenser is connected. The motor is prevented to rotate by stopping its torque. This is done by attaching a nut to the shaft of the motor. This causes the motor to vibrate. The particular time installments at which the dispenser will vibrate has been set in the programming of Arduino UNO. This controls the flow of seeds from the seed dispenser in order to stop the wastage of seeds.

Mode 2

This mode provides the harvesting of the crops. The harvester made up of cylindrical rods that harvest and collects the crops at the time of harvesting. A 3V4280 RPM DC motor is connected to the side of the harvester in order to provide rotation to the harvester. This motor is connected to the Arduino Uno via motor driver L293D. The rotation speed and other specifications can Uno

Mode 3

This mode provides robot to plough. A plough made up of jagged teeth is attached at the back of the robot which ploughs the field. It provides a proper stable space for the seeds to settle in the soil in a proper line. Hence, all the functions are recorded in the program code of Arduino Uno and the commands are given by the user itself making the robot fully automatic. A farmer can set the respective mode at any instant of time and the robot will function accordingly. Simultaneously, the robot is providing a full obstacle monitoring to the farmer at the receiver ends. This machinery will always provide aid to farmers and produce better quality crops.

HARDWARE AND SOFTWARE COMPONENTS-

1. ARDUINO UNO MICROCONTROLLER
2. IC 7805 5 VOLT REGULATOR
3. RF Module (Transmitter & Receiver)
4. DIGITAL VOICE PROCESSOR USING APR 9600.
5. Variable resistor, Capacitor and Level Sensors

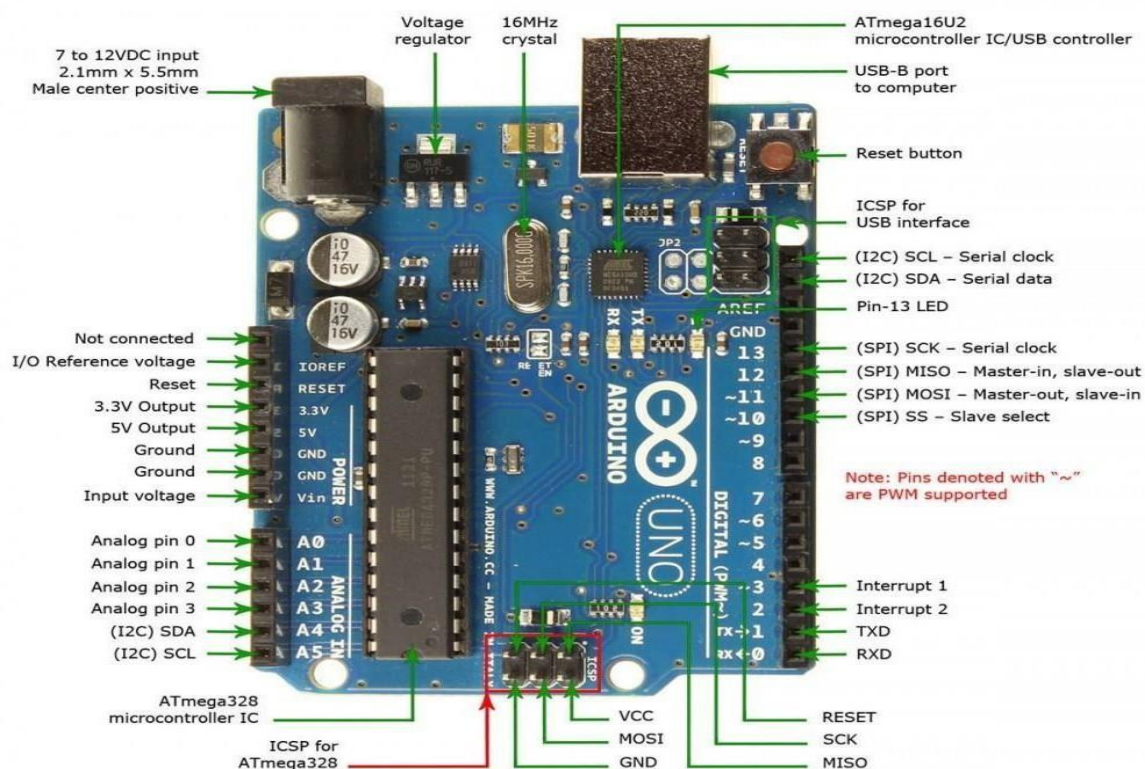
COMPARITIVE STUDY

Problems Faced by Indian Agriculturists

1. The little and divided landholdings.
2. The farming of seeds is a fundamental contribution for attaining higher yields and the dispersion of guaranteed quality seed is critical as the creation of seeds and the nature of seeds are out of achieves and good quality seeds are difficult to identify.
3. The absence of motorization the absence of automation of agribusiness in a few sections of the nation. The majority of the agricultural tasks in bigger parts are carried on by human hand utilizing simple and regular apparatuses like wooden plough sickle and so on. After freedom, some advancement have been made for automating agriculture in India and the green unrest in 1960 has been a requirement for mechanization was uniquely felted. What's more, the increase was an aftereffect of expanding utilization of tractor control tiller and consolidated gatherer water system pumps and worker machines. In spite of the fact that India is the second biggest flooded nation in the world after China, 33 percent of the trimmed territory is the underwater system.

4. The soil disintegration the soil disintegration has vast tracts of rich land endure from soil disintegration by wind, rain and water. This territory must be dealt with and re-established to its unique richness.
5. A cow does on overage release between 70 and 120 kg of Methane per year. Methane is a greenhouse gas like carbon dioxide (CO₂). But the negative effect on the climate of Methane is 23 times higher than the effect of CO₂. Therefore the release of about 100 kg Methane per year for each cow is equivalent to about 2'300 kg CO₂ per year. Let's compare this value of 2'300 kg CO₂: The same amount of carbon dioxide (CO₂) is generated by burning 1'000 litres of petrol. With a car using 8 litres of petrol per 100 km, you could drive 12'500 km per year (7'800 miles per year).

Worldwide, there are about 1.5 billion cows and bulls. All ruminants (animals which regurgitate food and re-chews it) on the world emit about two billion metric tons of CO₂ equivalents per year. In addition, clearing of tropical forests and rainforests to get more grazing land and farmland is responsible for an extra 2.8 billion metric tons of CO₂ emission per year!



According to the Food and Agriculture Organization of the United Nations (FAO), **agriculture is responsible for 18% of the total release of greenhouse gases worldwide** (this is more than the whole transportation sector). Cattle-breeding is taking a major factor for these greenhouse gas

emissions according to FAO. Says Henning Steinfeld, Chief of FAO's Livestock Information and Policy Branch and senior author of the report: "Livestock is one of the most significant contributors to today's most serious environmental problems. Urgent action is required to remedy the situation."

6. The deficient storerooms
7. The composts manures and biocides.
8. The water system and ploughing
9. Lack of lasting methods for the water system.
10. During work, farmers have to suffer many problems, at the time for spraying pesticides liquids they have to face some breathing diseases.

Usage of Agriculture robots in India

There are many uses of Agriculture robots in India. India being a developing country has a very primitive and neglected farming sector. India has a very rich land in terms of betterment of Indian crop production, good quality crops, development and employment; Agriculture robots should be used in India to have a better managerial crop production without wastage of crops.

Every year a huge amount of crops are being produced but due to improper methods of harvesting, batch management and supply, some amount of crops gets wasted. Farmer has to do hard work in growing crops working every day with long hours in sun. Cattles are used for farming like ploughing which requires a lot of time. But if Agriculture robots will be used then all these problems could be tackled. For this Indian government plays an important role in the investment of capital in farming sector which is a most important area for the development of India.

With the help of Agriculture robots, all the tasks could be performed by the robot while the farmer just has to operate the machine and then he could also do some other work if he wants. Agriculture robots could do all the work with less time and very efficiently. It will draw proper and accurate lines on the soil with the jagged teeth of the plough, this provides better space for each seed to grow and absorb an equal amount of water and sunlight. This will produce better quality seeds. For the harvesting also, Agriculture robots can harvest all the crops efficiently with the help of harvester. These robots could be made in all sizes depending upon the requirement of the farmer and the field. For small areas, small Agriculture robots will do just fine. All this

will save time and energy for the farmer and will bring a lot of profit as good quality and healthy crops will be produced in less time.

Present Work

According to our literature survey, with the technology getting more advanced, India is lagging in the farming sector. Very primitive ways are used by farmers for agricultural purposes. Our present work has been developed with the references taken with these some findings which have been shown below on which thesis on the topic of the Agricultural automation system.

1. Developed agriculture needs to find new ways to improve efficiency. One approach is to utilize available information technologies in the form of more intelligent machines to reduce and target energy inputs in more effective ways than in the past. Precision Farming has shown benefits of this approach but we can now move towards a new generation of equipment. The advent of autonomous system architectures gives us the 18 opportunity to develop a completely new range of agricultural equipment based on small smart machines that can do the right thing, in the right place, at the right time in the right way.
2. Agricultural Robotics is the logical proliferation of automation technology into bio systems such as agriculture, forestry, greenhouse, horticulture etc. Presently a number of researchers are being done to increase their applications. Some of the scientist contributions are a mobile robot, flying robot, forester robot, Demeter which is exclusively used for agriculture. A brief discussion is being done about the types of robots which increase the accuracy and precision of the agriculture.
3. Computer-based sensors and actuators such as global positioning systems, machine vision, and laser-based sensors have progressively been incorporated into mobile robots with the aim of configuring autonomous systems capable of shifting operator activities in agricultural tasks.

However, the incorporation of many electronic systems into a robot impairs its reliability and increases its cost. Hardware minimization, as well as software minimization and ease of integration, is essential to obtain feasible robotic systems. A step forward in the application of automatic equipment in agriculture is the use of fleets of robots, in which a number

of specialized robots collaborate to accomplish one or several agricultural tasks. This paper strives to develop system architecture for both individual robots and robots working in fleets to improve reliability, decrease complexity and costs, and permit the integration of software from different developers. Several solutions are studied, from a fully distributed to a whole integrated architecture in which a central computer runs all processes.

4. This paper strives to develop a robot capable of performing operations like automatic ploughing, seed dispensing. It also provides manual control when required and keeps tabs on the humidity with the help of humidity sensors. The main component here is the AVR Atmega microcontroller that supervises the entire process. Initially, the robot tills the entire field and proceeds to plough, simultaneously dispensing seeds side by side. The device used for navigation is an ultrasonic sensor which continuously sends data to the microcontroller. On the field, the robot operates in an automated mode, but outside the field is strictly operated in manual mode. For manual control, the robot uses the Bluetooth pairing app as a control device and helps in the navigation of the robot outside the field. The field is fitted with humidity sensors placed at various spots that continuously monitor the environment for humidity levels. It checks these levels with the set point for humidity and alerts the farmer. The alerting mechanism is GSM module that sends a text message to the farmer informing him about the breach in set point. The farmer then responds via SMS to either switch on the water sprinklers or ignore the alert. The water sprinklers, if on, bring down the humidity level thus providing an ideal growing environment to crop.
5. Mobile application-controlled agriculture robot is a device used in agricultural activities with the aim to reduce manual activity, as labour shortage is the crisis of the recent agricultural production. Agricultural productivity relies on various factors such as water availability, soil fertility and quality of seeds, labours, availability and allied agricultural machinery. The labour shortage is the major concern for the cause of reduced productivity. In this research, a mechanical device with the aid of the mobile control is proposed to engage in multiple agricultural activities. This mechanized robot is expected to overcome the labour shortage and likely to enhance the agriculture productivity. Agricultural robotics is machine programmed to do the agricultural task. The robot which is controlled by the mobile application or by a program which is used for harvesting, Plough, spraying and cutting and also includes

camera monitoring manner with the help of this mobile application. The robot will be operated by a battery which is connected to a solar panel for recharging. The challenge and demand of designing and developing of robots are to work in synchronization with nature.

6. In the current scenario, most of the countries do not have sufficient skilled manpower specifically in the agricultural sector and it affects the growth of developing countries. So it's a time to automate the sector to overcome this problem. An innovative idea of our project is to automate the process of sowing crops such as sunflower, baby corn, groundnut, cotton and vegetables like beans, lady's finger, pumpkin and pulses like black gram, green gram etc. to reduce the human effort and increase the yield.

FEATURES	TRADITIONAL SYSTEMS	PROPOSED SYSTEM
MOBILITY	NO	YES
WATER REQUIREMENT	HIGH	LOW
OPERATION/MAINTENANCE COSTS	HIGH	LOW
SENSORY & REMOTE CONTROL	NO	YES
SELF SUSTAINABLE	NO	YES
SOLAR ACTIVATED	NO	YES

COST OF THE PROJECT

The research model focuses on self-sustainability, energy efficiency, water and land resources conservation, it can generate resources of its own functioning and is easy to install, Less maintenance fee.

Moreover, Grants are provided for conducting such research in INDIA and infrastructure is provided at subsidized rates.

CONCLUSION:

The Agrobot has been tested on the field region where small rocks and pebbles whenever appeared on the path of the robot while the robot moves forward, the obstacle monitoring system showed the obstacles on the TV monitor. By this, the robot could be shut down immediately by the farmer. The wireless AV Radio needs to be tuned to set the proper frequency. This will

enhance the video quality of the TV Monitor. In an open space like fields, wireless network works best. Hence, the wireless connection suits best for fields while monitoring. All three modes have been checked properly and tested. All the modes work successfully. Mode 1 shows the proper functioning of seed dispenser. The seeds get dispensed in a proper line drawn by the jagged teeth of the plough. Below shows the image of seed dispensed in the proper line.



Figure: Result of Seed dispenser

Hence, the robot has been duly tested and it functions properly when all its features have been operated.

Scope

The project can be actualized with tremendous outcomes in huge scale that will profit each farmer. Aside from seed dispensing, ploughing, harvesting and other cultivating processes like showering pesticides, fruit picking, and so forth can likewise be executed in one robot in this manner making the machine skilled multitasking. Raspberry Pi of most recent versions could be utilized rather than Arduino Uno for greater progression of the robot.

The robot can be completely mechanized with the assistance of programmable logic controller (PLC) and even SCADA for more appropriate and progressed control of elements of robots over an extensive scale. In future, drones can likewise be included in order to dispense the seeds and also showering pesticides. AgroDrones could also help agriculturists in future while they spray seeds or pesticides at the height fed by the user in the hardware system.

All these advancements could lead India in a better state in terms of the farming sector.

18. MOUSE EVENTS CONTROL USING HAND GESTURES

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Abstract

As the computer technology is growing up, the importance of **human computer interaction** is rapidly increasing. Most devices use touch screen technology which cannot be affordable to all the applications. A virtual human computer interactive module such as virtual mouse can be an alternative way for the traditional touch screen. The **objective** is to create a hand tracking application to interact with system, and develop a virtual human computer interaction module. This module can be used for creating an interface between computer and human using hand gestures.

This project presents an approach to develop a **real-time hand gesture recognition** based on "Vision" that uses a webcam and Computer Vision technology, such as image processing that can recognize several gestures for use in computer interface interaction. The applications of real time hand gesture recognition in the real world are numerous, due to the fact that it can be used almost anywhere where we interact with computers. An **important application** of this project is to simulate the mouse as a visual inputting device with all of its tasks such as left click, right click, double-click, dragging and dropping, and scrolling.

Introduction

The importance of computers has increased to a great extent these days. There it can be used for general purpose or at work places. Even there is a demand of more and more application based devices, where the latest example can be of smart phones.

Traditionally, we use hardware devices i.e. the mouse and keyboard to interact with the system. But due to the growth of technology and demand of virtualization, this new technique has been proposed. An alternative way

for touch screen can be creation of a virtual human computer interactive device.

The various HCI Interfaces that are being used since earlier times having some demerits. They block the improvement of computer dependent devices or systems. It is now a general tendency to lessen human efforts and overcome the usual, traditionally being used computer dependent devices. Considering an example of a keyboard, it is not possible to reduce the entire keyboard in a very small size so that it can accommodate the fingers. Thus it becomes somewhat difficulty while working where accuracy is needed.

Gestures: Gesture is defined as an expressive, meaningful body motion that expresses an idea, opinion, emotion, etc. Human interaction with a computer in which human gestures, usually hand motions, are recognized by the computer.

Gesture recognition is used to interact with computers, such as interpreting sign language. The hand gesture recognition technique can be classified into two types: 3D-hand model approach and the appearance based approach.

A **static** gesture is observed at the sudden burst of time whereas a **dynamic** gesture is intended to change over a period of time. A waving hand means goodbye is an example of dynamic gesture and the stop sign is an example of static gesture. To understand a full message, it is necessary to interpret all the static and dynamic gestures over a period of time. This complex process is called gesture recognition.

As per the context of our project we calculate the movements of hands to define the movement of mouse pointer and use gesture recognition to perform various mouse events. The **primary** step in gesture recognition systems is the detection of hands and the segmentation of the corresponding image regions. This segmentation is crucial because it isolates the task-relevant data from the image background, Computer Vision Techniques for Hand Gesture Recognition before passing them to the subsequent tracking and recognition stages.

Various methods have been proposed in the literature that utilize a several types of visual features and, in many cases, their combination. Such features are skin color, shape, motion and anatomical models of hands.

Literature Review

This is not an original idea for the implementation of “Mouse Event Control using Gestures” the idea is being used in some places. But, here we will implement it with some extra features.

The main goal of gesture recognition research is creation of a system that can identify specific human hand gestures and use them to convey information or for device control as well as applications control. Hand Gesture Recognition System is a branch of Human Computer Interaction in which Human hand gestures are recognized by the computer system and then perform pre-defined task as per the application for controlling software as well as hardware.

Existing System and Drawbacks

No.	AUTHORS	DESCRIPTION	DRAWBACKS
1	Angel, Neethu.P.S.	Real-Time Static and Dynamic Hand Gestures Recognition.	The hand tracking has to be specifically adapted for each user. This system was implemented only in a restricted to the indoor environment. This system is prone to noise and sensitive to the change of the illumination.
2	J.L. Raheja, A.Chaudhary, K.Singal	Proposed using hsv algorithm but this uses special sensor kinect to capture image and processes it.	User has to spend more money for the sensor.
3	Abhik Banerjee, Abhirup Ghosh	Mouse Control using a Web Camera based on Colour Detection.	The presence of other coloured objects in the background might cause the system to give an erroneous response. If the resolution of the camera is too high then the system might run slow.

Some approaches to implement this System

(a) Mouse free: The proposed system makes use of the webcam for tracking the user's hand and to recognize the gestures for the purpose of interaction with the system. The contributions of our work will be to implement a system for hand tracking and simple gesture recognition in real time.

(b) Vision Based approaches: In vision based methods no extra devices are required. The system needs only camera to capture the image required for a natural human computer interaction.

(c) Instrumented /Data Glove approach: Instrumented data glove approach involves the use of sensor devices to recognize the hand gestures. This easily provides exact coordinates of palm and finger's location and orientation, and helps in hand recognition.

(d) Colored Markers approaches: In order to direct the procedure of tracking the hand and locating the palm and fingers colored markers are gloves that are worn by the human hand. It consists of some colors in order to direct, which provide the ability to extract geometric features necessary to form hand shape.

Problem Statement and Solution Approach

Problem Statement:

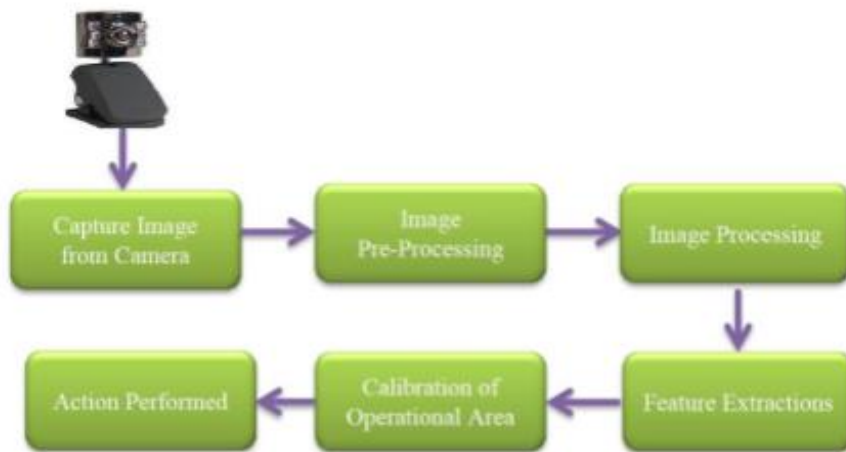
Generally for personal use in computers and laptops we use a physical mouse or touchpads invented a long time ago and in this project, requirement for external hardware is completely eliminated by using human computer interaction technology we detect hand movements and gestures for mouse movements and mouse events.

"Mouse Event Control using Gesture" helps to take control of complete system with movement of fingers of hand.

Solution Approach:

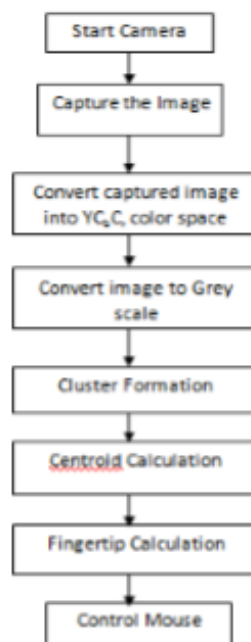
In this, the project is based on a real time video processing that is based on a real time application system. This project will replace one of the traditionally used input device i.e. mouse, by using the hand gesture the user will be able to naturally interact with the computer.

The basic block diagram of the overall proposed system is as shown below:



Here, as soon as the palm is detected by the camera, it starts capturing the images and stores in array and starts to process on it. Now the processed image is given as input to the next phase of processing where it starts to detect various hand gestures and works accordingly. The above flowchart is for capturing single image. This is a real-time processing system, so image is captured continuously by the web camera.

The detailed working of the proposed system is shown below,



In the given flowchart, the input is given through hand gesture to web cam. The web camera captures the image of the hand gestures. The image processor recognizes movement and then converts it into signal. Then the input signal is send to hardware to do further processing and makes decision.

The actual process involves following steps:

- (i) Take image from web cam.
- (ii) Get frames from it
- (iii) Now, create memory array of image

- (iv) Finding pixel RGB or HSV
- (v) Compare pixel color
- (vi) Make decision

Facilities required for proposed work:

- (i) Web Cam
- (ii) Python- For controlling various mouse events
- (iii) OpenCV- Open Source python library for Computer Vision used for Detecting Finger-Tip.

Real World Application

Today in this modern world, everyone wants to be ahead with respect to technology. Everyone wants to do their task and work without much effort and in easier way.

This Proposed System will help such people to access their system without much movement and physical effort. With this system, he can control his system in air by just moving their hand in some predefined gestures.

This system is of more benefits to people who cannot access their computer physically.

Gesture recognition empowers the communication of humans with machines and collaborates normally with no mechanical devices. Making use of the idea of gesture recognition, it is conceivable to point a finger at the PC screen with the goal that the cursor will move as needs be. This could make regular input devices, for example, keyboards, mouse and even touch-screens obsolete.

One Application can be in the office presentation where the person giving presentation can easily change the slide just by hand gesture and not by coming again and again to the system to change the slide.

19. COMMERCIAL BIN

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ABSTRACT:

This paper deals with the concept of Automation in the domain of Public Cleanliness and Hygiene. Careless throwing of garbage onto the roads is a common scenario to be found in all developing countries.

A Commercial BIN is a concept of an attached QR code along with a dustbin. Whenever anyone scans the code from their E-App and puts the trash in the dustbin, it automatically detects that trash and generates some points in their app profile for a limited period of time. These points could be used in big multi stores and other companies as digital money or it can be redeemed in their bank account. A single user can get reward maximum thrice a day. A Commercial BIN uses multiple technologies. The first is Scanning of bar code through Android App which we have to optimize to make sure that all the generated codes work properly and location of user is properly determined. The second technology used for infrared (IR) sensor and figuring out the movement of waste from a particular user and determining whether the dustbin is full or not and the third is entire bridge between the IR sensor and the Android App to ensure that they connect at the right time. So it is a mixture of software and hardware technologies. Commercial BIN is a new concept where users get

Points/award for keeping their surroundings clean. We got inspired from "Swachh Bharat Abhiyan" which is a national campaign by the Government of India, to clean the streets, roads and infrastructure of the country. Citizens are now becoming active participants in cleanliness activities across the nation; the dream of a Clean India once seen by

Mahatma Gandhi has begun to get a shape.

KEYWORDS- IOT(Internet of Things),Smart Garbage Management System, IR Sensors, Weight Sensor, UV Sensor, Wireless Network, Bluetooth, Microcontroller, RFID, Arduino.

INTRODUCTION

Garbage accumulation is so high that it becomes a crisis if left uncollected. If the garbage collector does not turn up, a household would probably direct their maidservant to pick the bags of trash, as it would be too much for the bags to be kept inside the home. The servant would probably dump the trash at the end of the lane. Having seen that, others would follow suit. The place would gradually turn into a garbage dump yard, this would turn into a haven for health diseases. Inefficient waste collection systems lead to environmental pollution, which in turn results in breeding of insects, animal scavengers and rodents, and giving rise to range of diseases. The traditional method includes burning of the waste if not collected in time. Burning of waste causes air pollution to great extent. Uncontrolled release of methane by an aerobic decomposition of waste also adds in social health issues.

Waste is an important issue, which needs to be tackled smartly. Wisely, we segregate the waste at our homes for ease in processing and recycling. We got inspired from “Swachh Bharat Abhiyan” which is a national campaign by the Government of India, to clean the streets, roads and infrastructure of the country. The citizens want to have better service, lower cost and having easy accessible reports on what has been done and how much it cost.

Prime Minister Narendra Modi may want a “Swachh Bharat” (clean India) by 2019, but sweeping the streets does not address the enormity of India's real garbage challenge. As prosperity grows, [62 million tonnes](#) of garbage is generated everyday by the 377 million people living in urban India, now the world's third- largest garbage generator. However, it's not the amount of waste generated that's as much of an issue as the fact that more than 45 million tons, or 3 million trucks worth, of garbage is untreated and disposed of by municipal authorities every day in an unhygienic manner leading to health issues and environmental degradation. These 3 million trucks, if laid end to end, would cover half

the distance between the earth and the moon. Or to put it another way, that's the distance you would cover if you made 15 trips between Mumbai and Los Angeles.

SALIENT FEATURES:

1. Sensors based Model.
2. Rewards distribution.
3. Dustbins located on Map.
4. Red colored dustbins in map indicates it's full and Green indicates it's available.
5. Very low budget required.
6. Includes identification of dustbin using QR code.
7. A Multifunctional Android application.
8. Limited Range of IR sensor.
9. Sensors will be turned on only when in use, to save battery.
10. Provision for Proper waste management.

OBJECTIVE AND SCOPE

With increase in population, the scenario of cleanliness with respect to garbage management is degrading tremendously .In city there are many public places where we see that garbage bin and dustbins are placed but are overflowing .This creates unhygienic condition in the nearby surrounding .Also create ugliness and some serious diseases at the same time bad smell also spread and it also degrades the valuation of that area. To avoid such situation we come with a project called Commercial BIN which is a IOT based Garbage and waste collection bin that provides Rewards for using it.

With rapid urbanization, industrialization and an explosion in population in India, solid waste management will be a key challenge for state governments and local municipal bodies in the 21st century. The "Swachh Bharat Abhiyan" (Clean India Mission) was created to tackle these very issues related to waste management, cleanliness and sanitation on a national level. The campaign was launched on 2nd October 2014, on the occasion of Mahatma Gandhi's birth anniversary. Thus, this is a project in context to help the Government in waste management system in Future.

METHODOLOGY:

Based on studied literature we specify three modules of a system for implementation.

Module 1: In first module before starting actual implementation we will design the system prototype and also the GUI. Then we will select appropriate types of hardware and software components which will be needed for our project. By studying different types of microcontroller and IR sensors we will create overall basic structure of the program and how it would work.

Module 2: We will do coding part of the microcontroller which is Arduino, we are using Arduino IDE which is open source software and it makes easy to the code. We are also using Android Studio which is a software development platform written in java. The Android Studio allows applications to be developed from asset of modular software components called modules in which we will code for connectivity of Arduino with Android App.

Module 3: Management of digital money would be handled along with the implementation of HC-05 Bluetooth module. After implementing the entire interface we will check the working of the system and make the changes accordingly.

The system is divided into 3 units

1. Android application
2. Arduino uno module
3. Firebase database and functionality

Android app: It is the user interface for interacting with the system. The app will perform functions like login, notifying the client about their collected points, showing the bins on the map along with details of filled bins.

Arduino Uno module: This unit will be interfaced with a Bluetooth module and an IR sensor. The Bluetooth module will request for level after a certain interval of time. The Arduino will sense the fill level using ultrasonic sensor.

If there is a change in fill level, the data will be forwarded to the bluetooth module. The Wi-Fi module will then connect to the firebase and update the fill level for that bin in the database.

Firestore: The firebase authentication is used for user login purpose. The firebase realtime database will be used to store the levels of all bins. The firebase cloud functions will define the operations to be performed on the data. Firebase notifications will be used to send notification on the client application.



HARDWARE AND SOFTWARE COMPONENTS-

Hardware Requirements:

1. Arduino Uno Board
2. IR Sensor
3. HC-05 Bluetooth Module

Software Requirements:

1. QR Code Generator
2. Android Studio
3. Arduino IDE

COMPARITIVE STUDY

The proposed model is better than the existing systems on the following grounds:

This is not an original idea, for the implementation of a smart trash bin; the idea has existed for few years.

In papers, authors propose system where the sensors in the bin check if the bin is filled up to the brim or not. If it is filled it sends an automated message to the server end of the system, through the Arduino SIM module, which is made use of by the application of the Arduino board.

Authors in other paper propose Waste Collection System architecture using Internet of Things has been proposed. The architecture consists of embedded device with sensors and microcontroller for sensing information of Bins and sending to workstation, which is situated at municipal office for finding shortest path.

Another paper proposes smart garbage management system using IR sensor, microcontroller and Wi-Fi module. This system assures the cleaning of dustbins soon when the garbage level reaches its maximum. If the dustbin is not cleaned in specific time, then the record is sent to the higher authority who can take appropriate action against the concerned contractor.

Recently in Mumbai, realizing the need of the Internet in everyday life and waste management, two commerce graduates decided to give free Wi-Fi to people in exchange of a cleaner surrounding with an unique initiative -- a 'Wi-Fi Trash Bin'. "When somebody dumps trash into a dustbin the bin flashes a unique code, which can be used to gain access to free Wi-Fi.



COST OF THE PROJECT

The research model focuses on self-sustainability, energy efficiency, hygienic factors, conservation, it is easy to install, maintenance free and externally independent. Through this even people earn money i. e. Reward people for throwing waste in dustbins.

Narendra Modi's "CLEAN INDIA CAMPAIGN" is financing such wonderful models.

Moreover, Grants are provided for conducting such research in INDIA.

In real time, the implementation of the COMMERCIAL BIN comes out to be TWO THOUSAND rupees only. (including sensors, batteries etc)

SOCIAL IMPACT:

It is an established fact that 45% of India's population throw waste in the open, thus the COMMERCIAL BIN will work wonders in the cleanliness sector of India.

COMMERCIAL BIN is an environmental friendly technology and is applicable in all the three sectors namely-**Residential, Commercial and Health care.**

The aim is to create awareness among people regarding proper hygiene maintenance, healthy lifestyle, automation, reduce pollution, proper waste management and usage of smart technologies.

COMMERCIAL BIN can be used a source of earning various vouchers and money just for throwing wastes in bin.

Thus, the proposed model can be used as the main source of cleanliness since it motivates and gives a reason to people for proper waste disposal since they are earning something for it.

CONCLUSION:

To ensure the cleanliness, the system encourages the use of the garbage bins by luring the users through rewards. The IOT is used to create a virtual web of bins for the regarding authorities to ensure proper cleaning and service of the garbage bins and to receive feedback from the public. This survey will help to understand different waste collection methods and the opportunities of improvement for the techniques of smart collection of waste to keep the community clean.

20. ADVANCED GARBAGING MACHINE

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ABSTRACT:

The "ADVANCED GARBAGING MACHINE" is an Advanced Machine which is designed to see The National Program "CLEAN INDIA", "GREEN INDIA" AND "SWACHCH BHARAT", "SWASTH BHARAT" AND "MAKE IN INDIA". It is an advanced Machine which is capable to collect the garbage with the help of two Loaders and vacuum cleaner which will be implemented under the truck. It reduces Time and Provide Effectively waste Management System.

KEYWORDS- Front Loader, Side Loader, Vaccum Cleaner, Hydraulic System, IR Sensor, LED

INTRODUCTION

Population explosion, Waste management system and hygiene maintenance, urbanization, environmental pollution,, changing lifestyle/technology and are the major factors responsible for designing Advanced Garbaging Machine and provide a permanent solution.

Advanced Garbaging Machine is based on "Hydraulic System and IR Based controlling. Front Loader is used for big Container and Side Loader for Medium and Vacuum Cleaner for rest Garbage.

SALIENT FEATURES:

- Sensors based monitoring (IR and Level)
- Fast collecting
- Hydraulic based loader
- Vaccum cleaner
- Automatic side loader
- Seperated portion for waste

- Emergency Alarms

OBJECTIVE AND SCOPE

A Garbage Machine is a truck specially designed to collect municipal solid waste and transport.

It is a solid waste treatment facility. In the present scenario, the Garbaging truck is not capable to collect the garbage separately. They collect organic, inorganic and hazards waste in same lobby and pulled in the landfill. And organic and inorganic waste cannot be recycle at same time and when it collect the garbage some garbage left near the container and when it passes through the city the smell of trashes and spread in the city . And there is used labor to collect the garbage and pulled into lobby in India.

The advanced Garbaging Machine is capable to collect waste separately. Front loader for large container to collect organic waste .which is capable to lift big container. And side loader is used to collect the garbage by medium container .it collect organic and inorganic and hazards waste by three different container. And rest Garbage collect by vacuum cleaner.

There is a huge scope of AGM in new India to make effectively waste management.

Architecture

Most of the body components on a garbage truck are made of steel. The body floor, sides, top, and ends are made of steel sheet or plate and are reinforced with formed steel channels. Different thicknesses of sheet or plate are used for different areas of the body, depending on the stresses expected in that area. This helps minimize the weight of the body, and therefore, maximize the weight of trash the truck can carry.

The lift arms and forks on a front loader are cut from thick steel plates, and the torque tubes are made from thick-walled, seamless steel tubing. The packer blade, or head, is used to periodically compress the garbage inside the body. It is made from steel plate and slides on plastic, steel, or bronze shoes.

Purchased components include the vehicle cab and chassis, lights, warning labels, electrical wiring, and the hydraulic fluid, cylinders, hoses, and controls.

HARDWARE AND SOFTWARE COMPONENTS-

1. ARDUINO UNO MICROCONTROLLER
2. RF Module (Transmitter & Receiver)
3. Variable resistor, Capacitor and Level Sensors
4. ON/OFF SWITCH and Emergency Buzzer
5. C programming
6. vehicle cab and chassis,
7. lights, warning labels,
8. electrical wiring,
9. and the hydraulic fluid,
10. cylinders,
11. hoses, and
12. Controls.

COMPARITIVE STUDY

This Advanced Garbaging Machine is better than other Garbaging Machine. Because in India Garbaging Machine is not capable to collect garbage separately .and it is capable to collect garbage separately .and it is more efficient and low fuel consumed and there is a solar system for low power and electronic systems. So It is successful model for India.

To understand it in a better way, a tabular representation showing the advantages is drawn:

FEATURES	TRADITIONAL SYSTEMS	PROPOSED SYSTEM
SEPERATION	NO	YES
VACCUM CLEANER	NO	YES
AUTOMATIC LOADER	NO	YES

HYGIENE DEGREE	LOW	HIGH
SPEED	LOW	HIGH
SENSOR BASED CONTROLLING	NO	YES
FUEL CONSUMPTION	HIGH	LOW
SOLAR ACTIVATED	NO	YES

COST OF THE PROJECT

The Model Advanced Garbaging Machine is focused on Clean India, hygiene, green India, Maintained a effectively Garbaging system in India. It cost is high due to to heavy size of it.

And there will be used hydraulic system and piston and pump for pressure so its cost is little bit more but collect more revenue and in comparison to its cost its prize is less.

SOCIAL IMPACT:

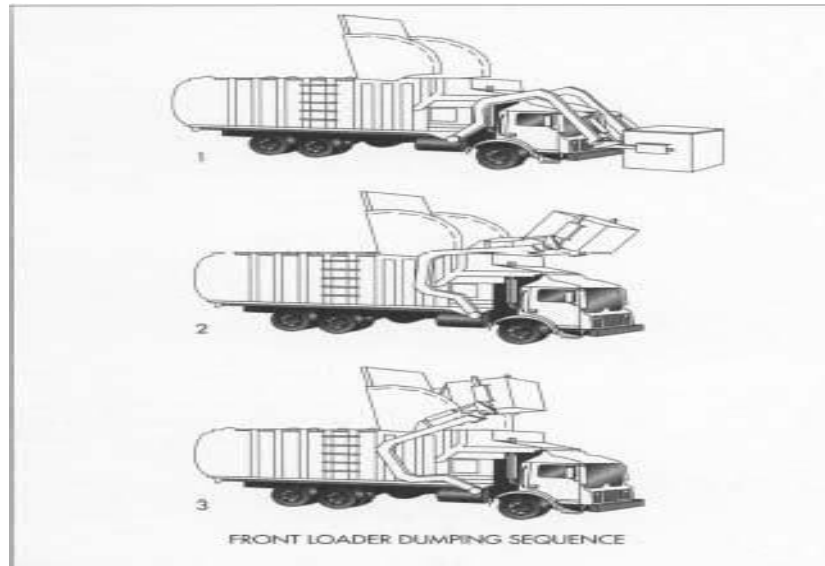
It is a great model for India to achieve Clean India green India and SWACHCH BHARAT, SWASTH BHARAT. It can work more efficiently and collect Garbage with more effectively.so it have great social Impact. It save money and time and keep the city more hygiene.

CONCLUSION:

The proposed working model of “ADVANCED GARBAGING MACHINE” caters to **ALL** the Three national missions namely:

1. **CLEAN INDIA AND GREEN INDIA-** It is advanced Machine to collect Garbage and play a significant role in clean India and green India.
2. **SWACHCH BHARAT-** It collect Garbage seperately and play a important role to keep SWACHCH BHARAT.

3. **SWASTH BHARAT**- It collect Garbage automatically and there is need of extra man to collect the garbage and for pulling the garbage in lobby.
4. **MAKE IN INDIA & DIGITAL INDIA**- It will be completely make in India . It is sensor based controlling. It is contribute in MAKE IN INDIA AND DIGITAL INDIA.



21. LANDSLIDE DETECTION SYSTEM

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ABSTRACT

Landslide is a natural calamity damaging the social life every year. It can be defined as the movement of mass of rock, debris down a slope. It generally occurs due to natural or manmade activities. Asia has been found to be the most affected continent where 75% of landslides occurred.

The main objective to study the landslide detection is to prevent the natural calamity by detecting its early movement. This will help in reducing or saving the human loss caused by the landslide. Also it is to find a certain way in which the sensing elements should respond quickly to rapid changes of data and send this sensed data to data analysis center. The proposed WSN/Internet of things (IoT) based landslide detection and monitoring system is a low cost, robust and delay.

KEYWORDS:-Arduino UNO, IOT, WSN, MQTT

INTRODUCTION

A landslide is movement of a mass of rock, debris, or earth down a slope that takes place due to tremor action under the surface of the earth (crust layer). In rainy season the rain water penetrates and develops hydraulic pressure which exceeds the elastic limit of the soil or rocks. Due to this the strain gets accumulated which forces the soil and rocks to loosen their binding strengths entailing landslides. Landslides result in destruction of agricultural and forest lands, road transports, destroy earth's natural environment resulting great loss to life. Also, it adversely affects a variety of resources such as water supplies, fisheries, sewage disposal systems, dams and roadways for years after a slide event happens. The landslide is seen when the slope changes from a stable to an unstable condition. This difference in the stability of a slope can be caused by many factors together or alone. The natural causes, such as, ground water pressure acting to destabilize the slope, erosion at the bottom of a slope by rivers or ocean waves, earthquakes adding loads to barely

stable slope, earthquake etc. The Manmade causes, such as, deforestation, cultivation and construction which destabilizes the already fragile slopes, vibrations caused by machinery or traffic. Landslide prediction, detection and monitoring have been done by researchers for different case studies all over the world. Landslide detection can be done by using various methods like visual inspection using image/video processing, satellite remote sensing, using statistical methods or using machine learning algorithms. Landslide detection can also be based on data driven approaches using wireless sensor networks (WSN). This detection system is going to detect the happening possibility of the landslide by detecting the tremoring action that will take place. Further this system will help in segregating different segments of a landslide prone area into zones ranging from 1-9. The segregation of different segments will depend on the output values of the sensors used i.e. accelerometer and soil moisture content. This proposed detection is effective in terms of cost and maintenance.

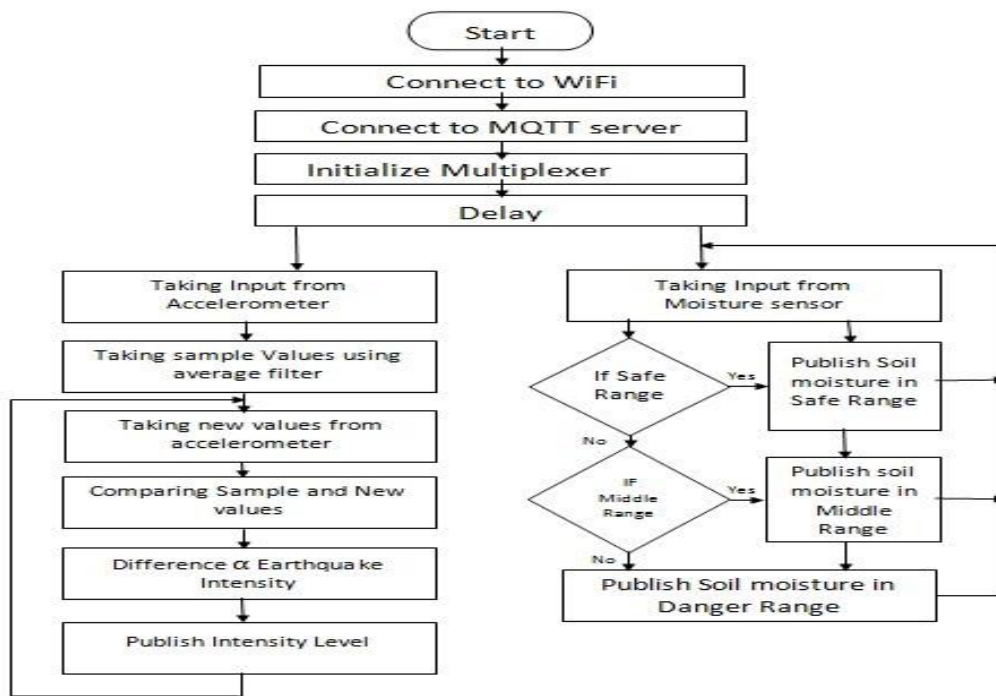
METHODOLOGICAL OVERVIEW OF LANDSLIDE DETECTION SYSTEM

The system consists of sensor nodes, controller at the landslide site and Arduino UNO at the monitoring station. All these sensors produce output for the landslide monitoring parameters such as landslide displacement and soil moisture. The detection system uses a soil moisture sensor operating on 3.3 to 5 V. It has two plates which measure the water content in the soil. The electric current through the plates is proportional to the amount of water content. When there is more moisture content around the sensor, it draws more current which results in less output resistance and the corresponding output voltage is low. In another case, when there is less moisture around the sensor, it draws less current which results in high output resistance and the corresponding output voltage is high. The output of the soil moisture sensor can be both analog and digital, but analog output is preferred for the analog input channel of the multiplexer.

The accelerometer which contains a polysilicon surface-micro machined sensor and signal conditioning circuitry is used for vibration sensing (slope displacement measurement). The basic structure of the accelerometer has a fixed plate and a moving plate. The moving plate gets deflected due to the acceleration which in turn unbalances the differential capacitance and gives the output voltage proportional to the accelerations. The accelerometer provides analog voltage at the output X, Y, Z pins which are proportional to the acceleration in respective directions i.e. X, Y, Z. The obtained data from the sensors is given to the controller through multiplexer CD4051B. This is done because the controller used here is Esp8266 (esp8266) which contains only one analog input pin and in-built WiFi module which is required for transmission of data towards the monitoring station.

The controller takes the data from sensor nodes as input. If these input values cross threshold values, it gives an alert. The entire data range is divided

into three classes; SAFE zone, MIDDLE zone and DANGER zone. First alert is shown when sensed values lie in MIDDLE zone. This alert informs the local citizen to stay alert as there might be chances of landslide occurrence in future. This alert also give this information to keep their important belongings such as first aid kit, clothes, water bottle and eating stuff ready as these are the things people need in hazardous situations. The second and the final alert is given as the sensed values lie in DANGER zone. Apart from giving alerts to the local citizens, controller also transmits all the sensed data to the monitoring station. The monitoring station does the work of monitoring and analyzing for the data. The sensed data is transmitted to monitoring station via Esp8266 using MQTT protocol.



FLOWCHART OF THE PROCEDURE

When the system is given power up, the Esp8266 configures itself to the Wi-Fi and the MQTT server. After making these connections successfully done, it initializes multiplexer. Then, it starts accepting readings from the soil moisture and accelerometer sensors. Initially, it accepts the soil moisture sensor reading and compares it with the programmed threshold values. The values are mapped in between 0-255 levels. If the received reading lies in between (160 to 255), it publishes the message as “Soil Moisture is in SAFE range” under soil moisture topic over MQTT. If the received reading lies in between the range (130 to 160), it publishes the message as “Soil Moisture is in MIDDLE range” and if reading lies below 130, then the published message is “Soil Moisture is in DANGER range”. After displaying soil moisture status, controller receives accelerometer readings. The average of the values is calculated and the result is further saved as “sample/reference value”. Then all further values are compared with this reference value. The difference between the

new received values and the reference value directly represents the vibration intensities.

HARDWARE COMPONENTS

- Arduino UNO / Nodemcu
- Accelerometer (ADXL335)
- Soil moisture sensor(FC28)
- Power source
- Display devices

RESULTS AND DISCUSSIONS

The readings of Soil Moisture sensor are used to segregate different zones. The threshold values change according to the soil type and its characteristics. The accelerometer is used to check the movement of soil due to earth's vibration. The output values of accelerometer are mapped with the reference values to use it as a Seismograph device are as shown in Table below.

Instrumental Intensity	Acceleration (g)	Velocity (cm/s)	Perceived shaking	Potential damage
I	< 0.0017	< 0.1	Not felt	None
II-III	0.0017 – 0.014	0.1 – 1.1	Weak	None
IV	0.014 – 0.039	1.1 – 3.4	Light	None
V	0.039 – 0.092	3.4 – 8.1	Moderate	Very light
VI	0.092- 0.18	8.1 – 16	Strong	Light
VII	0.18 – 0.34	16 – 31	Very strong	Moderate
VIII	0.34 – 0.65	31 – 60	Severe	Moderate to heavy
IX	0.65 – 1.24	60 - 116	Violent	Heavy
X+	>1.24	>116	Extreme	Very Heavy

Seismographic values and its indications

COMPARITIVE STUDY

The proposed model is better than the existing systems on the following grounds:

Most of the deaths happening in the hilly areas is majorly due to the natural calamity i.e. landslide

Passerby will be notified in advance before entering the landslide area through notification on their mobile connected on a common formed network.

FEATURES	TRADITIONAL SYSTEMS	PROPOSED SYSTEM
PORTABILITY	NO	YES
IMPACT ON PEOPLE	LOW	HIGH
OPERATION/MAINTENANCE COSTS	HIGH	LOW
COST	HIGH	LOW
SENSORY & REMOTE CONTROL	NO	YES
SELF SUSTAINABLE	YES	YES

COST OF THE PROJECT

As all the components used in the project are readily available in the market so it makes the cost of the project comparatively low .The ost of the project varies between 3-6k rupees only depending on the required sensitivity of the project.(including sensors, LED lights, microcontroller etc)

SOCIAL IMPACT:

The aim is to create lifesaving installment to save lives and personal property of people. This project also ensure the availability of such devices at low cost

The **project's goal** is to work as a savior for some unfortunate people and save their lives.

Thus, the proposed model can be used as revenue generating, and a business model.

CONCLUSION AND FUTURE SCOPE

The landslide detection system is implemented as a prototype. All the sensors and other component works as per the expectations. The sensors effectively sense the surrounding conditions and give the readings. Based on readings, the prediction of landslide is obtained successfully.

The system senses data and transmits it at constant time interval. When Esp8266 is to connect with Wi-F it consumes 1.6 Watt (i.e. 320mA current is drawn with 5V supply voltage) and when Esp8266 gets connected to Wi-fi

and sends data it consumes 0.49 Watt (i.e. 98mA current at 5V supply voltage).

To reduce power consumption and increase the battery backup, the Esp8266 can be operated in duty-cycled mode. The system takes 10 ms time to take data from sensor and transmit it to arduino UNO over MQTT. Also, additional 20 ms time is required for uploading data from arduino UNO to displaying device.

To cover large area, say 1000 sq. ft., approximately 375 nodes are required where one node consist of one soil moisture and one accelerometer. As the system uses arduino UNO at the monitoring center, machine learning can be implemented in the system through python programming code in future work.

22. VERTICAL FARMING USING HELIOSTATS

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ABSTRACT

We live in a time where demand of land is getting higher and higher whether it is for Agriculture, Housing or Industrializing purpose and we are frequently getting into conflict with each other on this issue, there are some ways to solve this issue one of them is Vertical farming, Vertical farming is a technique of farming in which farming takes place on horizontal floors which are stacked vertically, this way we can farm with much high capacity by using as low land as possible, there are already many places around the world which are implementing this idea but as fine as this idea sounds it comes with its own problems, since you can't transmit direct Sun light on most of the floors, So we have to use artificial lighting and we need to provide an electric energy source to it, which increases the electric bills and that increase the cost and carbon foot print of goods that we would produce in this building compare to traditional farms .

So clearly artificial light is not making our life any better, another way to provide light to our system is by reflecting sunlight using heliostats from roofs of the surround building this way we can provide sunlight to our system without any usage of intermediate energy converters.

This project is about my journey to make this idea into a virtual reality, in this project I tried to find the most efficient way of transmitting sunlight to a vertical farm using computer simulations but since I have no experience in any optics related simulation softwares, I have to make my own tool to find the most efficient configuration using MATLAB.

Using this tool box you should be able to find the design of your desired farming building based on your geographic location and mirror position with respect to the centre of the building.

In 2nd part of this project we worked on a Physical demonstration of "Vertical farming using Heliostats" concept.

INTRODUCTION:

Before starting first we need to clarify, why using renewable energy source would be a bad idea, one might say that by using renewable energy source to provide power to this farm, we can decrease our carbon foot print and also as renewable energy gets cheaper in coming years we might be able to produce low cost goods through this system, this idea sounds nice but experts have proven that if we apply this technique we would actually end with much higher usage of effective land and also carbon footprint would be much higher than the traditional method. This is because as electricity moves it dissipates some of its energy in the form of heat and also efficiency of our best renewable energy sources and best LEDs are terrible for this purpose for example efficiency of our best solar cells is around 25% and efficiency of our best LEDs which are still in development phase is between 40% to 50% or less Therefore, a good solar system used to power electric lights produces less than 10% as much light as it collects on the other hand a common mirror will reflect more than 95% of light incident on it.

BASIC IDEA

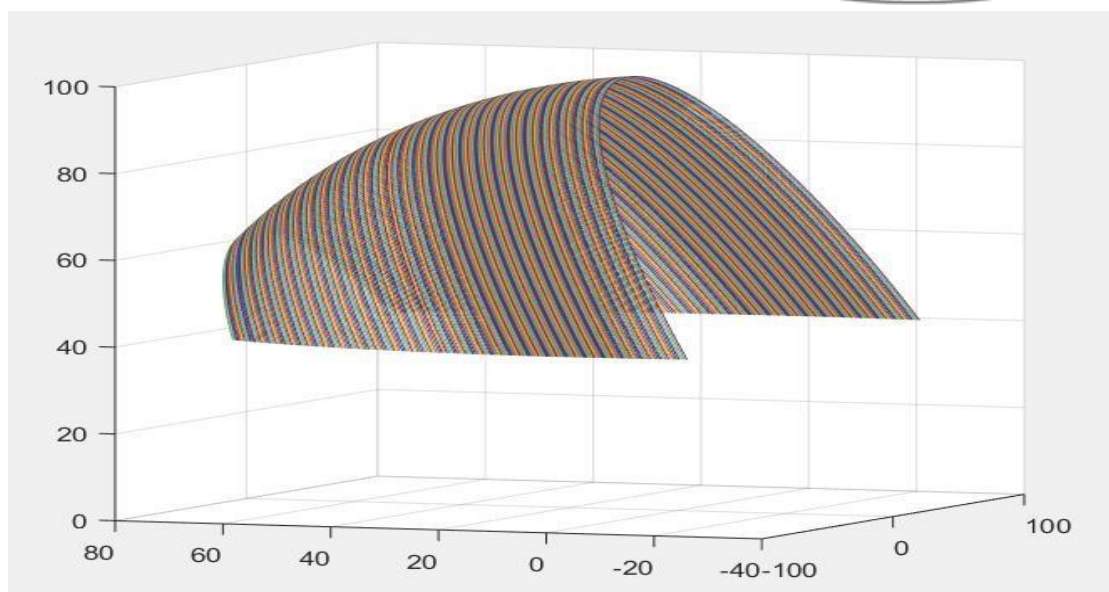
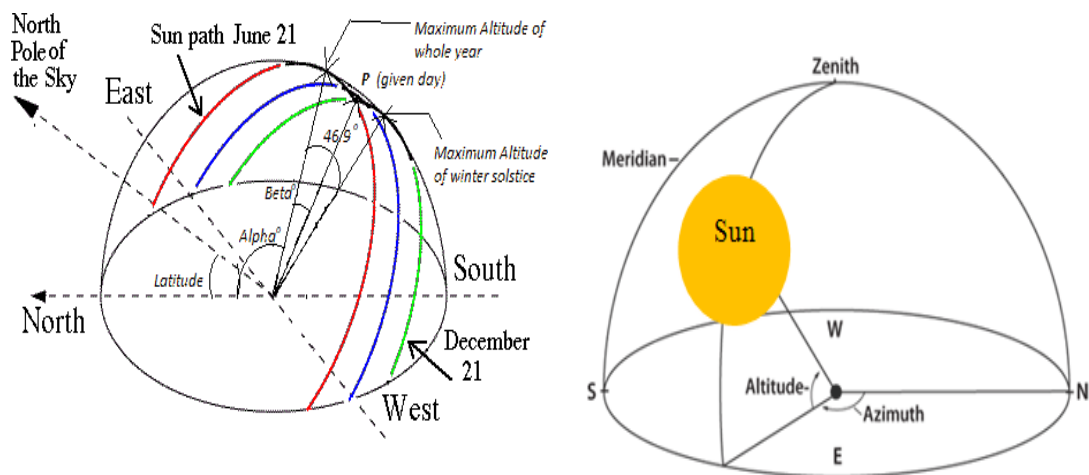
The basic idea is pretty simple, Using Heliostat mirrors around a building to reflect sunlight inside the building for vertical farming but at the end of the day I need to see if this idea is even practical and if this idea will result in greater efficiency than artificial lightning method,

To do that I first need to do some computer simulations now because I don't have any experience of using Optics related software I chose to build my own program using MATLAB to test my idea.

First step is to make the basic things which required to run this simulation which are Mirrors, Sun's path and Reflecting light.

SUN'S PATH

We found that we can approximate the sun's path of a day by cutting a hollow sphere completely with a plane whose normal is parallel to the "North pole of the sky". We can find equation of the plane and we can use this equation to find sun's path on 21st June (Summer Solstice). I also find that maximum Altitude difference between Summer Solstice and Winter Solstice (21st Dec) is 46.9 degrees September and 20th March is same.



Simulation result of Sun's Path, Here every single curve represent every single day.

REFLECTING LIGHT

Reflecting light from one surface to another is one of the most important part of this simulation, the basic information we would require to achieve that are coordinates of the surface from which light is reflecting, destination plane of reflecting light and light direction, now if " $ax+by+cz+d=0$ " is the equation of destination plane and 'N' is it's normal and 'P' is one of the point on that plane than,

$$\begin{aligned}
 a &= N(1) \\
 b &= N(2) \\
 c &= N(3) \\
 d &= -(a * P(1) + b * P(2) + c * P(3))
 \end{aligned}$$

and if “[x0, y0, z0]” are coordinates of the plane from which light is reflecting and [m, n, k] is the directing of reflecting light then equations of a lines in 3-D space is from reflecting surface to the destination surface is given by,

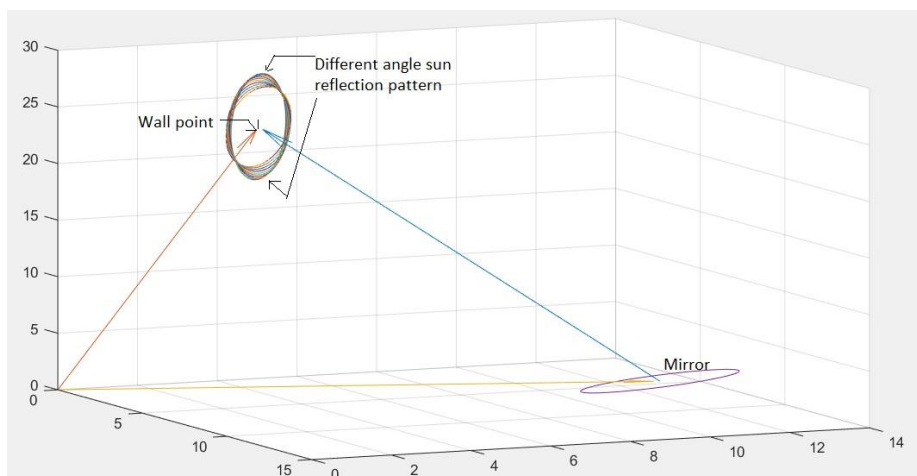
$$\begin{aligned}x &= x_0 + t \cdot m \\ y &= y_0 + t \cdot n \\ z &= z_0 + t \cdot k\end{aligned}$$

Hence after solving plane and line equation the point of intersection would be

$$t = -(a \cdot x_0 + b \cdot y_0 + c \cdot z_0 + d) / (a \cdot m + b \cdot n + c \cdot k)$$

So after solving for x, y and z we would get coordinates of points where light hits the given plane “ax+by+cz+d=0”.

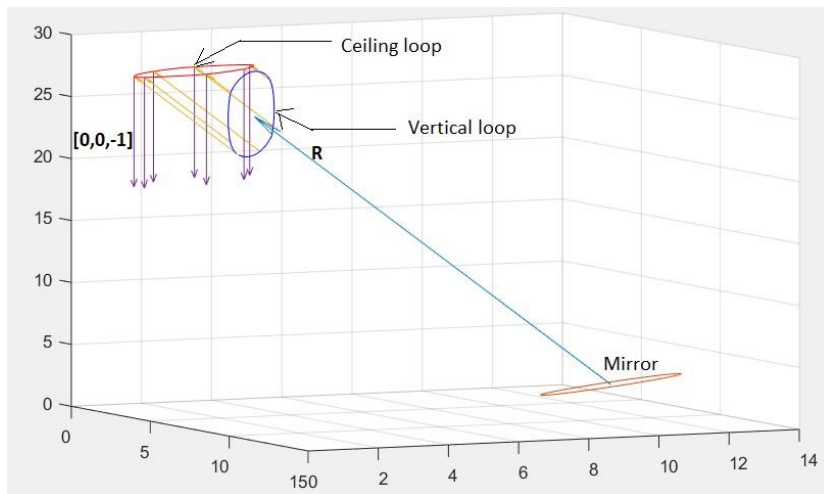
Let’s simulate, and see what pattern we will get after one day of sun light reflection on wall,



As you can see in above figure, each individual reflected circle on wall is a result of sun light from different angles but there is a common area in side this whole pattern in which light is always present so we have to focus on this area and ignore rest of the pattern.

COMMON AREA

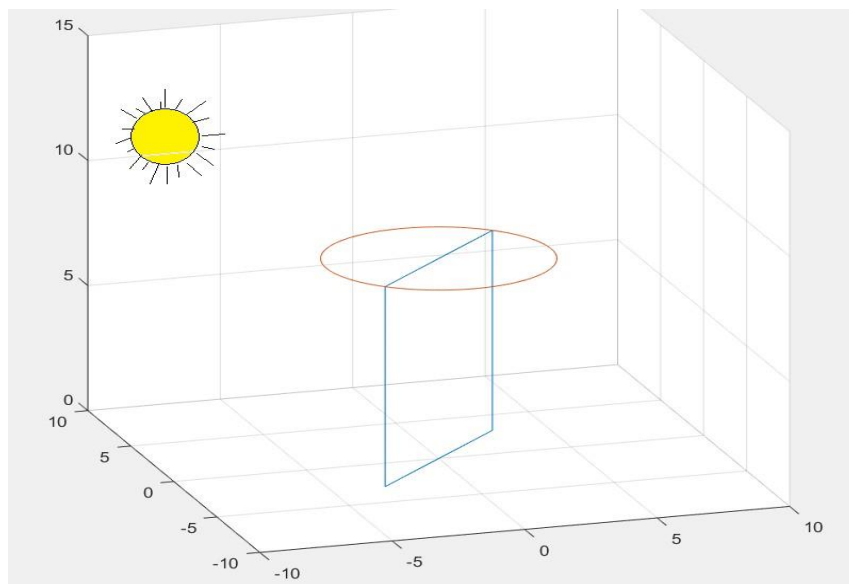
In this problem MATLAB's in build function "polyshape" comes handy,



What we did for a day, we can repeat the same thing for any amount days and get a region where light is always present; we can use this mechanism to generate a region which is specific to a particular crop's lifespan.

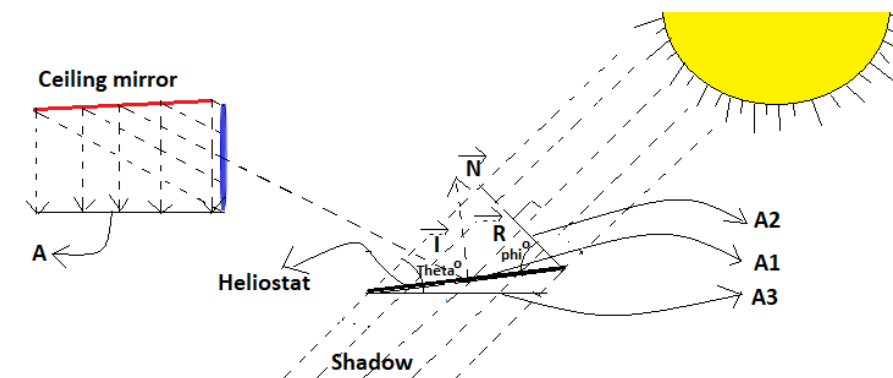
SHADOW

As you can guess shadow of the building will going to create some serious problems



Using this simple model we can subtract the shadow region of the building from heliostats.

EFFICIECIES



Here, $A_1 = \pi \cdot (\text{radius of heliostat})^2$; $A_2 = A_1 \cdot \cos(\phi)$
 And $A_3 = A_2 / \sin(\theta)$.

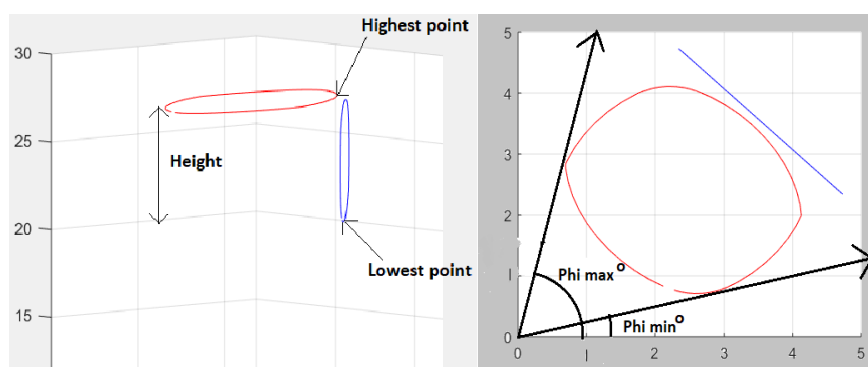
ϕ = angle between N and R
 θ = angle between R and horizontal level

So, $E_1 = A/A_1$ (Area efficiency) $E_2 = A/A_2$ (Energy efficiency)
 $E_3 = A/A_3$ (Comparison with traditional farm)

Average of efficiencies at every instance of calculation is equal to the efficiency of that particular heliostat and average of all heliostat efficiencies is the overall efficiencies of the system.

BOUNDARY

When we are dealing with more than one heliostat for same building then defining boundary of 3-D space used inside the building for reflection purpose become crucial, this 3-D space is made of vertical (blue) and ceiling (red) loop

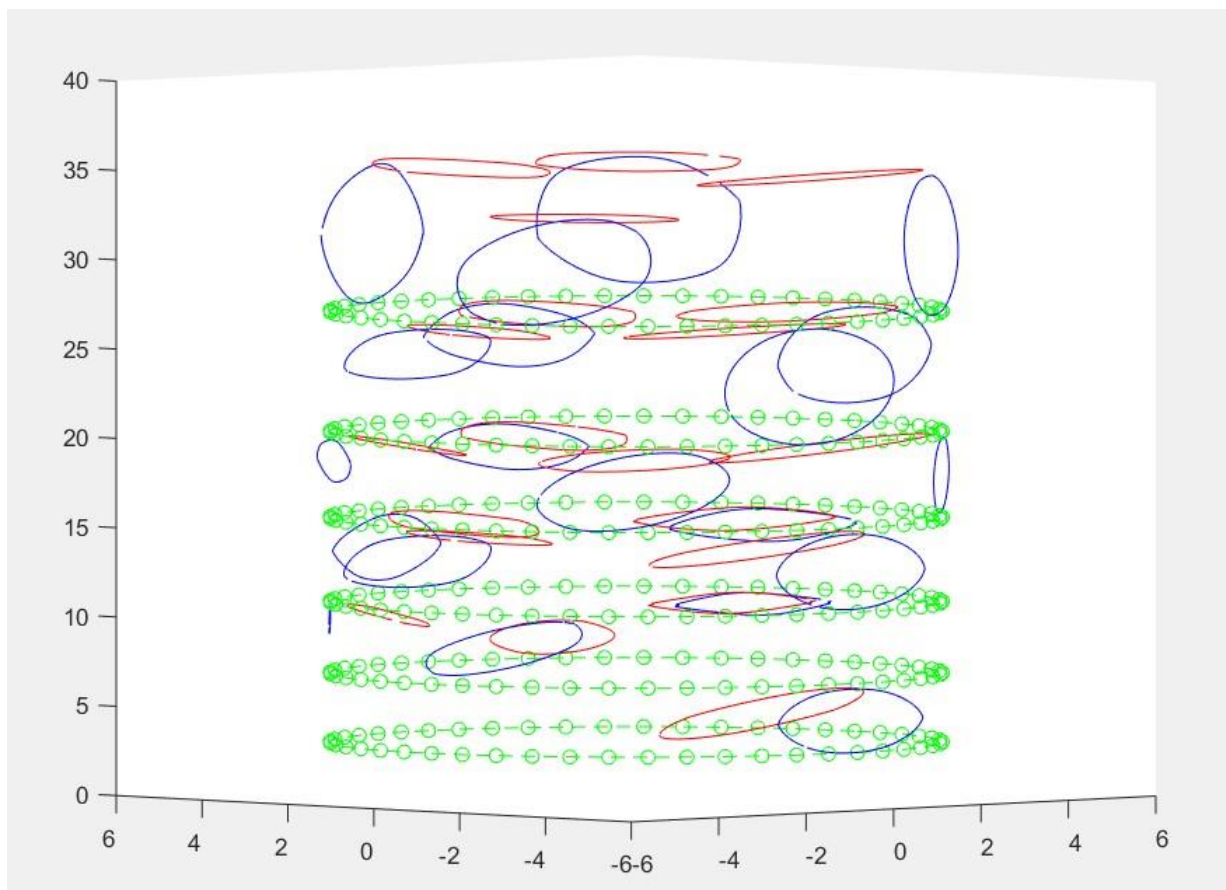


OPTIMIZATION

It turns out that efficiency almost always increases when 'H' is increased for almost every heliostat present at different locations, but because now we are dealing with more than one heliostat, we have to think in terms of overall efficiency of the system and work to increase this value.

Now the question arises that, what 'H's should we give for given heliostat locations such that overall efficiency of whole system is as high as possible for as low overall height of the building as possible?

After all the optimization we have picture something like this,

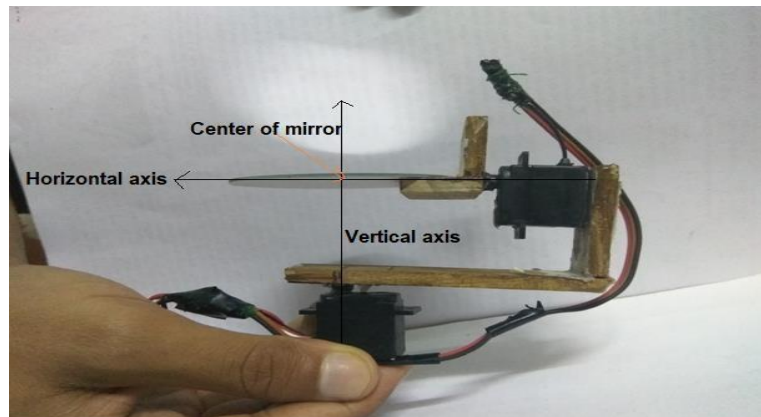


You can notice here that there are more loops in upper floor than in lower floor because as I said earlier greater 'H' gives greater efficiency.

PHYSICAL DEMONSTRATION

HELIOSTATS

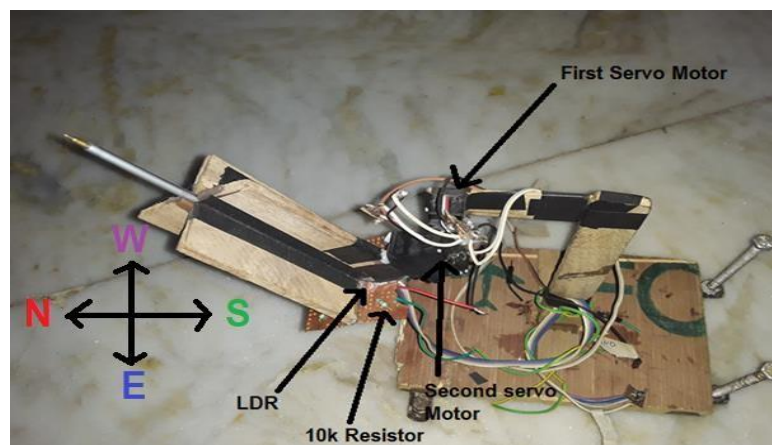
Heliostats is one of the most important aspect of this project. We made each heliostat using two servomotors and a frame on-to which the servomotors along with the heliostat mirror, was mounted. The heliostat setup is capable of



rotating around two axes. The axes of rotation of both the servomotors are perpendicular to each other and are passing through the centre of the heliostat.

SUN SENSOR

We need Sun sensor to locate the direction of sun light so that we can adjust the normal of Heliostat to reflect sunlight at desired location. We made a two-axis sun sensor using two servo motors and 4 LDRs with four 10k resistors. As you can see in below figure both servo motors axis of rotation are perpendicular to each other and all four LDRs are compartmentalized in separate regions using wooden plates of '+' shaped cross section.



END MODEL

First Sun sensor will find the direction of the light source (i.e. The Sun) this information is then send to the Arduino, Arduino will send this information to the computer, the computer then will calculate how much each Heliostat should rotate based on the current "Normal" of each heliostat and the current light rays direction such that they reflect the light towards their respective ceiling mirror, then computer will send this calculations to Arduino and Arduino will rotate each Heliostat one by one. Ceiling mirrors will then reflect light to their respective floor.

This process will repeat itself in regular intervals because sun is changing its direction continuously.



Conclusion

In traditional Vertical farm artificial light is used to provide energy to plants and it accounts for more than 80% of the overall annual cost for running this kind of farm that is the main reason Vertical farms are still confined to very limited places like in Iceland where they use there Geothermal pools to provide energy for artificial lights. Our idea of using Heliostats and Mirrors to provide direct Sun light to plants from surrounding building to a common building can drastically reduce the cost of the goods produced from Vertical farming Building.

23. MULTI-FUNCTIONALITY OF PLANTS

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ABSTRACT

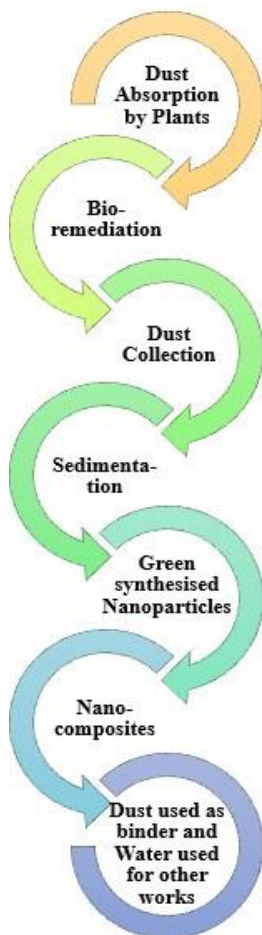
The modern society is heading towards the destruction of natural environment and transforming the green belt areas into concrete forest. Every sphere on earth is being polluted owing to the technological advancements made by humans. Specifically focusing on air quality in today's time has decreased drastically in comparison to times two to three decades back. Major pollutants can be captured through numerous developed techniques while upcoming threat is due to fine dust (diameter < 10 microns). These can be controlled through a natural process known as phytoremediation. This process uses the dust absorbing plants to curb the fine dust pollution. The plants leaves such as *Melia rubia*, *Delonix regia*, *Tamarindus indica* possess dust trapping efficiency which can be seen as dust deposition on upper surface of plant leaves. This process help controlling the particulate matter within limits. The above specified species can be further utilized for the formation of nanoparticles. As the nanotechnology is advancing, green synthesis is being explored to protect the environment from the harmful and toxic gases formed during the fabrication of nanoparticles. The green process employs these leaves for the formation of nanoparticles after being washed twice with distilled water. These leaves are boiled in deionized water for specified time and then filtered through Whatman No. 1 filter paper. This leaf extract is then blended with metal salt solution and then left still for formation of metal nanoparticles. The process is easy, cost efficient, eco- friendly and simple to execute. It does not release any harmful substance in the environment during the formation process. Along with this they possess anti-bacterial and anti-microbial properties thereby extending the life of item when incorporated in any application. Considering all these aspects and the environment friendly behaviour, the project finds its application in engine oil as additives for the vehicles. The commercial trend had upgraded the engine oil with the addition of solid lubricants as additives. The latest research defines new boundaries in terms of metal nanoparticles as additives to engine oil. Hence,

the same plant species produces answers to the problem of fine dust pollution, green synthesis of metal nanoparticles, level of toxicity in environment and eventually the hurdles of machines running on road, flying in sky and floating on water. This approach with time can help in restoration of natural environment and beauty of earth.

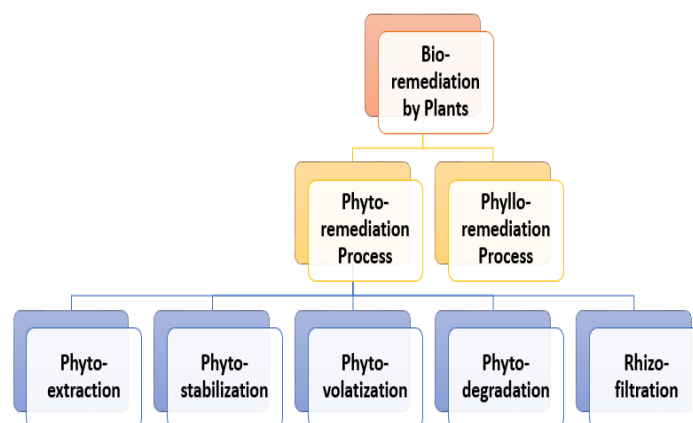
OBJECTIVE

The objective of this project is to study and analyse the use plants (roadside, indoor, ornamental) as purifiers of air, land and water, as binders, as catalyst and additives in various industries such as construction, automobile and manufacturing. It also aims at use of plants and their parts in the development of nanoparticles as reinforcements for nanocomposites and as additives in lubrication areas. It aims at using a natural path to lower the fine dust percentage in the air which is a source of numerous health problems.

BLOCK DIAGRAM



(a)



(b)

Figure 1. (a) Steps of Experimental Investigation, (b) Bioremediation and its Types Table 1. Step-by-step Procedure for Various Bioremediation Process

Remediation Process		Step-by-Step Procedure
Phytoremediation	Phyto-Extraction	<ol style="list-style-type: none"> 1. Dissolution of metal contaminants in a form absorbable by roots. 2. Absorption of heavy metal. 3. Chelation process for self-protection and metal mobility enhancement. 4. Safely storage of chelated metal and damage repair
	Phyto-Volatilization	<ol style="list-style-type: none"> 1. Absorption of organic contaminants from the soil. 2. Modification of organic contaminants during transportation. 3. Release of transformed contaminants through transpiration.
	Phyto-Stabilization	<ol style="list-style-type: none"> 1. Absorption and accumulation of contaminants in roots. 2. Adsorption of contaminants onto the roots. 3. Reduction in mobility of contaminants preventing migration to ground water and reduction in metal availability in food chain.
	Phyto-Degradation	<ol style="list-style-type: none"> 1. Absorption of contaminants from the soil by the roots. 2. Translocation of contaminants from roots to shoot system. 3. Degradation of contaminants within the plant tissues.
	Rhizofiltration	<ol style="list-style-type: none"> 1. Development of stable root system. 2. Acclimation process of roots with the contaminants. 3. Translocation of contaminants from root biomass to shoot system. 4. On saturation with contaminants, plants are harvested.
Phyllo-remediation		<ol style="list-style-type: none"> 1. Surface sterilized leaves take up the contaminants. 2. Leaves with habituated microbes or inoculated bacterium (known as phyllosphere) significantly degrade the contaminants. 3. Leaves and leaf-associated microbes mitigate the air pollutants.

EXPERIMENTAL DETAILS

1. IDENTIFICATION OF LEAF (PHYULLOREMEDIATION)

- Initially a plant was identified from the plants listed above, chosen from the roadside plants category. The identified plant was Religiosa ficus (Common Name: Peepal).
- An identification mark was established on the leaves which were considered for the remediation process after they were washed with

water.

- c. Since the selected plant was a roadside plant, it was exposed to vehicular smoke and dust flowing due to the vehicle movement.
- d. After a week's time, the leaves were detached from the plant and were taken for further processing.

2. CALCULATION OF LEAF AREA (GRAPHICAL METHOD)

- a. Outline the considered leaf onto the graph paper.
- b. Assign numbers to the blocks inside the drawn closed boundary.
- c. For every complete square box a numerical series (1, 2, ...), for every half box roman numbers (i, ii, ...) and every 3/4th of the box an alphabetic series (a, b, c, ...) was used.
- d. Mathematical calculation was carried out as follows:
 $Area = (\text{last Numerical no.}) * 1 + (\text{last Roman no.}) * 0.75 + (\text{Total no. of alphabets}) * 0.5 \text{ cm}^2$

3. SEDIMENTATION OF DUST IN WATER

- a. Water, used for cleaning the leaves, was collected in a beaker.
- b. This water and dust solution was left over for 6-7 hours to settle the dust at the bottom of the beaker.
- c. Then the water was collected in another beaker, leaving the dust at the bottom.
- d. The dust and leftover water was sieved through the Whatman No. 1 filter paper for the collection of dust on the filter surface.
- e. The filter paper was dried in oven, leaving dust free from moisture on filter paper.

4. FABRICATION OF NANOPARTICLES AND NANOCOMPOSITES

- a. Copper III Sulphate salt was considered for the fabrication of copper nanoparticles.
- b. An aqueous solution of 250 ml and 0.1 M Copper III Sulphate (Chemical formula: CuSO_4) was prepared in a volumetric flask.
- c. The leaf extract was prepared by boiling 25 g of cut leaf in 250 ml of distilled water for 10 min on hot plate.
- d. After the boiling process, leaf extract was filtered using Whatman No. 1 filter paper and used for the synthesis of Copper nanoparticles.
- e. The extract so obtained was found with a green color characteristic after cooling.
- f. 5 ml of leaf extract was added to the prepared aqueous solution of Copper Sulphate for the reduction of copper cations.
- g. The reaction mixture thus obtained was left undisturbed for 24 hours in

- dark until the blue transparent solution converted into a green colour.
- h. The synthesis of copper nanoparticles was carried out at room temperature and then purified particles were stored at 4 °C after air drying for further analysis.
 - i. These particles were then considered as reinforcement for the development of composite through stir casting process.

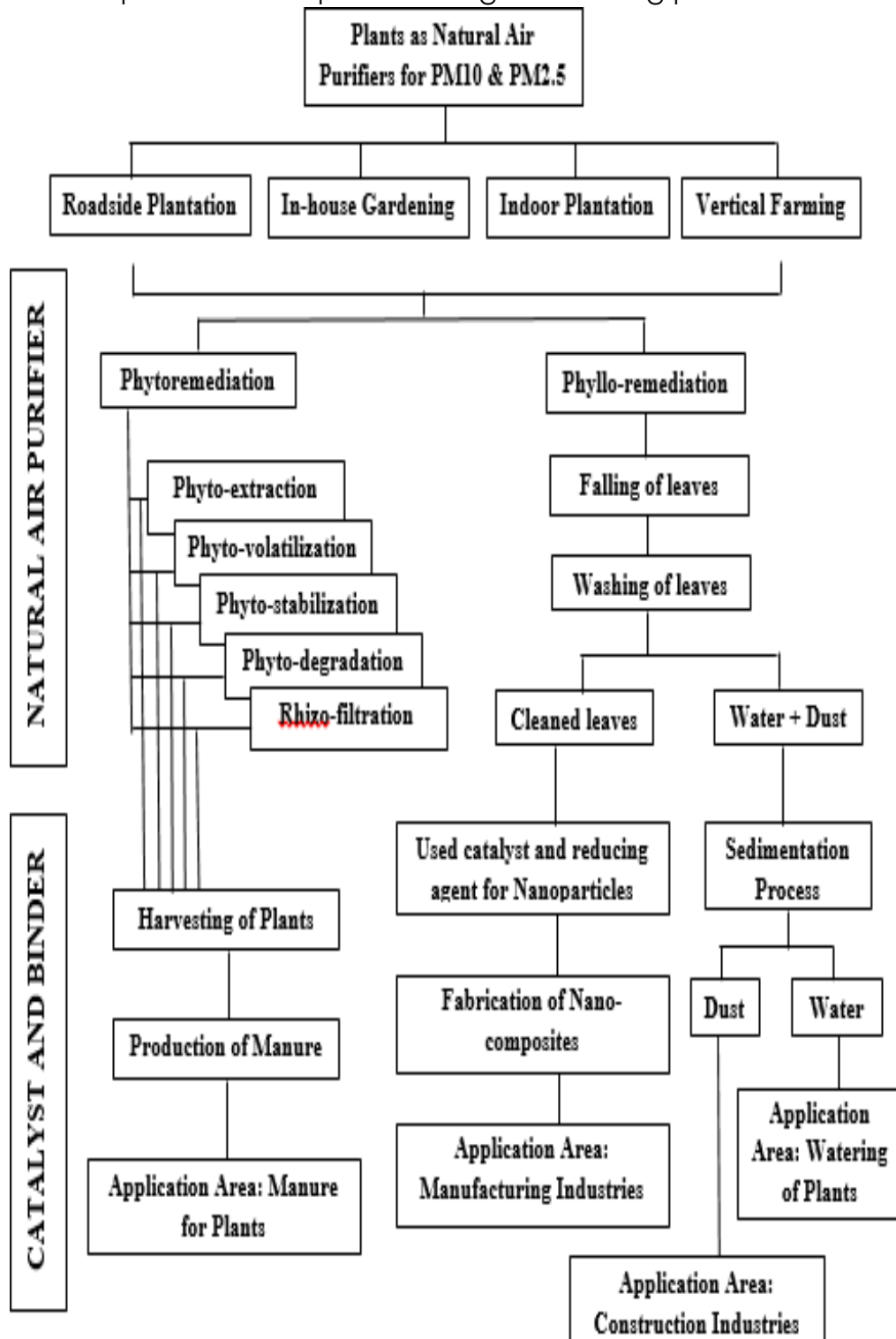


Figure 2. Detailed Block Diagram of Investigation

Table 2. Dust Absorbing Plants

SCIENTIFIC NAME	COMMON NAME	TOXINS REMOVED
Epipremnum Aureum	Golden pthos	Xylene, Benzene, Formaldehyde, Trichloroethylene
Phoenix Roebelenii	Dwarf Date Palm	Xylene, Formaldehyde
Spathiphyllum	Peace Lily	Xylene, Benzene, Formaldehyde, Carbon Monoxide
Chlorophytum Comosum	Spider Plant	Xylene, Formaldehyde
Ficus Elastica	Rubber Plant	Xylene, Benzene, Formaldehyde
Nephrolepis Exaltata Cv. Bostoniensis	Boston Fern	Xylene, Formaldehyde
Chrysalidocarpus Lutescens	Areca Palms	Xylene, Benzene, Formaldehyde, Carbon Monoxide
Pineapple Plant	Pineapple Plant	
Dracaena Deremensis	Dracaena	Xylene, Formaldehyde, Trichloroethylene
Benjaminia Ficus	Weeping Ficus	Xylene, Formaldehyde, Trichloroethylene
Sansevieria Trifasciata	Snake Plant	Xylene, Benzene, Formaldehyde, Trichloroethylene
Cassia Tora	Sickle Wild	
Cassia Occidentalis	Coffee Senna	
Cynodon Dactylon	Bermuda Grass	
Bauhinia Variegata	Orchid Tree	
Picea Abies	Norway Spruce	
Taraxacum Officinale	Dandelion	
Religiosa Ficus	Peepal	Metal Contaminants
Paspalum Distichum	Rice grass	
Paspalum Distichum	Guinea Grass	
Trifolium Repens	White Clover	
Helianthus Annuus	Sunflower	Uranium
Brassica Juncea	Indian Mustard	Lead
Thlaspi Caerulescens	Alpine Penny-cress	Nickel
Alyssum Murale	Yellow tuft	Lead
Ipomea Alpina	Morning Glory	Copper
Hibiscus Cannabinus	Deccan Hemp	Boron

SUMMARY

The present investigation aimed at providing natural alternative to control the particulate matter i.e. PM10 and PM2.5. Keeping in mind the current environmental conditions, a novel step was taken to utilize the plants and their parts to lower all the types of pollution, further use the by-products as binders in the construction industries and for watering the plants. Also the leaves once cleaned can be utilized in the development of new materials i.e. metal matrix composite. The leaves act as catalyst and reducing agent for the fabrication of nanoparticles which are further used as reinforcements for the development of nanocomposites. These nanoparticles can also be used for enhancing various properties depending on their applications. The above process has the following advantages and applications:

- a. Plants act as natural air purifier.
- b. They help in lowering the soil and water pollution.
- c. Leaves and other parts act as catalyst, reducing agent and stabilising agent during development of nanoparticles.
- d. The by-product of the process i.e. dust can be used as binders and additives.
- e. They do not release any harmful or toxic material to the environment.
- f. The process is eco-friendly and non-toxic in nature.
- g. The process is beneficial to construction industries (binders), manufacturing industries (nanoparticles/nanocomposites), and automobile sector.
- h. The process can be applied to the buildings, concrete structures, and pillars etc. in the form of vertical farming which help in beautification of place as well as purify the air.
- i. The water used in the process can be reused for gardening as it does not involve any toxic chemicals.

It can be inferred that plants are natural purifiers of land, air and water. They help in maintaining the ecological balance as well as help in technological developments without harming the environment. This process has the advantage that it takes the unwanted and harmful particles from the environment, process them without any harmful release and also assist in technological advancements through eco-friendly techniques.

COST

The present investigation was evaluated through a small prototype model in order to identify the feasibility of the process and its advantages. The cost of the entire process is estimated for a prototype model. The major areas of cost investments are listed below:

- a. Cost of metal salt used for fabrication of nanoparticles.
- b. Cost of mould fabrication.
- c. Cost of development of nanocomposite casting through stir casting process.
- d. Hidden auxiliary costs such as testing of samples, arrangement of equipment etc.

Including all the costs (visible and hidden), the total expenditure incurred during the process will be approximately Rs 5000. The larger aspect will lower the total expenditure as it proves to be beneficial to the society in various fields.

24. SIGN LANGUAGE TRANSLATOR

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ABSTRACT:

World report on Disability produced jointly by WHO and the World Bank, suggests that more than 1 billion people in the world today experience disability. Of these more than 38 million people have communicating disabilities. But nowadays, with the development of technology, great advances have been made in medical science. As a result, various technological solutions are available for specially-abled individuals. Here we are trying to find a solution for persons with communicating disabilities. This project aims not only to help an individual but also to help the entire community to easily communicate and interact with their nearby surroundings.

INTRODUCTION

Learning sign language is a difficult process, therefore, this process is not well renowned by privileged individuals.

With the help of this **Smart Glove**, privileged individuals will be able to understand those who use sign language. This will help the specially-abled fit into society better and communicate more effectively. The Smart Glove can act as a simulator for the privileged individuals who want to make an effort to learn sign language and communicate with persons having communication disabilities. This project is basically an assistive technology that can help specially abled to communicate easily with the people around them. The technology can convert basic symbols that represent the 26

English alphabets as mentioned under ASL (American Sign Language) script and display them on a screen.



Fig 1 : Image of the working model

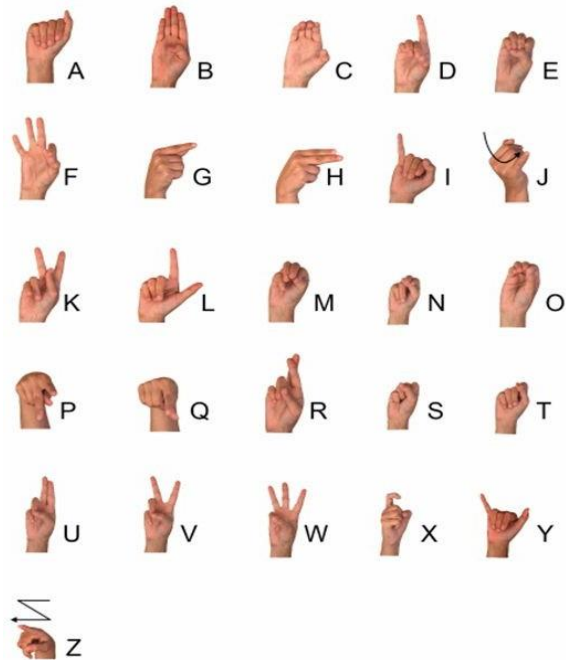


Fig 2 : Hand gesture of all letters

OBJECTIVES

To translate sign language into text and speech.

To send data to a mobile app via Bluetooth module.

To convert letters into text and speech on mobile screen.

SCOPE OF WORK

The letters can be also converted to speech.

A mechanism to combine letters into words can also be added.

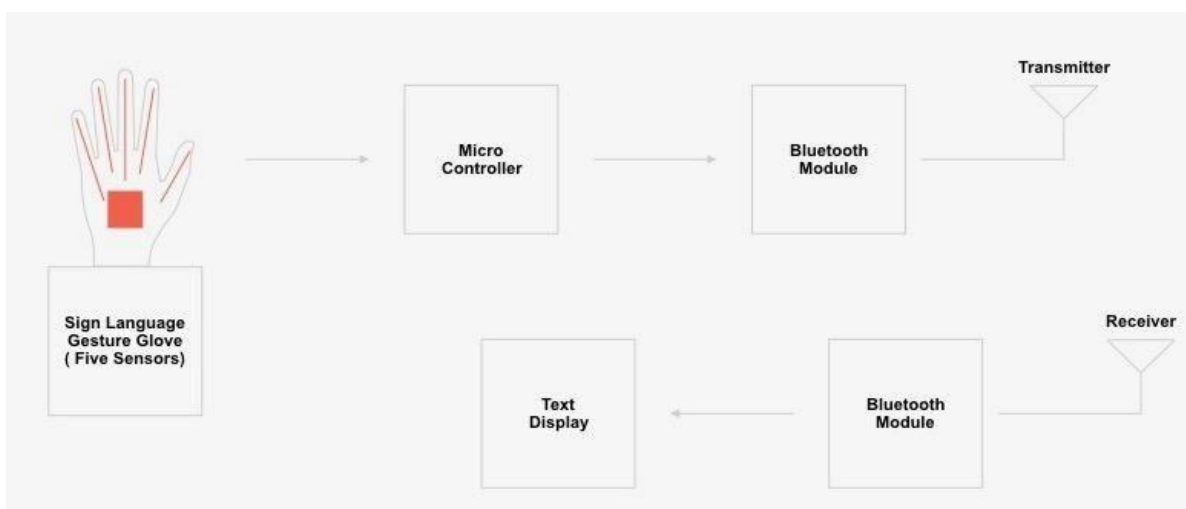
The project can further be integrated with various services and help to generate employment for the deaf and dumb people.

Geared up with the controller to provide home automation on finger tips.

Paired up with fitness sensor to monitor the health of the individuals.

METHODOLOGY:

To understand the architecture of the proposed system, a complete flowchart is drawn.



1. First, the five flex sensors on the fingers and thumb send in current values to the Arduino Nano.
2. The microcontroller then processes this data according to the program deployed on it, and converts the gestures into an alphabet.
3. The alphabet is then sent to the Bluetooth module. The Bluetooth module transmits the data to the receiver.
4. The Bluetooth receiver of the mobile phone will receive the data and display it on the application.

WORKING METHODOLOGY:

1. In the project we plan to attach a set of five flex sensors on the glove, one for each finger and the fifth for the thumb. This will help us read the positions, angles and shapes of the fingers and the thumb.
2. In the project we plan to attach a set of five flex sensors on the glove, one for each finger and the fifth for the thumb. This will help us read the positions, angles and shapes of the fingers and the thumb.
3. Along with the number of fingers pulled out and its shape, the tilt and orientation of the fingers is also an important part to understand the alphabet or digit. For this we will connect an accelerometer to all the flex sensors on the glove. This will enable the program to read the tilt of fingers.
4. The complete information of shape being created, number of fingers pulled out, tilt and orientation of the fingers will be given to the Arduino Nano cumulatively from flex sensors and accelerometer.
5. A program code will be deployed on the microcontroller, Arduino Nano to distinguish all the 26 letters of the American Sign Language and find out which one is being used at the moment.
6. Once the decision is made, using a bluetooth module this information will be sent to a mobile application that will give the output in the form of text display.

HARDWARE COMPONENTS:

S. No.	Name of Component
1	Flex Sensors
2	Arduino Nano
3	Bluetooth Module HC-05
4	Battery
5	Resistors
6	Capacitors
7	Glove

SOFTWARE COMPONENTS:

S. No.	Name of Component
1	Program Code
2	Mobile Application

SOCIAL IMPACT:

Using this technology we will be able to make a difference in the life of the specially abled community, specially the personals with communicating disabilities. With the help of this Smart Glove, we aim to help the unprivileged to come a step closer to the privileged society and communicate more effectively. This will help them to gain access to majority of resources that were not available to them earlier, such as more employment opportunities than before, easy access to education and much more.

Also, SMART GLOVE can be used as a source of revenue by implementing this model commercial mass production.

Thus, the proposed model can be used as a revenue generating and a business model.

CONCLUSION:

Using this technology we will be able to make a difference in the life of the specially abled community, specially the personals with communicating disabilities. With the help of this Smart Glove, we aim to help the unprivileged to come a step closer to the privileged society and communicate more effectively. This will help them to gain access to majority of resources that were not available to them earlier, such as more employment opportunities than before, easy access to education and much more.

25. ECO-FRIENDLY REFRIGERATOR

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ABSTRACT:

The global warming and depletion of ozone layer is the main concern in the today world .The use of refrigerants in refrigerators contains the chlorofluorocarbons. In which the chlorine atoms are responsible for the depletion of ozone layer. So the use of eco-friendly refrigerator is the small contribution to save our planets and full fill our needs.

INTRODUCTION:

1. Refrigeration is the process of heat removal from a space in order to bring it to a lower temperature than surrounding temperature .In this context , “**peltier cooling module** “which works on thermoelectric refrigeration, aims to provide cooling by using thermoelectric effect rather than the more prevalent conventional method like ‘ vapour compression cycle ‘ .
2. There are three types of thermoelectric effect. The seebeck effect, the peltier effect , the Thomson effect .from these three effects, peltier cooler works on the peltier effect ,which states that when voltage is applied across two junctions of dissimilar electrical conductors, heat is absorbed from one heat is rejected at another junction .
3. Peltier coolers are basically used as a cooling element in laser diodes, CCD Cameras (charge coupled device), blood analyzers, portable picnic coolers laser Diodes, microprocessors, blood analyzers and portable picnic coolers.

THE SEEBECK EFFECT:

The seebeck effect is the conversion of heat directly into electricity at the junction of dissimilar electrical conductors. It is named for the Baltic German physicist Thomas Johann Seebeck.

$$V = a(T_h - T_c)$$

Joule heating, having a magnitude of $I^2 \times R$ (where R is the electrical resistance), also occurs in the conductors as a result of current flow. This joule heating effect acts in opposition to the peltier effect and causes a net reduction of the available cooling. The peltier effect can be expressed as

$$Q_C \text{ or } Q_H = \beta I$$

THERMOELECTRICS MATERIAL:

Material used in thermoelectric is largely dependent on figure of merits. It is advisable to use the material which has higher value of figure of merit because it leads to higher cooling power of a module. As we have seen figure of merit in previous section, it depends on seebeck coefficient, thermal conductivity and electrical conductivity. So, the properties which are considered for selection of thermoelectric material are:-

1. ELECTRICAL CONDUCTIVITY

2. THERMAL CONDUCTIVITY

THE EARTHENWARE POT PRINCIPLE:



Earthen pots allow waters to evaporate ,which helps to prevent the water from becoming hot .as the air outside of the pot gets hotter ,its potential to

absorb more water normally increases ,so more water get evaporate .This is the entire principle for wet bulb thermometer.

HYPOTHESIS

The principle of eco-friendly refrigerator is the same as the cooling of water in the earthen pot. The main phenomenon involved is the evaporation of water from the upper surfaced. The rate of evaporation is improved by the use of forced convection by using a fan.

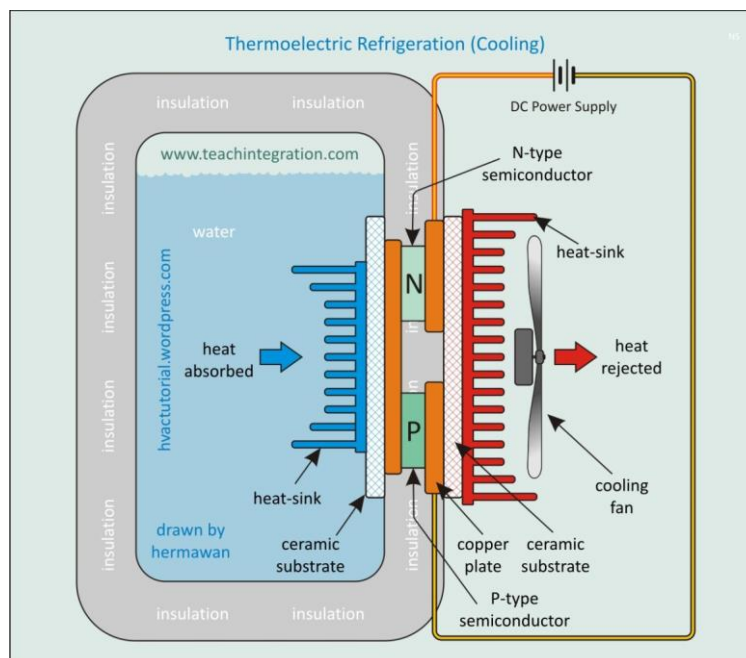
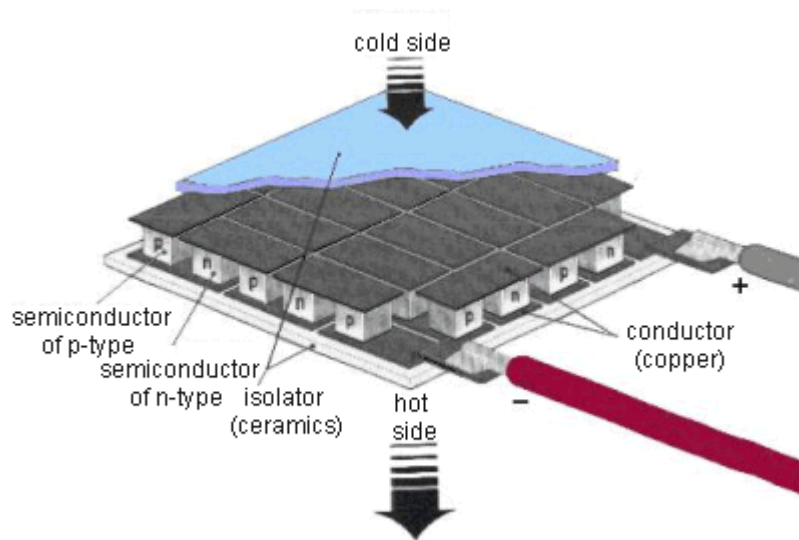
The conventional cooling system are used now a days are requires the refrigerants, whose phase takes placed in heat exchanging and compressor are required for the compression of refrigerant. The compressor required more power and space.

The eco-friendly refrigerator is based on phenomenon – evaporation of water. Since evaporation is the process of converting liquid into vapour below boiling point. The amount of heat required to change its phase is called latent.

EASE OF USE

The eco –friendly refrigerator is easy to use. An increasing surge in the demand of refrigeration has been noticed e.g. .air conditioning, food preservation medical services and cooling of electronic devices to an increasing consumption of electricity which is a contributing factor for global warming and climate change.

The eco-friendly refrigeration is a beneficial alternative as it does not use any electricity can operate from solar and less electricity for pump only .for cooling application and meeting our present 's energy challenges .further it is quite in operation ,in addition to this ,there is no use of refrigerant which causes ozone depletion ,the chlorofluorocarbon ,potentially offering a more environmental friendly alternative to conventional refrigeration .



The eco-friendly refrigerator can be used as:

Cold storage for –foods and beverages, beauty products, cooling of drinking water.

Inner layer is galvanized iron sheet, middle baked clay and outer layer is of jute. The jute layer is used to retain the water sometime so that it can evaporate .the baked clay layer provide the porous effect.

The water above the walls evaporate continuously by the surrounding air .for the evaporation the water need some heat to change its phase .this heat is known as latent heat of evaporation

The lowering in temperature depends upon the rate of temperature also .the rate of evaporation is increased by providing a fan operating from solar panel by the phenomenon of forced convection. The pump can also be driven by solar if battery of high voltage is provided.

ADVANTAGES:

The eco-friendly refrigerator is safe as no heating components, no flame, no refrigerants or toxic agent used.

Easy service-parts can be replaced easily, lower price and compact size.

SUMMARY:

The system can be very useful in niche application where there are unique

Advantages outweigh their low efficiency as their efficiency is low.

This is helpful in saving our planet without compromising our present's needs.

COST:

The cost of eco-friendly refrigerator is very economical as it is the cost of various devices that are used in the project the Implementation of the project idea on large scale units would reduce the cost and size of per unit. The project would cost an amount of Rs 5000 (approx).

26. EDIBLE SPOONS

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ABSTRACT:

In this piece, we have conducted a throughout analysis of edible spoons journey. The area of concern explained includes the process of producing edible spoons, societal norms, economic and social implication of edible spoons.

INTRODUCTION:

Plastic which is considered as the cornerstone behind every article bought today is perhaps the most harmful trash which is dumped. Edible spoons are an eco- friendly alternative to plastic spoons. The spoon naturally decomposed without any external labor. After human consumption of food if one does not want to eat spoons then it could easily be eaten up by animal (like cow, dog, cattle) if spoons are discarded in an open space.

FEATURES:

Edible cutlery creates zero waste and therefore the issue of waste disposal is entirely eliminated.

If the spoons are disposed in a pit, it decomposes in a week or less.

Edible spoons are fully vegan, preservatives free, Trans fat free and dairy free products.

OBJECTIVE AND SCOPE:

The objective of edible cutlery is to bring an affordable solution to plastic waste. The use of edible cutlery causes no any health implications and with advances, it promises to reduce both plastic waste and plastic pollution.

COMPONENTS OF EDIBLE SPOONS:

The main components of edible spoon include different types of flour (white flour, wheat, bajra). Spices and flavor are added according to the taste. Edible cutlery does not have any

Preservatives or fats and their moisture content is extremely low. These spoons can even withstand hot as well as cold liquids so they can accompany any meals.

PLASTIC SPOONS	EDIBLE SPOONS
These are non-eco-friendly products.	These are eco-friendly product.
These are non nutritional spoons.	Edible spoons are highly nutritious product.
Plastic spoons take many years to degrade.	Edible spoons easily degrade within 2 to 3 days.
Plastic spoons are harmful for health.	Edible spoons are good for healthy lifestyle.
Plastic spoons are tasteless products.	Edible spoons can be produced of different flavors and hence are tasty.

MATERIALS REQUIRED:

AUTOCLAVE:

Principle: Autoclaves uses pressurized steam as their sterilization agent.

It is a machine that uses pressure and steam too high for any microorganism or their spores to live. Autoclave works ideally at a temperature of 121*c and pressure of 15psi.



OVEN:

Principle: Hot air oven sterilizes by dry heat which is accomplished by conduction. The heat is absorbed by the outside surface of the item and then passes towards the center of item layer by layer. The entire substance will eventually reach the temperature required for sterilization to take place.

An oven is a thermally insulated chamber used for heating, baking or drying of a substance.

SPOONS:

These are used for pressing out shapes.

Measuring cups and measuring spoons.

Flat circular rolling board and roller.

PROTOCOL:

Initially apparatus required for making edible spoons are autoclaved.

Dough preparation for spoon making begins.

Then molding spoon shape out of the dough.

Initially the oven was pre-heated at 100°C for 20 minutes.

Now the spoons are placed in oven for 30 minutes at a temperature of 150°C and spoons are prepared. (flavors can also be added according to the taste)





NUTRITION FACTS:

PROTEINS	1.06 gm
FAT	0.12 gm
MINERALS	0.13 gm
FIBERS	0.19 gm
CARBOHYDRATES	7.64 gm
IRON	0.56 gm
CALCIUM	2.43 gm
ENERGY	36.86 cal

Minerals such as phosphorus, magnesium, manganese, zinc and copper are present with small of fat and sodium salt.

ENVIRONMENTAL IMPACT OF EDIBLE SPOONS:

For sure the environmental is everything. As the spoons are made only of flours, rice, water as well as chemicals and preservatives free. This is a great step towards helping the environment and reducing the amount of plastic we use and dispose of.

COST CALCULATION:

The present cost of our edible spoon is Rs 1.2 while the cost of spoons can be reduced to half once it is produced in masses. The total money we invested in the making of spoons is Rs 120 and by using 1 kg of flours we made 100 spoons. The restaurant, hospitality, street food sellers are mainly the largest consumer of plastic spoons.

CONCLUSION:

The balance of our ecosystem is essential to our quality of life and will ultimately depend on when the world decides to stop turning a blind eye to the issue and make necessary lifestyle changes.

Our ambitions stretch far beyond the realm of edible spoons. Currently we have mold to produce spoons and fork. Our plane is to expand it into cups, plates and more of traditional disposable tableware. Our Edible Spoons favours certain government schemes and campaign.



SWACHH BHARAT ABHIYAN: -

By using edible spoons each one of us can contribute to the most significant campaign put forward by government of India.

SWASTH BHARAT: -

This was an attempt made by Food Safety and Standard Authority of India (FSSAI). As our product neither contaminated the sewage nor blocks it reducing water borne diseases making clean and healthy India.

MAKE IN INDIA: -

Make in India initiative aims to promote manufacturing in India. This scheme promotes entrepreneurship and impetus and recognition in market.

27. WATER WASTE MANAGEMENT

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SCHOOL STUDENTS	SHRUTI BHADORIA, NEHA
SCHOOL	CHETRAM SHARMA GIRLS INTER COLLEGE, SECTOR-45, NOIDA

ABSTRACT:

This project is basically based upon the dream of our lovable Prime Minister Shri Narendra Modi's dream of clean rivers of India. In this project we are basically proposed various techniques for river water treatment and also make assure the cleanness and purity of water. In this way the first step for river water treatment is by Bakture Powder. In the next step we will use many rotors in form of motors, which maintains the flow of river water and also helps in mixing the Bakture powder. Further we will also install various nets on both sides of rotor alignment to stops the plastics and other heavy particle and to protect aquatic animals to get harm by contact to the machinery. We will also incorporate Automatic water tank filling system near the river so that the pure water can directly be stored and by further processing it can be convert into drinking water. We will try to create smart irrigation system near rivers which will irrigate the crop when needed i.e. when the soil lost moisture then the pumps automatically gets started and irrigate the soil. We have also installed the automatic water filling tank i.e. when the tank gets empty then it automatically fill the water tank. At last but not the least we have also installed many nets on both sides on the river bridges so that the waste which peoples throw into the rivers by spirituals reasons will not contaminated the river.

INTRODUCTION

Fortunately, a solution is in sight. The International Organization for Migration (IOM) in Somalia is using a coagulant called Polyglu to treat drinking water in Somalia and to assist those affected by the recent drought. IOM helps to protect migrants, refugees and those displaced within their country.

From November 2016 to March 2017, over 600,000 people were displaced within Somalia. Many were forced to leave their homes and livelihoods behind in search of food and water. A startling 8,000 people are being displaced every day. Since safe drinking water is at the center of their displacement, Polyglu offers an effective and innovative solution that could

help hundreds of thousands of people, in Somalia but in other countries as well.

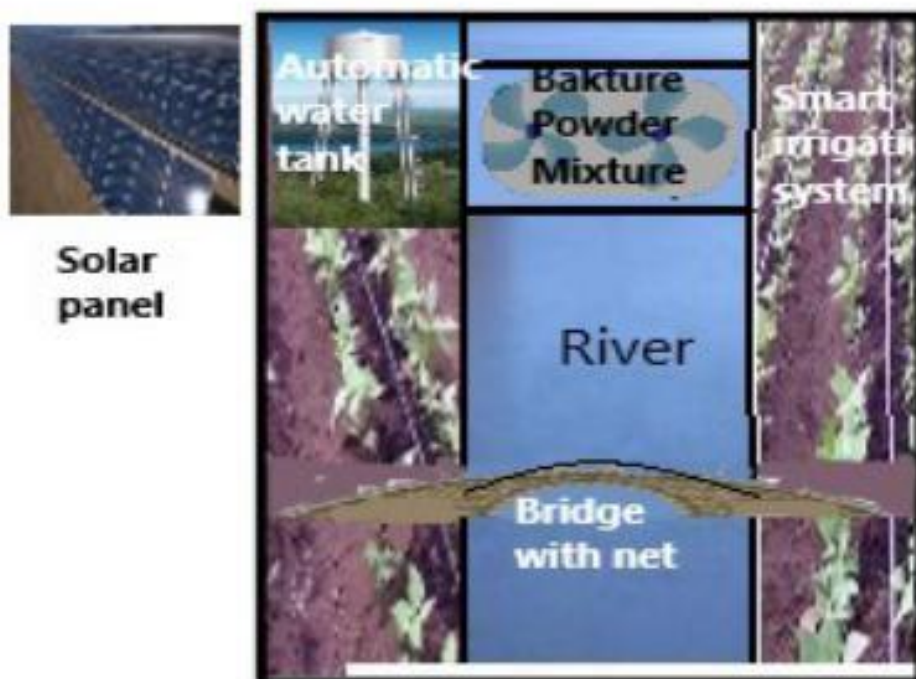
SALIENT FEATURES:

- Solids control : 40–80% reduction
- Pollution control : COD/BOD reduction – 40–90%
- Fecal coliforms control : 50–100% reduction
- Ecotoxicity : Nil
- Dissolved oxygen : Increased by 150% – 1200%
- Aquatic species :
 - Increase in plants/plankton – 200%
 - Increase in micro-invertebrates – 200%
- River water treatment
- No harm to aquatic animals
- Automatic irrigation system
- Automatic water tank
- Fully non-conventional energy uses (Use Solar panel for energy)

OBJECTIVE AND SCOPE

The key ingredient of the powder is a polymer of the amino acid glutamic acid, a coagulant made from fermented soybeans, which helps quicken the coagulation of impurities in water. It is a safe and eco-friendly flocculent which has been applied in various fields such as food, industrial equipment and cosmetic materials.

One gram of the powder can treat up to 5L of polluted water, depending on the turbidity (cloudiness) of the water source. The product can also be used in water with varying acidity levels and temperatures. Waste water can be treated too, however it cannot be fully purified, requiring further filtering in order to be safe to drink.



Dreamed project

Polyglu is a powder, primarily composed of a coagulant made from fermented soybeans, which serves to quicken the clotting of impurities found in water. Polyglu is unique in that it is a safe and environmentally friendly purifying agent that has been successfully applied in the food and industrial equipment industries.

It has been successfully deployed in India, Bangladesh, Somalia and Tanzania. In collaboration with IOM and the Internally Displaced Person camps in Mogadishu Somalia has used Polyglu to address water-borne diseases and water scarcity. According to locals in Mogadishu, Polyglu has contributed to lowering the rate of diarrhea and other illnesses among Somali children plagued by all kinds of shortages and war.

METHODOLOGY:

Polyglu offers an effective and innovative solution that could help hundreds of thousands of people, in Somalia but in other countries as well. The key ingredient of the powder is a polymer of the amino acid glutamic acid, a coagulant made from fermented soybeans, which helps quicken the coagulation of impurities in water. It is a safe and eco- friendly flocculent which has been applied in various fields such as food, industrial equipment and cosmetic materials.

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HARDWARE AND SOFTWARE COMPONENTS-

Arduino UNO Board

The Arduino UNO is one of the most used microcontrollers in the industry. It is very easy to handle, convenient, and use. The coding of this microcontroller is very simple. The program of this microcontroller is considered as unstable due to the flash memory technology. The applications of this microcontroller involve a wide range of applications like security, home appliances, remote sensors, and industrial automation.

Technical specifications:-

Operating Voltage	5V
Input Voltage (recommended)	7-12V
Input Voltage (limit)	6-20V
Digital I/O Pins	14 (of which 6 provide PWM output)
PWM Digital I/O Pins	6
Analog Input Pins	6
DC Current per I/O Pin	20 mA
DC Current for 3.3V Pin	50 mA
Flash Memory	32 KB (ATmega328P) of which 0.5 KB used by bootloader
SRAM	2 KB (ATmega328P)
EEPROM	1 KB (ATmega328P)
Clock Speed	16 MHz
Length	68.6 mm
Width	53.4 mm
Weight	25 g

Soil Moisture Sensor

Soil moisture sensor is one kind of sensor used to detect the soil moisture content. This sensor has two outputs like the analog output as well as the digital output. The digital o/p is permanent and the analog o/p threshold can be changed. The working principle of soil moisture sensor is open & short circuit concept. Here the LED gives an indication when the output is high or low.

In the agriculture field, sensors are used like soil moisture. The information received from the sensors is sent to the Database folder through the Android

device. In the control section, the system is activated using the application, this is finished using the ON/OFF buttons in the application. Also, this system is automatically activated when the soil moisture is low, the pump is switched ON based on the moisture content.

The application has a feature like taking some time from the user and water the agriculture field when the time comes. In this system, there is a switch used to turn off the water supply if the system fails. Other parameters such as the moisture sensor demonstrate the threshold price Lack of access to safe water is a striking feature in almost all the part of Somalia. Only 45% of Somalis have access to improve water sources and this fact increases the risk of outbreak of waterborne diseases. Cholera is an endemic and claims hundreds of lives annually, particularly in densely populated area. Increasing access of safe water must be an efforts to ensure the quality of drinking water, Water quality monitoring and as well as safe storage, are critical in reducing the risk of contamination water supply.

COST OF THE PROJECT

The research model focuses on self-sustainability, energy efficiency, hygienic factors, water and land resources conservation, it can generate resources of its own functioning and is easy to install, maintenance free and externally independent.

Narendra Modi's "CLEAN INDIA CAMPAIGN" is financing such wonderful river water treatment project.

Moreover, Grants are provided for conducting such research in INDIA and infrastructure is provided at subsidized rates.

In real time, the implementation of the Smart irrigation cum water cleaning project will cost not more than 2 lakh upto 10 km of range.

CONCLUSION:

The proposed working model of "SMART MOBILE TOILET" caters to **ALL** the four national missions namely:

SWACHCH BHARAT- This will eliminate the pollution causing substance.

SWASTH BHARAT - The sewage water is taken care of thus reducing the water borne diseases and ensuring health facilities.

RENEWABLE ENERGY-Solar activated will preserve electricity. It provides very less harm to the aquatic animals.

28. MULTI-TOOLHEAD MACHINE

COLLEGE	NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA
GUIDE	DR. CHANDAN KUMAR
COLLEGE STUDENTS	SHIVAM CHAUHAN, SAHIL MOHAMMAD TELI, ROSHAN ROY, ROHIT KUMAR
SCHOOL STUDENTS	AMRITA, KOMAL BISHT
SCHOOL	CHETRAM SHARMA GIRLS INTER COLLEGE, SECTOR-45, NOIDA

INTRODUCTION

We are students of mechanical Engineer building a future project for revolutionizing the various industrial, educational and commercial sectors in India. Our Project is to build a machine that can perform various operations within one frame. By simply changing the tool head, we can change the operation of the machine. These are the following operations;

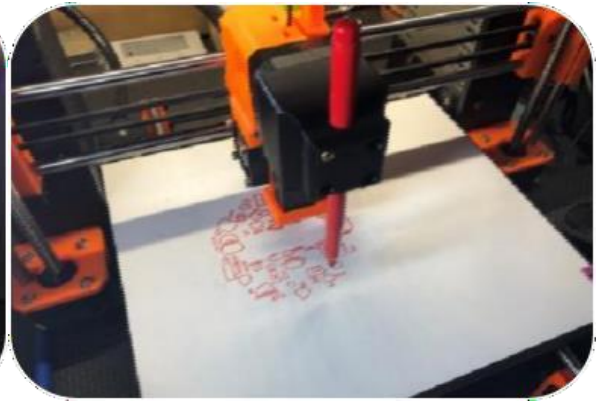
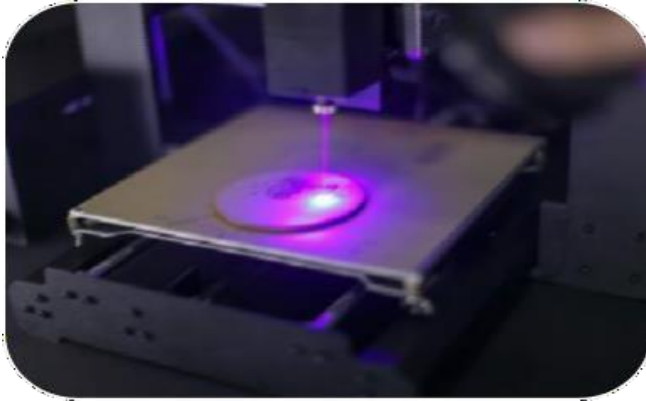
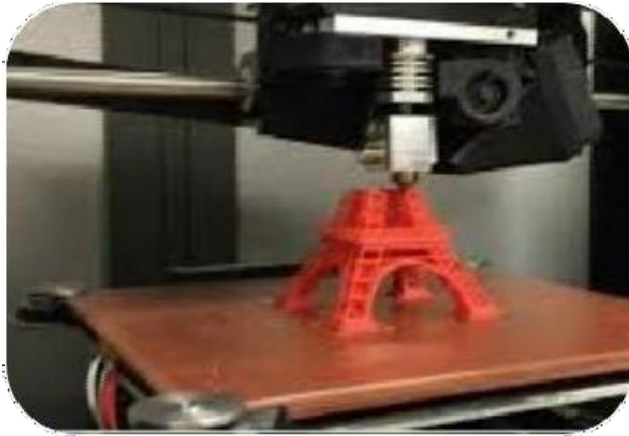
- 1- 3D Printing
- 2- Laser Engraving
- 3- 2D Plotting
- 4- CNC

METHODOLOGY

- 1- Firstly, we have already designed the frame of the machine.
- 2- We will be using printed parts in various places to reduce the cost of the material.
- 3- All other raw materials will be procured.
- 4- Assembly of the components within the frame.
- 5- Electronics and software integration with the components of the machine.
- 6- Start with the testing of 3D printing extruder, and also will modify the extruder for multi-material.
- 7- Testing with the other major tool heads including Laser Engraving, 2D plotter, CNC and PCB printing.
- 8- For laser engraving we will be using Laser Module (5000mW, 405nm).
- 9- For CNC we will be using 300W Air cooled spindle motor 0.3KW dc

motor CNC engraving machine DC 12V-48V high torque dc motor.

10- In the final step we will be configuring it with Wi-Fi using ESP88266 for mobile control.



CONSTRUCTION

- NEMA 17 Stepper Motor
- Wire
- Aluminum Frame
- Lead Screw
- SmoothRod
- Printed Parts
- Hot end
- Heat bed
- Arduino Mega
- Ramps 1.4
- Drivers a4988
- Bearings

- Couplers
- Pulley
- Belts
- Nuts & Bolts
- End stops Switch
- Power Supply
- Connectors (male-female)
- Wires
- ESP8266 Module
- Laser Module

OBJECTIVE

Our objective is to build a low cost machine that can perform the work of 4 different machines and provide benefits to various sectors like:

- 1- Rapid Prototyping
- 2- Schools and Colleges
- 3- Architects
- 4- Designers
- 5- Medical

This Machine is going to greatly accelerate their development of ideas.

SPECIFICATION

MATERIAL:	ABS, PLA, HIPS
BUILD VOLUME:	15 x 15 x 15 cm
MIN LAYER HEIGHT:	50 microns
MAX LAYER HEIGHT:	500 microns
EXTRUDER HEAD:	1
PRINTING SPEED:	275mm/sec
3RD PARTY MATERIAL:	Yes
HEATED PLATFORM:	Yes
FILAMENT DIAMETER:	3.00
ON-PRINTER CONTROLS:	Yes
CONNECTIVITY:	USB, Wi-Fi
CNC MILLING DEPTH:	1cm
LASER MODULE:	1.5 Watt

PROBLEMS OUR MACHINE CAN SOLVE

- 1-In Schools and Colleges students have many creative ideas, but due to lack of resources they are not able to convert their ideas into real-time projects.
- 2-In various industries using 3D printer, laser engraving, or CNC separately, have to face problems regarding the cost of these different machine, and increased floor area.
- 3-Major problem is customization, which is not possible with traditional machine.

FEATURES:

- Wi-Fi Enabled
- Filament Run out warning
- Multi Material Print
- Direct Plug & Play
- Laser Engraving up to 4mmthickness

ADVANTAGES OF THIS MACHINE:

- No need of 4 different Machines.
- Money Saving.
- Less Floor area needed.
- Portable and easy to Use.
- Best suited for Schools, Colleges and Small Industries.

COST OF THE MACHINE: The cost of the machine is Rs. 35000/-

CONCLUSION

This machine will be a great achievement in manufacturing, especially for Schools & Colleges where the students can built their projects and able to use the best technology to enhance practical learning.

In industries also, instead of 4 machines, a single machine can be used to perform the job.

29. PAIN RELIEVER MACHINE

COLLEGE	POORNIMA COLLEGE OF ENGINEERING, JAIPUR
GUIDE	MR. SUGREEV CHOUDHARY
COLLEGE STUDENTS	ADITYA GUPTA, ARJUN KUMAR
SCHOOL STUDENTS	ANKIT CHOUDHARY, SHIVANG SAIN
SCHOOL	GOVT. SEC. SCHOOL, SECTOR-19, PRATAP NAGAR, JAIPUR

Abstract:

We have only one life given to us by GOD so we want to be a healthy life we want to spend our full time with family. But doing a little bit a work gives pain to our body, with the passage of time our body become weak and need an external source for pain healing, for which many among us use the therapies, massage etc. Which is a time and money consuming process, of course nobody wants to waste his money and time. The main objective of this project is to heal the pain as quick as possible which is achieved by using the application of heat and pressure (as massage) on the effected part of the body. Heat will increase the rate of healing and external pressure is required to increase the flow of blood in the body which in result increase the body temperature. By the studies of kinematics of chemical reaction we found that rate of reaction increases with the increase in temperature which simply means if anyhow we increase the temperature of our body we are indirectly increasing the rate of pain healing.

Keywords: Heat, pressure, chemical kinematics, rate of reaction, pain,

Introduction:

Technology is developing day by day and moving towards automation. No doubt that this has made the life very comfortable and reduces the need the work by hand. All this need a simple command it may be a manual input or a voice input. Due to which most of the peoples doesn't do any kind of work thus their body adopts this and when a job is done by such a person it gives a pain to his body.

Body pain is now become a common problem for, some pains need a medical treatment and some need physical stimuli to that particular part of

the body. Physical stimuli include massage, therapy, applying heat etc. but nobody want to do it manually as this is the age of automation.

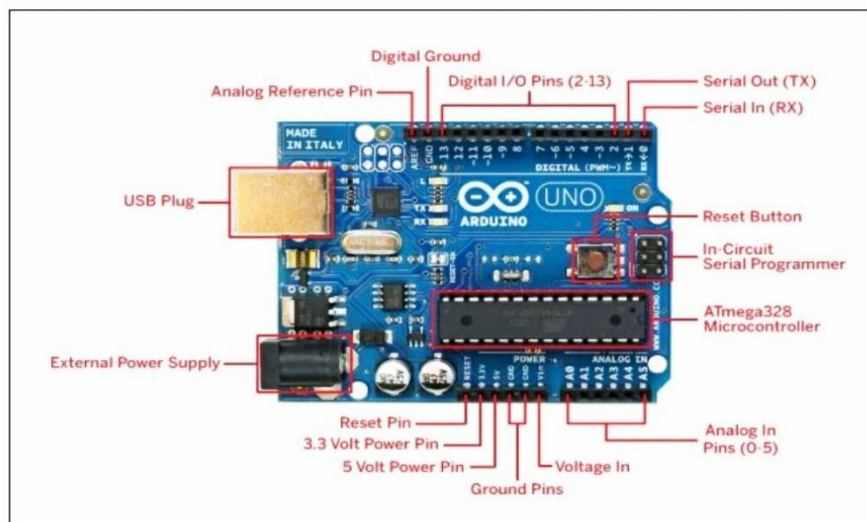
Our body pain reliever machine is an automatic controller based device which uses the application of heat and pressure on the skeleton muscles tissue and helps in pain healing.

We are using Arduino as microcontroller which will help in controlling whole system make it an automatic one, a pressure sensor is added in the cuff of the project which will help in identifying the pressure on the body part.

Air sucker will suck the air from surrounding and deliver it into air compressor which will increase the pressure of air which indirectly helps us in increasing the temperature of air. This hit is passed into the cuff; thus, heat is absorbed by the body part. No, the temperature of that part of the body is more the normal body temperature. Thus, increase in temperature will increase the rate of pain healing.

Arduino with the help of sensor main rain a pressure of 100mmHg on the body part for 1 second and refuse it to 70mmHg for one second. This relaxation and contraction cycle continue for time we want.

In order to operate /power the system we need mini rechargeable battery of 12 or set of two or three batteries to full fill the requirement. In this way our



Arduino Uno Pin Diagram

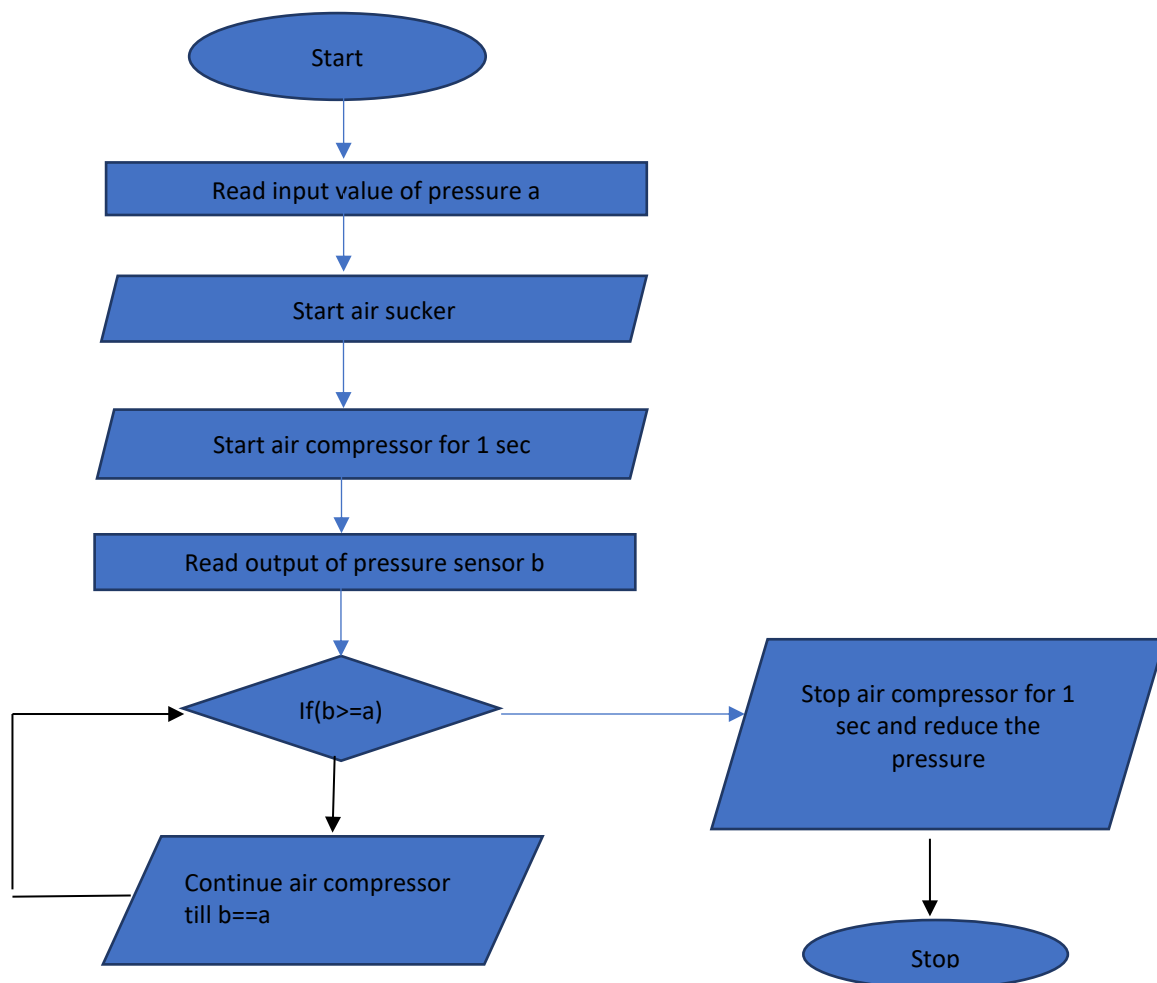
project will be helpful for pain healing. The pin configuration of the Arduino is shown.

Salient features:

- Compact size.
- Controller based operations.
- Manual pressure setup.
- Auto contraction and relaxation.
- Uses air working fluid.
- Uses the application of heat along the pressure.
- Adjustable size as per the size of body part.

Methodology used:

The methodology of the project is explained with the help of below flow chart:



List and specification of components used:

1. Arduino
2. Air sucker
3. Air compressor
4. Pressure sensor
5. 16 X 2 led display
6. A cuff type belt.
7. A rechargeable battery
8. Connecting wires (both male to male and male to female)

Comparative studies:

During the research studies on our project we have found that there are a number of methods/ techniques that are very effective for the pain healing like transcutaneous electrical nerve stimulator (TENS), Magnetic field therapy, Electrical Muscle Stimulation (**EMS**), acupuncture therapy etc. All these therapies are very effective and have scientifically proved as free from side effects but there is a problem that these are done only by a specialist person of the therapy center and not by any one. This makes them a little bit time consuming process and money also. Our project is more beneficial than these therapies because it doesn't require an operator or an expert any one can use it. It is good to invest a small amount of money for this machine for saving a lot from therapy and massage center.

Cost of the project: Rs.3000

Conclusion:

This project is an easy and effective pain relieving machine which will be helpful for all the people in healing all kinds of external body pain like joint pain, bone pain etc., its low cost and compact size make it very useful for society, it doesn't require any expensive working substance as it uses air free working fluid. The applications of heat and pressure together make it more effective and better than other available pain relieving machines.

30. SMART ACCIDENT PREVENTION AND AUTHENTICATION SECURITY SYSTEM (SAPASS)

COLLEGE	SAGAR INSTITUTE OF RESEARCH AND TECHNOLOGY, BHOPAL
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COLLEGE STUDENTS	HAMZA AMIN, AVNISH KUMAR DWIVEDI
SCHOOL STUDENTS	TRISHITA SHARMA, ANEYA SAXENA
SCHOOL	SAGAR INTERNATIONAL SCHOOL, BHOPAL BILLABONG HIGH SCHOOL, BHOPAL

Abstract:

The proposed **Smart Accident Prevention and Authentication Security System** is a research model designed keeping in mind the national flagship programme like National Automotive Testing and R&D Infrastructure project (NATRIP), Fame India Scheme II Phase. This is an innovative model that involves a secure authentication system to validate the owner, obstacle detection, automated braking in case the driver fails to register a response and emergency sos message to emergency services in case of an accident.

Keywords: fingerprint scanner, authentication, automated braking, crash sensor, IR sensor, gyro sensor and emergency sos messages triggered along with pinned GPS location in case of an accident.

Introduction:

Rapid urbanization has led to more and more number of vehicles on the roads which has also caused the number of road accidents and deaths associated drastically. Every year about 150000 people are killed which accounts for about 400 fatalities per day. This model can help reduce the accidents caused either due to negligence or driver error and can potentially bring down the death toll by a great margin, along with that by incorporating an authentication system with it, this will also solve the problem of vehicle robberies.

This system is based on IoT and relies on IR, crash and gyro sensors to monitor and send information to the system which can then react in case the driver fails to respond by automatically triggering the brakes thereby bringing the vehicle to a standstill.

Salient features:

1. Cloud based server holding the details of the user for authentication (DI, vehicle registration, insurance)
2. Fingerprint Scanner (for authentication purposes)
3. IR sensor based monitoring (to detect obstacle)
4. Automated braking
5. Crash and gyro sensor (triggered in case of an accident)
6. GPS and GSM module (to send emergency sos message with gps location)

Objective and Scope

The primary objective of the proposed model is to be implemented in the automotive industry so as to help the number of road accidents and deaths to be brought down. This model can also be incorporated with the new EV startups supported by the government under NATRiP and Fame India II scheme.

In the present scenario many of the vehicles on road are lacking proper documentation to be road legal and along with that robberies and vehicle loss is also an emerging problem besides road accident.

This model can solve the above problems as follows:

First there will be a cloud server that holds all the user info such as driving license, vehicle registration, insurance etc and can even notify the user if any of the document is due to be renewed or has already expired. Once the user is authenticated then access is granted

Second during the time of driving if an obstacle comes up suddenly the user has the time to react and provide suitable input, in case the user fails to give the necessary input then the system jumps into action and provides the input itself. The braking pressure applied depends upon the distance between the user's vehicle and the obstacle upfront. The braking zone is divided into 3 parts i.e Green, yellow, red

In the green zone the system does not react in case there is an obstacle as sufficient distance is between the vehicle and the obstacle for the user to react

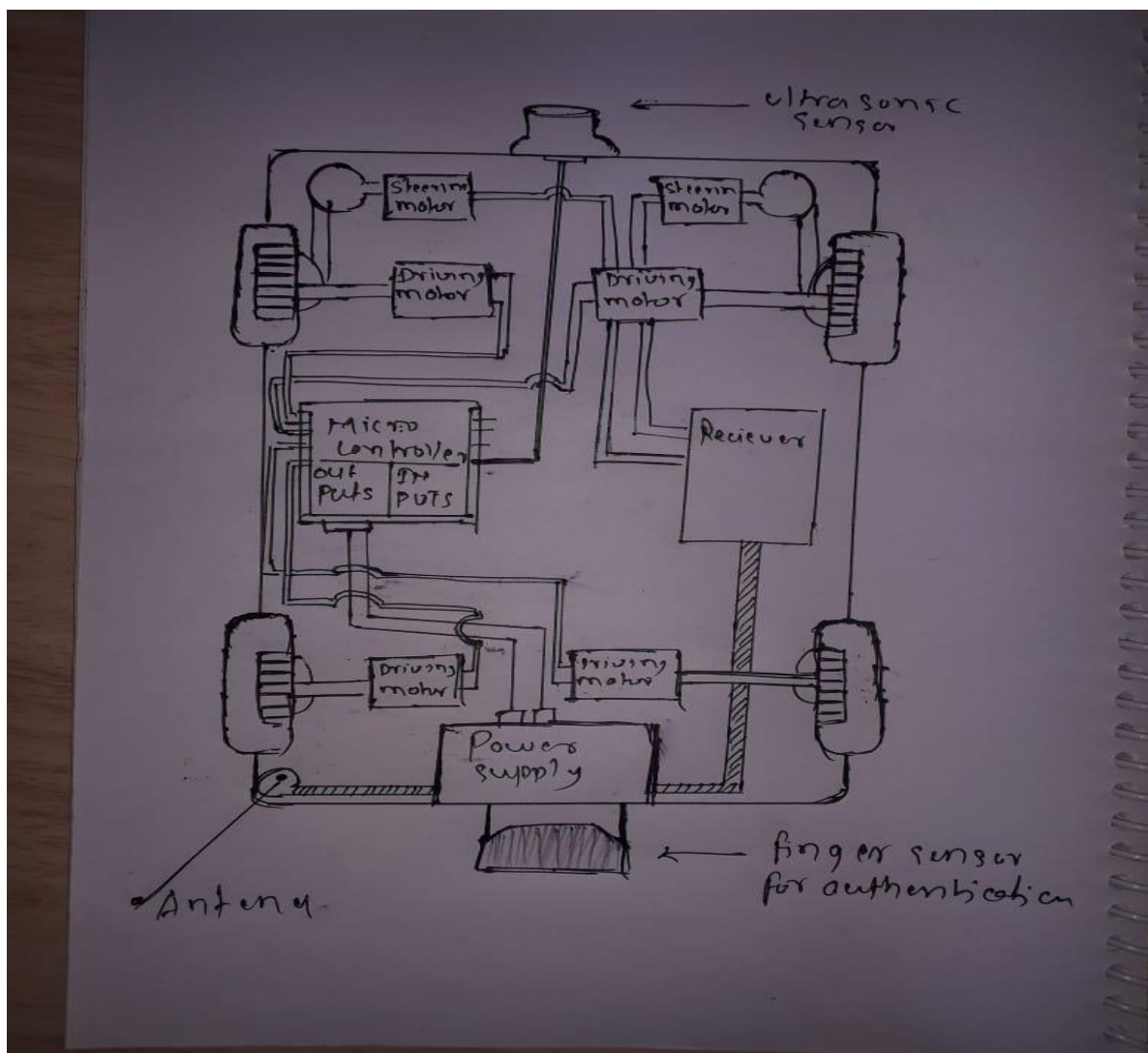
In the yellow zone the system jumps into action and starts braking by increasing the amount of pressure in small amounts

In the red zone the system will immediately apply the brakes completely to bring the vehicle to stand still suddenly.

Third in case a collision occurs the crash and gyro sensors trigger the system to send an sos message to the emergency services and close family members along with the GPS location by making use of GPS and GSM modules.

The proposed model will prove to be highly beneficial for the automotive sector and for the large consumer base associated by detecting, preventing and also sending sos messages in case of an accident which can reduce the time taken by the emergency services to be notified and help in quick response.

Block Diagram:



Hardware and software components:

Authentication system:

1. Fingerprint Scanner
2. Output screen
3. Arduino uno
4. Bread board
5. Connecting wires
6. Buzzer
7. Power cutter

Software:

1. Sql Database
2. Arduino
3. Interface

Accident Prevention system:

Hardware:

1. IR sensor
2. Led lights Red,Green,yellow
3. H bridge
4. 2 servo motor
5. Simple motor
6. Arduino

Software:

Arduino

Post Accident:

Hardware:

1. Trigger sensor
2. Crash sensor
3. Gyro sensor
4. GPS module
5. GSM module
6. Data sim

Software:

arduino

Comparative study

The proposed model is best suited for the Indian market as in the present scenario there are no AI based vehicles unlike foreign countries where these objectives can be handled automatically. India is a price sensitive market and in order for AI based vehicle systems to arrive properly in this market it will take a lot of input capital and time which will sky rocket the prices of these systems which could drive the potential users away.

Since this model is based on IoT and can help achieve the same benefits of its AI counterpart, this can help to be a bridge between conventional systems and AI based systems until they can arrive at a reasonable cost in the Indian market.

The conventional systems have proved to be inefficient in helping to solve the problem of vehicle robberies and road accidents as they solely rely on user input. The proposed model on the other hand is an integration between man and machine where the system works in conjunction with the user and not only provides the user enough time to react but also has sufficient control to provide its own input in case the user fails to register an input thereby preventing a fatal accident.

Cost of the project:

Since the model is based on IoT and can be co-developed with new EV startups that are not only provided subsidy by the Govt. but are also backed by the Govt. under NATRiP and Fame India II scheme which can help reduce the cost of R&D and manufacturing by a significant amount.

The objective of the system is to cover all grounds in terms of vehicles ranging from commuter transport (2 wheelers, 4 wheelers) all the way to upcoming EV and large scale vehicles

In real time the cost of the project to be implemented on a small scale dummy RC car model is only 7000 rupees approx.

Social impact:

This model can solve the problem of vehicle robberies and users driving around with invalid documents and can also help solve the problem of vehicle accidents

This will also solve the problem of late arrival of emergency services which often leads to death as the time gap between the time of accident and notification of emergency services is a lot. With this system into play emergency services can be notified quickly and they can take appropriate action swiftly.

The AI based counterpart and other associated systems along with strict Govt. regulations have already proved to be successful as the number of annual deaths reported by US is 40000 and in India alone stands at a staggering 5Lakh accidents in 2015 out of which 1.5 lakh proved to be fatal most of which included teenagers.

This system can help the in reducing road and traffic accidents by 50% by 2022 which the Govt. intends for.

Conclusion:

The proposed system can cater to two of the Govt. schemes

1. NAPTRiP Under this the Govt. provides incentive in form of subsidy and financial assistance to emerging EV startups
2. Fame India II scheme: In this the newly emerging EV companies are provided support in the form of subsidy by the govt. to help build their startup

31. WASHING WATER PURIFIER SYSTEM

COLLEGE	SAGAR INSTITUTE OF SCIENCE, TECHNOLOGY AND RESEARCH, BHOPAL
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COLLEGE STUDENTS	NARESH LODHI, SHUBHAM PATEL
SCHOOL STUDENTS	NITIN MARAM, VIDYA MARAN
SCHOOL	SAGAR VIDYA NIKETAN, SIKANDRABAD, BHOPAL

Purpose:

The purpose of this project is to design a water purification system that can purify washing water. This system is relatively cheap. Its main purpose is to re-use water which was used for washing vehicles.

Introduction:

The washing water purifier is basically use in water purification. It is a use of waste water & purifies water. It is a reduce water pollution in waste water. It is a using Eco - friendly component in purification

Method:

In the beginning the waste water is sent in the upper most tank as shown in figure. After the water is filled in the tank most of the suspended impurities of the water settle at the base of the upper most tank. Then suspended particles free water enters in the second tank through a filter. In the second tank the water first passes through small pieces of bricks after that foam. Then it passes through aggregates than again foam. At last it passes through a wooden powder and foam. Till now almost 70-80% impurities of the water are treated. The water now enters in tank three where it passes through there are passes in three and two different layers. Tank second is a three layer and tank third is two different layers. There are passes in total five layers. A top is connected at the bottom of tank no. three to let the pure water out. It is a not reduce a hardness.

Working:

As per the above discussion we have three tanks at different high and the waste water is called at ground tank in this project we use solar pump to lift the water then ground tank this solar pump operates by solar power dc battery the battery charges by solar pump the capacity of top most as just tank is 10 liters. The capacity of solar pump is 60 liters per hours the upper most gets full water level in 10 minutes.

After that the water passes through first filters foam. Then it filled in second tank where it passes through the three segments of different materials and finally it goes in last third tank. Where two layers of different materials fitted.

Now the water has 95% filtered and it can reuse for washing again the vehicles.

After that collecting water and its water are pure. Its water is not reducing a hardness of water. It is pure a water in 70 - 90 %.It's water of output is 60 liters in 1 hour.

It is used as in material of environment easily available. It is eco-friendly. It purifies water.

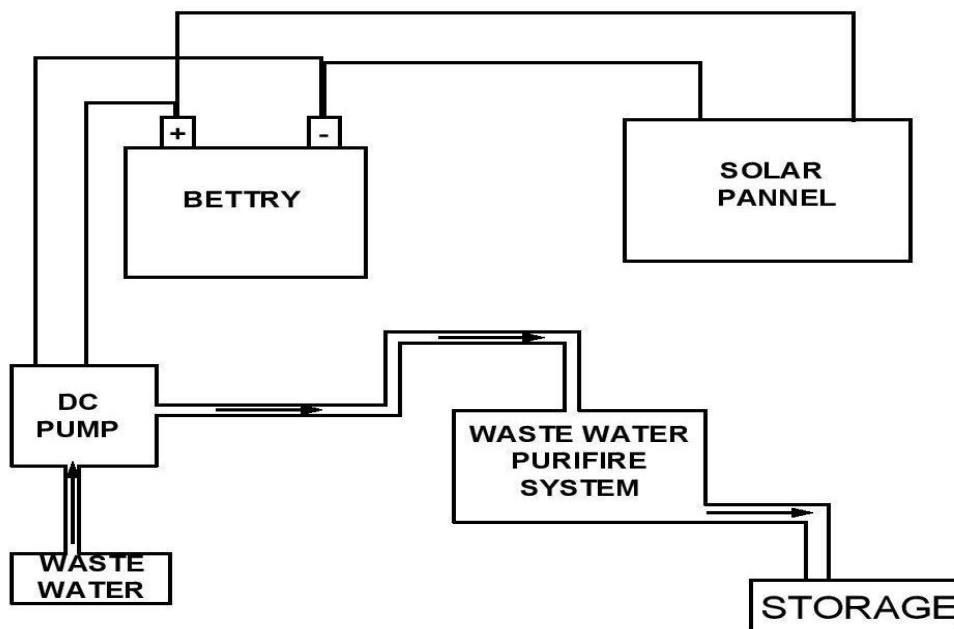


Figure-Block Diagram of Washing Water Purifier System

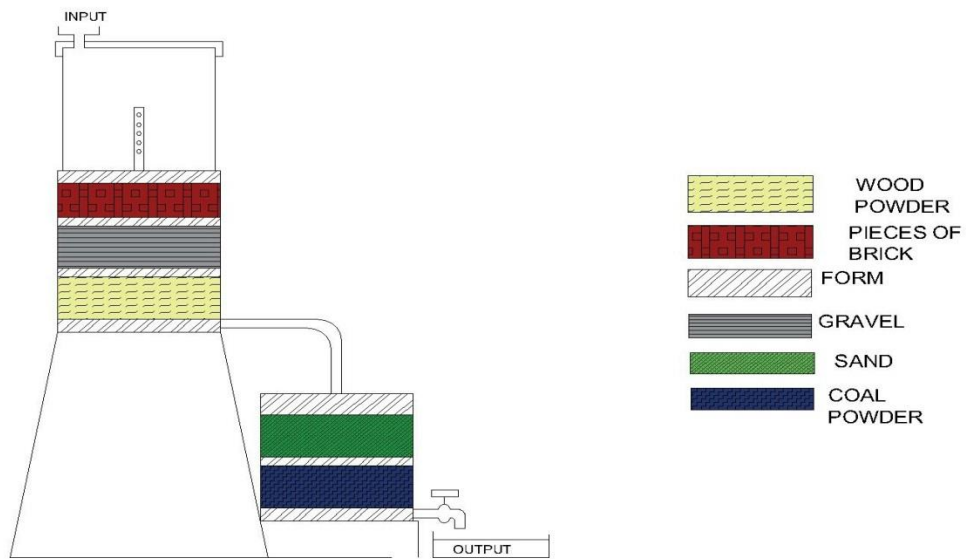


Figure- Washing Water Purifier System



Picture of Project

Cost of the Project: It is very low cost project. Its cost is 3000 Rupees Only.

Sr. No	Component	Price
1.	Water purifier	1350
2.	Solar panel	500
3.	Battery	450
4.	DC water pump	350
5.	Plumbring item's	350
	Total	3000 (Approx)

Advantage (Use):

In this project are reducing a wasting of water in a washing cars and other. It is a recycle of waste water in future.

There will be shortage of water in future .So our project is very much useful in this direction. We can reuse the 80- 90% of some water after purification.

Result:

It is an output of water is 45 liters in one hour. It does not reduce hardness.

32. GREEN POWERED AC SYSTEM

COLLEGE	SAGAR INSTITUTE OF SCIENCE TECHNOLOGY & RESEARCH
GUIDE	MR. BHOOPENDRA SINGH
COLLEGE STUDENTS	SHAKTI SINGH, RAHUL RAJPUT
SCHOOL STUDENTS	ASHUTOSH MARAN, AKHIL MARAN

ABSTRACT

Performance enhancement of refrigeration by cycle modification is an emerging research topic now-a-days to reduce the electricity consumed leading to mitigating the problems related to the environment pollution by utility power plants. In today's generation most of people are using water cooler because AC becomes costly. Due to the use of water cooler moisture is released which dry up our environment and other biggest problem in today's time is, How to save electricity?

The first requirement of every customer is that get cheaper and best working product and our model fulfills both requirements. If we install any ordinary Air Conditioner, then capital cost is approximately 35k and running cost in terms of electricity consumption is also very high. In our model 'Green Powered AC System', we are using VCRS principle. Under this principle compressor is driven by the help of 24V DC Batteries which is chargeable by solar energy. Due to no moving parts, low maintenance cost and use of solar energy as well as DC batteries our project will be affordable for all communities of people. If we will install 'Green Powered AC System' then we can easily operate, it in rural area because it based on renewable energy resource (SOLAR ENERGY) and does not requires AC-current to operate it.

HYPOTHESIS

There are two principle for heating and cooling VARS & VCRS, we changed VCRS cycle by adding some DC equipment for the purpose of operate it on fully DC.

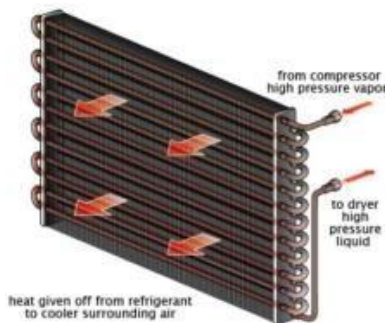
Principle- VCRS and 2nd law of Thermodynamics. Its main components are:

(1) COMPRESSOR:-



The compressor is the heart of the cooling cycle. We are using air cooled compressor to compressed refrigerant into high pressure as well as high temperature. Here we used compressor which runs by DC motor.

(2) CONDENSER:-



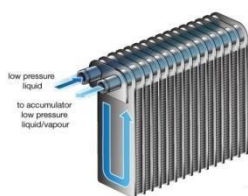
In a cooling cycle of a refrigeration system, heat is absorbed by the vapour refrigerant in the evaporator followed by the compression of the refrigerant by the compressor. The high pressure and high temperature state of the vapour refrigerant is then converted to liquid at the cond. It is designed to condense effectively the compressed refrigerant vapour.

(3) EXPANSION VALVE:-



Expansion device is one of the most commonly used throttling devices in the refrigeration and the air conditioning systems. It is a copper tube of very small internal diameter. Expansion valve is of very long length and it is coiled to several turns so that it would occupy less space.

(4) EVAPORATOR:-



Evaporator is an important component together with other major components in a refrigeration system such as compressor, condenser and expansion device. The reason for refrigeration is to remove heat from air, water or other substance.

(5) SOLAR PANEL:-



Solar panels are those devices which are used to absorb the sun's rays and convert them into electricity or heat. . The process of converting sunlight to electrical energy is one that has improved dramatically over the last few decades, and is now more efficient than ever.

(6) DC-MOTOR:-



DC-Motor is a device which transforms the electrical energy into mechanical energy. We are using 24V, 230W DC-Motor. The function of DC-Motor in this model is to rotate the compressor clutch.

(7) BATTERY 24V, 26Ah:-



A battery is a device that produces electrons through electrochemical reaction and generates emf (Electro Motive Force). In this model battery produces emf and transfers it in DC- motor.

(8) FLYWHEEL:-



Flywheel is a rotating device that is used to store the rotational energy; it has moment of inertia and thus resists changes in rotational speed. The energy stored in the device is proportional to the square of its rotational speed.

EXPERIMENT & WORKING

Working of Green Powered AC System:-

To run this system, we will first give the DC-current to DC-motor (24V, 800W, 1300RPM) after that DC-motor will run compressor by the help of belt drive. Then compressor compressed the refrigerant to high temperature as well as high pressure. Then compressed refrigerant will enter in condenser. Here, temperature of the refrigerant will be reduced so and it will convert liquid form. After this the refrigerant will enter to capillary tube. In capillary tube throttling process will be completed, which will reduce the temperature of refrigerant. Then it goes to Evaporator. Here, temperature of refrigerant will increase at room temperature then again it will go to compressor and compressed by compressor. This process continues continuously.

RESULT

If we use normal air conditioner, then it consumes 200 watts of power in an hour and it will costly also. If we will use this model, it runs model constantly used by D.C. supply and solar energy. We will be able to save a lot of power by using solar energy and save electricity to troubleshoot future problems. The life cycle of 'Green Powered AC System' is too good because of long life of solar panel and DC-batteries.

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. It requires one time investment and does not require any maintenance. On a small scale the project would cost an amount of 28K.