

Student Projects Technical Record

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

Conducted Virtually

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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

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

Introduction

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

Agastya Vision:

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

Mission of Agastya

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

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

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

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

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

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



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

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

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

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

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

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



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Third Party Impact Studies:

MHRD study on 2048 children from 256 schools

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

Best Practices Foundation study of 1348 children in Karnataka

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

Achievements and Recognitions

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

Looking Forward...

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



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

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

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By clicking on the following links you can

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

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

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

ABOUT SYNOPSYS

Corporate Background

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

- See more at:

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

ABOUT ANVESHANA

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

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

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

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

Engineering colleges will participate as teams with 2 members. The teams will select 2 students from nearby underprivileged schools (Govt. and Govt. aided schools) to **mentor** them to design and build models or projects around an identified social problem. In the process school children would directly get the opportunity to work together with more qualified under-graduates, and a chance to 'learn' the basic principles (along with hands-on skills on diverse products and interesting processes). The interaction with Juries and dignitaries would be a life-time experience for them to cherish. The school students thus will be exposed to entire planning, designing and building process of the models and in turn will get educated in the scientific and engineering concepts behind the models in Anveshana-2021. (www.anveshana.org)

Process of Anveshana (Engineering Fair & Competition):

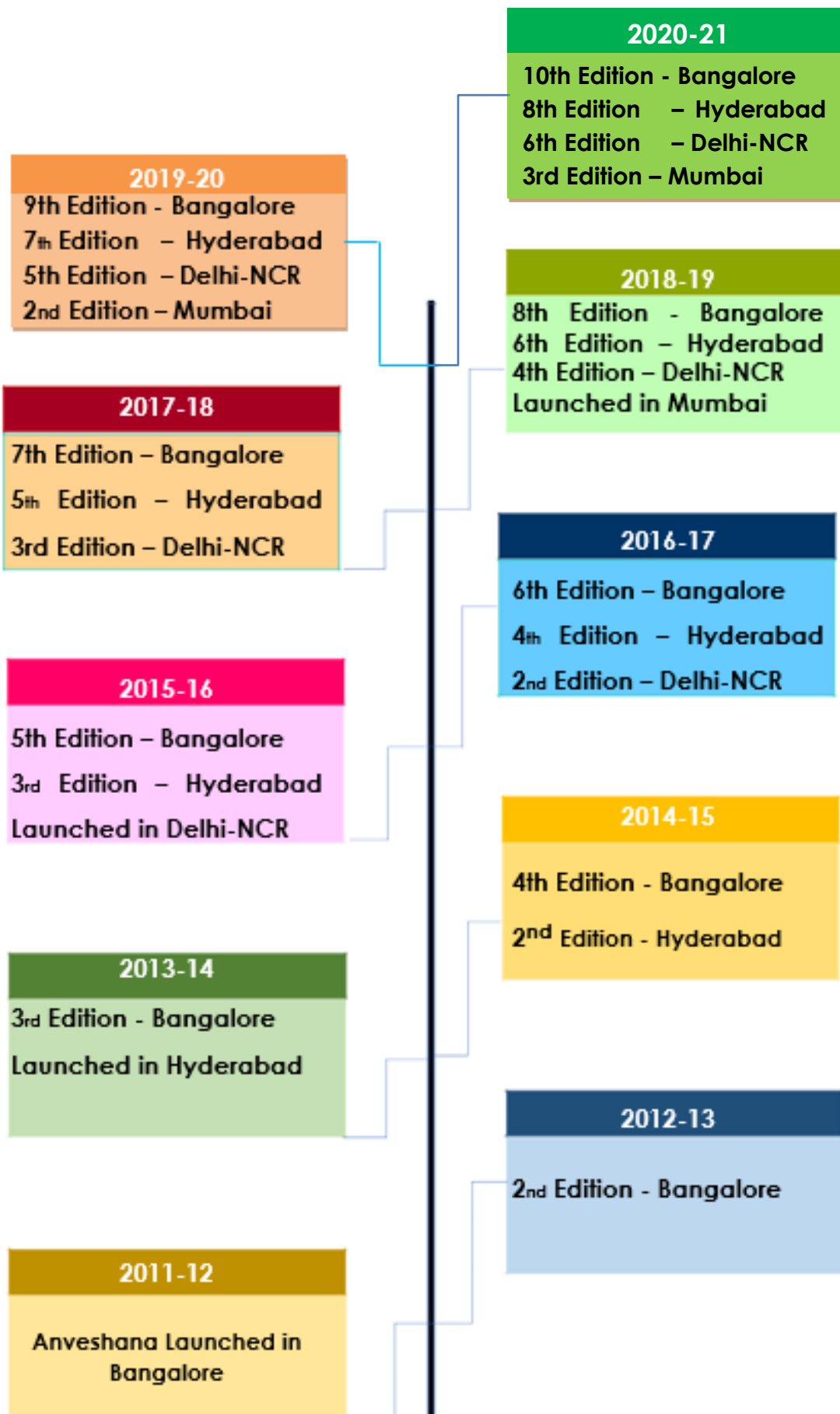
- Initial Screening of Engineering College Teams: Concept synopsis based on social problems and related Engineering solutions are invited from engineering college teams for pre-screening by the jury.
- Screening, selection of Synopsis and identifying mentees: Once selected the teams are asked to contact 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 FIRE EXTINGUISHING SUIT	Bharati Vidyapeeth's College of Engineering, Delhi
			Govt. Co-ed Sarvodaya Vidyalaya, Rampura, Delhi
2	AS-D-G-02	Warm Patient Mattress	Poornima College of Engineering, Sitapura, Jaipur
			Govt. Senior Secondary School, Sanganer, Jaipur
3	AS-D-G-03	The Braille Cell	Maharaja Agrasen Institute of Technology, Rohini, Delhi
			Govt. Sarvodaya Kanya Vidyalaya, Nangloi, Delhi
4	AS-D-G-04	Electricity from sludge	GL Bajaj Institute of Technology and Management, Greater Noida
			Govt. Girls Sr. Sec. School, Paharganj, New Delhi
5	AS-D-G-05	DELHI DUKAAN - VOCAL FOR LOCAL	Bharati Vidyapeeth's College of Engineering, Delhi
			Govt. Sarvodaya Co-ed Vidyalaya, Sec-8, Rohini, Delhi
6	AS-D-G-06	Smart Medicine Box	JSS Academy of Technical Education, Noida
			Rajkiya Balika Inter College, Sector 51, Noida,
7	AS-D-G-07	SELF Balanced Electric Two Wheeler	Dronacharya Group of Institution, Greater Noida
			Govt. Sarvodaya Co-ed Vidyalaya, Sec-8, Rohini, Delhi
8	AS-D-G-08	waste paper recycling machine	Dronacharya Group of Institution, Greater Noida
			Govt. Sarvodaya Co-ed Vidyalaya, Sec-8, Rohini, Delhi
9	AS-D-G-09	Recoil Reducing Pressure Device	Dronacharya Group of Institution, Greater Noida
			Model Upper Primary School, Dhanipur, Aligarh

10	AS-D-G-10	MT bot	Hi-Tech Institute of Engineering & Technology, Ghaziabad
			Ramanujan Sarvodaya Kanya Vidyalaya Mehrauli
			Govt. Girls Sr. Sec. School No-3, Dr Ambedkar Nagar
11	AS-D-G-11	VERTICAL AXIS WIND TURBINE	GL Bajaj Institute of Technology and Management, Greater Noida
			Sarvodaya Kanya Vidyalaya, No.1 School, Uttam Nagar, West B, Delhi
			Govt. Girls Senior Secondary School, Nangloi, Delhi
12	AS-D-G-12	Atmospheric Water Generator	Bharati Vidyapeeth's College of Engineering, Delhi
			Govt. Co-ed Sarvodaya Vidyalaya, Rampura, Delhi
13	AS-D-G-13	Ultraviolet Sterilizer	GL Bajaj Institute of Technology and Management, Greater Noida
			Rajkiya Pratibha Vikas Vidyalaya, A-6, Paschim Vihar, Delhi
14	AS-D-G-14	Solid Waste Management	Ajay Kumar Garg Engineering College, Ghaziabad
			Govt. Girls Senior Secondary School, Nithari Village, Delhi
15	AS-D-G-15	Water Conserving Faucet	Bharati Vidyapeeth's College of Engineering, Delhi
			Govt. Sarvodaya Co-ed Sr. Sec. School, Hiran Kudna
16	AS-D-G-16	Tracking Water Usage at Home	Ajay Kumar Garg Engineering College, Ghaziabad
			Govt. Girls Senior Secondary School, Nithari Village, Delhi
17	AS-D-G-17	Real-Time Face Mask Detector	Ajay Kumar Garg Engineering College, Ghaziabad
			Government Girls Sr Sec. School, Mubarakpur Dabas, Delhi
18	AS-D-G-18	mask and thermal sensitive door	Dronacharya Group of Institution, Greater Noida
			Rajkiya Sarvodaya Bal Vidyalaya, No-2, Shakarpur, Delhi
19	AS-D-G-19	ARANYANI	Bharati Vidyapeeth's College of Engineering, Delhi

			Govt. Girls Senior Secondary School, Nangloi, Delhi
			Government Girls Senior Secondary School, Hastal, Delhi
20	AS-D-G-20	Waste Collector and Recycling	Sagar Institute of Science and Technology, Gandhi Nagar, Bhopal
			Govt. Naveen Girls H. S. School, Tulsi Nagar, Bhopal
21	AS-D-G-21	limitation on person entry	GL Bajaj Institute of Technology and Management, Greater Noida
			Sarvodaya Kanya Vidyalaya, Arambagh Lane, Delhi
22	AS-D-G-22	HLED	Bharati Vidyapeeth's College of Engineering, Delhi
			Govt. Sarvodaya Co-ed Vidyalaya, Sec-8, Rohini, Delhi
23	AS-D-G-23	Musical Hydroponics	GD Goenka University, Gurugram
			Govt. Model Sanskrit Sr. Sec. School, Sushantlok, Gurugram
24	AS-D-G-24	Modish Litter Basket	Sharda University, Greater Noida
			Aligarh Muslim University, Aligarh
			Ramanujan Sarvodaya Kanya Vidyalaya Mehrauli, Delhi
25	AS-D-G-25	Forest-Desert Land Segregation	JSS Academy of Technical Education, Noida
			Rajkiya Balika Inter College, Sector 51, Noida,
26	AS-D-G-26	Portable EEG Machine	Maharaja Agrasen Institute of Technology, Rohini, Delhi
			Govt. Girls Senior Secondary School, Nangloi, Delhi
			Govt. Sarvodaya Co-ed Vidyalaya, New Multan Nagar, Delhi
27	AS-D-G-27	FOREST ANALYSIS USING GIS	Ajay Kumar Garg Engineering College, Ghaziabad
			Jaypee Institute of Information Technology, Noida
			Rajkiya Sarvodaya Bal Vidyalaya, No-2, Shakarpur, Delhi
			Rajkiya Srvoidaya Bal Vidyalaya, Laxmi

			Nagar, Delhi
28	AS-D-G-28	Bookhub	Sagar Institute of Research and Technology, Bhopal
			Govt. Adarsh Residential Girls Institute for Sanskrit, Bhopal
29	AS-D-G-29	ORIPANEL	Indraprastha Engineering College, Shahibabad, UP
			S.S.L.T Gujarat Sr. Sec. School, Raj Niwas Marg, Delhi
30	AS-D-G-30	HYDROGEN FUEL	GD Goenka University, Gurugram
			Govt. Girls Senior Secondary School, Ghamroj
31	AS-D-G-31	Smart hacker	Sagar Institute of Research and Technology, Bhopal
			Govt. Adarsh Residential Girls Institute for Sanskrit, Bhopal
			Govt. Naveen Girls H. S. School, Tulsi Nagar, Bhopal
32	AS-D-G-32	Solar power forest fire detector	Poornima College of Engineering, Sitapura, Jaipur
			Govt. Senior Secondary School, Sanganer, Jaipur
33	AS-D-G-33	Smart cyber rampart system	Sagar Institute of Research and Technology, Bhopal
			Govt. Adarsh Residential Girls Institute for Sanskrit, Bhopal
34	AS-D-G-34	Open Source Ventilator Project	Global Institute of Technology, Jaipur
			Govt. Senior Secondary School, Sukhupriya, Jaipur
35	AS-D-G-35	Conversion of CO-2 into Electricity	Global Institute of Technology, Jaipur
			Govt. Senior Secondary School, Gator, Jaipur
36	AS-D-G-36	Wear Smart Safety	Sagar Institute of Research and Technology, Bhopal
			Govt. Higher Secondary School, Anand Nagar, Bhopal
			Mahatma Gandhi Higher Sec. School, Barkheda, Bhopal
37	AS-D-G-37	VeSaFe	Sagar Institute of Research and Technology, Bhopal
			Govt. Naveen Girls H. S. School, Tulsi Nagar, Bhopal

38	AS-D-G-38	AIR FILTER SYSTEM	Sagar Institute of Science and Technology, Gandhi Nagar, Bhopal
			Govt. Naveen Girls H. S. School, Tulsi Nagar, Bhopal
			Govt. High School, Chunabhatti, Bhopal
39	AS-D-G-39	Power Outage Info module	Panipat Institute of Engineering and Technology, Panipat
			Govt. Sarvodaya Kanya Vidyalaya, Jwalapuri, Amalwas, Delhi
40	AS-D-G-40	Plastic Constraint by Plastics	Maharaja Agrasen Institute of Technology, Rohini, Delhi
			Govt. Girls Senior Secondary School, Nangloi, Delhi
			Govt. Girls Sr. Sec. School, Baprola, New delhi

1. AUTO FIRE EXTINGUISHING SUIT

COLLEGE	Bharati Vidyapeeth's College of Engineering, Delhi
GUIDE	Mr. Neeraj Kumar
COLLEGE STUDENTS	Tanisha Sharma, Ujjwal Tyagi
SCHOOL STUDENTS	Palak Patel, Almas Kashif
SCHOOL	Govt. Co-ed Sarvodaya Vidyalaya, Rampura, Delhi

ABSTRACT

Firefighters dedicate their lives to the fire service, working 24-hour shifts, responding to fires and explosions, automobile accidents and medical emergencies. Despite of working with a range of equipment, they still suffer injuries sometimes and at times die due to them. Our project is an addition to the gear used by firemen to improve their overall safety.

KEYWORDS- Automatic Protective Gear, Electromagnet, Fire extinguisher

INTRODUCTION

Every year, several firefighters lose their lives to fire hazards despite of the heavy protective gear they carry. According to the **National Fire Protection Association of the United States of America**, more than **600,000 firefighters either got injured or died** in the line of duty in this decade alone. Now imagine what the numbers of such incidents would be in a high population third world country like ours.

Our proposed system aims at providing an addition to their existing protective gear which will prevent potential life risking hazards.

The basic idea behind our project is to trigger extinguishing process when the suit of a fireman catches fire

GEAR USED BY FIRE-FIGHTERS:

Firefighting is an extremely dangerous occupation. In addition to fighting actual fires, firefighters must contend with smoke, water, hot embers, falling objects and collapsing floors. They perform their jobs under stressful time constraints, given that they often have precious few minutes to get occupants safely out of burning structures. Modern fire-fighters wear a full range of personal protective equipment to help protect them during their potentially dangerous work:

- **Fire Helmets** which are made of durable, heat-resistant materials to protect firefighters from both heat and falling objects.
- **Turnout Pants and Jacket** made of a two-layer fabric Nomex designed to repel heat and wick away any moisture that gets inside.
- **Thick leather gloves** is a basic part of their protective equipment. Firefighting gloves are heavily insulated and stretch past the wrist, so that

firefighters can safely handle hot objects as they work their way through a burning structure.

- **Waterproof firefighting boots** which are thick, natural rubber boots with rubber soles that function well on wet surfaces. Most firefighting boots are reinforced with steel or another tough metal alloy in the toes and soles to protect firefighters from sharp debris they might accidentally kick or step on.

METHODOLOGY:

This extra addition we're proposing consists of **three components:**

- 1) A foam type fire extinguisher with modified **holding mechanism**
- 2) **Triggering mechanism**
- 3) A pressurised foam **channelling system**.

A small and modified foam type extinguisher similar to **(Fig 1)** will be attached to the back of the protective gear. The extinguisher nozzle will be connected to the channelling system (network of thin pipes) via a valve. The moment fire suit catches fire, the triggering mechanism will release the extinguishing foam out of the channel and fire will be put out.

Here's how a foam type extinguisher works:

- The main container is filled with sodium bicarbonate, whereas the inner container is filled with aluminium sulphate.
- The inner container has a cap at the top which is kept in place by a plunger.
- The plunger is turned to release the cap and the extinguisher is then inverted for both the chemicals to mix.
- Carbon dioxide is produced from the chemical reaction which pressurizes the container from inside and forces out the foam.

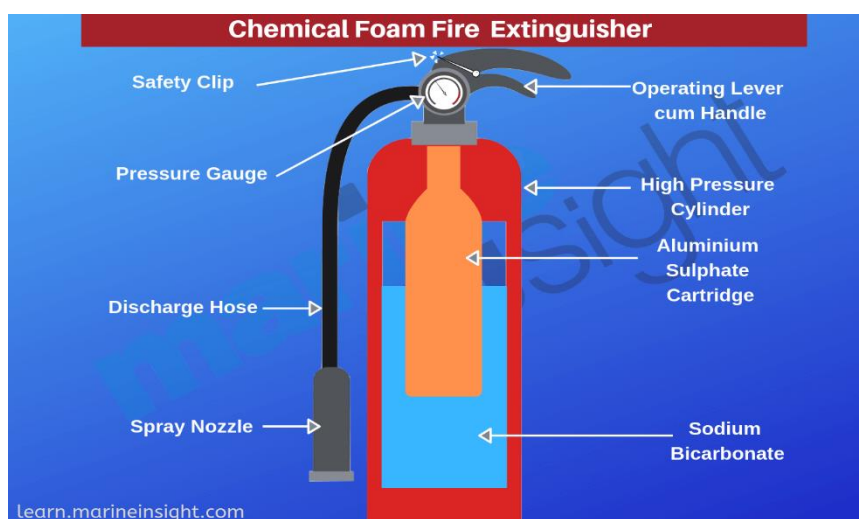


Fig 1: Construction of a traditional chemical foam type extinguisher

The reaction occurring inside the chemical foam type fire extinguisher is as follows:

ws:



We aim to automate this action using the three aforementioned components:

1) Holding Mechanism:

- We replace the inner container with a metal canister containing Aluminium Sulphate and instead of the traditional holding mechanism, we hold it using an electromagnet (and a removable clip initially).
- Before its use, the canister will be held by an easily removable clip/pin and it will be removed when the electromagnet is SWITCHED ON.
- When the suit catches fire, the circuit is broken by the triggering mechanism and the electromagnet holding the cartridge drops the cartridge into the bag. The resulting foam eruption is channelized through the thin pipe network mentioned and the fire is extinguished.

2) Triggering Mechanism:

The triggering mechanism consists of a battery, an electromagnet, and a **thin electricity conducting wire of suitable melting point** laid under one layer of the fire suit whose purpose is to melt in proximity of fire and break the circuit like a fuse. The material used for the wire is Zinc whose melting point is 420 degrees Celsius. The melting point of zinc lies in the range 370-430 degrees temperature between which Nomex fibre (used in jacket) burns.

3) Channelling System:

The channelling system will consist of a network of interconnected thin metal pipes laid over protective jacket of firefighter with tiny holes in them. These are connected to the nozzle of the fire extinguisher. When the foam is formed inside the extinguisher, it will be released through the nozzle into these pipes. The foam coming out of the tiny holes will blow out the fire on the jacket.

HARDWARE COMPONENTS:

- Metal Sheet (Steel, Galvanized Iron)
- Electromagnet
- Nomex Jacket
- Battery
- Zinc Wire
- Thin Copper Pipes
- Metal Canister
- Connecting Wires

CHEMICAL COMPOUNDS:

- Aluminium Sulphate
- Sodium Bicarbonate

Illustrations of the components of the project:

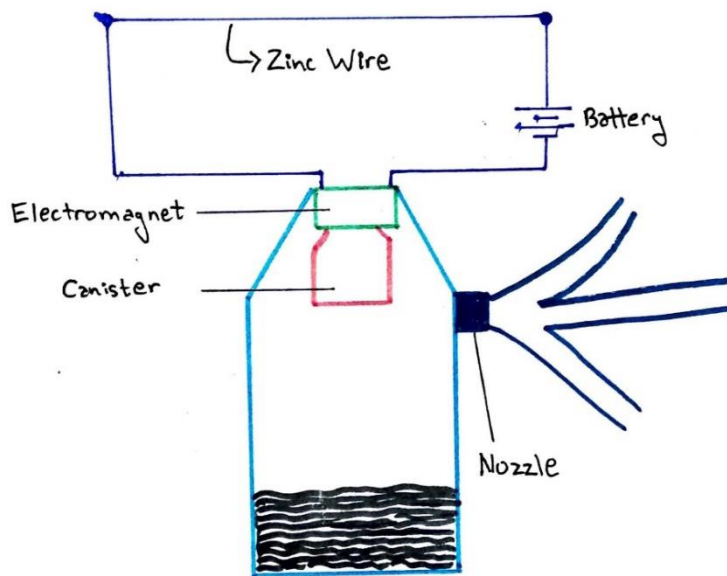


Fig 2: Holding mechanism and Basic Circuit

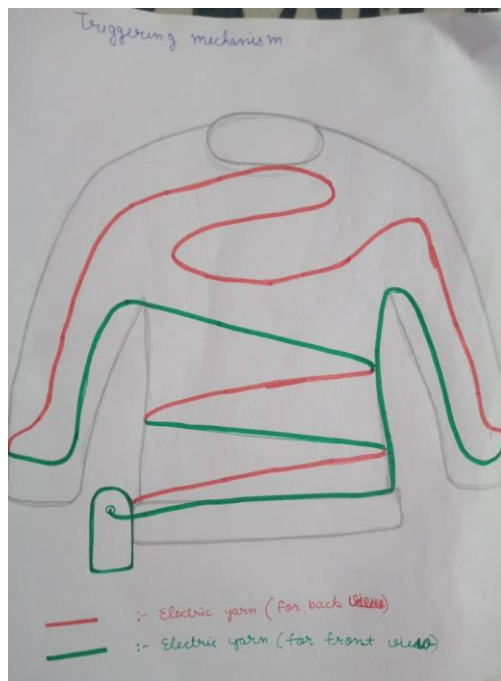


Fig 3: Triggering Mechanism

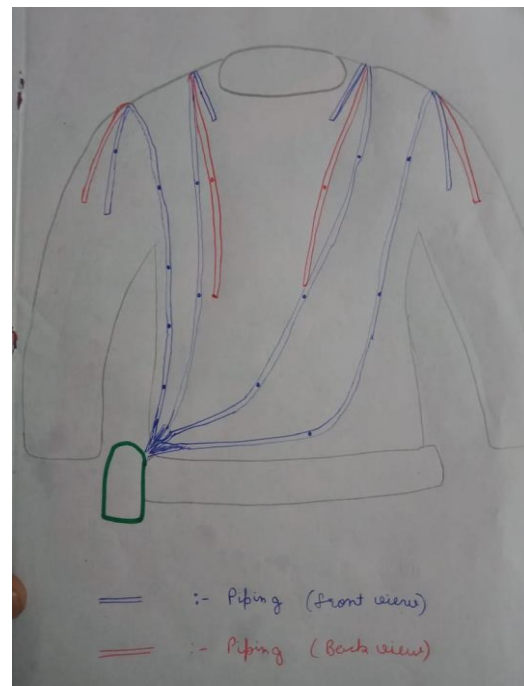


Fig 4: Channelling System

Step by step working of the project:

Step 1: When not in use, the canister and the electromagnet are held by a clip/pin.

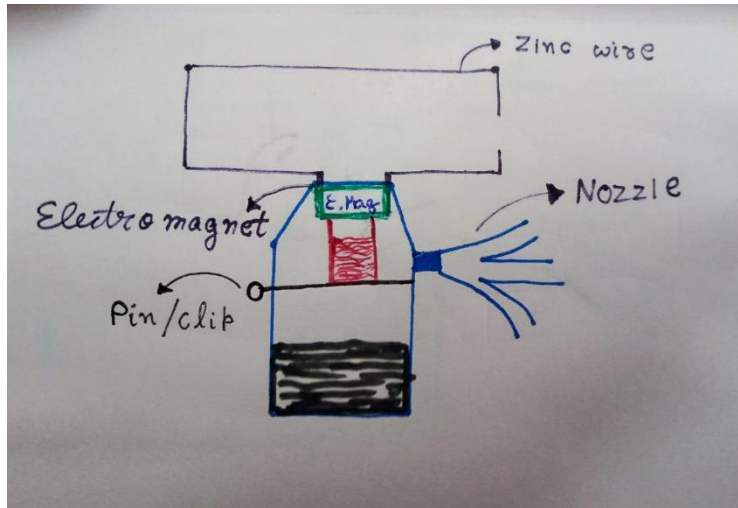


Fig 5: Canister and electromagnet held by clip/pins

Step 2: When power is supplied to the circuit via battery, the clip/pins are removed and the electromagnet holds the canister (electromagnet is ON). The extinguisher is now ready to use.

Step 3: When the suit catches fire, the wire burns and the circuit is broken. The electromagnet is now switched OFF and the canister drops in the concentrated foam tank.

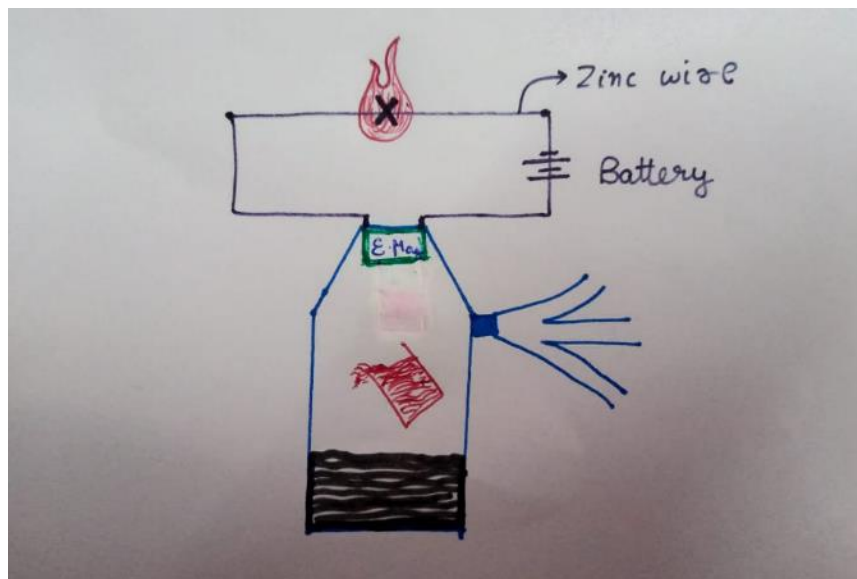


Fig 6: Circuit switching OFF and canister dropping in foam tank

Step 4: After reaction, high pressure foam is released from the nozzle and released via the channelling system.

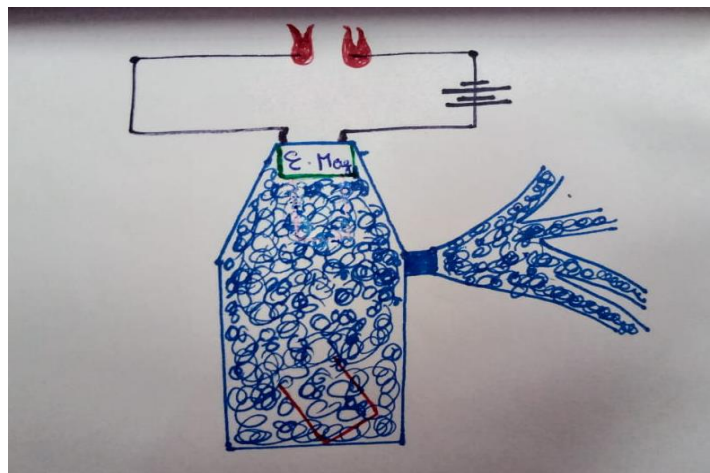
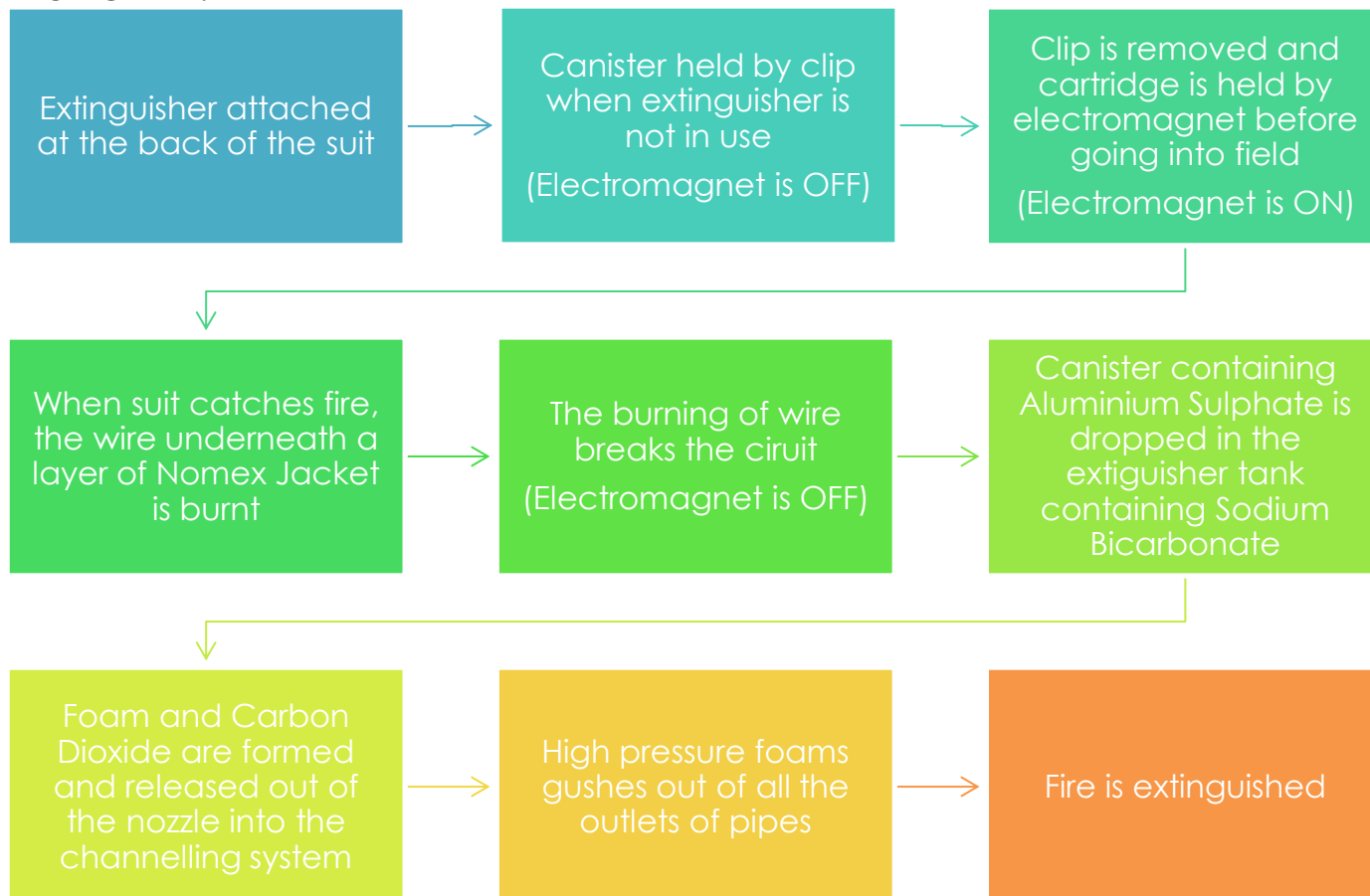


Fig 7: High pressure foam releasing through nozzle into the channelling system

FLOWCHART:



SALIENT FEATURES:

- In case of a fire accident, an automatic protective equipment is much more helpful than a manual one. This entire mechanism doesn't depend upon the user's previous experiences with accidents, his instincts, or reaction time during a crisis, rather it saves the user even when he's not prepared.
- This simple addition to the existing protective gear has the potential to save hundreds, or possibly thousands of lives
- It is cost effective
- Combined with a jacket, this project can be used as a safety measure for workers in work fields prone to fire hazards, like thermal power plants, firecracker factories, foundries, etc.

COST OF THE PROJECT:

The project consists of simple components like electromagnet, battery, zinc wire, and a couple of chemicals. Other components like Fire Extinguisher and Nomex jacket are already provided by the Fire department to the firefighters.

The cost of this project is projected to be around **5000 to 8000 INR** (this includes a fire resistant polymer we'll use for the jacket and metal sheet we'll use for making the cylinder).

CONCLUSION:

Our country lacks world class firefighting equipment which becomes the cause of several firemen deaths in the country. This enhancement will improve the overall protection offered by the existing gear and prevent fatal injuries.

2. WARM PATIENT MATTRESS

COLLEGE	Poornima College Of Engineering, Sitapura, Jaipur
GUIDE	Mr. Manish Sharma
COLLEGE STUDENTS	Aman Jain, Jinesh Khandelwal
SCHOOL STUDENTS	Subhash Manjhi, Buddhi Prakash Sain
SCHOOL	Govt. Senior Secondary School, Sanganer, Jaipur

ABSTRACT

The proposed device "WARM PATIENT MATTRESS" is a biomedical research model which is designed keeping in view the need to save the water and cost. According to the study and research, it has been found that due to the warmness of mattress patients feel relaxed, content & comfortable. It is obvious that our body have to maintain a body temperature and as per law of thermodynamics heat transfer from higher temperature to lower temperature, the warm mattress will maintain the body temperature by activating brown fat and generate heat by metabolizing glucose. if it temperature is not maintained, it causes diseases like 'Sepsis' And 'Hypothermia' & "Fever" which directly attacks on kidney and heart and may lead to death of the admitted patient. As per the details found through the research material, it has been noticed that hospital uses blanket to warm and as each patient require a new blanket and even in a small hospital daily 50-60 blankets are used and approx. Rs. 1500-2000 is invested on washing and which causes loss of warmness so our device is to heat the mattress at a desired temperature by the user, it should be easily washable, price efficient, and set temperature between 2-3 minutes and complete shock proof. But at present, devices available in the market are quite high in price and are not secure as well. Therefore, we would like to propose our device named as Warm Patient Mattress for fulfilling the purpose and making the medical field equipped with this kind of comfortable device which can be used by the hospitals at the low cost for the good health of the patient.

KEYWORDS- Carbon fiber heating element, Arduino, Temperature sensor.

INTRODUCTION

- All over the world there is significant increase in usage of water. The proposed device will be able to save approx. 10 million ton of water daily across the world.
- The mattress will also be able to serve to all the generation of people especially pregnant women, old age person & children.
- Cost always plays an important role, it is cost effective.
- Warmness will always conduct in the mattress as the mattress will not washed in a week.

The project is economic and social in nature. It has got several advantages which is unbeatable such as **environment friendly, abundant & secure, grid independent, and varied use**. The most important concern now-a-days is Water, our project promotes “**Save Water & Save Earth**”.

The project's principle is to:

- Increase efficiency.
- Reducing water waste flow
- Serve most needful components to next generation.
- Serve to all the generation.
- Pocket Friendly.

SALIENT FEATURES

The Carbon fiber heating element has following features:

- High Voltage test
- Low leakage current
- Increased efficiency.
- Withstand with power of power.
- High rated voltage
- Insulated property
- High tensile strength
- Self-discharge limit
- Reduced Cost
- Nominal cell voltage
- Low thermal expansion.

OBJECTIVE AND SCOPE

Our device will serve as biomedical device with increased efficiency which has tremendous scope in India. The environmental condition of world is changing every year. Mostly US has high rate of deaths because of hypothermia. In India, too a lot of people die because of sepsis, hypothermia and fever like diseases. Its instant heating at an exact required temperature will serve as the weapon for the discussed diseases.

It has got various applications in:

- Military
- Pregnant ladies
- Children

Thus, World has massive plan for water conservation and increasing bio medical that may not only fulfil in the medical field as bio medical device but also contribute largely in Green agriculture and to those who go miles away for water.

METHODOLOGY

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

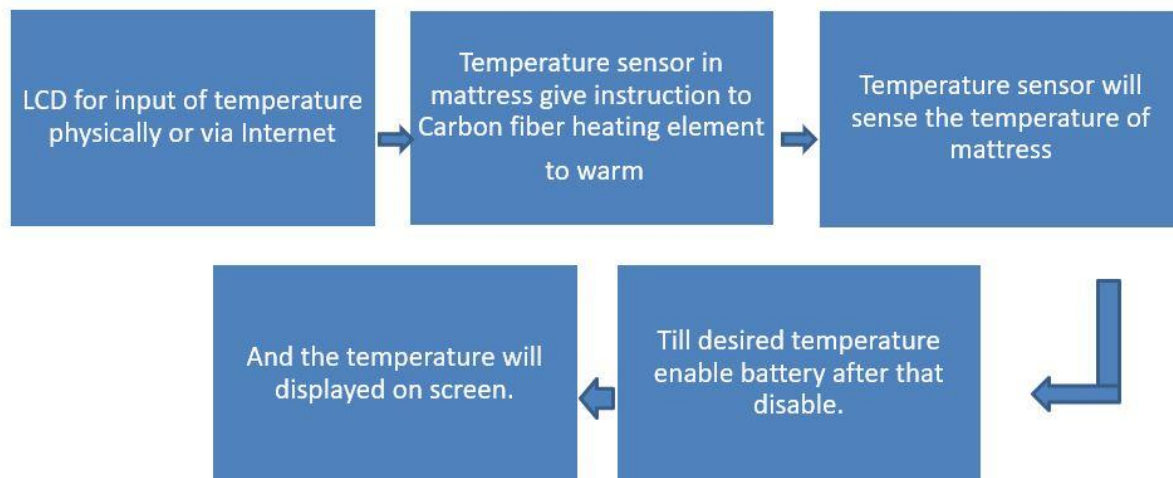


Fig. 1 Block Diagram of Warm Patient Mattress

BASIC STRUCTURE OF CARBON FIBER HEATING ELEMENT



Fig. 2 Carbon fiber heating element

HARDWARE COMPONENTS

- Carbon fiber heating element
- Frame
- Cells
- Glue

SOFTWARE AND TECHNOLOGICAL COMPONENTS

- Arduino
- Lm35
- LCD
- Male to male connector
- Male to female connector
- female to male connector
- Arduino IDE

COMPARITIVE STUDY

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

- In the present scenario, the mattresses are not able to make the

- person warm within 2 minutes, suggested will warm in 2 minutes.
- In not make the flow to blood good, while proposed will make a very good flow because of infrared heat emission.
- Presently electronic mattress has a risk of shock while it is completely shock proof.
- Mattress required washing in every week while proposed ones don't need washing put a bed sheet on that.

Features	Traditional System	Proposed System
Water usage	High	Low
Shock chances	Yes	No
Blood circulation	Doesn't help	Make good circulation
Stiffness	Low	High
Pocket Friendly	Yes	Yes
Insulation	Not Complete	Complete

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

SOCIAL IMPACT

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

- **Serve water: By conserving water, this can be served to thirsty people who have to go miles away.**
- **Water means upcoming generation: Water is a basic and very important need of everyone and hence to give water to upcoming generation we have to save water.**
- **Will save life: The price will be so less that approx. all can achieve as can be used in the homes too.**
- **Water serve agriculture: With the help of water, agriculture goes on a height. And by doing this we will make our country proud.**

COST OF PROJECT

- Cost of manufacturing of the existing model is around fifteen hundred rupee INR.
- As the e-components has a high cost in making circuits on PCB.

CONCLUSION

We concluded that in water deficient country like India, where water conservation and to make us healthy is required most, Warm patient Mattress is a method to do so The Proposed model caters to these **FOUR** National missions namely:

- **MAKE IN INDIA** – Automated machinery can be setup completely here.
- **HELP FOR INDIA** – Will serve to all the farmers and all those to go miles away for the water
- **MAKE PEOPLE HEALTHY** – Using this can make person warm instantly and can save life from hypothermia, sepsis like diseases.
- **START-UP INDIA** – Our Further plan for the model is not only a business plan but also will create job opportunities.

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3. THE BRAILLE CELL

COLLEGE	Maharaja Agrasen Institute of Technology, Rohini, Delhi
GUIDE	Ms. Shashibala Agarwal
COLLEGE STUDENTS	Vibhor Srivastav, Lakesh Goel
SCHOOL STUDENTS	Anshika, Khushi Rani
SCHOOL	Govt. Sarvodaya Kanya Vidyalaya, Nangloi, Delhi

ABSTRACT

In the modern world, the visually impaired people are at a disadvantage at the outset due to the lack of infrastructure which would help them to become aware and informed. The complete disregard for the well-being of the visually impaired people on the part of industrial innovators and the degrading economic conditions further discourages them from uplifting themselves, on their own. The traditional sources available in the market aren't beneficial in the learning curve and they don't justify the price points at which these products are available in the market. However, the recent developments in technology holds the solution to the plight of the blind people. Our device, 'The Braille Cell' uses cost-effective and efficient technologies like Arduino, which has made the information accessible, available and affordable to the visually-impaired people, aiming to become self-reliant. The uniqueness of our device lies in its simplicity and cost-effectiveness. This was achieved by innovative use of servomotors, which was paramount in ensuring an inclusive learning environment for the visually-impaired people. In the simulation(s) performed by our team, the device showed promising results, which can be extrapolated to the real-life scenarios. The device was effectively able to display the Grade-1 Braille language, in such a manner that they can be easily interpreted by the user.

KEYWORDS

Braille, Arduino, Servomotor, Vibrating Motor, Array of Pins, Actuator, E-Books

INTRODUCTION

The process of gaining knowledge in the 21st century has been revolutionized drastically due to the advent of technology and high-level researches in the field of education culminating to widespread access to various educational tools. Unfortunately, the same cannot be said about the specially-abled classes of the society and in particular, the visually-impaired people. One of the most widespread disability in the world is; Blindness.

Various efforts have been done in the past regarding the upliftment of the visually-impaired people in the sphere of education, but to very little or no avail. These include; A reading aid with a lens system, OCR based software & an electronic pen.

The costing of various assistive aids available to visually-impaired people is out of reach of these people. The professional Braille Readers (already in the market) cost around \$2000 USD. This discourages them and they stray further away from learning and educating themselves. Our project puts forth a cost-effective and simple idea, which can be easily afforded by the blind people and help them in becoming empowered individuals, with extensive information available at their disposal.

In addition to the above reasons, the outbreak of the COVID-19 pandemic has shifted the emphasis of learning techniques towards a virtual atmosphere. The haphazard shift of the education sector from online to offline mode has compounded the distress of the visually impaired students multi fold.

Our device is designed to solve all the above listed problems and easily able to integrate with the existing infrastructure, so as to provide an effective and efficient working environment.

SALIENT FEATURES

The features of The Braille Cell are as follows:

- 1) It ensures practical usability by the end-user.

- 2) It efficiently integrates with the existing infrastructure.
- 3) It is cost- effective.
- 4) It requires minimal pre-requisites.

OBJECTIVES

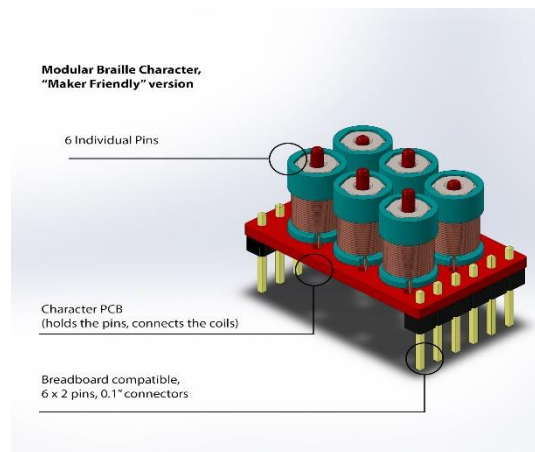
- ▶ To minimize the DIGITAL DIVIDE between average and an especially abled consumer.
- ▶ To develop a rigid & fool-proof infrastructure so that imparting the information becomes easy.
- ▶ To minimize the challenges posed by Virtual Learning, which is, necessitated by the COVID-19 pandemic.
- ▶ To ensure the 3 A's of Education i.e. Availability, Accessibility & Affordability pertaining to the Education of Visually-Impaired people.

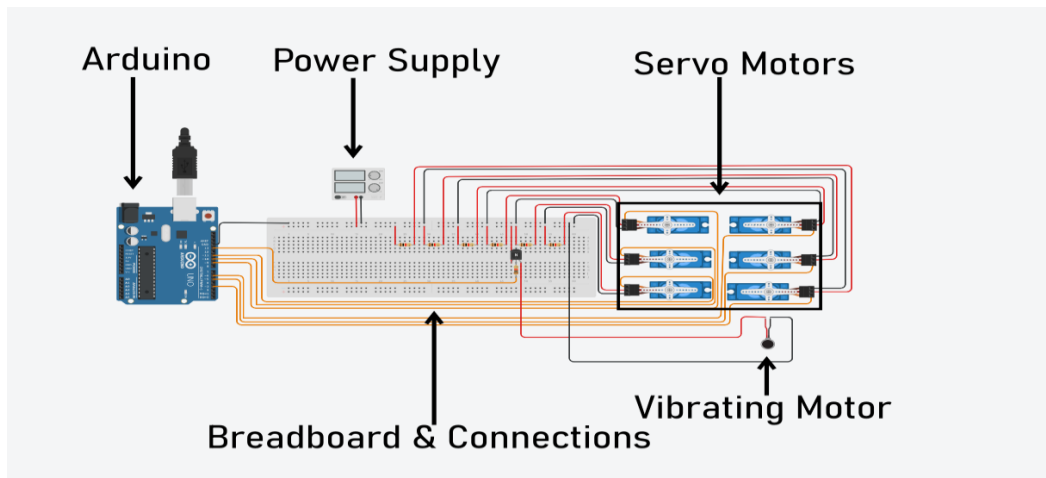
METHODOLOGY

BASIC STRUCTURE OF THE BRAILLE CELL

Electronic refreshable braille displays create the dots in braille cells by raising and lowering plastic or metal pins to correspond to the dots in the letters or numbers being represented.

CIRCUIT DIAGRAM AND COMPONENTS





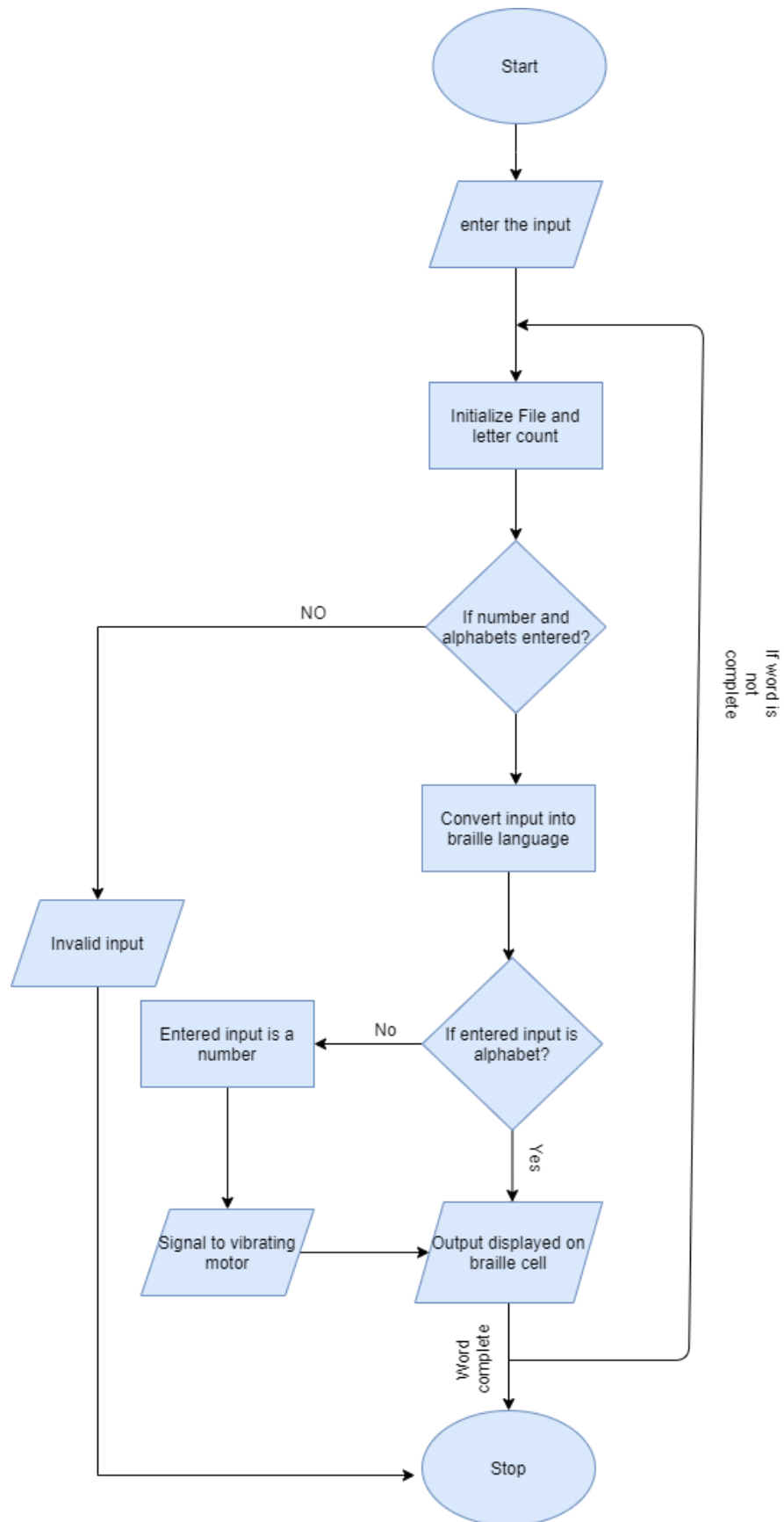
COMPONENTS USED

- Hardware Components:
 - 1) Arduino UNO
 - 2) Micro Servo motor
 - 3) Vibrating motor
 - 4) NPN transistor
 - 5) Resistor
 - 6) Power Supply (rectifier 12V)
 - 7) Capacitor

- Software Components:
 - 1) Arduino IDE
 - 2) Tinkercad (Online Simulation for students)
 - 3) Proetus (For all other modules like: Wi-Fi, IR sensor)
 - 4) DIA

PROCESSING

We enter a word **apple** then first it takes the word 'a' and then converts it into braille language and represents it on the braille cell and after that it takes the next alphabet 'p' and represents it on the braille cell and so on. This loop continues till it shows the last alphabet i.e. 'e' in this case. The above example is explained, diagrammatically, on the next page.



COMPARATIVE STUDY

Parameter	JAWS Software (Competitor)	The Braille Cell (Product)
Costing	Rs. 30,000	Rs. 2,000
Access	Only through online channel	Through online and offline channels
Country of Origin	USA	India
Supported Platforms	Windows	Windows & Android
Mode of Teaching	Auditory	Tactile
Distributorship	Only through a single vendor for whole Indian subcontinent.	Will be available through numerous NGOs and blind school(s)

SOCIAL IMPACT

The social impact of the product is multi-faceted;

- 1) **Information Dissemination**: Our device will ensure the proper delivery of information to the visually-impaired people so that they can participate as informed citizens of our country.
- 2) **Employment**: With proper knowledge and information, the visually impaired people can improve their skills and rightfully ask for the jobs they deserve to take part in the formal economy. Additionally, it would help in generating employment during manufacturing stages.
- 3) **Education**: In a world, where everything is going virtual, the education of visually-impaired people suffers a lot. But our product helps these people to educate and empower themselves.

COST OF PROJECT

Component	Rate	Quantity	Cost
Arduino Uno	350	1	350
Servo Motor (\$90)	70	6	420
Resistors	40	1	40
Vibrating Motor	90	1	90

Breadboard	50	1	50
Battery	20	5	100
Jumper Wire(s)	50	1	50
IR Sensor	200	1	200
Wi-Fi Module	200	1	200
Tax @ 18%			267
Packaging			100
<u>TOTAL</u>			Rs. 1867**

****Costing subject to further optimizations**

CONCLUSION

Our main objectives of making the device simple, efficient & cost effective have been achieved by the use of latest technologies, coupled with the innovation done by the team. We have also managed to keep the device size small so that it becomes easily portable and can be use on-the-go in this fast-paced world. In addition to this, we have also managed to keep the final costing of the product to a bare minimum, which would ensure the commercial success of the product. The device explained above paves the way for the visually impaired people to become self, reliant, aware and informed citizens of our country.

The objectives fulfilled overlap with the Sustainable Development Goals No. 4, 9 & 10 i.e. Quality Education, Sustainable Development & Reducing Income Inequalities. Our product is able to deliver on the problem statements envisaged in these goals and shows promising potential.

Moving forward, the distribution of this product can be strengthened by the aid of various government agencies and NGOs which are tirelessly working for the welfare of the blind people. This device also comes under the ambit of various government schemes like 'Digital India', 'Make in India' and recently launched, 'Atmanirbhar Bharat' and our team aims to capitalize on the same.

4. ELECTRICITY FROM SLUDGE

COLLEGE	GL Bajaj Institute of Technology and Management, Greater Noida
GUIDE	Ms. Shylaja Vinaykumar Karatangi
COLLEGE STUDENTS	Anaam Singh, Anshica Singh
SCHOOL STUDENTS	Urooj Ansari, Antima
SCHOOL	Govt. Girls Sr. Sec. School, Paharganj, New Delhi

ABSTRACT

"We will make electricity so cheap that only the rich will burn candles."

"ELECTRICITY" The need of an hour? Rightly said! Then why is our nation still facing electricity crisis? It is because the demand for electricity supply has been increasing tremendously. Lack of electricity not only affects the life of an individual but it has also impacted our economy as a whole, the crisis is occurring because of Industrial development and population growth! Which have led to a surge in the global demand for electricity in recent years.

India is currently facing an electricity crisis because of its major dependency on coal and crude oil imports to meet the growing energy needs of the country. More than 40% of households lack access to electricity. The government is making efforts to increase investment in renewable energy

India's electricity sector faces many issues, including:

- The demand of electricity in India is 11,96,309 GWh and our installed capacity is 5,82,379 MW (as of 2020) and as result we face a lot power cuts especially in rural areas and problem of low voltages are common.
- Coal supply by Coal India Ltd (CIL) is restricted to around 65% of actual coal requirement by coal-based thermal plants, leading to increased dependence on imported coal.
- As per the estimates of Planning Commission, Government of India (GoI), to ensure a sustained 8% growth of the economy, India needs to increase its primary energy supply by three to four times.

But the problem doesn't end here-

- With the increase in population, demand of energy has risen

significantly.

- An estimate tells that we have only 96 years left for petroleum to get fully exhausted.
- An electricity shortage is felt most acutely in heating, cooking, and water supply. Therefore, a sustained energy crisis may become a humanitarian crisis & situation like droughts can occur.

To overcome such issues, we came up with the solution of an energy resource which can solve the problem up to a large extent.

We will be using the Anaerobic bacteria present inside the Sludge or any waste material to produce electricity. We'll be using the drain water too for generation of electricity.

I would like to give you some data from PWD, India's urban areas produce 120,000 tonnes of sludge on a daily basis, but an estimated two-thirds of the households aren't connected to the sewer system, so we can say with absolute certainty that, India has an extreme hidden potential in terms of electricity generation.

After analysing the pros & cons of our idea, we visited 3 of the sewage treatment plants in our city (Prayagraj) for the survey and ground reports. We collected the samples to test them & results of the samples were satisfactory. In total, daily 110 MLD (Million Litres per day) of drain water enters the plant. The Sludge produced is just dried and disposed off. Now, just image the amount of potential we have in our country.

OBJECTIVE AND SCOPE

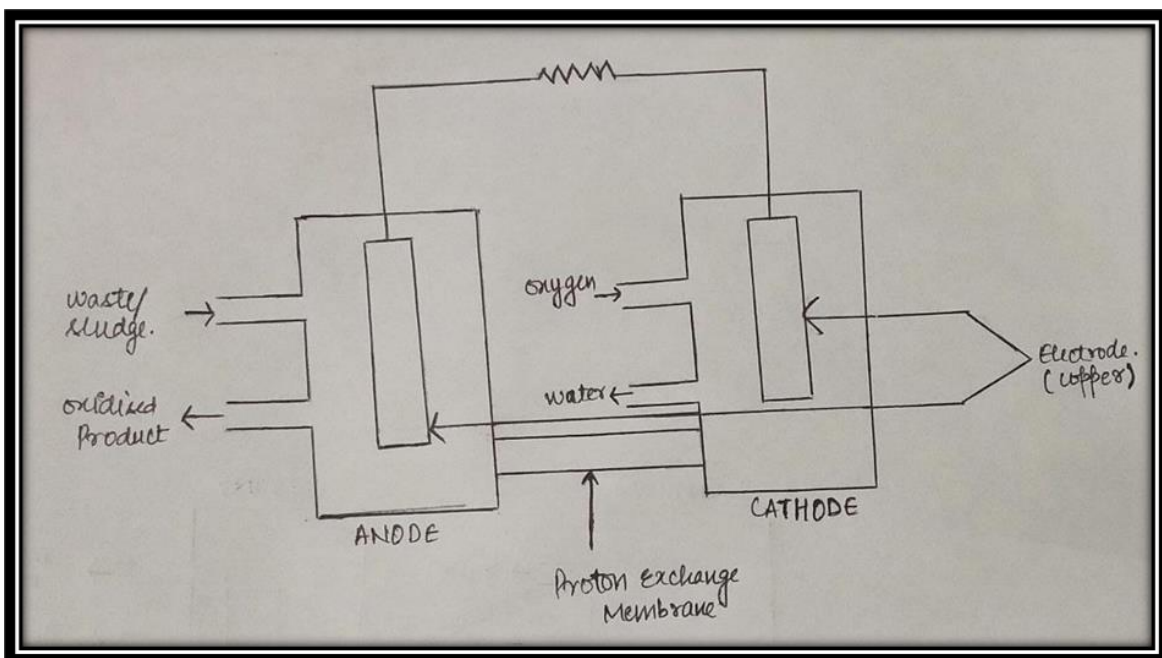
We are using a simple concept of Microbial fuel cell. Microbial fuel cells (MFCs) are devices that use bacteria as the catalysts to oxidize organic and inorganic matter and generate current. Electrons produced by the bacteria from these substrates are transferred to the anode (negative terminal) and flow to the cathode (positive terminal) linked by a conductive material containing a resistor, or operated under a load (i.e., producing electricity that runs a device). By convention, a positive current flow from the positive to the negative terminal, a direction opposite to that of electron flow. Electrons can be transferred to the anode by electron mediators or shuttles, by direct membrane associated electron transfer, or by so-called nanowires produced by the bacteria, or perhaps by other as yet undiscovered means.

Our prototype consists of two compartments - the anodic and cathodic half-cells - which are connected by proton exchange membrane or a salt-bridge. The anodic chamber consists of microbes suspended under anaerobic

conditions and the cathodic chamber contains the electron acceptor (oxygen). In essence, the electron donor is physically separated from the terminal electron acceptor across the two chambers. Most of the electrons released from the process of oxidation are conveyed to the anode. Electron transfer to the anode can be accomplished by electron mediators or shuttling agents, directly by the cell or by means of nanowires. These electrons are directed to the cathode across an external circuit and for every electron conducted, a proton is transported across the membrane to the cathode for completing the reaction and sustaining the electric current.

METHODOLOGY

Our prototype consists of two compartments - the anodic and cathodic half-cells - which are connected by proton exchange membrane or a salt-bridge. The anodic chamber consists of microbes suspended under anaerobic conditions and the cathodic chamber contains the electron acceptor (oxygen). In essence, the electron donor is physically separated from the terminal electron acceptor across the two chambers. Most of the electrons released from the process of oxidation are conveyed to the anode. Electron transfer to the anode can be accomplished by electron mediators or shuttling agents, directly by the cell or by means of 'nanowires'. These electrons are directed to the cathode across an external circuit and for every electron conducted, a proton is transported across the membrane to the cathode for completing the reaction and sustaining the **electric current**.



HARDWARE COMPONENTS

For Prototype-

- 1) Two containers
- 2) Wires
- 3) Sludge
- 4) Electrolyte (Water+ Salt)
- 5) Salt bridge
- 6) Copper Electrode
- 7) Voltmeter (to measure the voltage)

Proposed target specifications & performance standards-

The operational target specifications are:

- It uses organic waste matter as fuels and readily available microbes as catalysts.
- It does not require highly regulated distribution systems like the ones needed for Hydrogen Fuel Cells.
- It has high conversion efficiency as compared to Enzymatic Fuel Cells, in harvesting up to 90% of the electrons from the bacterial electron transport system.
- No extra setup is required, as sewage plants already perform the task of collecting the sludge.

Performance standards-

1kg of sludge can produce 0.0116W of electrical energy. Now, we have 120,000 tons of sludge so it can produce 1,400 KW of electrical energy (in total).

CONCLUSION

We concluded that in energy deficient country like India, where power generation is costly, electricity from 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 the waste material, we are focusing on the clean India Campaign.
- **START-UP INDIA** – Our Further plan for the model is not only a business plan but also will create job opportunities.

5. Delhi Dukan-Vocal For Local

COLLEGE	Bharati Vidyapeeth's College of Engineering, Delhi Amity University, Noida
GUIDE	Mrs. Gargi Mishra
COLLEGE STUDENTS	Dhruvi Bansal, Mitashi Bansal
SCHOOL STUDENTS	Anshika Tiwari, Shivani
SCHOOL	Govt. Sarvodaya Co-ed Vidyalaya, Sec-8, Rohini, Delhi

ABSTRACT

DELHI DUKAN: Empower the offline market with e-Commerce!

Providing a platform to small vendors, DELHI DUKAN helps the vendors to sell their products easily and contribute larger than before in G.D.P of India and also ease the buyer's safety. Being online is a must for every kind of business. By being online means being available to every internet user, anytime & anywhere in this world. We're planning to launch an online platform (Website) where offline markets could shift themselves to the online E-commerce world.

KEYWORDS- E-Commerce website, HTML5, CSS, JAVASCRIPT, PHP, SQL

INTRODUCTION

- Due to the COVID-19 pandemic, it is very difficult for offline vendors to survive in the economic market. As buyers do not want to visit outdoors to buy groceries, articles, services, etc. which really impacts offline vendors. Today, everyone is moving forward to the online E-commerce market thinking that it would be better to stay at home and get products right on their doorstep.
- Because of the Covid-19 situation the offline markets are in a great loss because the buyers are moving to the online platforms for their day to day supply needs, big vendors who have big scale shops can cope up with this situation through some kind of online markets, etc., but small vendors don't have these opportunities because of the high tax policies all over the country, big online markets like amazon and flip kart have their own commission share from the vendors which small vendors are not able to pay, if they pay these

taxes and commissions then they have nothing as a profit and these local markets and small vendors are also a part of the economy, **DELHI DUKAAN** provides them a helping hand so they can also show their products for the purpose of selling.

- Every consumer wants proper service and quality controlled goods. They are always looking for easy to buy options with on-time delivery and well-packed goods. As per today's situation, consumers also want to be safe from COVID. They would love that if they get sanitized and well-packed products right from the vendor and they have 100 % surety because they ordered from a known vendor.
- As we know India is a hub of knowledge but if we talk about India's economy it even doesn't rank among 100 all over the world. And if we refer to today's situation, India is already affected by the decrease in the employment rate as sellers are not allowed to open their shops (although for their security because of this pandemic), this rate is decreasing more and more. That's not all, after this Covid-19 outbreak, buyers are also hesitating in going to the offline markets because of the fear from the virus, and all of this is resulting in a decrease in employment rate as well as the economy. DELHI DUKAAN helps the vendors to sell their products easily and contribute larger than before in G.D.P of India and also ease the buyer's safety.

SALIENT FEATURES

The DELHI DUKAAN has following features:

1. Providing a platform to small vendors
2. ENHANCING "OFFLINE MARKETS" TO "ONLINE MARKETS"
3. Surviving in COVID-19
4. SSS (Safety, Surety, & Security)
5. Increasing G.D.P
6. Our website will also benefit those rural women or people who made homemade items like pickle, chutney, papadh etc. to sell with their own name.

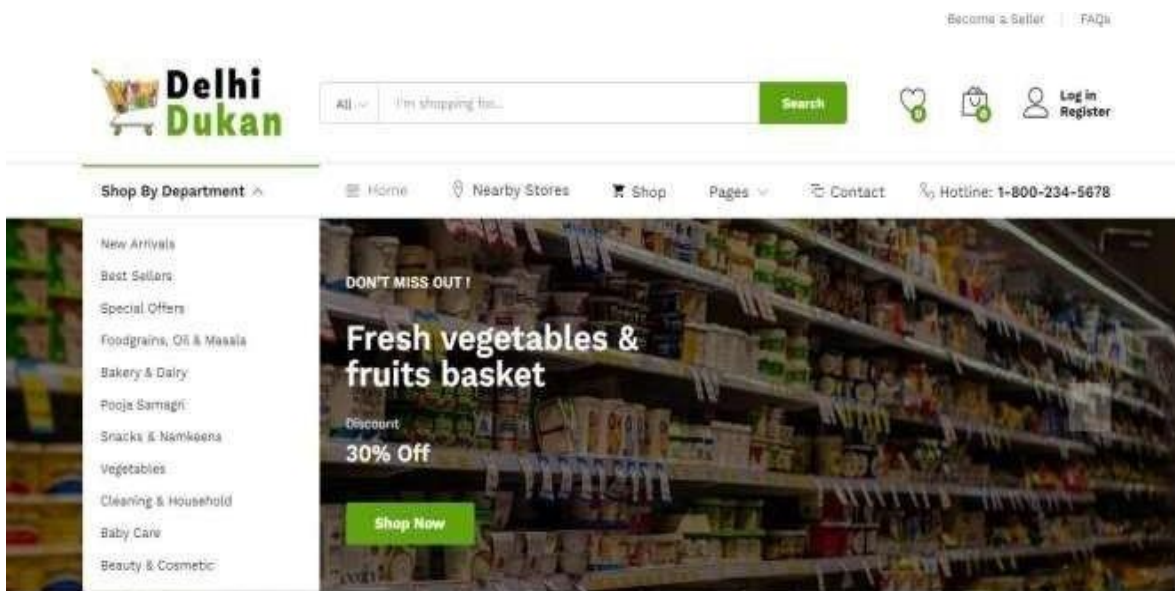
OBJECTIVE AND SCOPE

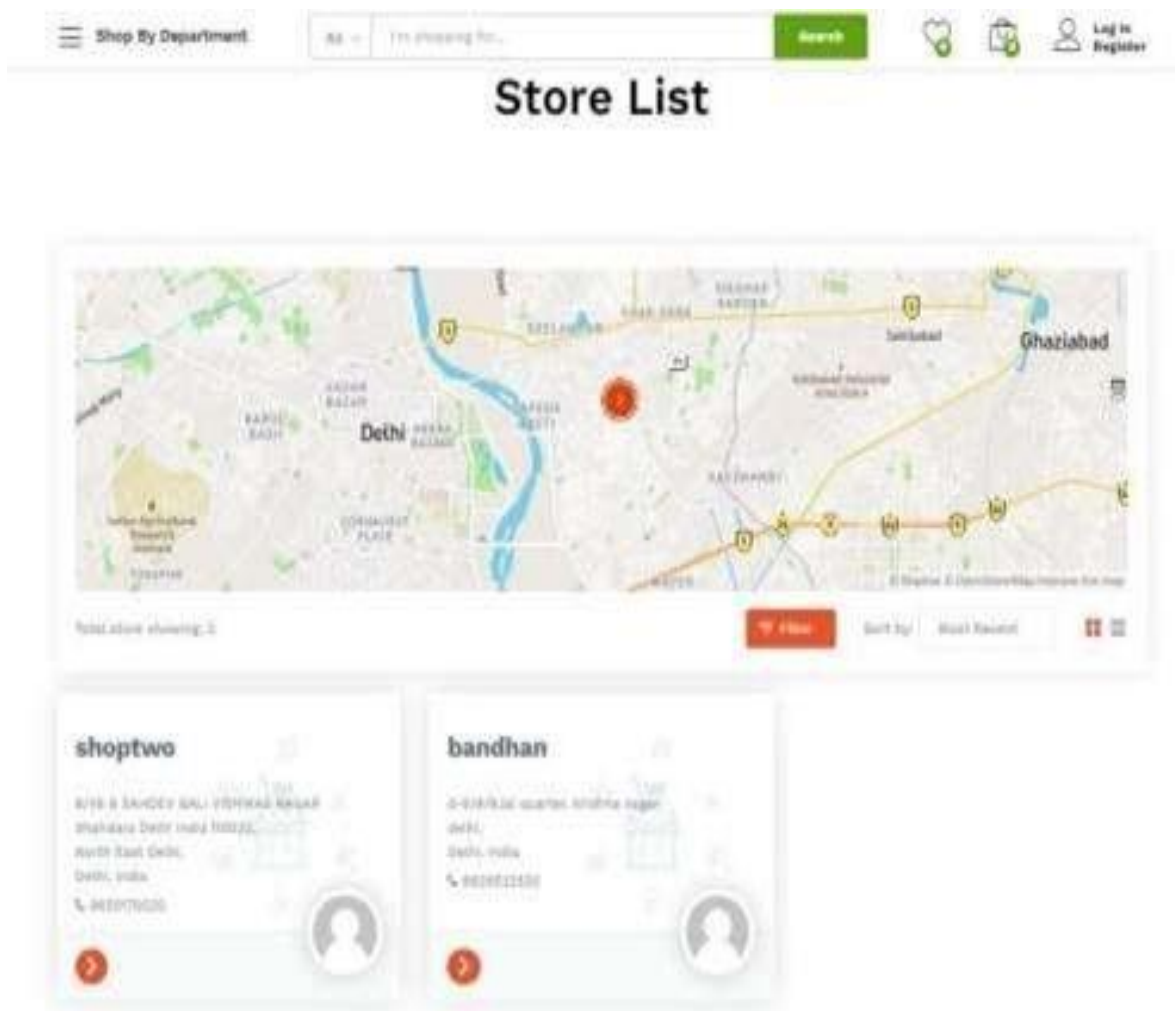
If your business is not on the internet, then your business will be out of business.

Being online is a must for every kind of business. By being online means being available to every internet user, anytime & anywhere in this world. We're planning to launch an online platform (Website) where offline markets could shift themselves to the online Ecommerce world. It sounds like selling on amazon or flip kart, but it's totally different from them. For the solution of this problem, we want to launch a web-based platform on which the users can visit the offline markets in an online way, by this, we mean that we are launching a platform on which you can visit any offline store on the application itself and can choose any nearby trusted store according to your preference and can order anything from there also. This will help both buyers and sellers as buyers will get their orders earlier than they used to get and local buyers are also benefited by this.

METHODOLOGY

1. The buyer will visit our website and choose his/her nearby trusted store.

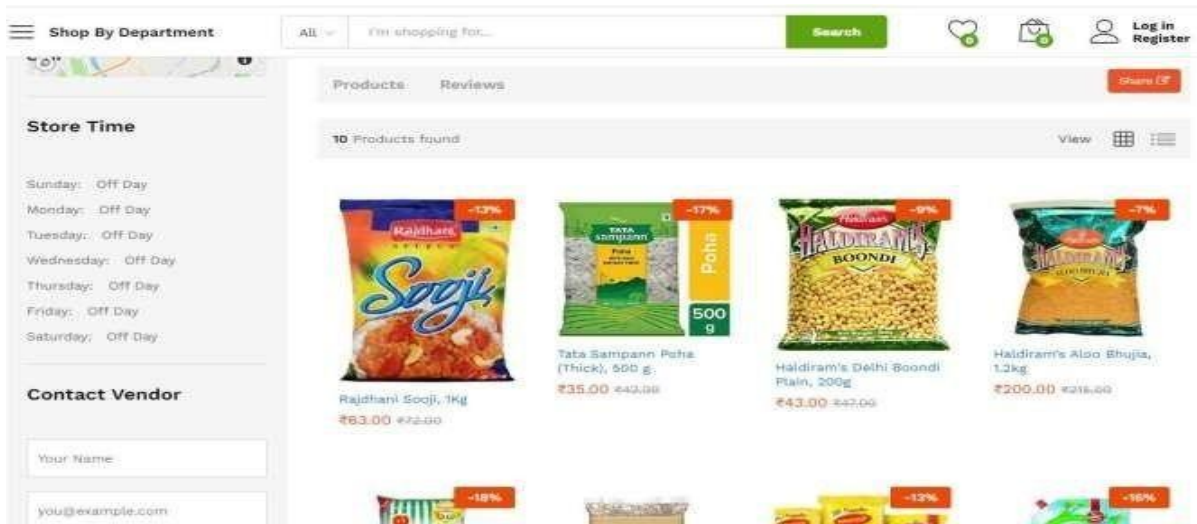




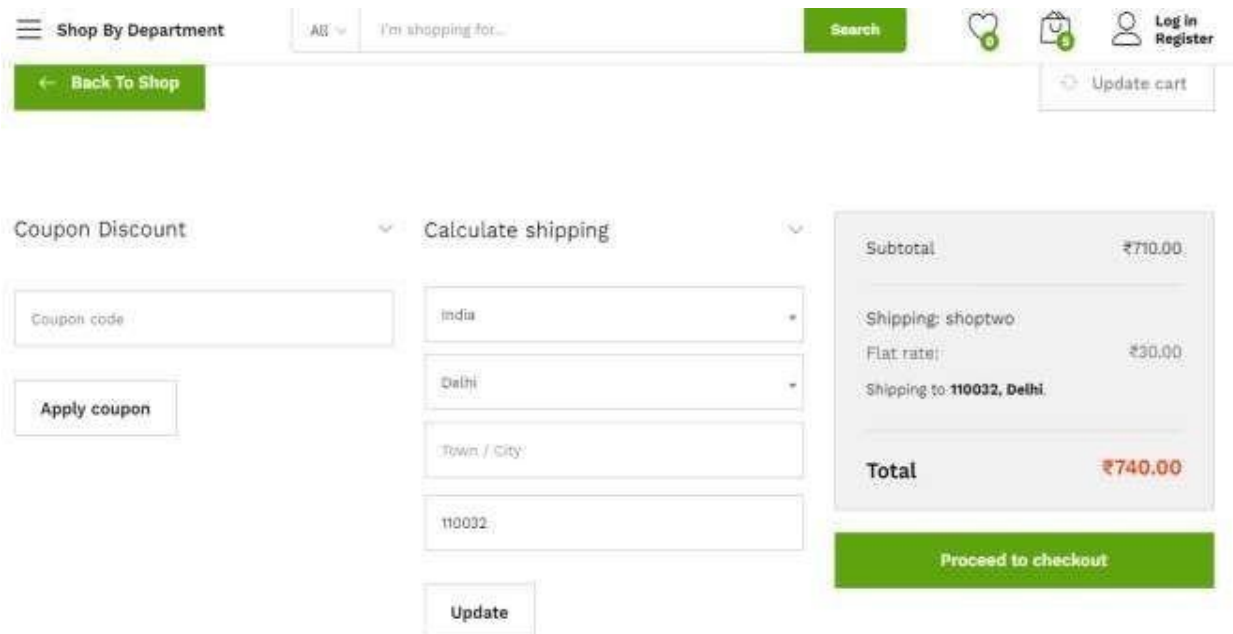
Stores showing under store lists are offline vendors of nearby places.

- ◆ Buyers can search for a store by store names of their choice.
- ◆ Buyers can filter nearby stores according to distance.
- ◆ Buyers can also give ratings & reviews for their preferred shops.
- ◆ Buyers can contact directly to shop owners for any query.

2. After selecting a store, it will feel like visiting a nearby shop virtually on the internet. The buyer will add products to his/her cart and will proceed further to place an order from Specific nearby shops of their choice.



3. The next step is to checkout, and buyers can choose COD (Cash on Delivery) or online payment methods.



After successful order placement, vendors could know orders received in his/her admin dashboard. Now our delivery partners will pick up the products from vendors and sanitize them and deliver them directly to buyers.

4. Let's have a look on Vendors Dashboard.

- Vendors can add, update or delete products from their store.
- Vendors can see orders received and manage their status.
- Automatic generated sales reports will help vendors to track their expenses & profit.

ORDER RECEIVE SECTION

Shop By Department All ▾ I'm shopping for... Search

Dashboard Products **Orders** Coupons Reports Reviews Withdraw Settings >

All (1) Completed (1) Processing (0) On-hold (0) Pending (0) Cancelled (0) Refunded (0) Failed (0)

Filter by Date Filter by registered cus... Filter Export All Export Filtered

Bulk Actions Apply

Order	Order Total	Earning	Status	Customer	Date	Action
<input type="checkbox"/> Order 4171	₹190.00	₹153.00	Completed	Roshan Gupta	July 5, 2020	<input type="checkbox"/>

PRODUCT MANAGEMENT SECTION

Shop By Department

All | I'm shopping for... Search

Dashboard

Products

Orders

Coupons

Reports

Reviews

Withdraw

Settings

All (7) | Online (0) Add new product

All dates - Select a category - Filter Search Products Search

Bulk Actions Apply

Image	Name	Status	SKU	Stock	Price	Earning	Type	Views	Date
	Rajdhani Chana Dal 1Kg	Online	-	In stock	₹80.00	₹76.00		1	July 5, 2020 Published

AUTOMATIC GENERATED SALES REPORT

Shop By Department

All | I'm shopping for... Search

Dashboard

Products

Orders

Coupons

Reports

Reviews

Withdraw

Settings

45% Profit complete

Add Banner to gain 15% progress

Sales

₹190.00

Earning

₹152.00

Pageview

1

Order

1

Sales this Month

Sales total

Number of orders

Orders

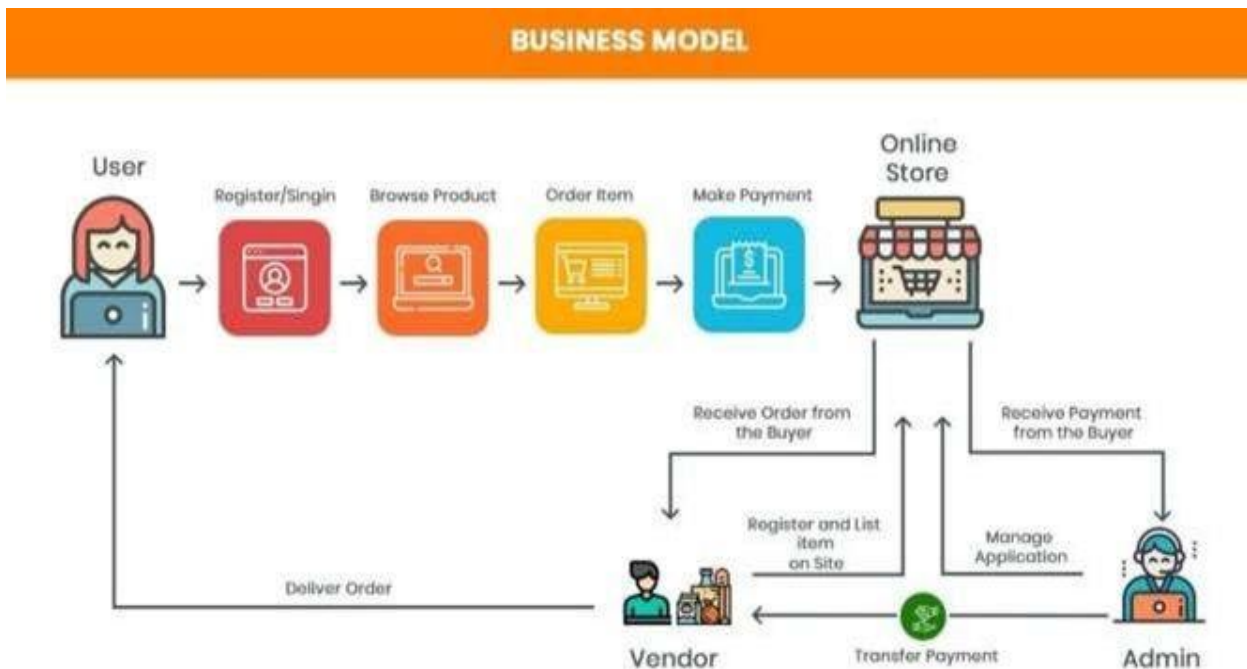
REFER THIS FOR MORE DETAILS :

<https://www.youtube.com/watch?v=G5Go2MjW8MU&feature=youtu.be>

BUSINESS PLAN

Buyers and vendors can register or sign in our website portal to browse the products or add products and order the items, they can also make payment via cash on delivery or any online payment gateway method to the offline shop near them through an online platform.

Through our website dashboard the information reaches to the vendors then we receive the order from them then the vendor will register and list items on-site when they will deliver the order to the customer, the admin will manage the application and receive the payment from the buyer and then he/she will transfer the payment to the vendor.



COMPARATIVE STUDY

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

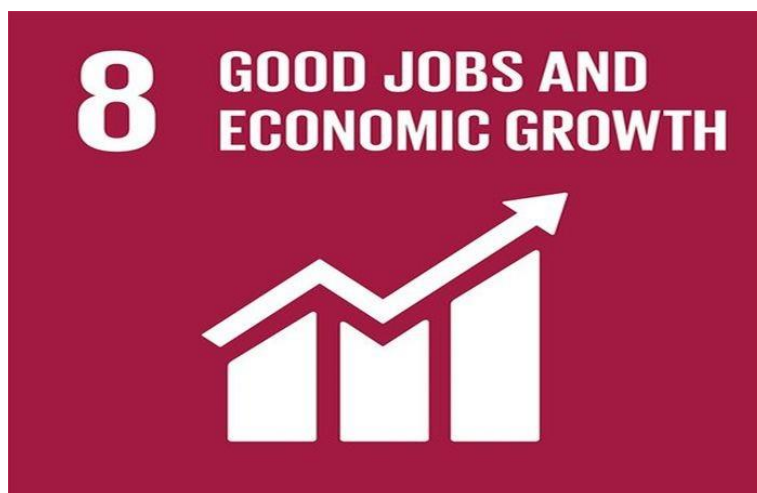
Features	Existing Systems	Proposed System
Details of vendors	NO	YES
Selection of Shops	NO	YES
Registration / Login	only buyer	Buyer as well as seller
Benefits to customers	Low	Moderate

SOCIAL IMPACT THAT WE ARE ADDRESSING HERE:

Our model's aim is to achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labor-intensive sectors.

Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services

Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all



CHALLENGES THAT WE ARE TRYING TO RESOLVE:

- 1. POVERTY**
- 2. UNEMPLOYMENT**
- 3. MODERN SLAVERY**
- 4. LOW G.D.P**

COST OF PROJECT

Cost of our proposed model is Rupees Twenty-Five Thousand.

CONCLUSION

We concluded that developing country like India, where time is precious, time and technology go hand in hand. So our platform will be the best alternate means of empowering the offline market to the online market. The Proposed model caters to these **TWO** National missions namely:

- **TECH INDIA** – We're planning to launch an online platform (Website) where offline markets could shift themselves to the online Ecommerce world.
- **START-UP INDIA** – Our Further plan for the model is not only a business plan but also will create job opportunities.

6. SMART MEDICINE BOX

COLLEGE	JSS Academy of Technical Education, Noida
GUIDE	Mr. Shivaji Sinha
COLLEGE STUDENTS	Syed Hasan Askari Rizvi, Shreya Gupta, Vedika Mishra
SCHOOL STUDENTS	Bulbul Kumari, Soni
SCHOOL	Rajkiya Balika Inter College, Sector 51, Noida,

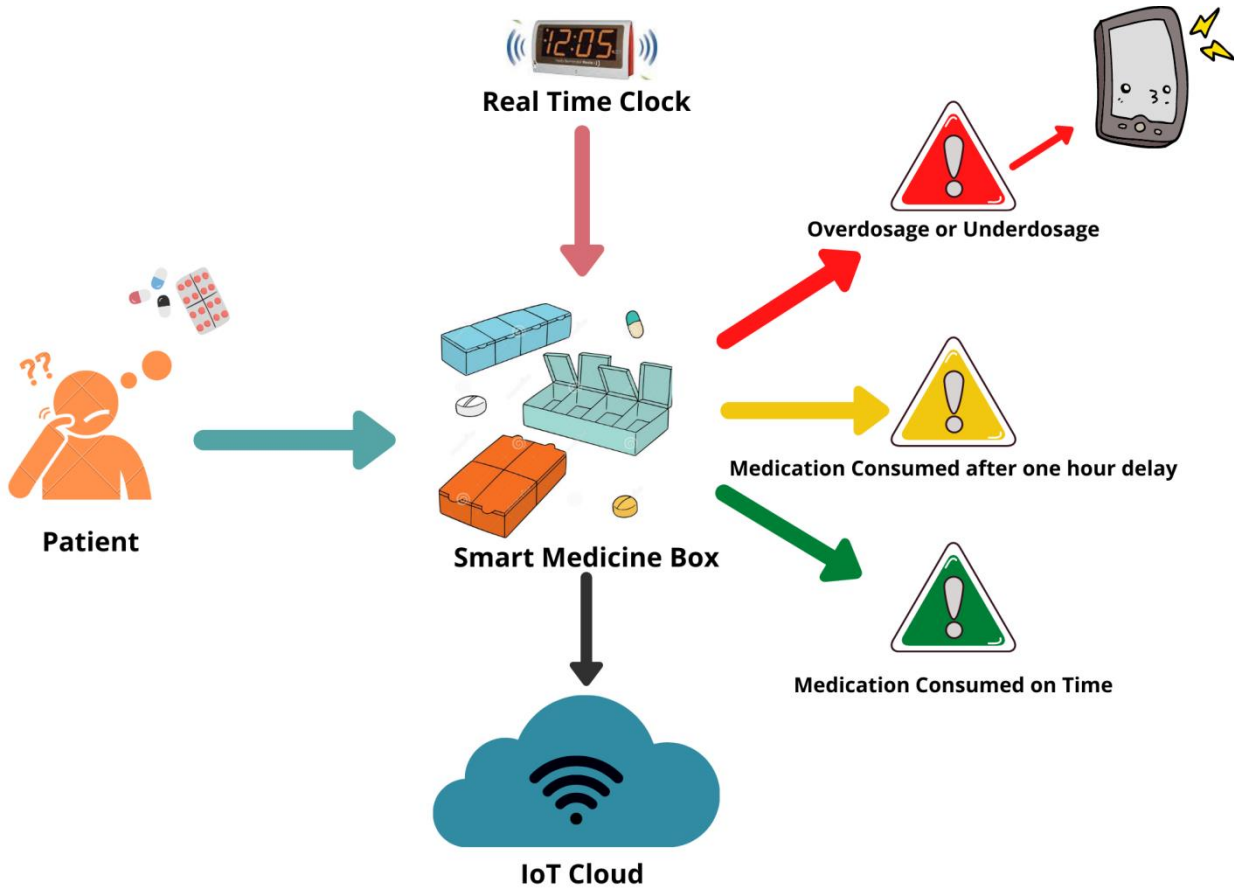
ABSTRACT

There are a lot of people who need our constant help in taking care of their health especially the old-age people, Alzheimer patients and those who have short term memory. They forget to take medicines on time which leads to mis-dosage of medication. In this fast-moving world even young generation forgets to take medicine on time. So, to curb the stated problem we are proposing a user-friendly Smart Medicine Box in which the user can set timings and dosage of the medicine to be taken.

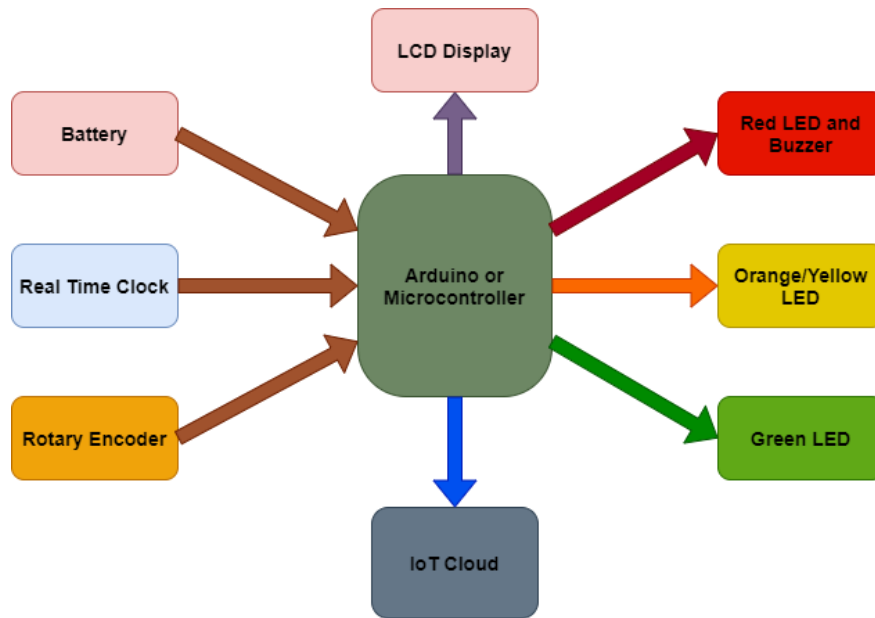
It will alert the patient at the time when the medicine needs to be consumed and will also alert regarding the Over dosage or Under dosage of the medicine. There will be an emergency button through which it will alert family members, doctors or other helping staff at the time of emergency. The data of the mis-dosage of the medicines by the patient could be shared to the doctors via IoT cloud.

KEYWORDS – Medicine, alert, IoT, emergency, mis-dosage

GRAPHICAL ABSTRACT



BLOCK DIAGRAM



INTRODUCTION

For many people, remembering to take a timely medication can be the difference between life and death. Yet many people forget. Millions of people lose their life due to negligence in medication or error in medication i.e., over dosage or under dosage. The overlapping aspects of sustainable development are: **Ensuring Healthy lives and Promoting Well-being**.

Our proposed model 'SMART MEDICINE BOX' has got a self-explanatory title. Its primary aim is to save lives and reduce mortality rates due to misdosage of medicine. The project is economic and social in nature. It has got several advantages which are unbeatable such as **environment friendly**, user-friendly, **IoT capabilities** and real time medicine tracking.

The project's principle is to:

- Increase efficiency.
- Alert on mis-dosage.
- Low cost.
- Consumption Tracking.
- Emergency Button.

SALIENT FEATURES

The smart medicine box has following features:

- User Friendly
- Consumption Tracking
- IoT Capabilities
- Panic button
- Alert on mis-dosage
- Compact
- Ergonomically designed
- Cost effective

OBJECTIVE AND SCOPE

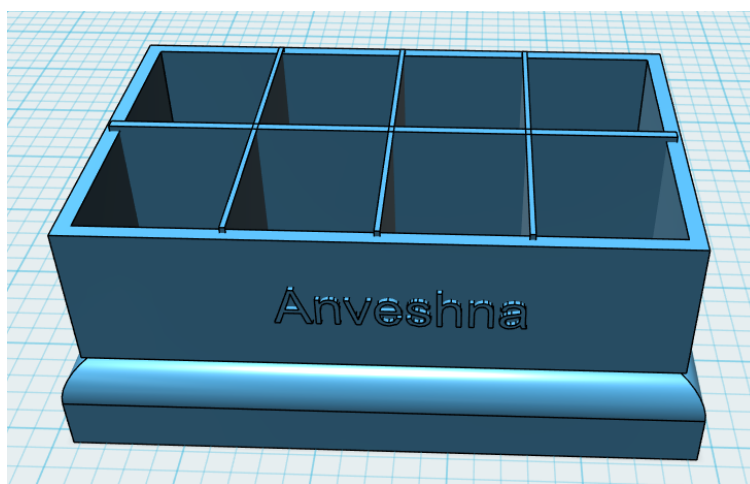
To save lives of people and take a step towards "**Healthy India**". Our main aim is to notify people at the time of medication so that no more medical errors happen and people don't lose their lives because of misdosage. A smart home-based medicine box with wireless connectivity along with IoT capabilities helps patients and doctors to be in more close communication. Along with this we can alert them with an alarm and light indications. So that even if the person is sleeping or busy with some work the alarm helps in alerting him. to confirm that the person has taken that medicine or not we can put IR sensor at the opening end of the box. It comes with one more feature that when the person is feeling uneasy or in case of some emergency, he can notify others by pressing the button on the device.

It has various applications like we can install it in hospitals so that less human intervention is needed for timely medication. And the doctors can get track of the dosage of medicines taken by the patient in real time. There is an emergency button to notify the family members at the time of emergency.

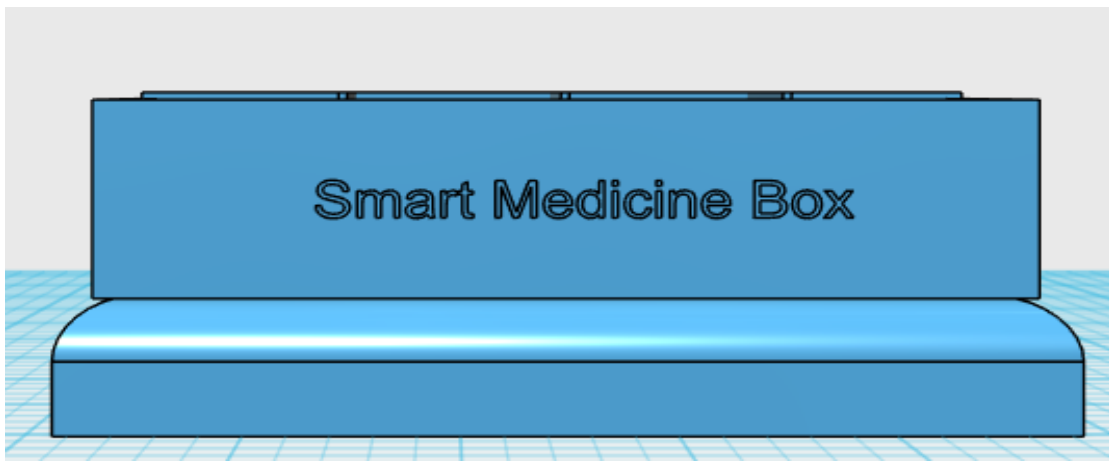
METHODOLOGY

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

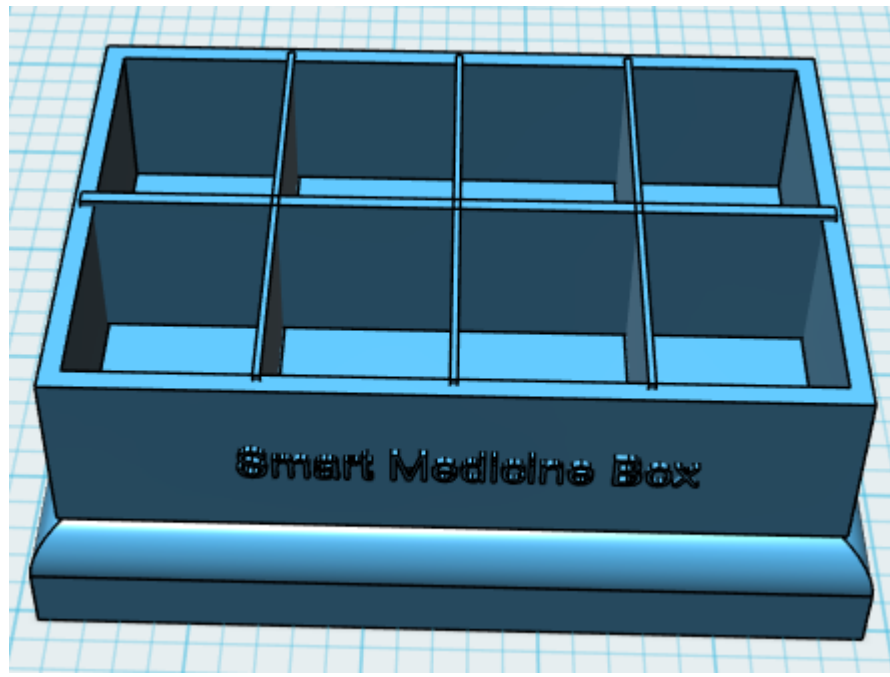
BASIC STRUCTURE OF SMART MEDICINE BOX



Front Part of Box



Back Part of Box



Top Part of Box

HARDWARE COMPONENTS

1. Arduino Uno
2. IR sensor
3. I2C LCD/OLED
4. RTC (DS3231)
5. Rotary Encoder

6. LED (5mm, 0.25W)
7. Buzzer
8. Wi-Fi/Bluetooth module
9. Li-Po battery
10. DIY Box
11. Button
12. BMS
13. Wires
14. Breadboard

SOFTWARE AND TECHNOLOGICAL COMPONENTS

1. Arduino IDE
2. Http Requests
3. Rest API
4. Webhooks
5. Web Services
6. IFTTT Client
7. Cloud/web server
8. SMTP

COMPARATIVE STUDY

As Per our research, this product (The working that we intend) is not available in Indian market. There are different variant of products with different working but each has its own problem. There are products/projects that want patients to give bare medicines which is not only hazardous as the medicines are exposed to environment that will cause all sorts of problems but also they segregate them which make them even more hazardous as they can risk in mixing chemicals of different medicines. There is one more variant available which is similar to what we just explained but with different boxes of pills. These can be less hazardous yet they are very much tedious and time consuming to set. In these user has to

put different medicines in different small cups for different time for different dates which can get very time consuming and exhausting. Here also contamination risk is all time high.

But Our product will be free from all such risk factors with IoT capabilities as an add-on as well as messaging as well as alerting system. Hence we can conclude that our product is robust, Ergonomic, Advanced and most importantly Economical. There is no product in the market that satisfy all pockets demands but we do that is another benchmark of our product. As a complimentary benefit to our premium customers, we will provide cloud storage capabilities to store their vital records which doctors can access. Also they can use smart, intelligent AI techniques for their betterment but with service based price obviously. By this product and our vision, we want to rediscover and redefine the medical treatment in INDIA.

SOCIAL IMPACT

Our model's aim is to Save Lives and Reduce Medication Errors. Many social benefits can result from the use of smart medicine box.

- **Job Creation:**

Workers needed to plan, develop and implement the project which will create numerous job opportunities and in future we can add many more features to this device like tracking of vitals.

- **Smart Medicine Box means Healthier India:**

There are many diseases which require proper tracking of the medication as a gap of single dose can be hazardous. So, this device will help them in real- time tracking of medicines and notify them which in turn can make the citizens and workers healthier.

- **Smart Medicine Box saves life:**

Millions of people lose their lives due to error in medication. So, our product will help them in reducing medication errors.

- **Pocket friendly:**

As we have divided our product into 3 variants it is made affordable by everyone.

COST OF THE PROJECT

We have divided our product into three variants on the basis of their features:

- 1. Basic-1500 rupees:** This product will have only the embedded features and will alert the patient regarding the time of the medication through LED and buzzer.
- 2. Advanced-1900 rupees:** This will have embedded features as well as IoT capabilities and will send alert to mobile phones also.
- 3. Premium-2300 rupees:** This will have data analysis features with the features of the above two variants. It will send the record of the misdosage of the medicine to the doctor weekly or monthly.

CONCLUSION

We concluded that 5.2 million medical errors occur in India annually. There will be around 7.6 million Indians with dementia in 2030 according to ARDSI. The proposed model caters to these **FOUR** National missions namely:

- ❖ **PROUDLY MADE IN INDIA** – This device could be a major contributor in Aatmanirbhar Bharat Mission.
- ❖ **HEALTHY INDIA** – This product could help in reducing the mortality rate due to misdosage of medicines.
- ❖ **CLEAN INDIA** – As the box used in this product is made of PLA which is totally biodegradable and consists of renewable raw materials.
- ❖ **START-UP INDIA** – Our Further plan for the model is not only a business plan but also will create job opportunities for embedded and IoT enthusiasts as well as for data scientist.

7. Self-Balanced Electric Two-Wheeler

COLLEGE	Dronacharya Group of Institution, Greater Noida
GUIDE	Mr. Shailesh Kumar Singh
COLLEGE STUDENTS	Karanjot Singh, Jaydeep Singh
SCHOOL STUDENTS	Reeva, Sanjna Pandey
SCHOOL	Govt. Sarvodaya Co-ed Vidyalaya, Sec-8, Rohini, Delhi

Abstract: -

A 2-wheeler vehicle cannot stay in balancing condition without any external support. This statement is applicable in each condition when it's at rest or slowly moving. Here, we present a very unconventional plan contingent on gyroscopic mechanism to stabilize 2-wheeled vehicles (like bikes, scooter, mopeds etc.) in each condition (either they're at rest or moving). This concept also can be envisaged to manufacture 2-wheeler based cars. Which is advantageous in high traffic zones like metropolitan cities (Delhi, Mumbai, Bangalore. etc.). Because of higher density of huge sized four-wheeler vehicles (the traffic, air pollution, sound pollution etc.) problems deriving too swiftly. These issues are very disturbing for mankind living in those metropolitan cities. Stabilization of a 2 vehicle plays a significant role within the complicated transportation. Gyroscopes will deliver a serious contribution towards stabilization of 2-wheeler vehicle. It's being theorised that gyroscopically stabilised vehicles would have higher well-being with reference to regular 2 wheelers. Once torsion is applied to associate degree axis traditional to the spin axis, inflicting the gyro to method, an instant is made a few third axis, orthogonal to each the torsion and spin axes. because the vehicle tilts from vertical, a precession inducement torsion is applied to the gyro assembly and therefore the opposing rotating mechanism reaction moment can tend to get back the vehicle in its position.

Keyword- Self balancing mechanism, Gyroscope, Car on 2 wheels, Electric vehicle.

INTRODUCTION: -

There has been a heap of tries to create a mechanically stabilised vehicle to contend with safety and traffic congestion problems. In 1905, engineers developed a gyroscopic railroad that utilised a CMG (Control Moment Gyroscope) system controlled by passive effort of many mechanisms and mechanical sensors designed to control the unbalanced orientations of railroad. Here, we've created a 2-wheeler which may be balanced by rotating mechanism. we've got additionally tried to grasp underlying physics and mathematical modelling. To begin with which gyro is employed for 2-wheeler. They're usually used for travel or for gratification. The first means of transport in Asian countries are 2

wheelers. Today most road accidents are of the 2 wheelers. To avoid such tragic situations, a mechanical gyro will be put within the vehicles. The two-wheeler vehicle may be degraded naturally an unstable system. Putting such a balancing system may be a laborious task. This treatise presents a vehicle during which all integrant (mechanical, electrical) are designed from terribly starting, construct, integrate along and tested. This vehicle will be viewed as ecological, battery operated and really simple to be used as system. A gyro may be a spinning machine or disc during which the axis of rotation is liberated to assume any orientation by itself. whereas spinning, the orientation of this axis is unagitated by tilting or rotation of the mounting, per the oversight of momentum. Thanks to this, gyroscopes unit helpful for measure or maintaining orientation. Gyroscopes also are supported alternative operational principles, like the electronic, microchip-packaged MEMS gyroscopes found in devices, solid-state ring lasers, fibre optic gyroscopes, and therefore the very sensitive quantum gyro.

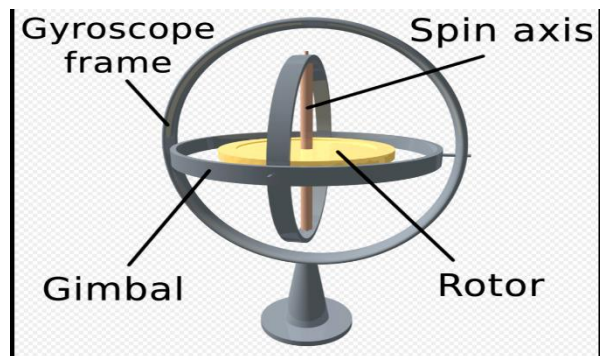


Fig.1

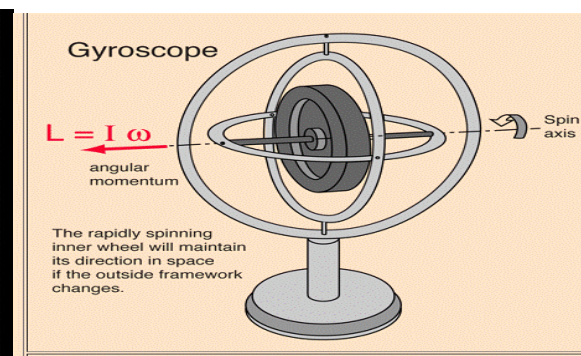


Fig.2

MODEL FABRICATION: -

The objective of this treatise is to prove the fact that 2-wheeler can be balanced solely with the help of gyroscopic balancing mechanism in idle or running condition with the assistance of mechanical gyro. The rotating axis principle are often with success used for modelling a self-balanced two-wheeler vehicle.

The prototype was created with following parts:

- Wooden Frame • Wooden Base • 12V DC Motor • Mild steel disc • Flat head stud • Rubber Wheels • Nuts and bolts (M3, M5) • Hub • Ball bearings

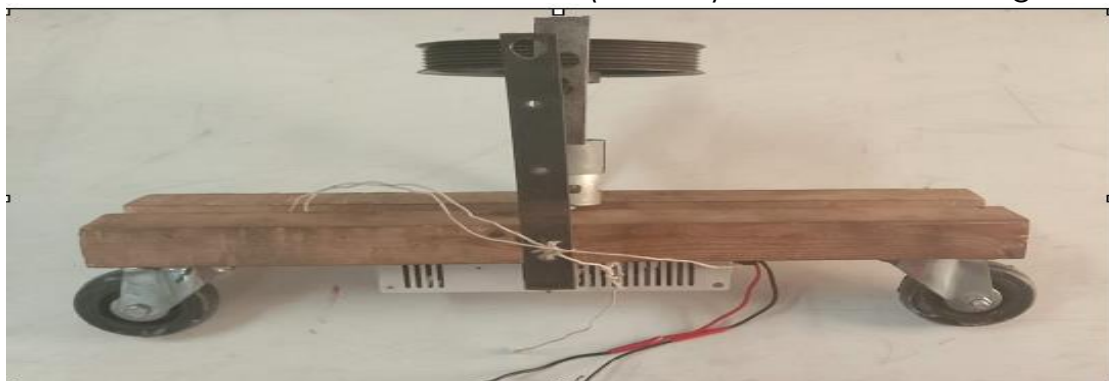


Fig.3 3-D model of self-balancing mechanism on 2-wheeler

CONSTRUCTION: -

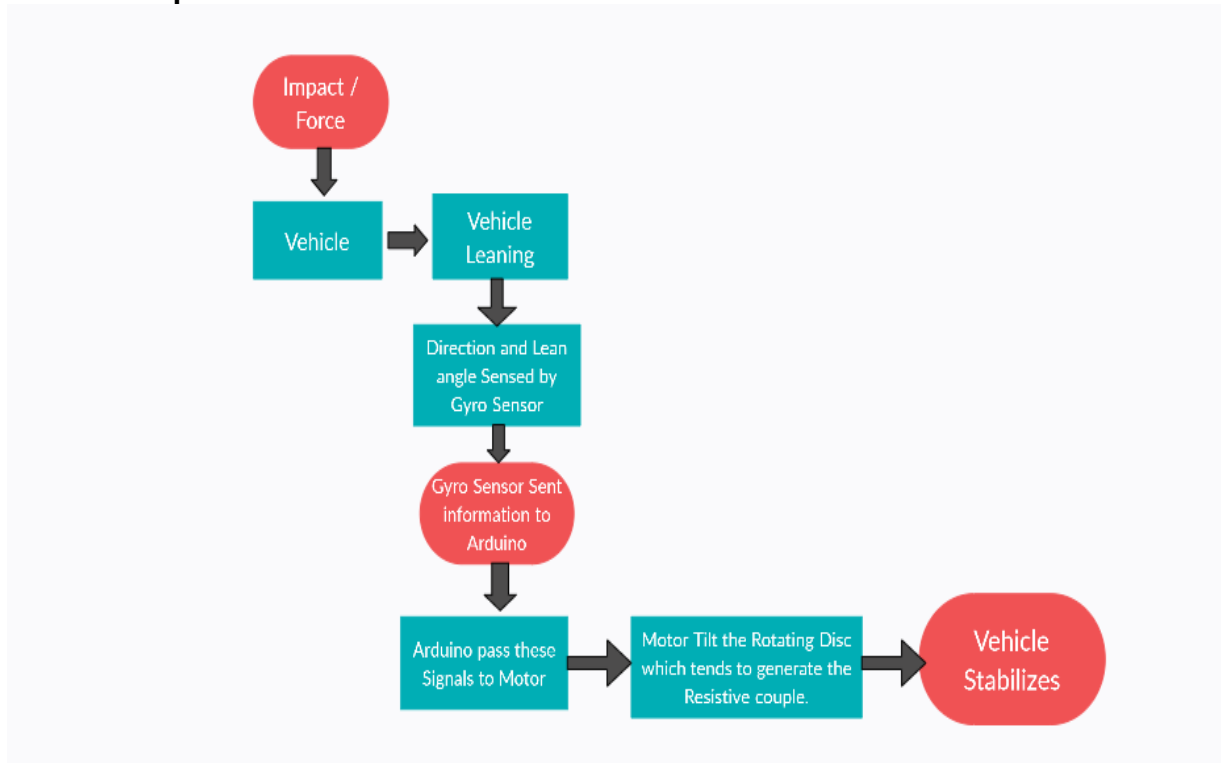
The gyro disc that we have use in this mechanism is mild steel flywheel. The wooden frame used is latched on the lowest wood base. Plastic wheels with rubber grip square measure fitted to the wood base at the lowest, the circular holes within the structure square measure trained so as to suit the gimbal of the gyro assembly, the DC motor supported on a U bracket is placed on the gimbal. the sole pre-requisite for this setup to figure is that the mass distribution, the mass ought to be dominant on the top side (setup ought to be prime heavy) of the gimbal. The centre of gravity is so simply higher than the gimbal axis, low-carbon steel disc used as gyro square measure fitted to the shaft of the motor. The DC motor is latched to the U-bracket and also the shaft of the DC motor is passing through a hole gift in centre of U bracket. the fabric utilized in creating the gyro disc, hub, and U-bracket is low-carbon steel. whereas collection the whole model, numerous sizes of batty and bolts were used. One vital style deliberation that we have create during this model is that the gyro disc ought to be freely swinging within the U-bracket connected to the structure. we have used ball bearings and studs to form the angular movements and changes free and swift. The circlips square measure placed on the inner ends of the studs to avoid the studs to manoeuvre out of the ball bearings, so avoiding breakdown of example throughout the running condition. The example be created in such some way that the front wheel will move to require turns so as to vary the direction of motion.

WORKING: -

The model is powered by an influence provide unit of 12V output. Once the motor starts rotating, the mild steel disc fitted on the motor shaft starts to rotate and step by step gains speed. This rotation of the disc ends up in the assembly of the rotating mechanism result so, once the wheels lose their balance thanks to the active rotating mechanism couple, a counter acting reactive rotating mechanism couple is made within the other way thanks to rotating mechanism result, so stabilising the prototype. This rotating mechanism result happens on each left still as paw aspect. Thus, thanks to rotation of the gyro, a counter-acting reactive rotating mechanism couple ends up in the stabilization of the prototype. The motor and gimbal shaft assembly are meant in such a way that it's prime significant. This suggests that the centre of gravity lies higher than the gimbal shaft. that the motor and gyro assembly try to realize the position such the centre of gravity of the core can move downward. however, at constant time the motor and gimbal assembly are organized among the frame having bearing reaction at ends. So, the sole potential method for motor to realize the steadiness is to either lean forward or backward. So, once the motor is started the body is near to fall on either aspect and additionally the motor assembly is leaning this causes the precession of spin axis. thanks to this precession, in step with paw rule the reactive rotating mechanism couple acts on the frame that nullifies the result of the distressful couple and so stabilizes the vehicle. once few

rotations and oscillations of motor, the motor and frame attain the stationary position and gyro is subjected to pure rolling motion concerning the spin axis.

Process Implementations: -



Experimental Results: -

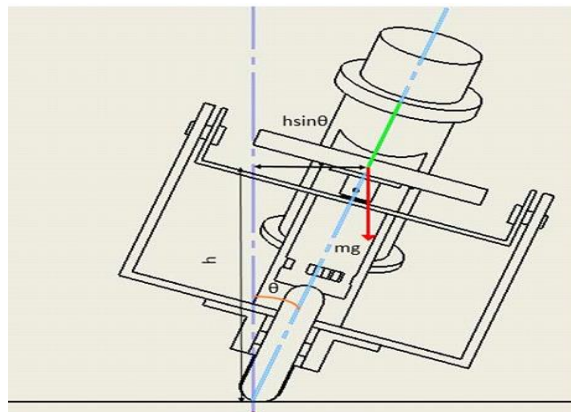


Fig.4 Diagram representing the parameters when vehicle is cornering

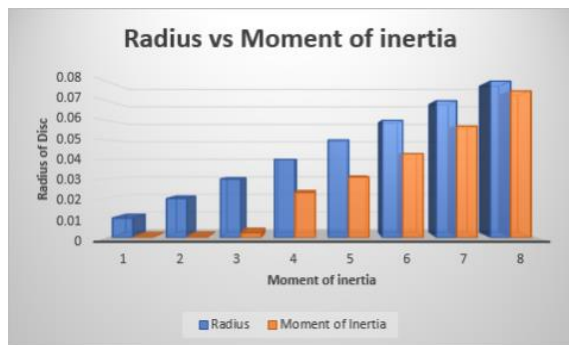
Basic formulas utilized in calculation:

- Moment of Inertia, $(\text{kg}\cdot\text{m}^2)$ $I =$
- Angular momentum $(\text{kg}\cdot\text{m}^2/\text{sec}) =$
- Torque, $\tau = Fr\sin\theta$
- Force, $F = mg$
- Tilt distance $= h\sin\theta$

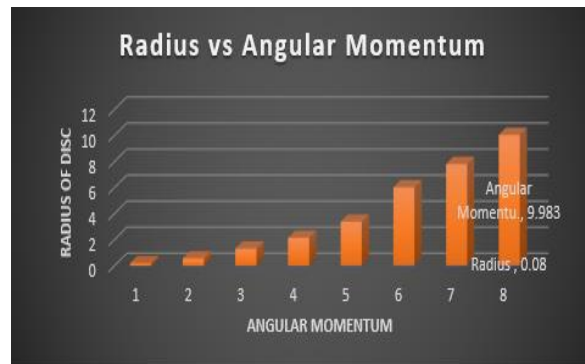
- m = Mass of the disc= (in kg)
- r = Radius of the disc in meters
- N = RPM

Table-01
Change of Moment of Inertia and Angular Momentum w.r.t Radius

Serial No.	Radius	Moment of Inertia	Angular Momentum
1	0.01	0.0001	0.197
2	0.02	0.0003	0.559
3	0.03	0.0024	1.297
4	0.04	0.023	2.121
5	0.05	0.031	3.346
6	0.06	0.043	5.979
7	0.07	0.057	7.759
8	0.08	0.075	9.983



Graph 1: Radius vs Moment of Inertia, Mass-1.2kg



Graph 2: Radius vs

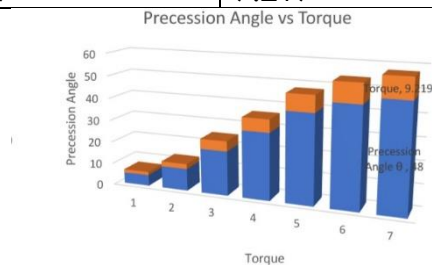
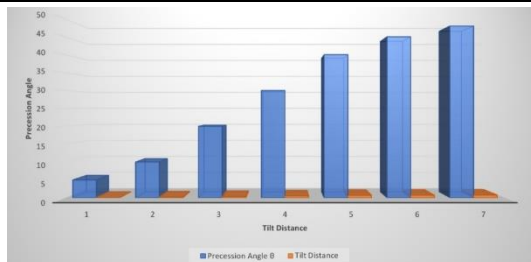
Graph 1 provides the clear concept that after we try and increase the radius of the gyro disc, the instant of Inertia (MI) made by the gyro will increase. So, we will say that with variable radius of the gyro disc, the instant of Inertia (MI) varies consequently.

Graph 2 shows the relation between the radius of the gyro disc and also the momentum made by the gyro. Here, we will see that after we try and increase the radius of the gyro disc, the momentum additionally will increase in response to the variable radius and the other way around which suggests that radius may be a variable issue to get variable momentum values for the gyroscope.

In Graph 1 and Graph 2, we tend to recorded the readings by keeping radius because the parameter to realize completely different readings of Moment of Inertia and momentum made by the rotating mechanism severally.

Table-02
Changes of Tilt Distance and Torque w.r.t Precession Angle

Serial No.	Precession Angle θ	Tilt Distance	Torque
1	5	0.0953	1.4578
2	10	0.221	2.247
3	20	0.357	4.512
4	30	0.510	5.752
5	40	0.702	7.482
6	45	0.726	8.659
7	48	0.779	9.219



Graph 3(Precession Angle vs Tilt Distance). Graph 4(Precession Angle vs Torque)

Graph 3 shows the relation between Precession angle and Tilt distance of the rotating mechanism. Here, if we tend to vary the angle of precession axis, the space of the precession axis from the traditional varies consequently. So, we will see that with increase in precession angle, the lean distance conjointly will increase consequently.

Graph 4 is that the illustration of the results by varied the Precession angle so as to get corresponding values of force to the amendment within the values of Precession angle. once the Precession angle will increase, we tend to see a amendment within the worth of force generated by the rotating mechanism. From the higher than graph, we will see that increasing values of Precession angle ends up in increase within the force generated by the rotating mechanism.

For Graph 3 and Graph 4, we tend to unbroken the Precession angle because the parameter that resulted within the amendment of Tilt distance of the Precession axis and force generated by the rotating mechanism severally.

RESULTS AND DISCUSSIONS-

Initially, an experiment was conducted to see whether or not the structure is often balanced on its own or not. The analysis found that with high rev hub motor the structure are often stabilised. Then the priority was shift it manually once belongings the structure lean. With the assistance of the hub motor, we tend to might balance the chassis. Due to the mounting of the servo motor and its linkage over the chassis, the chassis became significant on one facet. To catch up on the overweight on one facet, the opposite facet was loaded with

the assistance of batteries. The disc used as rotating mechanism was balanced and centred properly to forestall any vibrations and unsteady of the disc.

The project is up to now has managed to find the principle of self-balancing. it's managed to style AN formula to stay the frame straight all time. However, the frame isn't quite able to balance totally on its own. It creates a force during a sure direction of orientation of hub motors. however, the hub motors are a small amount overweighed once adding some further weight. this huge weight {along with along faceting conjunction with beside at the side of together with} the force because of orientation of rotating disc creates such a momentum to urge the frame to the opposite side instead of keeping it straight. shift quick doesn't facilitate, because the initial impact force is enough to make the large momentum that pushes the frame on the far side our expected limit. The disc is inclined to the opposite direction to catch up on this event. However, till the full frame is leaned on the point of our threshold angle it generates larger momentum to diminish the force provided by the rotating disc and fell on the opposite facet. the full system worked absolutely.

However, the electric motor attracts abundant current because of its high force and therefore the quantity of load it's to handle. that the motor driver circuit burns directly once providing few outputs. The system is intended to stabilize the automobile whereas standing still. The dynamics are all completely different once the wheels of the vehicle are rolling. The higher the speed of the vehicle the lesser the brink angle would be.



Fig 4. Final Working Prototype

CONCLUSION-

The final model of the self-balancing vehicle style is shown above. This style has been tested at totally different RPMs of the disc and conjointly with different weights to check that the vehicle is balancing. This paper presents style and fabrication of the two-wheeler self-balancing vehicle that is capable of balancing itself after application of external forces and impacts. The vehicle balances itself below varied conditions like forced tilt of the vehicle. therefore, the projected system is a lot of useful for two-wheel vehicles reducing accidents or unwanted falls and increasing safety to the rider. this technique reduces the work of humans also as provides eco-friendly surroundings. From the project some sure observations are provided:

- The higher the rev, the larger the counterforce. meaning the counterforce is far larger once the rev of the hub motor is larger.
- The direction of rotating wheel tilt determines the force direction of once spinning is during an explicit direction.
- The hub motor can be driven even by connecting just one battery however the rev of the motor decreased during this case. To stay balanced the rev to the rated rev of the motor, it's to be driven by connecting 2 batteries (12V each) in parallel.

8. Waste paper recycling machine

COLLEGE	Dronacharya Group of Institution, Greater Noida
GUIDE	Mr. Shailesh Kumar Singh
COLLEGE STUDENTS	Pratik Kumar, Shubham Singh
SCHOOL STUDENTS	Isha Poddar, Ishu Yadav
SCHOOL	Govt. Sarvodaya Co-ed Vidyalaya, Sec-8, Rohini, Delhi

Abstract

Paper is one of the most important parts of human life as we know education, business, anything is not possible without the use of paper. As paper population increases day by day so the paper sourcing raw material is emerging. As a result, natural resources are being exploited. So recycling of paper becomes one of the important parts of the life to preserve our natural resources. Paper recycling is also helping to make paper making process easy and helpful. Paper recycling also helps in environment protection. This process does not create any type of pollution. The study concludes that weight of waste paper as a raw material within the cost of the factory is 43%.

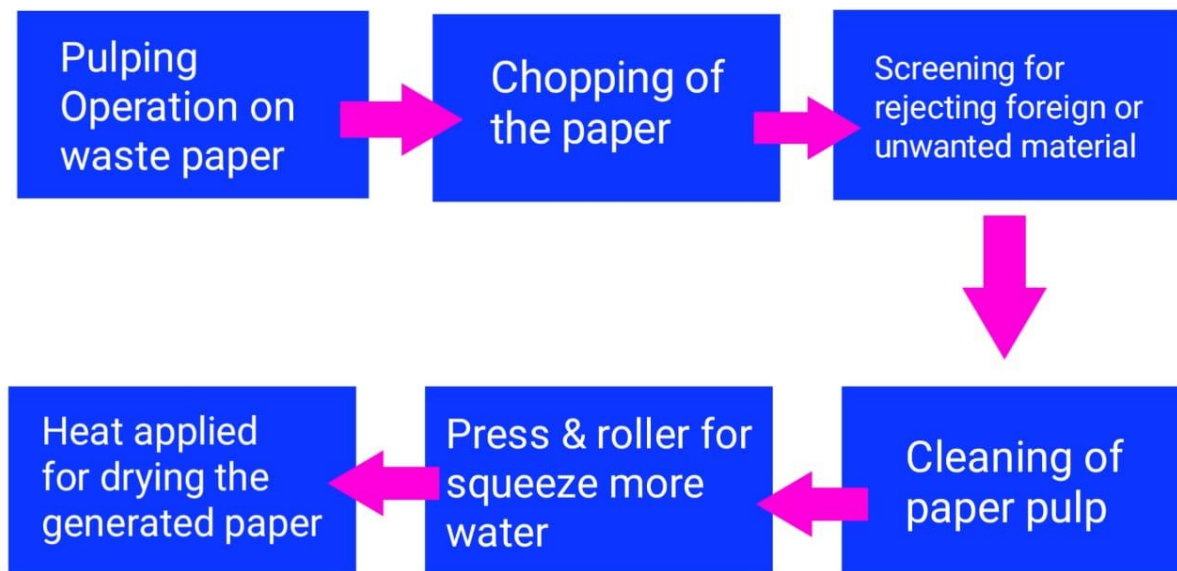
Keywords: Waste paper, pulp,

Introduction

Paper plays an important role in human life as it is used for various prospectuses such as communication, decoration, packaging, toilet paper, ruled paper purpose etc. Although paper manufacturing plants exist in the world which utilize trees. While on the other hand trees are essential components for survival of human beings, the trees are getting reduced day by day.

Hence there is utmost need to recycle waste paper which has already been used for primary purposes and dumped in garbage. Here we propose recycling prototype for these dumped paper which can be used after recycling done by our smart, efficient, integrated cost effective system. Due to the improved technological advances in communications people have taken a blind towards the consequences of disposal of used papers both proper and improper without the consideration that paper is still the most important means through which documentation, advertisement, communication and mostly education is carried out.

Processes involved



Paper described recycled paper as a type of paper that completely or partially consists of recycled fibres. These fibres can have very different origins and therefore also very different characteristics when it comes to being a component in new paper. Newsprint, tissue and paperboard are the products primarily produced using recycled paper as raw material. The paper is

According to Jiang and Mag (2000, pg. 1-2) De-inking is a separation process to remove inks and other non-fibrous contaminants from waste-papers. The key in the deinking process is the ability to detach ink from the fibres. This is achieved by a combination of mechanical action and chemical means and these are by washing and flotation process.

The waste paper is put into a pulper with a large quantity of water and broken down into a slurry. Contaminates or 'contraries' such as staples and plastic are removed by wire mesh machines and a mechanical action.

Hart and Rudie (2012) describes bleaching as the destruction of colorants in inks and the brightening of the pulp using bleaching agents such as hydrogen peroxide and sodium dithionite added during the pulping step and/or in a separate bleaching step. Bleaching is typically used to brighten recovered pulp for the production of higher quality graphic papers such as improved newsprint, for other high brightness recycled printing papers and for hygiene papers.

Methodology

In the design sufficient in depth research was done. The concepts were than generated and a suitable solution was chosen. The chosen solution was than developed. The design was then drawn model and simulated CAD.

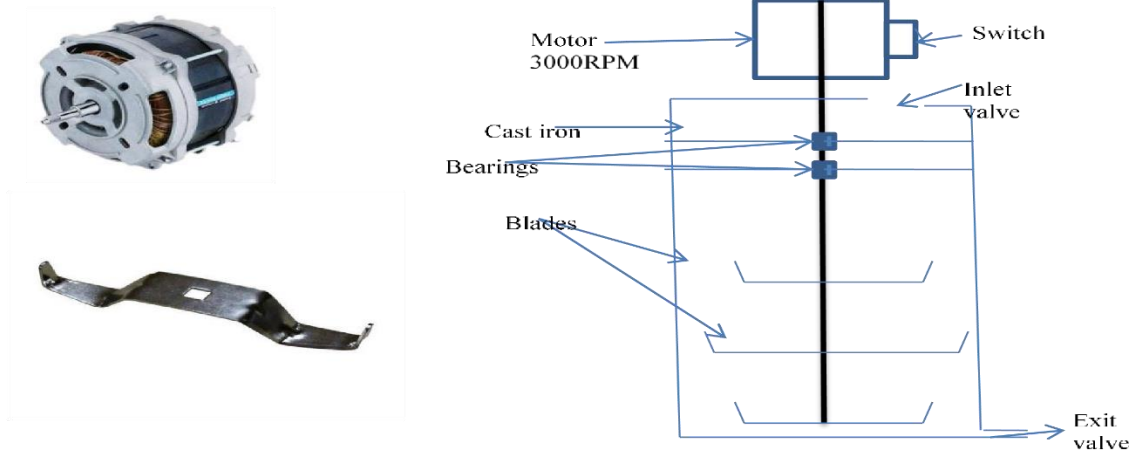
First operation in the step of creating paper is pulping operation on waste paper. After wetting of raw paper, chopping and removing foreign or unwanted material from paper pulp is done. As cleaning is mandatory in order to get good quality product cleaning is done by adding Bleaching. To remove excess water press and roller is taken in use. Final touch is given by applying heat to dry and generate paper.

- Hydrapulper
- Paper maker
- Water Remover
- Dryer

- **METHOD:**

- **Hydrapulpur**

It is the heart of machine which is made up of iron. It converts the paper into paper pulp. It is cylindrical in shape which having an inner diameter of 188mm. It having a thickness of 9mm. So the outer diameter is 206mm. The height of the cylindrical block is 251.3mm. A base plate having thickness 7mm. It is having an AC motor of 3000rpm. Blades are used to producing a centrifugal force inside the cylindrical block. These blades are connected to the motor by a shaft. The shaft has a length of 380mm.240 mm length is inside the hydrapulper. In this length blades of high sharpness are welded to convert paper into pulp. The motor rotates shaft at 3000rpm and this power transfer to the blades. Bearing are used in the shaft to provide constant rotations. In this cylindrical block, we add 50% water 50% paper, alum, and starch. Now we start the motor with 230v AC supply. Blades start rotating. We use alum and starch for deinking of paper. Due to centrifugal force and sharpness of blades, the paper is converted into paper pulp.



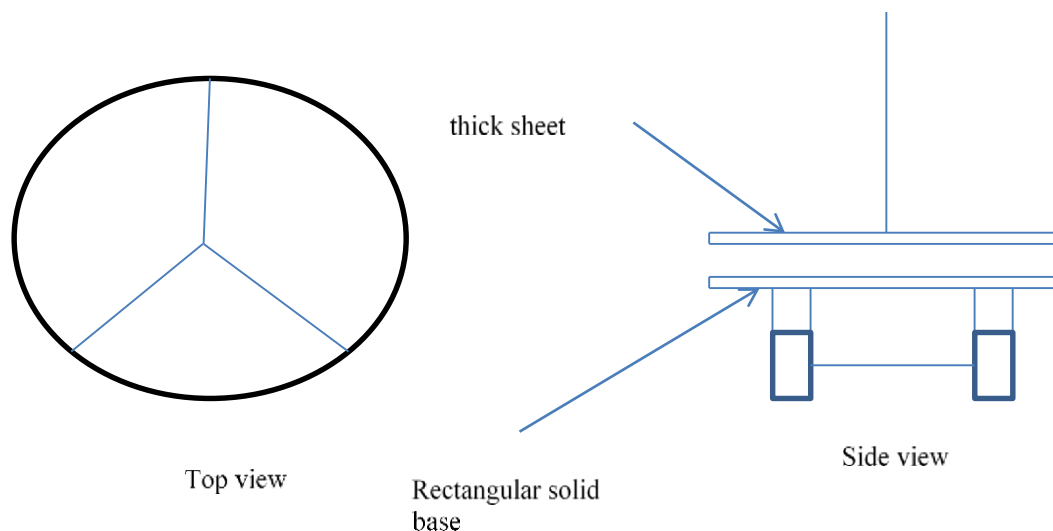
➤ **PAPER MAKER**

It is basically a machine that converts the paper pulp into the paper sheet. It is made up of iron. In this machine, it has a rectangular shape box having length 30inches, width 18inches and height 4 inches. This rectangular box only having base no top is there. Another rectangular box which does not have a base and tops having dimension length 18 inches and width 12 inches. The base has an iron net that holds the cloth uniformly and helps to maintain the paper regularly on the cloth. In the paper making process, the outer box contains water. That water comes inside the inner box by iron net [5]. Now we pour paper pulp that comes from hydrapulper inside the inner box. The inner box has cloth arrangement that makes the paper sheet by moving inner box upward direction. This paper sheet contains a high amount of water.



➤ **WATER REMOVER**

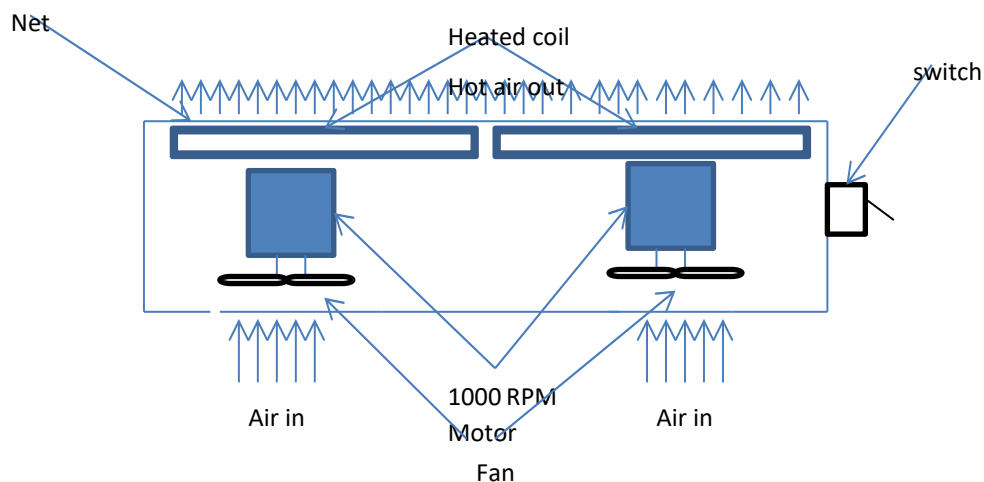
It is a device which is used to remove water from the paper sheet which is produced by paper maker. It is made up of iron. This machine is the solid rectangular base of dimension 18*12*2 inches. A thick solid rectangular plate of dimension 18*12 inches is connected with a shaft which having screw arrangement. This arrangement is used to make this plate up and down. This plate touches the solid base. The paper sheet is placed between the solid rectangular block and solid plate. Now, the plate is moving downward direction by screw arrangement. As plate moves downward, water starts removing from the paper sheet due force applied by solid rectangular base and pressure applied by a screw. Now water gets removed from the paper sheet.



water remover by the pressing

➤ **DRYER**

Now, water gets removed from the paper sheet. But, there is little moisture present in the paper sheet. To remove that moisture, we use this device. This device is basically a wooden box which having dimensions 18*12*6 inches. Base and top are made up of the iron net. Two motors of 1000rpm are used in this device. These motors are connected to the fans. These fans take air from outside and a heated coil is used to make the air hot. Now, this hot air is used to remove moisture from the paper. And now recycling [1] process get completed and new paper formed.



Proposed prototype of Waste paper recycling machine

RESULT

This machine produces a paper of 18*12 inches. Size of A4 size paper is 210mm*297mm. So basically it produces a paper sheet of size equal to the size of 2 A4 size paper approx. This machine recycles used papers and forms new papers which have correct thickness and size. The cost of manufacturing of this machine is very low and processing cost for paper recycling [1] is also very cheap.

Paper product size: 297 x 210 millimetres (11.69 x 8.27 inches)

Thickness of paper obtained: 0.5 to 1 mm

Desired thickness: 0.1 mm



paper produced by prototype

Proposed work:

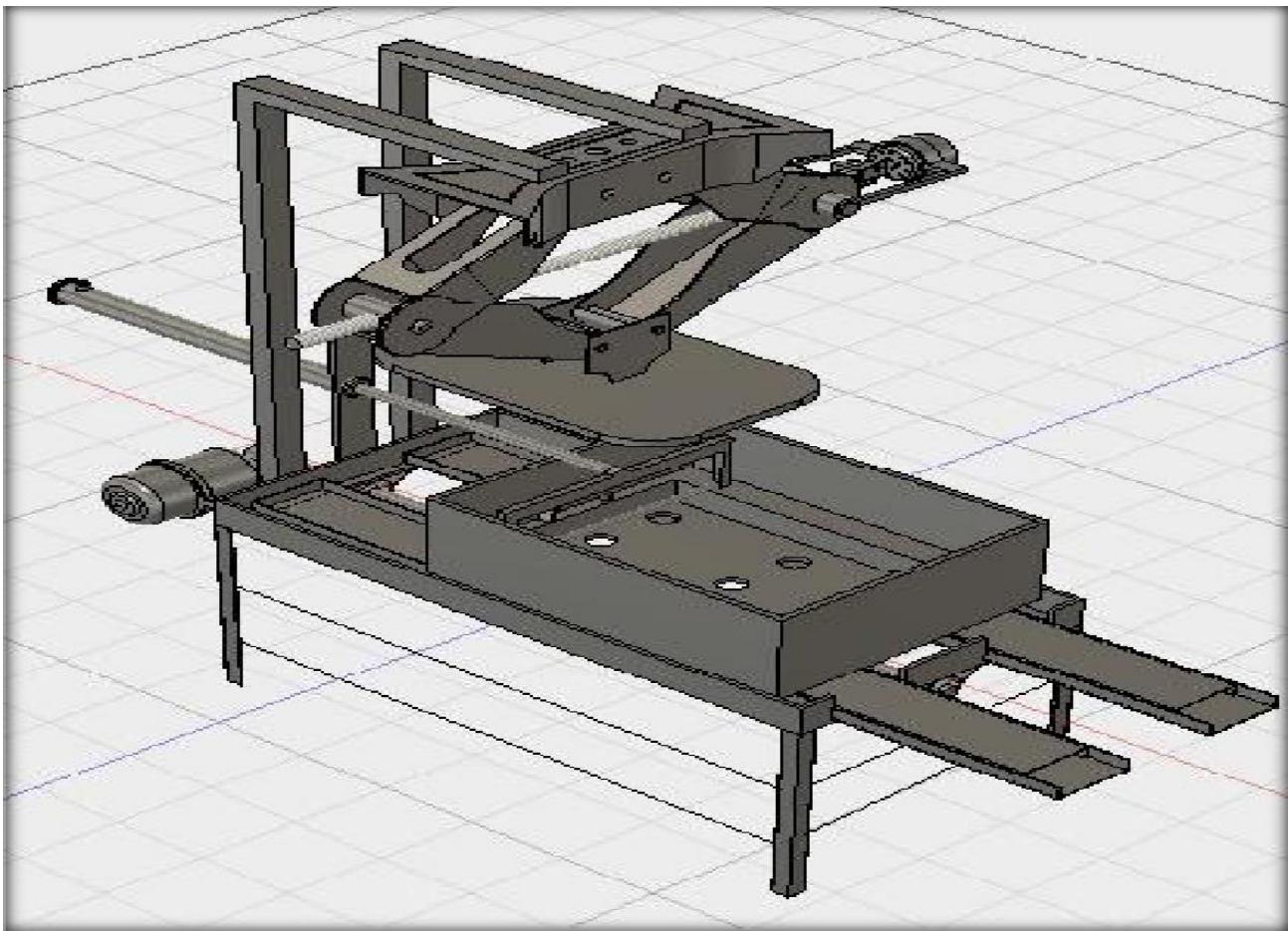
- ❖ Production of thin paper of A4 size
- ❖ Instant dryer of paper pulp in the tray
- ❖ Complete automation of Waste paper recycling Machine

Plan to implement in large scale

- It can be easily installed in school, collages & offices.
- And can be easily operated by semi-skilled operator.
- There is abundant demand of recycled Paper as they are cheap.
- And can be installed in small scale industries.
- It is economically affordable for low budget manufacturing startup.

CONCLUSION

The development of a manually operated used paper-recycling machine is much cheaper than the automated recycling industries worldwide. The fabricated machine can serve dual purposes; it can be manned permanently at a stationary position or it could be shifted from one place to another as the case may be. One great advantage to be derived from the use of this machine is that the cost of running it is minimal compared to what it takes to run a full plant. The simplicity of operation of this machine ensures that no too much technical skill is needed to operate it. When the machine is well maintained, its durability is guaranteed by the roller.



9. Recoil Reducing Compact Air Pressure Device (CAPD)

COLLEGE	Dronacharya Group of Institution, Greater Noida
GUIDE	Mr. Shailesh Kumar Singh
COLLEGE STUDENTS	Abhimanyu Saxena, Mohit Dixit
SCHOOL STUDENTS	Divyam Varshney, Kartik Varshney
SCHOOL	Model Upper Primary School, Dhanipur, Aligarh

ABSTRACT

Defence organization is one of the most reputed organization where best of the officers and soldiers serve for the safety on one's country, without complaining about anything and giving their all in to protect us from various threats that could lead to disintegration of the country.

Thus, the main motive to develop this device is to help our defence services to get the best, while they are giving their best for the country. The idea is to develop a device that would counter the recoil of the gun used by the officers and soldiers, to make them more efficient. Keeping in mind that the renewable resources of energy are depleting at a fast pace and pollution is increasing day by day leading to global warming, we have taken air as our resource to produce the desired effect.

The device would be developed using aluminium, compact single cylinder air compressor and Arduino programming to measure the pressure required for each shot fired from the gun. The principles of Law of conservation of momentum are applied to reduce the recoil of the gun to 80 %, thus helping in better aiming and precision. By installing this device, the demerits that makes AK47 a primitive gun would be subdued and without buying the expensive advanced guns, the arsenal would be upgraded at minimal cost possible.

KEYWORDS

Conservation of momentum, Single stage reciprocating air compressor, Recoil of gun, Recoil reducing device, Recoil reducing compact air device, Indian Defence Services, AK47.

INTRODUCTION

The idea was developed to overcome the problem of budget of Defence Services (only 2.1% of GDP), which enable them to upgrade the arsenal time to time and hence they have to adjust with the weapons of primitive technology. Whereas other countries enhance the technology timely thus making their defence sector stronger, which will give them an upper hand during a war as well as to combat the terrorists.

The most used gun in the Indian Defence Services which constitutes of Indian Army, NSG, CRPF etc is AK47.

AK47 is a really good gun, but it has become primitive after various advanced guns being inducted by the US, USSR, China, Japan, & Finland. The major drawback of this gun is high recoil velocity, which makes it difficult to handle and often leads to injuries.

Thus, in order to help our Defence Services we have come up with an idea to develop a Compact Air Pressure Device which would help in minimizing the recoil of the gun by developing a device which would use air to produce the required pressure

The device would be a simple single cylinder air pressure device of a very compact size and extremely light in weight which would produce a counter recoil force to keep the gun balanced. In this way the recoil will get reduced, thus providing better aiming, precision and control of the gun.

There are around 2 Lakhs guns already present in our Defence Sector and other 7 Lakhs are going to be inducted in a year. Thus, to meet the requirements of around 9 Lakhs gun, the production of this device would also help in creating work for a number of unemployed people as well as will help in increasing in the GDP of the country.

LITERATURE REVIEW

<u>S.No</u>	<u>Author Name</u>	<u>Major findings</u>	<u>Year</u>	<u>Reference</u>
1.	Vijaykumar F.Pipali a Dipesh D. Shukla Niraj C. Mehta	Investigation on reciprocating air compressor - In understanding the mechanism enough to enable development of reliable heat transfer correlations and at the application level to enable development of easy, quick and reliable procedures for predicting its impact on compressor performance.	December, 2015	[1]

2.	Manoj Bansidas Agravatt	<p>Importance of Conservation of momentum</p> <p>$E = mc^2$ equation to momentum a component of the total energy equation (related to sum of special relativity energy and momentum)</p> <ol style="list-style-type: none"> 1) A decrease of time and velocity shows momentum will increase short term. 2) An increase of time and velocity shows momentum decrease short term. If conservation of energy fails to be true, this inference is important. 	November, 2014	[2]
3.	Harper, W.H;Ellis , P.H;Hanlon ,W.H;Merkey, R.P	<p>The effects of Recoil on shooter performance-</p> <ol style="list-style-type: none"> 1) Isolate and quantify recoil characteristics that effect aiming error. 2) Investigate and measure how those factors affect the soldier's perception and tolerance of recoil. 3) Evaluate the effectiveness of recoil-mitigating device. 	May, 1996	[3]
4.	<u>Simon Collyer</u> , <u>Clive Warren Bronwyn Hemsley</u> <u>Chris Stevens</u>	<p>Aim, Fire, Aim –Project planning style in dynamic environment - The make-static approach may be applied where safety and risk minimization is an imperative or change adaption offers little advantage</p>	August, 2010	[4]
5.	David Streiner, Geoffrey Norma	<p>Precision - The term precision refers to how precisely an object of study is measured. The article ends with a call for the use of the more</p>	2010	[5]

	n	traditional terms as better reflecting the process of scale development and the uses to which they are put.		
6.	C-G Wang, W-H Xu, C.Xu	Influence of different automatic action of gun on its recoil effect in man-gun system - The research results show that the rules of the changes of gun recoil force and the shooter' recoil velocity and displacement with recoiling time, and the number of occurrences and time of the maximum are not same for two different kinds of automatic gun.	May, 2014	[6]
7.	Sun-Young Park; Jae-Sung Bae; Jai-Hyuk Hwang; Kuk-Jeong Kang	Forward momentum of a soft recoil system- A soft-recoil or FOOB (Fire-Out-Of-Battery) system can reduce the recoil force considerably. Its firing sequence is different from that of a conventional or FIB (Fire-In-Battery) system.	January, 2010	[7]
8.	Michael Courtney; Amy Courtney	Testing bullets at reduce velocity - Testing bullet performance at lower velocity presents a challenge because smokeless powder charges cannot be safely lowered to arbitrary levels in cartridge arms, and extending the range to very large distances (so that air resistance slows the bullet to the desired level) is impractical because the required accuracy is probably not	January, 2009	[8]

		available.		
9.	Jan Hjelmgren	Dynamic measurement of pressure - develop fundamental reference transducers for periodic pressure sources. The approach employed in most cases, and felt to be unsatisfactory by most people, is to choose a measurement system with a bandwidth many times that of the pressure signal to be measured.	2002	[9]
10.	Arun Vijayakumar D; Om Prakash ; R. K Sharma	Estimation of Air density and its importance in barometric pressure measurement - The air density in a controlled environment at NPL, India is found to be varying within 1.135 kg/m ³ and 1.155 kg/m ³ , the lowest during summer and the highest during winter months.	February , 2012	[10]
11.	Florian Ion Tiberiu Petrescu; Taher Abu-Lebdeh ; Antonio Apicella	Oscillating Sliding mechanism - A mechanism with an oscillating slider is a mechanism quite often used in the technique. It has some advantages over other similar mechanisms being able to work with accelerations and reduced forces under the same conditions with another similar mechanism.	February , 2018	[11]
12.	P.K Stefano poulus; G.F Hadjigeorgiou;	Gunshot Wounds – A review of ballistics related to penetrating trauma - Ballistic factors such as the impact velocity and energy should not be considered in	Decemb er, 2014	[12]

	Konstantina Filippakis; Dimirios Gyftokostas	isolation, as their specific effects are determined by the interaction between the projectile and tissues.		
13.	Harri Palochimo; Michael Adebayo Omidiora	Feasible study on compressed air energy storage system for portable electrical and electronic device - The objective for this feasibility study was to assess the viability of introducing small-scale CAES (Compressed Air Energy Storage) system for mobile device charging and lighting in rural off-grid areas of the world and especially in the developing countries, where existing energy infrastructure is very limited.	July, 2009	[13]
14.	Kelvin Russell	Recent advances in small arms recoil reduction - This work presents the final patent (in a three-part series of patents) in the area of rifle operating group-based recoil reduction.	September, 2014	[14]
15.	Hiroaki Kajikawa; Tokihiko Kobata	Pressure gauge Calibration Applying O-A-O pressurization to reference gauge - The reference gauge was pressurized by O-A-O pressurization, whereas the test gauge could be pressurized through various procedures according to the user's requirements and the measurement conditions of the test gauge at industrial sites.	April, 2014	[15]

MATERIAL

Aluminium – As we can see from the calculations done in **section 7.3**, the discharge pressure that is required to control the recoil of gun is $P_d = 0.0158$ psi. So, the material that we can use could be potentially aluminium. The major reason to choose aluminium is that -

It is a very light metal with specific weight of 2.7g/cm^3 , about that of steel that makes it easy to handle and install. It naturally generates a protective thin oxide coating which keeps the metal from making further contact with the environment. It is ductile and has low melting point i.e. 660.3°C . It shows tensile strength as temperature drops. As it is non-magnetic in nature, it can be used in making weapons and shields and mainly due to its sound and shock absorption, non-sparking, and recyclability properties we will use aluminium. [16]

PRINCIPLE

CONSERVATION OF MOMENTUM:

To calculate the recoil, we apply the law of conservation of momentum and this is derived from Newton's third law. Law of conservation of momentum states that every applied force has an equal and opposite reaction. [2]

$$\mathbf{F}_i = -\mathbf{F}_r$$

Where, F_i = imparted force and F_r = Reaction force

In a typical recoil situation, the release of the body of smaller mass (body 1) has an impact on a larger body (body 2). If both the bodies start from rest, the law of conservation of momentum states that,

$$\mathbf{M}_1\mathbf{V}_1 = -\mathbf{M}_2\mathbf{V}_2$$

Now, our main aim is to reduce the recoil velocity by adding a compressor that can discharge pressure in the opposite direction. For all this to happen, the law of conservation of momentum should be followed.

$$\mathbf{M}_1\mathbf{V}_1 = \mathbf{M}_2\mathbf{V}_2 + \mathbf{M}_3\mathbf{V}_3$$

Where, M_3 is the mass of the compressor and V_3 is discharge velocity.

METHODOLOGY

Basically, when we are talking about the methodology of the project, we come across two different principles which are:

- i. conversation of momentum
- ii. single stage reciprocating compressor.

Initially, we have calculated the recoil velocity of the gun, with the help of the data extracted from different internet sources and then we will calculate the discharge pressure of our device in psi.

The basic idea of the project is to install a reciprocating compressor on the gun which will eject out the required amount of pressure thus producing force to counter the recoil velocity of the gun, hence stabilising it using the principle of conservation of momentum.

The suction and discharge effect are created due to the pressure difference inside the compressor. Initially, the atmospheric pressure of the device due to which the suction effect is created and after consuming the fluid inside the compressor the internal pressure increases and the atmospheric pressure decreases due to which we get high discharge velocity.

The installation will be done beside the scope using a sliding mechanism, which is by now the most appropriate location to install the device, the location might be changed after more rigorous experiments.

EXPERIMENTAL ANALAYSIS

NOTATIONS

- $M_1 =$ Mass of Bullet
- $M_2 =$ Total Mass of Gun
- $M_G =$ Mass of Gun
- $M_M =$ Mass of Magazine
- $M_2 = M_g + M_m + (30 \times M_1)$
- $M_3 =$ Mass of CAPD
- All the masses are in Grams (g).
- $V_1 =$ Velocity of Bullet
- $V_2 =$ Velocity of Gun (Recoil)
- $V_{2N} =$ Velocity of Gun (Recoil) after installing CAPD.
- $V_3 =$ Velocity of air discharge by CAPD.
- All the velocities are in Meter / Second (m/s)

DATA

Data has been taken in accordance with AKM Rifle.

- $M_1 = 16.3$ g
- $M_2 = 4389$ g
- $M_G = 3470$ g

- $M_M = 430 \text{ g}$
- $M_3 = 700 \text{ g}$ (Approximately)
- $V_1 = 715 \text{ m/}$
- $V_2 = 2.65 \text{ m/s}$

CALCULATIONS

- Momentum Conservation before Installing CAPD.

$$M_1 \times V_1 = M_2 \times V_2$$

- Momentum Conservation after Installing CAPD.

$$M_1 \times V_1 = (M_2 \times V_{2N}) + (M_3 \times V_3)$$

- Reducing V_2 to 20% we get V_{2N} .

$$V_{2N} = 20/100 \times V_2 \Rightarrow 20/100 \times 2.65$$

$$\mathbf{V_{2N} = 0.53 \text{ m/s}}$$

$$M_1 \times V_1 = M_2 \times V_{2N} + M_3 \times V_3$$

$$16.3 \times 715 = (4389 \times 0.53) + (V_3 \times 700)$$

$$(11654.5 - 2326.17) / 700 = V_3$$

$$\mathbf{V_3 = 13.32 \text{ m/s}}$$

- $P_d = 1/2 \rho V_3^2$
- $P_d =$ Dynamic pressure produced by CAPD in Pascal (Pa).
- $\rho = 1.225 \text{ kg/m}^3$ (Density of Air).
- $V_3 = 13.32 \text{ m/s}$
- $P_d = 109 \text{ Pa}$
- $P_d = 0.00014503773 \text{ psi}$
- $p_d = 0.0158 \text{ psi}$

RESULTS

- $\mathbf{V_{2N} = 0.53 \text{ m/s}}$
- $\mathbf{V_3 = 13.32 \text{ m/s}}$
- $\mathbf{p_d = 0.0158 \text{ psi}}$

RESULTS & DISCUSSION

After making the desired calculations we reached to a conclusion that the pressure which needs to be released from the air pressure device is approximately 0.0158 psi per shot fired.

The calculations are done by extracting the mass of gun, bullet and magazine and velocity of the bullet of AK47 from the internet so, the pressure required is accurate under our consideration which is quite less and can be released from a small compressor as well. So, the size of the compressor will be small and the weight of the air pressure device will also be less and this will not lead to any extra load on the army men.

After, calculating the forces we have come to a conclusion that to maintain the equilibrium of the gun based on the principle of conservation of momentum, we will place the air pressure device just below the barrel of the gun and to attach the air pressure device we will be using a sliding mechanism by developing and fixing a slider of desired shape on the gun with the help of various machining processes such as welding, grinding, shaping and turning and CNC machining.

This device will help the Indian armed forces to use the gun with more precision and can potentially be a good idea under the Make in India initiative as our defence equipment are mostly purchased from The United States and Russian Federation. Under a small defence budget this Idea will be a game changer if it works after all the testing of the prototype is done and the project

These are the 3 important values that we obtained after doing the calculation:

1. New Recoil Velocity = 0.53 m/s
2. Velocity of air expelled by the air pressure device = 13.32 m/s
3. Pressure to be developed to counter the recoil = 0.0158 psi

CONCLUSION

Hence our objective is to create a Compact Air Pressure Device of around **700 grams** using **aluminium** which would be able to produce a pressure of **109 pascal** or **0.0158 psi**.

This device would help in reducing the recoil of gun from **2.56 m/s** to **0.53 m/s** when a bullet is fired, thus the efficiency gained is **80%**.

This would in turn help in increasing the aiming and precision of the rifle, thus helping our defence Services to get the best output in defending the border and protecting the country from various threats.

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10. Multi-Tasking robot

COLLEGE	Hi-Tech Institute of Engineering & Technology, Ghaziabad
GUIDE	Er. Anuja Gupta
COLLEGE STUDENTS	Kshitiz Singh, Gaurav Singh
SCHOOL STUDENTS	Prachi, Sonam
SCHOOL	Ramanujan Sarvodaya Kanya Vidyalaya Mehrauli, Delhi Govt. Girls Sr. Sec. School No-3, Dr Ambedkar Nagar, Delhi

ABSTRACT:

In this new normal 2020 situation of the world, everything switched to online. Even the restaurants, cafes and some other public places are converted into online. But, some of them are still working offline people are visiting these place. The one thing common in this place is that one person who sits outside to check whether the person entering is infected or not. Which I think is a very dangerous job to do in nowadays situation. So, we have built a new modified version of a Bot which is very well suited for this job. It's an updated version of talking Bot, which has been loaded with various performances.

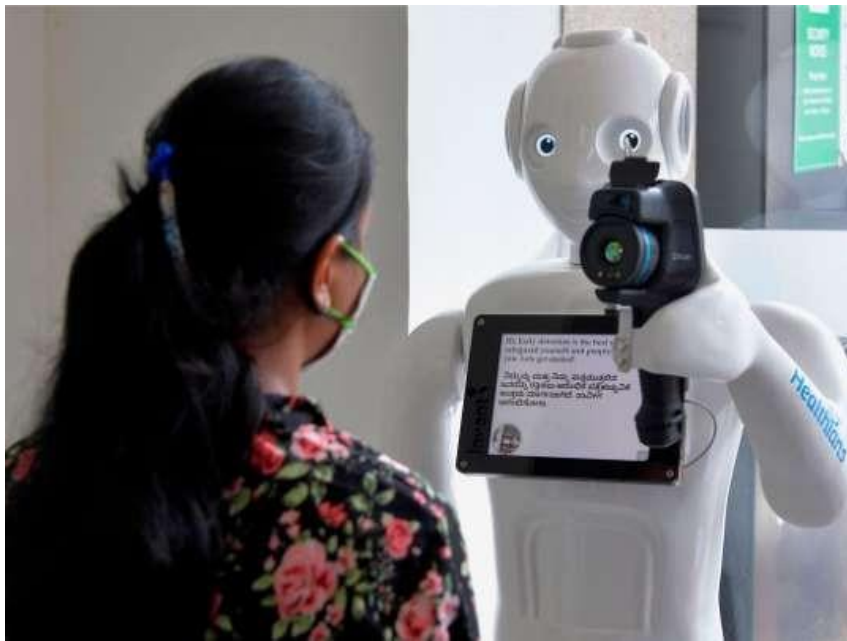


INTRODUCTION:

Since, we are dealing with the extreme condition of Covid-19 and there are no such treatments or drugs that can cure it. Freedom is undoubtedly the most important part of our lives and is something which everyone wants. But, now the new era of generation has begun where people have to find the alternatives to do their works since it would've been mandated that we all have to maintain social distancing, sanitization and contactless job. Nowadays, most of the things are online, virtual or robotic control. Technically, all I'm saying is, that why not let the machine handles the work which include some kind of contact or closeness. It would be incredible to use this robotic helper which can give you various facilities:

- It can move from one place to another on wheels.
- It is also a talking bot. It can reply to your commands.
- It consists of a platform as tray through which it can hold the stuffs.
- It also has an automatic sanitization spray which can be used to regular sanitization.
- It would also be consisting of a contactless thermometer which can measure temperature in °C or °F.

“We shall have no better conditions in future if we will not be following the rules of social distancing, sanitization, and contactless services”.



SALIENT FEATURES:

- ✦ It consists of four motors as wheels to move.
- ✦ It has a speaker and microphone to speak.
- ✦ Microphone will be use to give the commands.
- ✦ Speaker will be the voice of the robot.
- ✦ It has a sanitizer spray.
- ✦ Sanitization will be an automatic process.
- ✦ It has a contactless thermometer.
- ✦ This thermometer will measure the temperature with no physical contact.

OBJECTIVES & SCOPE:



Basically, the objective of this product is to provide protection, comfort, and advancement. 'Protection' from getting in contact, 'Comfort' as he can talk and reply to commands and 'Advancement' is through physical help. In this product it is not essential for everyone to call it and go to it. A single person can control its function by remote or by mobile. It will be operating on IOT by which you can give instruction to robot via Wi-Fi module and it'll do your work. It can wash your hands, measure your temp, sense you to not to come any closure and talk to you.

In the present scenario, a person has given this work to measure temperature and moving stuffs from one side to other but the contactless thermometer & tray in hand can do the things respectively which going to be the most important part of our lives. Not only does it do our tasks but also it maintains the contactless communication.

Since we all know when the Covid pandemic has begun, these types of robots or we can say serving robots were being used in the hospitals in countries like China, Japan, and Russia. That added a positive aspect to a country as well as their citizen. So, what we are doing? We are providing a modified version of that robot. That can talk to you and simultaneously do other stuffs too.

METHODOLOGY:

Technically, the project is divided into 4 parts- Motion, temperature sensing, auto-sanitation, and communication. The whole system working can easily be understood as follows:

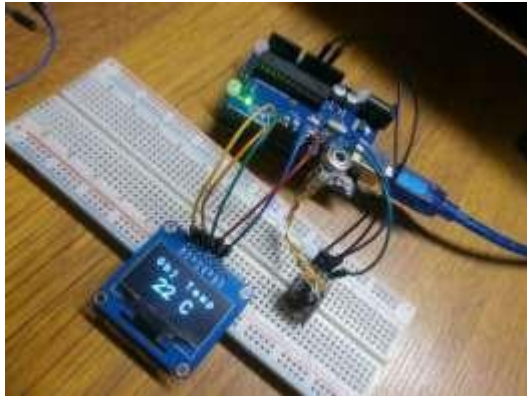
- **Motion:**

Motion is the wheel part of the robot; the robot will move on wheels. There are 4 sets of DC motors that will rotate accordingly to manage the motion of the robot. The rotation of the motors will be operated by the controller and power supply of 12V. The floor on wheels will manage the upper body of the robot. That's why we have used strong fiber.



- **Temperature sensing:**

There is a digital contactless temperature sensor which will sense the temperature of any surface or body in its range. This sensor will be assembled at the forehead part of the robot. This sensor will be controlled by a controller and its temperature will be visible at a led screen. There is also a small led torch which will also be connecting with it to be used at night or in dark.



- **Auto Sanitation:**

There's a mini sanitation device inside the robot for hand sanitization. This device is a whole system in itself. There will be a spray sanitizer and an UV led to kill the germs and virus from the client's hand. This device will be automatic and controlled by a servo motor which operates by a controller. The sanitizer will spray when it senses the human hand around it. The sanitization can be done repetitive until the person removes his hands from the sensor.



Communication:

There will be a communication set up between the user and the robot. We have installed a microphone and a speaker to the robot so that it can reply to our commands and talk to us. This idea of doing so can be achieved by using APR33A3 module which will record and play the audio from the robot.



HARDWARE AND SOFTWARE COMPONENTS

- MIX90614 sensor
- Laser light
- Resistor (5k, 10k)
- OLED
- On/off switch
- APR33A3 module
- Arduino UNOs
- 12V DC motors
- 5V servo motors
- Ultrasonic sensor
- LED light
- USB cable type A/B
- Wooden board
- Cardboard
- Fiber sheet
- Soldering rod/iron
- 12V Battery
- Bluetooth/Wi-Fi module
- Cutter-nails-screws
- Bluetooth/Wi-Fi module
- Cutter-nails-screws
- Sanitizer spray
- Arduino IDE

These components are being assembled in such a way to make a fully operational Multi-Tasking Robot.

COST

In real time operation, this system will include the cost up to 5000. It includes the various supportive measures and functions which provides you safety and support to you and others. You can use this robot as a keeper of your home or any public place or official place. It will operate at very low usage and can be controlled by simple commands from mobile.

SOCIAL IMPACT

- ❖ It has been an established fact that the usage of Robotics and technologies in daily life has been increased. Everybody wants to have one. This robot can easily fill that place as a beginning.

- ❖ MT bot is an environmental friendly tech-bot and is applicable in all the three sectors Namely-Residential, Commercial and Health care.
- ❖ The aim of this bot is to create awareness regarding measure of maintaining distance, healthy-lifestyle, automation and usage of smart technologies.

- ❖ The project's goal is also to create "Advanced intelligence society" just like we dream of. This MT robot can easily be used in urban societies such as houses apartments, where problem is severe.

- ❖ Also, MT robot can be used as a source of revenue by implementing it in the houses, hospitals, apartments, schools and other commercial places.

11. Vertical Axis Wind Turbine

COLLEGE	GL Bajaj Institute of Technology and Management, Greater Noida
GUIDE	Mr. Vishal Shankar Srivastava
COLLEGE STUDENTS	Lokesh Sharma, Sahil Anand
SCHOOL STUDENTS	Saniya Chaurasia, Jassi Yadav
SCHOOL	Sarvodaya Kanya Vidyalaya, No.1, Uttam Nagar, Delhi Government Girls Senior Secondary School, Nangloi, delhi

ABSTRACT

The amount of wind energy production by strong wake rises from the high-speed moving vehicles. At this research to use highway moving vehicles wake energy for the generation of electrical energy through vertical axis wind turbine throughout the Bhopal to Indore as well as it is beneficial to all over India's highway where vehicles speed is constantly high. The generated electrical energy is used for renewable self-powered applications such as lighting purposes such as traffic signals, highway lights, and light guidelines in a highway by high-speed vehicles. A convenient renewable wind energy gathering scheme of low economic vertical axis wind turbine has been designed and fabricated using low-cost materials to provide electricity alongside the highway between Bhopal and Indore in rural zones where availability of electric power is less. This energy can be generated by using an array of vertical axis wind turbines (VAWT) located in the middle of the highways and that can deliver an essential significant amount of wind to rotate a wind turbine due to high-speed vehicles moving in both directions and the natural localized wind. This system is economically viable for the society & villages also any men easily build it.

KEYWORDS- Green & Clean Energy, Aluminum alloy 6061, Darrius and Savonius.

INTRODUCTION

Most of the developed and developing countries are moving toward establishing additional wind farms across the world because electricity consumption is increasing day by day, and the whole world prefers the electricity production without any pollution. Now a day's many researchers are finding the idea to increase the transferable energy from the availability of the wind globally. We considered the wind energy that is freely available by nature. By using the wind turbine, we can convert wind kinetic energy into mechanical energy after that convert to electrical energy. As we know the wind turbine has two types' horizontal axis and vertical axis wind turbine. We take a vertical axis wind turbine because of less maintenance, less complicated design and less economic point of view. The main problem is the variation of the wind source for wind energy-related technology. On the basis of this problem here a closely constant wind energy process by rapidly high-speed moving vehicles like Bhopal to Indore highway. Throughout the world, India's position has one of the top five biggest road connectivity. However, in the remote location between the highway where less electricity is needed like highway lightning, guiding signal, and traffic operating signals to avoid accidents and proper functioning of traffic rules. So that the electricity demand fulfils by the wind turbine projected middle the site of a highway to use wind energy from constantly high-speed trucks, cars, and other heavy vehicles. The adopted VAWT was made by waste material like a plastic drum, bicycle rim, etc. alternatively the excess generated electricity could be fed back to the grid or distribute to the village where less electricity availability. According to the survey, the vehicle's speed is almost average speed 60 to 90 km/h on the highways that will produce nearly constant wind wake to rotate the wind turbine. The main motive of this research is to share with the world toward clean energy in a viable technique. However, the possibility of a planted VAWT in an array on the middle portion of the highways on a large scale to achieve some kind of energy demand to use in highway-related applications and by the use of waste material economically viable.

Wind 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 wind energy, unlike traditional sources of energy.

The overlapping aspects of sustainable development are: **Environmental, Economic, and Social**. 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.
- Increasing energy security.

SALIENT FEATURES

The VWAT has following features:

- Omnidirectional.
- Increased efficiency.
- Self-starter.
- Excellent Durability.
- Compact.
- Reduced Cost.

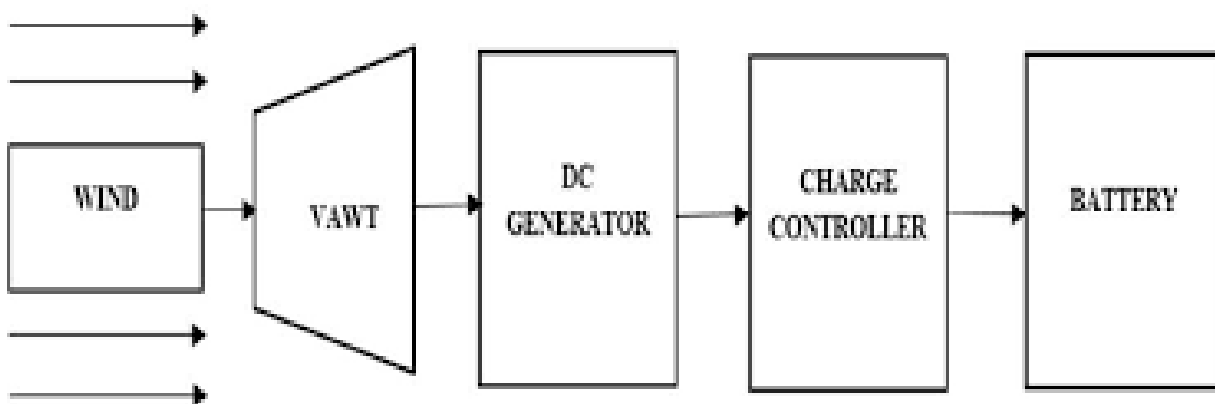
OBJECTIVE AND SCOPE

Our model is generating electrical energy with increased efficiency to glow the Highway's light basically, so it has scope in India. The geographical location of India (a tropical country) stands to its benefit for generating wind energy. Since Our Country has number of Highways with divider which has optimum space for installation of VAWTs. We can install number of VAWTs in array.

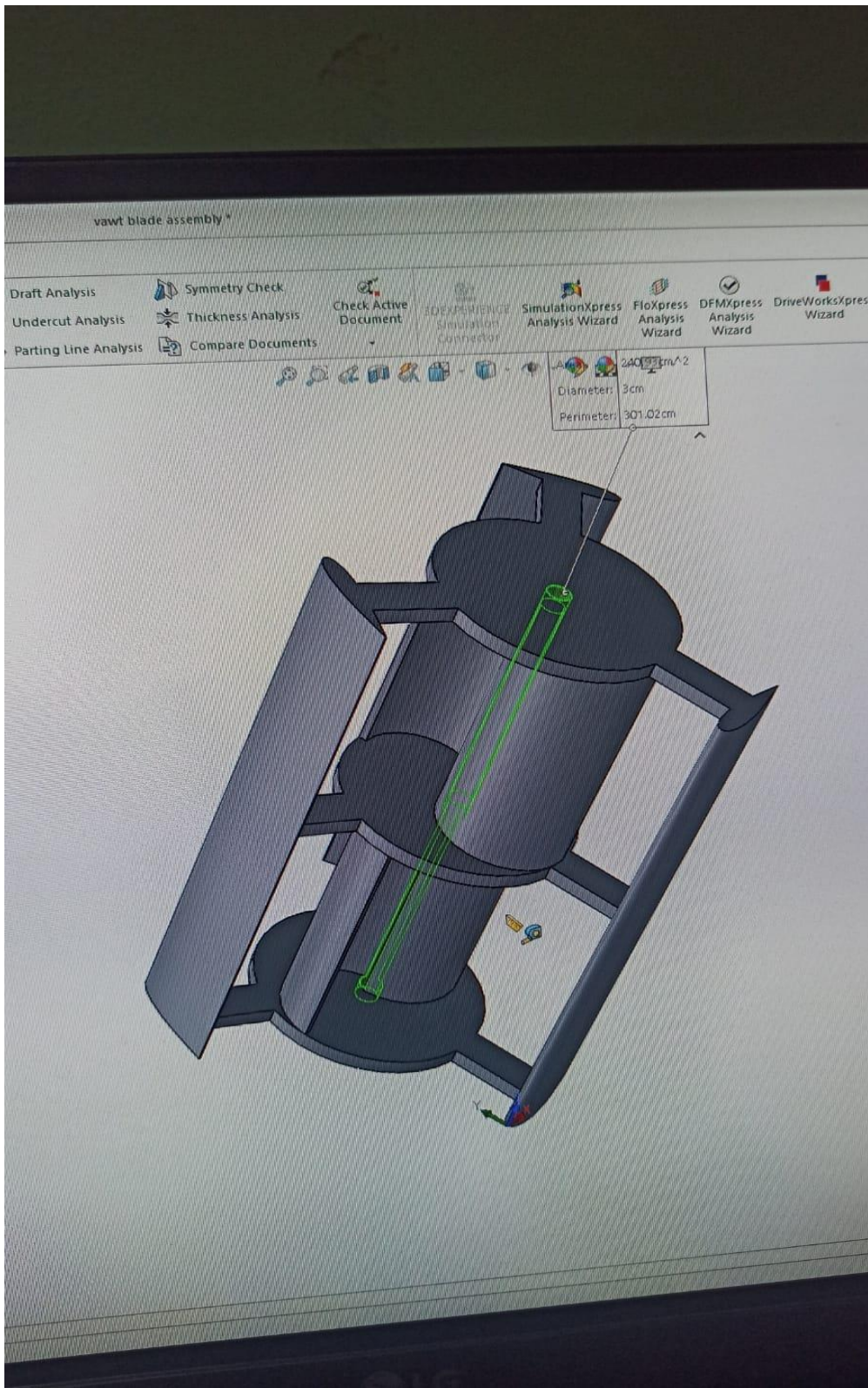
Thus, India as a developing country has massive plan for Wind Energy generation that may not only fulfil the deficit of power generation but also contribute largely in Green Energy Production to help to reduce the Climatic Changes globally.

METHODOLOGY

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



BASIC STRUCTURE OF VWAT BLADE.



HARDWARE COMPONENTS

- Blades
- Hub
- Shaft
- Bearing
- Dynamometer
- Battery with controller.

SOFTWARE AND TECHNOLOGICAL COMPONENTS

Solidworks for CAD

COMPARITIVE STUDY

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

- In the present scenario, the general VAWT doesn't have Hybrid blades i.e, Combined Darrius and Savonius blade.
- It is self-starter so it will not require too much torque to start at the beginning.
- It will require drag force from atmosphere to start

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 wind energy.

- Wind energy means healthier air: Generating energy from VWAT emits no pollution into the air, and thus wind energy is a much cleaner source of energy than the burning of fossil fuels. if we decide to use wind energy to generate electricity, the shift will help diminish the effects of global warming which in turn can make the citizens and workers healthier.
- Wind saves gas and fuel: The price of wind is zero. It is a renewable resource. Unlike fossil fuels, air is never going away. One can count on it every day.
- Wind 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 wind energy 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 **ten thousand rupees**.

In our substitution model, hybrid blade 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 **seven thousand rupees**.

CONCLUSION

We concluded that in energy deficient country like India, where power generation is costly, wind energy is the best alternate means of electricity generation for highway's light. The Proposed model caters to these **THREE** 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 wind alternative.

12. Atmospheric Water Generator

COLLEGE	Bharati Vidyapeeth's College of Engineering, Delhi
GUIDE	Mrs. Shashi Gandhar
COLLEGE STUDENTS	Naman Vashishtha, Prabhakar Kumar
SCHOOL STUDENTS	Utkarsh, Nishant Chaudhary
SCHOOL	Govt Co-ed Sarvodaya Vidyalaya, Rampura, Delhi

ABSTRACT-

AAWAG stands for Atmospheric Water Generator. It is an innovative project which is eco-friendly with low maintenance cost. It is an efficient way of producing clean water for drinking purposes. This project can be an alternative for many other water generating sources like sea water desalination and setting up water treatment plants for water filtration. It can be helpful and effective in areas which have high level of humidity and where solar insolation is high. This will help us produce clean water at a very minimal cost with very low maintenance. This will help us produce water from air 24 X 7 hours from the air. And it can be setup at places with high moisture content in the air like Tamil Nadu, Andhra Pradesh, Kerala, Andaman and Nicobar and Maharashtra. It will help producing water in large amount daily and supply. Also this project will boost our economy.

INTRODUCTION-

Water scarcity is one of the burning issues of today's world. Though water covers more than two third (about 70%) of the Earth's surface but still fresh water which can be used for drinking and carrying out everyday chores remains scarce (only about 2.5%). The acute problem of water shortage, is mainly faced by the countries with long coastlines and the island nations, which do not have adequate fresh water sources like rivers and ponds. As a result, most of these countries meet their water demands by desalination of sea water which is a very costly affair.

Till now India has not devised any way by which water from sea can be used to provide drinking water to the people. This project aims to solve this problem. In the coastal areas the relative humidity is quite high (around 70-80%). So, the air in coastal areas can be used to meet the water needs of people by using a dehumidifier unit. Further the solar insolation is quite high in these areas round the year. This can be used to provide necessary power to the dehumidifier unit. Thus drinking water can be obtained from the atmosphere by harnessing solar energy.

Not only in producing clean water the machine will also be efficient in giving flood alert on the basis of rainfall in an area. As the rainwater will fall in a capillary tube placed on the back side of Atmospheric Water Generator and as the capillary tube gets filled up the brim the water will come out and fall on a water sensor placed beneath the capillary tube which is connected to a buzzer, the buzzer will buzz and give an alert for the flood.

INNOVATION-

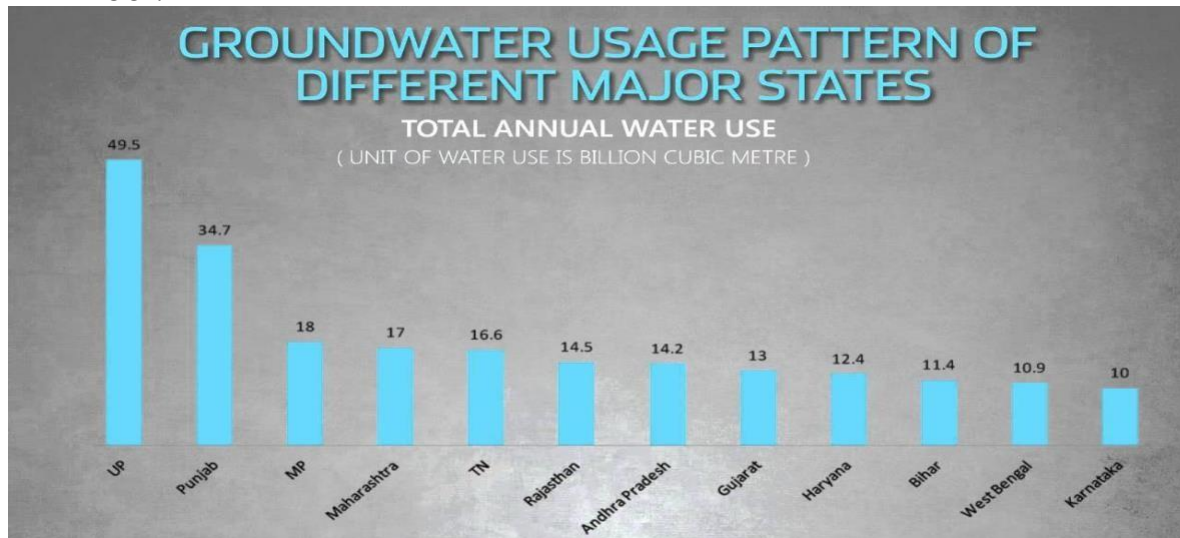
Component	Existing	Innovation
Source of Energy	Non Renewable Source of Energy	Solar Energy (Renewable Source of Energy)
Filter Used	Electrostatic Filter	High Efficiency Pleated Filter
Condenser	Aluminum	Copper
Flood Alert System	None	Capillary tube with a sensor and a buzzer,

- ❖ An Atmospheric Water Generator can be enhanced by adding technologies like **Internet of Things** to it and using **Solar Energy** which is a **Renewable source** of energy, instead of Non Renewable source of energy for the production of water.
- ❖ The **High Efficiency Pleated Filters** can be used to pull the air in, instead of regular electrostatic antimicrobial filter.
- ❖ We used **copper condenser** instead of traditional aluminium condenser as the the heat transfer rate of copper is better than aluminium which increases the efficiency of the machine
- ❖ We also fitted a mini flood system in the machine because we are looking to install the machine in areas with high moisture content in the air and these areas can be prone to floods also seeing the devastating effects of floods in the areas like Kerala, Chennai, Mumbai and Bihar it would be beneficial to add this thing in the machine as it will ensure the safety of the individuals from the floods.

So adding these things would increase the efficiency and durability of the machine reducing the cost. It is an **ecofriendly** project with low maintenance cost. The main aim of this project is to provide water in areas which face shortage of clean drinking water **free of cost**.

WHY IS THIS PROJECT REQUIRED IN INDIA?

- ❖ People across India are facing critical drought conditions and water shortages. As of June 25, 2019, nearly 65 percent of the country's reservoirs were running dry. One of the worst affected areas has been the west-central state of Maharashtra, where six of the 17 reservoirs are dried out.



- ❖ The water shortages are partly caused by low rainfall over the past few months. Chennai has been devoid of rain for nearly 200 days. In 2018, the city experienced one of its weakest northeast monsoon seasons, which runs from October to December and provides a large portion of the area's annual rainfall. Additionally, the southwest summer monsoon season from around June through September has been delayed across India and unable to deliver substantial rainfall to Chennai yet.

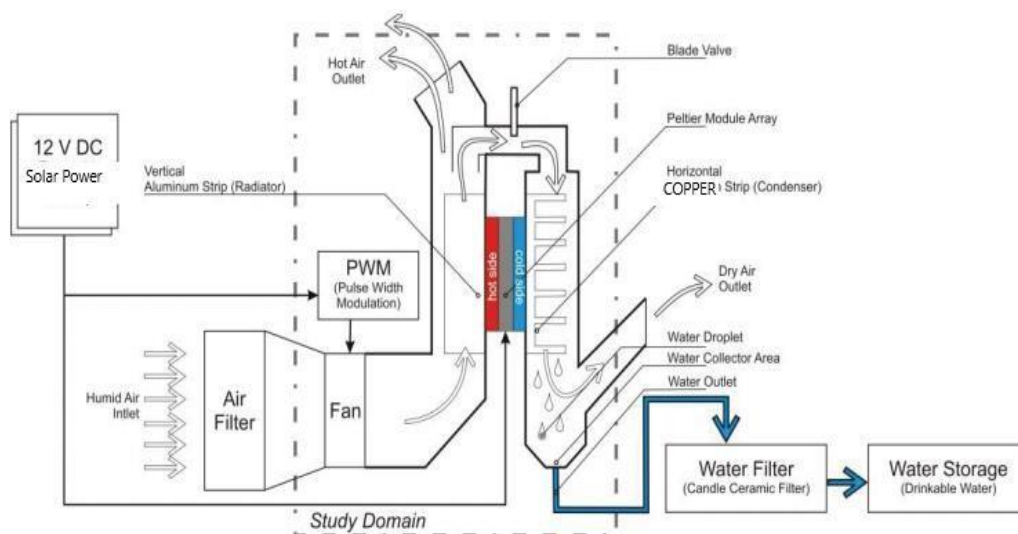


- ❖ Seeing the hazards and damage caused by the floods due to heavy rain in areas like Bihar, Maharashtra and Kerala installing a Flood alert system in the machine could really help the people living in risk areas giving an early alert for the floods.

BENEFITS OF THIS PROJECT TO THE SOCIETY-

- ❖ ECO FRIENDLY
- ❖ GENERATION OF WATER CONVINIENTLY
- ❖ IT IS CHEAP
- ❖ LOW MAINTENANCE
- ❖ EASY TO TRANSPORT
- ❖ NO ELECTRIC BILLS
- ❖ NO ADDITIONAL OPERATING EXPENSES
- ❖ EMERGENCY WATER SOLUTIONS
- ❖ LARGE AREA SETUP NOT REQUIRED
- ❖ WEATHER INDEPENDENT UNLIKE SOLAR PANELS
- ❖ FLOOD ALERT SYSTEM
- ❖ WATER PRODUCED WILL BE TRANSPORTED TO AREAS WHERE DEMAND IS GREATER THAN THE SUPPLY.
- ❖ SUITABLE FOR INDIAN CLIMATE
- ❖ INCREASES ACES TO ENERGY AS IT WILL WORK ON RENEWABLE ENERGY
- ❖ NO BACTERIAS OR HARMFUL CHEMICALS
- ❖ NO WASTAGE OF WATER

BASIC WORKING –



In the atmospheric water generator, water will enter through a filter and a compressor will circulate the refrigerant through a condenser and then an evaporator coil will cool the air surrounding it. This will lower the air temperature to its dew point, causing water to condense. A controlled-speed fan will push filtered air over the coil. The resulting water is then passed into a holding tank with purification and filtration system to help keep the water pure and reduce the risk posed by viruses and bacteria which may be collected from the ambient air on the evaporator coil by the condensing water.

The rate at which water can be produced depends on relative humidity and ambient air temperature and size of the compressor. Atmospheric water generators become more effective as relative humidity and air temperature increase. As a rule of thumb, cooling condensation atmospheric water generators do not work efficiently when the temperature falls below 18.3°C (65°F) or the relative humidity drops below 30%. This means they are relatively inefficient when located inside air- conditioned offices. The cost-effectiveness of an AWG depends on the capacity of the machine, local humidity and temperature conditions and the cost to power the unit.

Recent efforts have been made attempting to utilize the Peltier effect of semi-conducting materials in which one side of the semi-conducting material heats while the other side cools. In this application, air is forced over the cooling fans on the side that cools which lowers the temperature of the air to its dew point, causing water to condense, the resulting water is then collected.

HARDWARE COMPONENTS USED-

- ❖ SOLAR CELLS
- ❖ HIGH EFFICIENCY PLEATED AIR FILTER
- ❖ FAN
- ❖ PELTIER MODULE ARRAY
- ❖ BLADE VALVE
- ❖ COPPER CONDENSOR
- ❖ ALUMINIUM RADIATOR
- ❖ CANDLE CERAMIC FILTER
- ❖ WATER COLLECTOR
- ❖ LED LIGHT
- ❖ CAPILARY TUBE
- ❖ BUZZER
- ❖ LED LIGHT

SOFTWARE USED

- ❖ INTERNET OF THINGS

What we will bring to the final competition?

SIZE OF THE MODEL- Table Size (3 X 3 X 2)

LEARNING ASSOCIATED WITH THIS PROJECT FOR YOUNG LEARNERS-

The youngsters are aware of high demand of water and water requirements not being met in our country and to make them realize the importance of clean water under very minimal cost and very less maintenance we have created a project on Atmospheric Water Generator. This project will help young learners to know about how an electric circuit works and how water can be produced using basic technology and science. Therefore, making young learners aware of this would reduce the water scarcity in our country majorly.

BUISNESS PLAN-

For an NGO involved in projects, the cause is the core product. Like child education, social empowerment of women, water conservation, environment conservation and others. Reaching out to people involved with such NGOs with this product idea that can help them meet their objectives is the way forward.

The campaigns for this client will be mapped across multiple digital channels, like websites, social media platforms and key opinion leaders as influencers. Marketing communications will be created for the promotion of the project.

Working in close collaboration with client marketing and sales team we can boost the production and sale of the product

COST OF THE PROJECT-

Cost of manufacturing of the existing model is around thirty thousand rupees. After subsidies, it costs around twenty seven thousand rupees. Whereas, in our substitution model, Renewable Source of Energy is used which is comparatively cheaper and cost of manufacturing is also less. So our model will cost around twenty five thousand rupees.

13. ULTRAVIOLET STERILIZER

COLLEGE	GL Bajaj Institute of Technology and Management, Greater Noida
GUIDE	Dr. Satyendra Sharma
COLLEGE STUDENTS	Dev Parihar, Abhinav Verma
SCHOOL STUDENTS	Kapil, Hannu Verma
SCHOOL	Rajkiya Pratibha Vikas Vidyalaya, A-6, Paschim Vihar, Delhi

ABSTRACT:

UV (Ultraviolet) light is a confirmed technology that can be used for killing bacteria and viruses and other harmful germs that can jeopardize human health.

UV light kills or deactivates bacteria, viruses and Coronavirus by destroying nucleic acids and disrupting their DNA, leaving them unable to perform vital cellular functions. UV (Ultraviolet) Light has been used for disinfection of air and surfaces within hospitals, care homes, laboratories and many other organizations for many years.

In light of the current Coronavirus outbreak, UV is just one of the many technologies available and being utilized to help reduce and control the spread.

KEYWORDS: Ultraviolet technology, Coronavirus, UVC disinfection, Hospitals

INTRODUCTION:

Ultraviolet sterilizer is an environmentally friendly method of killing bacteria and viruses without the use of harmful chemicals and it reduces man power and does more work in less time.

UV Light sterilization can provide a safe effective solution. UV disinfection and sterilization system are proven to be:

- Highly Effective
- Cost Efficient
- Low maintenance
- Chemical Free

SALIENT FEATURES:

- UV light disinfection is an extremely effective form of disinfection.
- It can kill pathogens without immunity.
- UV light disinfection is non-toxic.
- It can be easily installed & easily maintained.
- It does not produce a strong irritating smell.
- It is affordable and environment friendly.
- It is portable means it can be moved easily from one place to another.

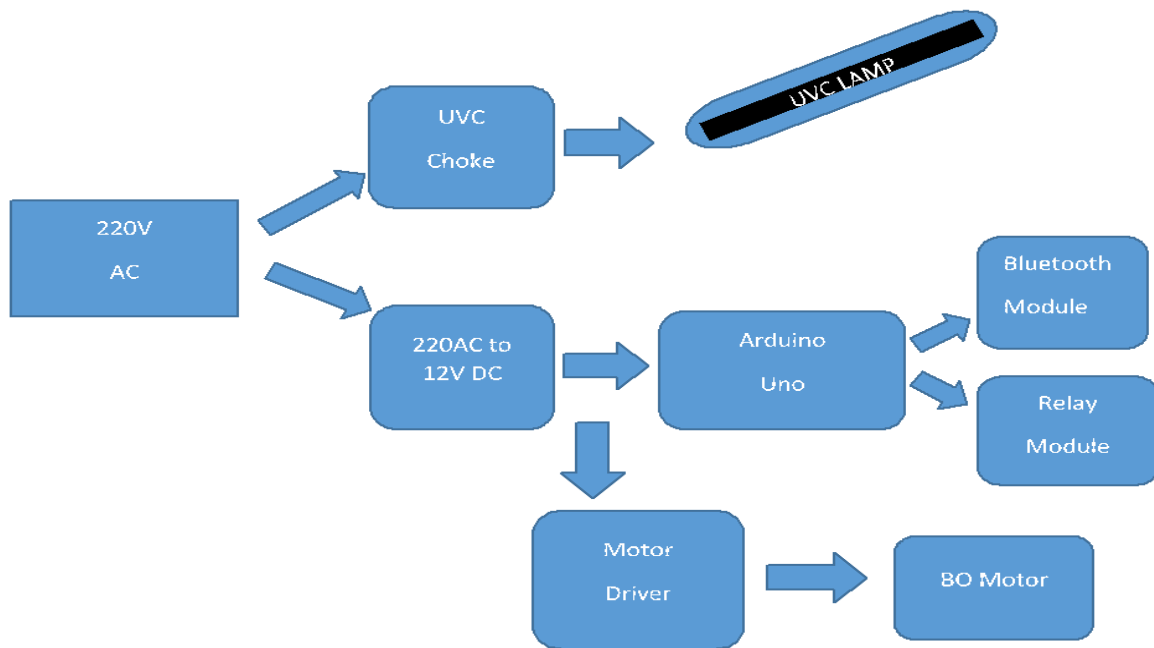
OBJECTIVE AND SCOPE:

We have made a semi-automated UVC robot which can disinfect the floor without using any type of chemical. UV disinfection robots kill germs in the environment by decomposing their DNA. Our robot also has a compartment which can be used as a sterilization of equipment. We have tried to make it compact so it can go underneath the beds in hospitals and medical facilities.

- UVC germicidal irradiations having been proved to be effective against all germs including COVID -19.
- It will help the hospitality sector in assuring their patients of a germ free ward and a germ free environment.
- It is Semi- automated (operated from Bluetooth).
- It disinfects the entire given area.
- It can go underneath furniture such as beds for better disinfection
- It contains ICMR (Indian council of medical research) approved UVC lamps.

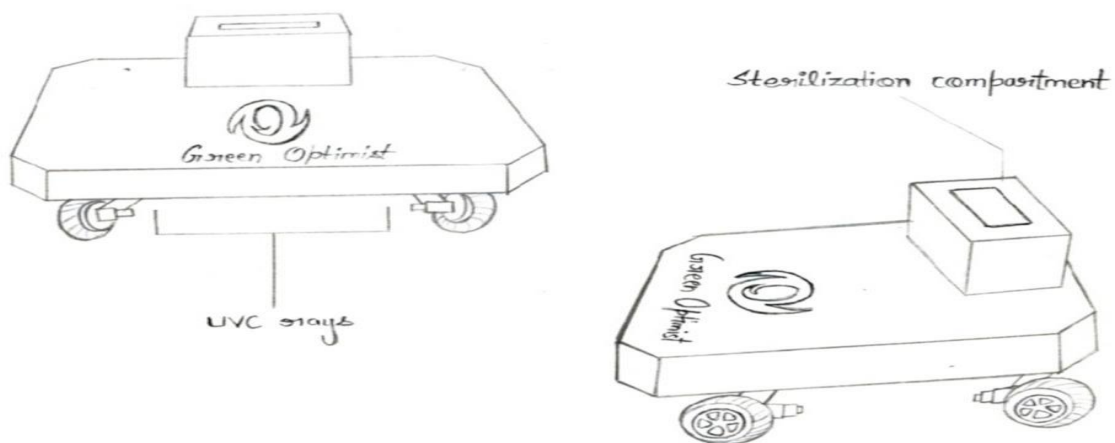
METHODOLOGY:

To understand the basic architecture here is the flowchart to understand the connection.



BASIC STRUCTURE OF ULTRAVIOLET DISINFECTION ROBOT:

Following is the structure of the ultraviolet sterilizer or we can say ultraviolet floor disinfectant robot:



HARDWARE COMPONENTS:

1. ARDUINO UNO
2. RELAY MODULE
3. MOTOR DRIVER (L298N)

4. BLUETOOTH MODULE (HC-05)
5. UVC LIGHT
6. UVC LIGHT CHOKE
7. BO MOTOR (BATTERY OPERATED)
8. 240V AC TO 12V DC CONVERTER
9. RUBBER TYRES
10. JUMPER WIRES

SOFTWARE AND TECHNOLOGICAL COMPONENTS:

1. ULTRAVIOLET TECHNOLOGY
2. MICROCONTROLLER (ARDUINO IDE)
3. BLUETOOTH TECHNOLOGY

COMPARATIVE STUDY:

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

1. In the present scenario, the existing UVC robots can be used only when the room where they are installed is completely vacant but our UVC floor disinfectant robot doesn't need the room to be empty means we can use it in the presence of people present around the room. This is possible since we covered the UVC robot from all sides so there will be no leakage of ultraviolet light.
2. We have also planned to install a PIR sensor for our robot so that if any moving body comes in the range of the robot or acts as an obstacle it will automatically stop its own movement.
3. We have also planned to install an encoder motor inside the robot. By installing an encoder motor, the robot will be able to memorize the path it has to repeatedly follow so that we need not to control it manually.
4. Unlike the other methods that are used for floor cleaning like the use of chemicals this method of floor cleaning is much more effective and also it doesn't produce the irritating and pungent smell that was caused when chemicals like phenyl etc. are used for floor cleaning purposes.
5. Also this robot has a separate compartment for sterilizing equipment like syringes, gloves, masks and other objects. In other words the robot can work as a device for disinfection as well as a sterilizer.

SOCIAL IMPACT:

Our model's aim is to kill all the viruses and bacteria present on the floor. Systematic cleaning is seen as an important feature, and modifications to the environment to support the navigation of the robot are largely accepted. Many social benefits can result from the use of ultraviolet technology.

1. Job Creation:

COVID-19 has upended society and brought chaos to generous swaths of the global economy, as governments have “locked down” to prevent the spread of the virus. The pandemic has also boosted interest in a variety of technologies that might help in the coronavirus fight—including the use of ultraviolet light to sterilize scarce personal protective equipment (PPE) such as face masks, for reuse.* Workers needed to plan, develop and implement the project which will create numerous job opportunities thereby fulfilling the ultraviolet technology facilities to kill viruses and bacteria and in turn help to decrease the unemployment rate.

2. UV light as one of the weapons against coronavirus:

In response to the COVID-19 outbreak, governments and companies across the world are taking to several sanitation practices including a solution that has been in use for decades for effective disinfection – ultraviolet (UV) light.

3. UV Disinfection is better than traditional methods of cleaning by chemicals:

Disinfecting is essential to kill germs and bacteria in our homes, schools, and hospitals where it is a high-level risk to occur in major diseases. It is necessary to kill germs that present on the surface of floors and in the environment. The most common disinfectants that you can use to eliminate germs are **Clorox 4 in 1 disinfectant spray** that works efficiently to reduce the allergen, kills bacteria, viruses, fungus. Clorox spray is designed for several cleaning jobs and comes in a convenient aerosol. **Clorox disinfecting spray commercial** can be used to disinfect the kitchen counters and wiping bathroom sinks that are highly-contaminated of the germs or bacteria.

COST OF PROJECT: The table shows the quantity, cost of a single piece of component and the total cost of our prototype.

COMPONENT	QUANTITY	PRICE OF SINGLE PIECE (INR)	QUANTITY*PRICE OF SINGLE PIECE (INR)
Arduino UNO	1	450	450

Motor driver (L298N)	2	129	258
BO motor	4	55	220
Relay module	1	60	60
Bluetooth module (HC-05)	1	369	369
UVC lamp	2	300	600
UVC choke	2	300	600
AC to DC converter	1	100	100
Rubber tyres	4	45	180
Jumper wires	As required	3	80 (approx)
Fabrication (body)		500	500
			Total cost=3417 (INR)

CONCLUSION:

UV-C disinfection system was effective in killing pathogens. Further study is warranted to confirm its effectiveness as an adjunctive method in disinfecting hospital environments. In this study, we have adopted the physical disinfection method by using UVC light as an agent. The UVC devices are studied and classified according to their disinfectant units, complementary devices, combined disinfection agents, mobilities, and order types. In conclusion, UVC technology was effective at reducing overall bacterial counts and significantly more successful than manual disinfection alone on hospital surfaces.

14. SOLID WASTE MANAGEMENT

COLLEGE	Ajay Kumar Garg Engineering College, Ghaziabad
GUIDE	Dr. Jitendra Kumar Seth
COLLEGE STUDENTS	Rishbah Sharma, Shruti Verma
SCHOOL STUDENTS	Honey Khatoon, Arti Singh
SCHOOL	Govt Girls Senior Secondary School, Nithari Village, Delhi

ABSTRACT

Creating a Database Management app on Garbage Management and Disposal for a small locality/colony which will help us to manage most of the garbage generated by its residents on local level, without the actual involvement of local Govt/municipal corporations. Thus, changing the place into a green locality.

INTRODUCTION

Disposing of waste has huge environmental impact and can cause serious problems. Waste is mostly buried in landfill sites – holes in the ground, sometimes old quarries, sometimes specially dug. Some waste will eventually rot, but not all, and in the process, it may smell, or generate methane gas, which is explosive and contributes to the greenhouse effect. Leachate produced as waste decomposes may cause pollution. Badly-managed landfill sites may attract vermin or cause litter. Incinerating waste also causes problems, because plastics tend to produce toxic substances, such as dioxins, when they are burnt. Gases from incineration may cause air pollution and contribute to acid rain, while the ash from incinerators may contain heavy metals and other toxins. Throwing away things wastes resources. It wastes the raw materials and energy used in making the items and it wastes money. Reducing waste means less environmental impact, less resources and energy used and saves money. Recycling is only one aspect of waste reduction. There are other steps which can be taken. Only recycle things if you are sure they cannot be repaired or reused.

OBJECTIVE AND SCOPE:

Objective of this project is to make the people understand the value of waste management and help in Waste Management through an app. This project will help in bringing out the right advantage from the waste depending on their ability to be recycled and reused. To encourage people to come up for the good cause, the app will have predefined settings that will reward the people with money for their waste according to the percentage of amount set for every kind of waste that will be used. The sheer objective of the project is to make people understand and come forward to work for waste management.

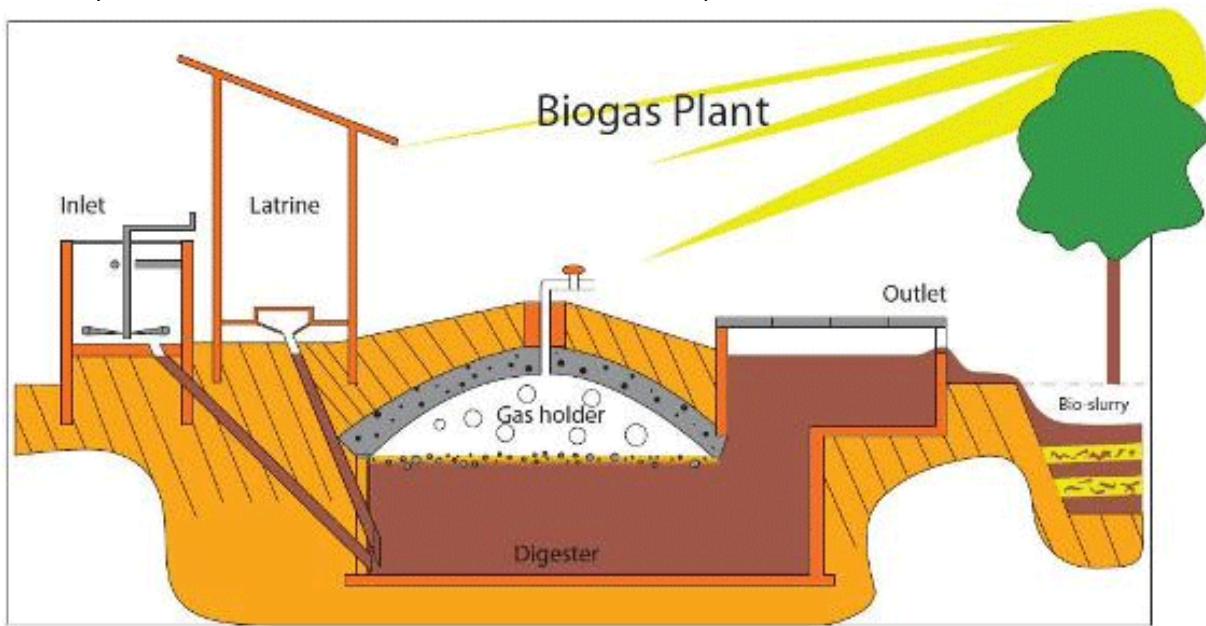
METHODOLOGY

Municipal solid waste (MSW) is one of the major areas of concern all over the world. It includes household garbage, street sweeping, construction and demolition debris, sanitation residues, trade and non-hazardous industrial refuse and treated bio-medical solid waste. In developing country like India, there is rapid increase in municipal solid waste due to urbanization and population growth. Composition of waste varies with different factors like living standard, climatic condition, socio-economic factor etc. The quality and quantity of MSW generated by a particular community varies according to their socio-economic status, cultural habits, urban structure, population and commercial activities etc. Planning, designing and operation of municipal solid waste management system can be done on the basis of composition and the quantity of MSW generated. In general, Indian MSW contains more organic material and less hazardous material than western countries like USA, Canada etc. The quantity of waste paper in India, is much less, as even the quantity thrown away is picked up by people for its use as a fuel and also for packaging of materials/food sold by road side hawkers. The plastics, rubber and leather contents are lower than the paper content, and do not exceed 1% except in metropolitan cities. The metal content is also low, (less than 1%). These low values are essentially due to the large-scale recycling of these constituents. Paper is recycled on a priority basis while plastics and glass are recycled to a lesser extent. Management of municipal solid waste is becoming difficult due to its varying quality and increasing quantity. According to Municipal Solid Waste Rule 2000, in India MSWM is responsibility of local administrative body (LAB).

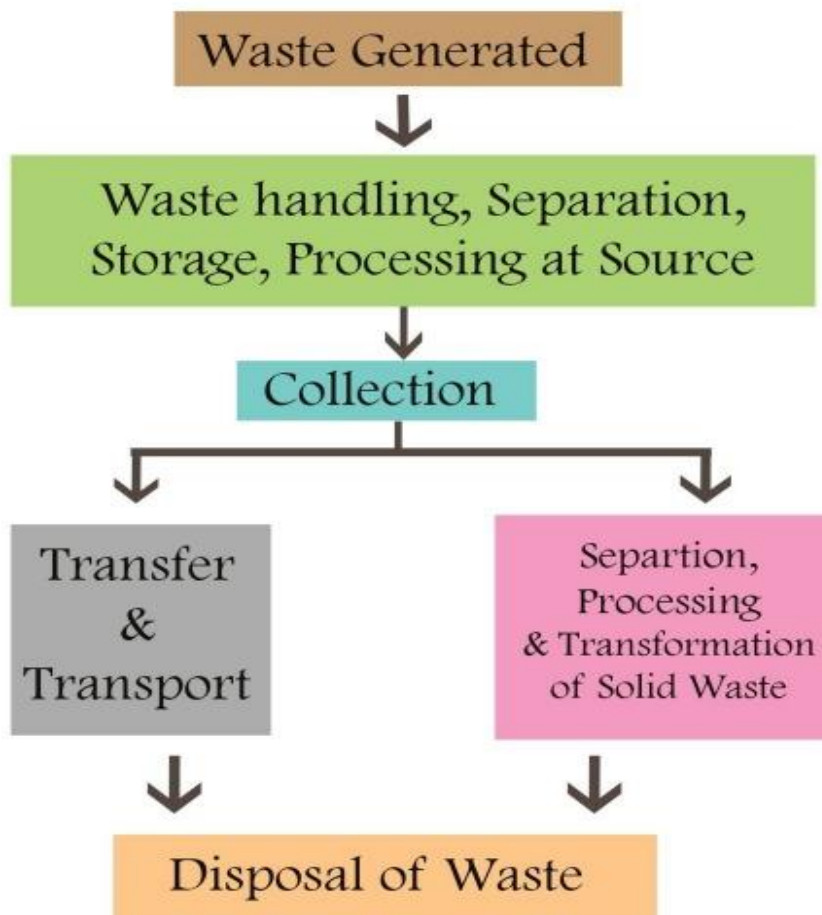
Management of municipal solid waste involves:

1. Development of an insight into the impact of waste generation, collection, transportation and disposal methods adopted by a society on the environment

2. Adoption of new methods to reduce this impact.



BASIC STRUCTURE OF OUR PROJECT



Separation of generated garbage begins at home, with residents dividing their trash into different streams:

- o Organic/ Wet waste is biodegradable solid waste, such as leftover food. Organic waste currently makes up about 34% of the solid waste weight and 11.6% of the volume.
- o Dry waste includes all but organic waste. This can be further separated into recyclable material and non-recyclable material. The recyclable material can and often is further separated (for example, into: electronics, packaging, plastic, paper and cardboard, textile, metals, and glass). Each stream is collected in separate trucks and has its own dedicated treatment of Organic waste is transferred to a transfer station for solid waste sorting, and then to a biodegradable solid waste treatment plant. There it is divided further, to be sent either to composting facilities or to anaerobic digestion facilities, where energy can be produced from biogas.
- o Dry waste is sent to a transfer station for solid waste sorting, and then to a solid waste recycling plant. Waste that is not economically or technologically recyclable will be sent to a landfill. Eventually, the hope is that instead of landfilling most of that waste, it will be used for the production of energy and/or fuel.

SOFTWARE AND TECHNOLOGICAL COMPONENTS

* Flutter app development (An app containing all the personal information about the all the members of the society. we also need people to collect all the garbage separately. We need a person to whom we could sell that garbage and earn money and then distribute the shares to each family.)

COMPARITIVE STUDY:

Secondary data were also collected for the study through the pre-defined setting of the app that tells us to know about the number of biodegradables and non-biodegradable wastes. The ministry of local administration has published various issues relating to the municipal / corporation functioning in its monthly bulletin. The required and relevant data were collected from the bulletin, especially, reports on environmental degradation and solid waste issues and strategies used to manage them efficiently. Apart from this data, the leading journals and magazines relating to economic aspects of approaching the environmental issues accumulated by the various chemical industries, leather industries and agro-based wastes were carefully studied and gathered in a sequential order and referred for this study. Primary Data: Primary data were collected with the help of a well-structured field survey and the method was employed from five hundred sample respondents. For this purpose, a well-structured questionnaire was used to collect the pertinent data from the respondents. Hence, the researcher has maintained a good rapport with the Erode city corporation officials, respondents of Erode city and ward councillors.

The respondents properly responded to all questions framed in the questionnaire. This shows the literacy level of the respondents, which helped the scholar to complete the task easily. The data thus collected from the primary sources of information were arranged systematically and sequentially to form simple Tables.

Sampling method: Sampling is a method that allows researchers to infer information about a population based on results from a subset of the population, without having to investigate every individual. Sample Size: no. of members of the colony or the society concerned. The sample size is a term used in market research for defining the number of subjects included in a sample size. By sample size, we understand a group of subjects that are selected from the general population and is considered a representative of the real population for that specific study.

COST OF PROJECT

Initially the cost our project is zero. We just need to create an app which we would create ourselves and then we just need to convince the residents of the society to understand our project and compliance with it for the benefit of themselves and the society to make our environment green and a more beautiful place to live.

CONCLUSION

Recycling is only one aspect of waste reduction. The sheer objective of the project is to make people understand and come forward to work for waste management. The proposed model caters to these **FOUR** National missions namely:

1. **MAKE IN INDIA** – We can setup machines built in India.
2. **RENEWABLE ENERGY** – This is an inexhaustible source of energy and the best replacement to other non-renewable energies in India.
3. **CLEAN INDIA** – By using our garbage we aim to keep our environments clean.
4. **START-UP INDIA** – Our Further plan for the model is not only a business plan but also will create job opportunities.

15. WATER CONSERVING FAUCET

COLLEGE	Bharati Vidyapeeth's College of Engineering, Delhi
GUIDE	Ms. Gargi mishra
COLLEGE STUDENTS	Vaibhv Sharma, RN Krishna Deekshit
SCHOOL STUDENTS	Anju Kumari Gautam, Anjali Kumari Gautum
SCHOOL	Govt Sarvodaya Co-ed Sr. Sec. School, Hiran Kunda, Delhi

ABSTRACT:

'**WATER CONSERVING FACUET**' is an innovative method to reduce water wastage by reducing the water usage. It highly reduces the usage of water in basic household activities like washing hands, dishes etc. Water Conserving Faucet will increase the total area covered by the water stream of faucet. The faucet will contain a rotatable nozzle which could change the outflow of water according to the user's requirement.

The nozzle will have a reduced cross section area for allowing high pressure water to flow. This will result in atomizing of water particles due to which water usage will be highly reduced.

KEYWORDS:

- Faucet
- Rotatable Nozzle
- Atomizing of water particles

INTRODUCTION:

Water conservation is easily one of the most important and necessary goal in today's time. Moreover, in these tough times of pandemic, lack of availability of water in some of the rural areas is more visible and concerning.

The rate at which water is depleting is a sure concern for the entire country and would be a challenge in future times if not taken care of.

'**WATER CONSERVING FAUCET**' is basically a reinvention of the traditional faucet which will help to reduce water shortage at household levels.

Project will consist of a nozzle which would be fitted at the opening of the faucet (from where the water flows). It will also contain an ultrasonic sensor for the detection of the human hand for the on/off of the faucet.



FEATURES OF WATER CONSERVING FAUCET:

- ❖ Increased wetting area
- ❖ Lesser water requirement.
- ❖ Less Maintenance requirement and easy installation.
- ❖ Use less amount of water.
- ❖ Easy to install.
- ❖ Cost effective

OBJECTIVE AND SCOPE:

The objective of the WATER CONSERVING FAUCET is to reduce usage of water. The main goal is to reduce the water that gets wasted in basic household activities like washing hands, dishes etc.

The nozzle we are trying to recreate will have a reduced cross section so that when water comes out of it, it spreads out using less amount of water.

Spreading of water eventually will help the task to be completed more easily and by using less amount of water.

The faucet will also contain an ultrasonic sensor which will stop the flow of water when the hand is removed.

There are certain household activities where you possibly need the conventional flow of water rather than the water flow being atomised. Therefore, this faucet will allow you to choose the required stream of water according to the user's need. The nozzle will be rotatable. One rotate of the nozzle will change the type of water flow.

The project can play a significant role in society, as faucet is available in majority of the houses, be it rural or urban. Also, reports claim that we only need 2% of the water for fulfilling the household activities. The remaining 98% water gets wasted.

METHADODOLOGY:

To understand our project better, the following basic demonstration can be used: -



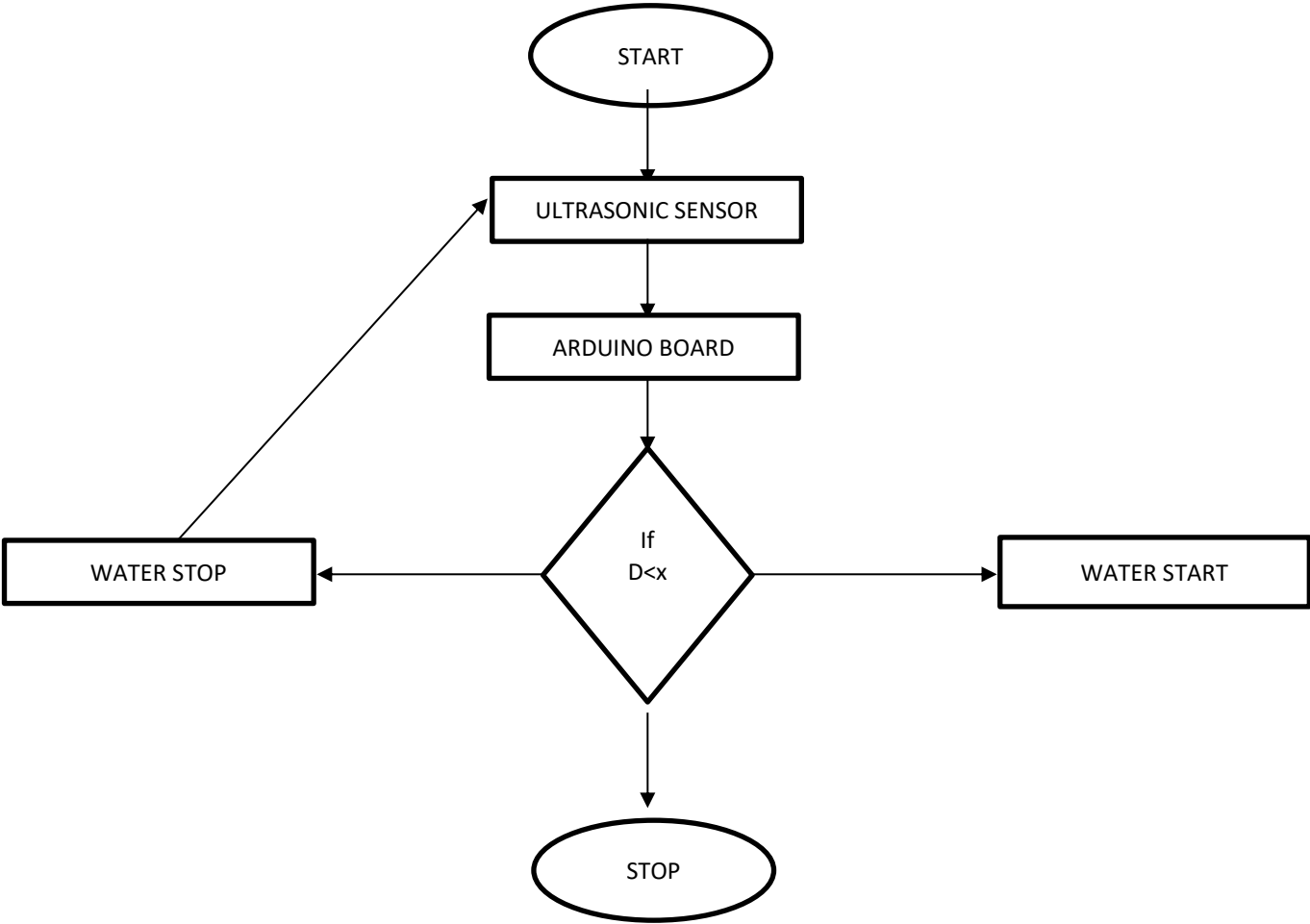
As in the above pic, the water flows out linearly, due to which the tasks that needs to be performed will need good amount of water

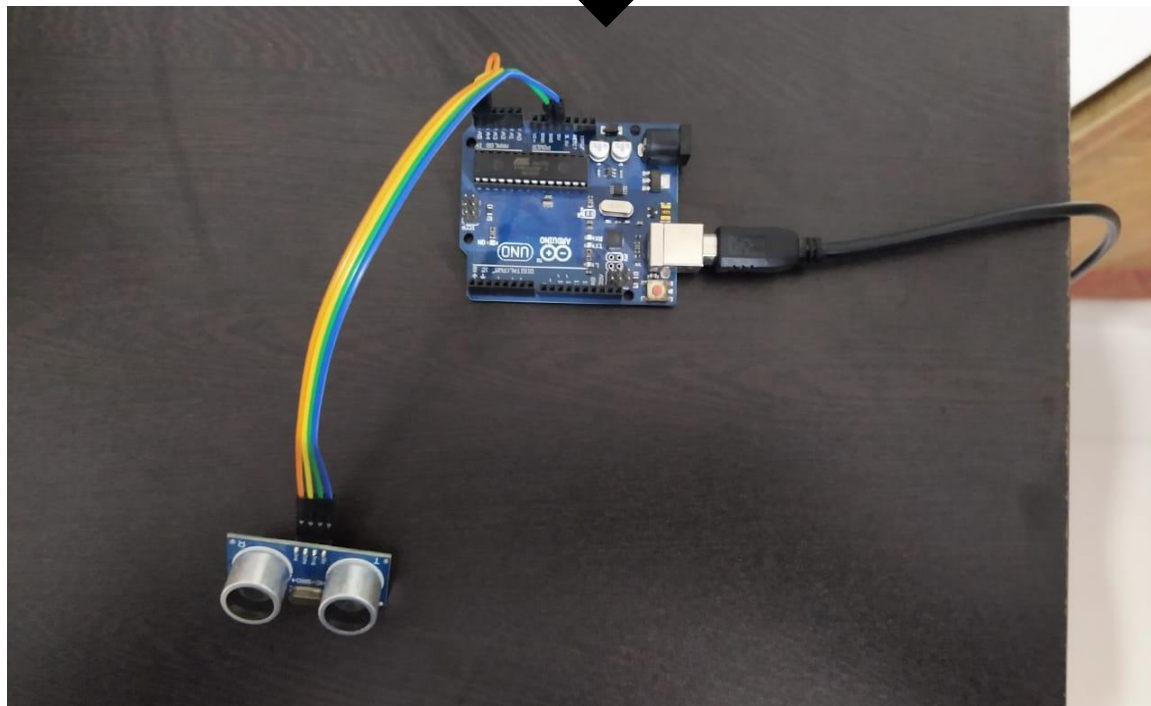
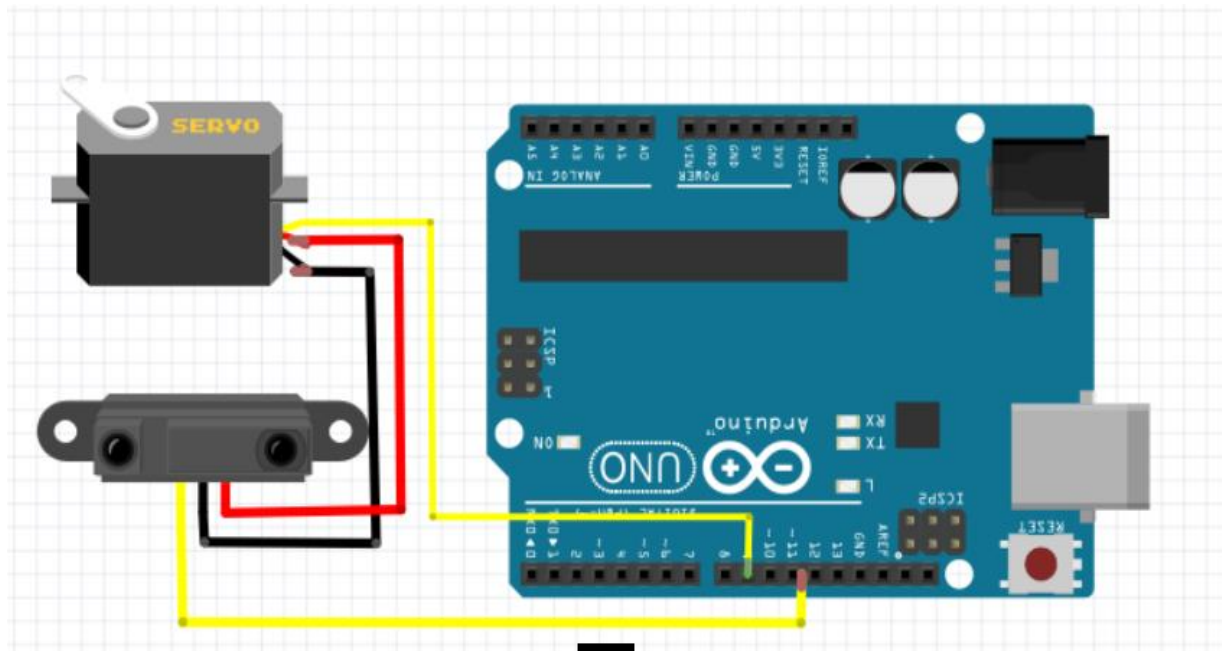


Now, as soon as a finger is placed on the mouth of the pipe, the cross section reduces thereby increasing the water pressure. Therefore, less amount of

water is eventually required thereby saving water. It also consists 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. The installation of ultrasonic will further save water as users sometimes forget to turn off the tap.

A simple code for the on/off water flow can be depicted in the following block diagram:





TECHNICAL SPECIFICATIONS:

1. Arduino Uno (R3)

2. Servo motor (SM-S2309S)
3. Ultrasonic Sensor (HC-SR04)
4. 16X2 LCD
5. Zero-PCB
6. Solder + Soldering Iron
7. Brass, PVC pipes (for nozzle)

COMPARATIVE STUDY:

Water Conserving Faucet is easily better than the traditional faucets in many ways.

Every day, approximately 68 to 100 liters of water is being used by an average Indian Household through these faucets. That is around 25,000 to 40,000 liters of water per year. Conventional Water Nozzles let water flow freely. This results in most of the water bouncing off while washing hands or doing dishes.

Some differences are listed below to show why the proposed model is better than the conventional faucets:

FEATURES	CONVENTIONAL FAUCET	WATER CONSERVING FAUCET
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:

Initially, cost of the project would be relatively higher for the scope of new modifications and improvement. But the project cost will be significantly reduced in future so that it could be beneficial to everybody.

The current cost of making the proposed model is **TWO THOUSAND RUPEES** only which will include sensors, nozzle, microcontroller etc.). For installation in homes, the price is expected to reach around **THREE THOUSAND RUPEES.**

SOCIAL IMPACT:

The aim of the project is to reduce water usage by a significant percentage and make it sustainable for future generations. Focus for this project is to make it as low-cost as possible, so that it could be availed by each person of this country. In middle class sections of the society, faucets are already present in their houses. So, the focus is to make just a nozzle which could be attached to their respective faucets. In rural areas, faucets may or may not be available. Therefore, the focus of the implementation of the project shifts on two parts- one for the rural areas and other for the urban areas. As soon as the project will come in play and mass production will be carried, overall cost would be reduced, and it could be a good revenue generating business model.

CONCLUSION:

Small changes together make a big and a massive change. Even if one drop is saved at each home, there would be a drastic difference which we might not see but could realize for sure.

16. WATER USAGE TRACKING SYSTEM

COLLEGE	Ajay Kumar Garg Engineering College, Ghaziabad
GUIDE	Dr. Jitendra Kumar Seth
COLLEGE STUDENTS	Vanshika Mehrotra, Tarun Raghav
SCHOOL STUDENTS	Khushi Pal, Nandini
SCHOOL	Govt Girls Senior Secondary School, Nithari Village, Delhi

ABSTRACT

Sustaining available resources is the most important issue faced globally. Increase in the population, urbanization and shortage of water due to less rainfall makes it difficult to provide fair distribution of water resource in real time. To solve this problem, we need an efficient system that provides better monitoring and controlling the consumption of water. IoT is used for uninterrupted monitoring and tracking of water consumption. Sensors collect readings of sensors showing the usage of water at every outlet. The application can retrieve data stored in cloud and display it to users in a better format. Same application can be used to notify users if their water consumption exceeds a predefined range. This automation can help users to efficiently monitor the usage and keep track of the bills. Unknown leakage in distribution pipe is a major issue that adds up to wastage of water. Wireless Sensor Network Consisting of Water flow sensors can be used for leakage detection in pipes. Proposed system aims at notifying respective authorities whenever the leakage is detected so that immediate actions can be taken.

KEYWORDS- Wireless Sensor Networks, Water Flow sensors, Arduino Uno, Wi-Fi/LAN Module.

INTRODUCTION

Water is a scarce resource and it is the responsibility of every person to utilize without wastage. Houses and industries are prone to unknown water leaks that is highly undesirable and costly. Unfair distribution of water, overflow of tanks, leakage in pipelines, excess consumption, these are some of the problems that arise due to lack of proper water monitoring. It is important to maintain a proper balance over supply and usage.

The objective of this proposal is to build a complete system that provides an uninterrupted water usage monitoring, controlling, and leakage detection pipes. This idea has been implemented using IoT where many interconnected objects collect useful information and communicate with each other using existing technology to come up with intelligent solutions to discovered problems. For achieving this, a flow meter is placed on every outlet pipe of each home for measuring the flow of water. Mobile applications are developed such that they can retrieve the data stored and view the same in terms of readable graphs. Also showing estimated bill for usage. Leakage of water is determined by comparing the readings of flow meters installed at different nodes of the distribution pipe. Leakage detection is immediately notified to the respective authorities and further actions can be taken.

PROBLEM DEFINITION:

Water conservation has been a growing need over the past few years. The constant misuse of the resource has created water scarcity in few regions. A comprehensive effort is required by all spheres of society for preservation of water. Therefore, the need for an adequate technology arises that can eradicate the problem or create a controlling mechanism to maintain an equilibrium.

SALIENT FEATURES

The WATER TRACKING SYSTEM has following features:

- Tracking water usage
- Generating bills
- Increased efficiency.
- Setting limit for water usage
- Transparency.
- Notify users if they exceed each metered range.
- Detection of Leakage.
- Easy to use.

OBJECTIVE AND SCOPE

The project aims to make a difference at the ground level. A mobile application to track water usage has utilization in every household.

Therefore, making people more conscious and bringing a positive change at community level. The proposed application shall inform users of current water level at home, the time-span when water consumption is maximum and generate a target consumption level

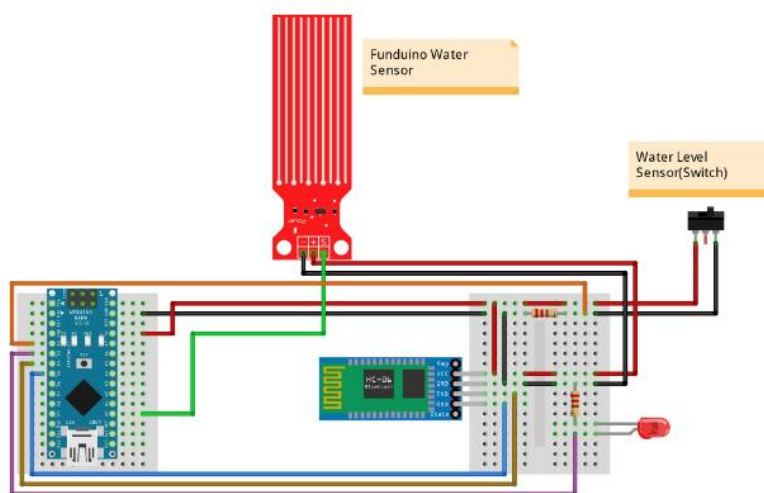
to be maintained. It will alarm users when the consumption exceeds the required level and maintain a database of past usage.

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

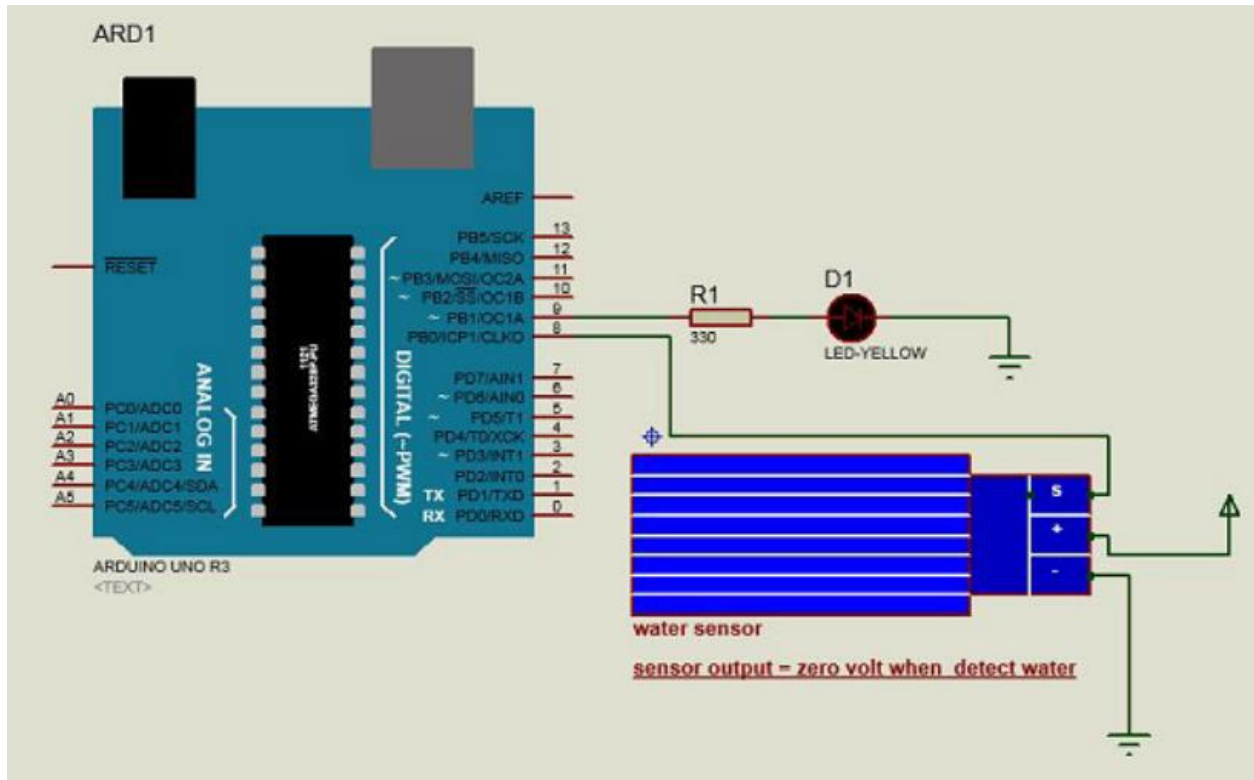
- Can be used by every general household
- Idea can be proposed to the government in places of water scarcity
- Can approach housing societies for the implementation as well.

METHODOLOGY

Advancement in IoT and communication technologies has improved the traditional techniques used for conservation of resource in every aspect of life. Water usage monitoring system aims at creating a complete module that can track usage by every user, generate bills, notify users if they exceed each metered range. Funduino Water sensor and Water level switch can effectively detect the integrity and level of water respectively. The sensors are connected to Arduino with use of suitable components. The HC-05 Bluetooth module is capable of transmitting data to the app with help of Arduino IDE libraries. The app shall display the data sent by Arduino.



Water sensor brick is designed for water detection, which can be widely used in sensing rainfall, water level, and even liquid leakage.



Water Level Sensor



HARDWARE COMPONENTS

1. Arduino Nano 3
2. Funduino Water Sensor
3. Water Level Switch (Sensor)
4. Breadboard
5. Male/Female Jumper Wires
6. Suitable resistors
7. HC-05 Bluetooth

SOFTWARE AND TECHNOLOGICAL COMPONENTS

- Flutter Technology.
- Arduino IDE

COMPARITIVE STUDY

EXISTING SYSTEM

Presently, water usage is recorded by the water flow meter that is installed at every home. The readings recorded by the meter are manually collected every month and a bill is generated. Customer pays the bill amount in the water supply board. The current system is simple but can be recreated so that the water usage monitoring can take care of unknown leaks and wastage of water. In case of pipe breakdown or leakages, water is wasted until the respective authorities get to know that the leak has occurred. Also customers cannot keep track of their usage or get notifications when their metered range is crossed. Also users cannot find out if there is a unknown leak in the distribution pipe that has been contributing to the increased water bills. As and how the requirements increase, the overall system should be changed to meet all the requirements.

PROPOSED SYSTEM

The aim of the project is to create a water usage monitoring system that provides uninterrupted water flow monitoring, controlling and leakage detection in pipes. For this flow meters are installed at different nodes to record the readings of water usage. These readings will be sent to microcontroller. Mobile app communicates with Arduino and can provide users an access to their usage data in a graphical form. User of each apartment is given login credentials to view their monthly/weekly/daily usage, estimated cost, etc.

Users can be notified when usage exceeds each range. Also leakage can be detected by comparing the readings of flow meters on the same line of pipe connection. Also immediate actions can be taken whenever leakage occurs by notifying it to the respective authorities. Proposed system can improve the existing system by implementing most of the useful requirements so that wastage of water is reduced. Moreover, users can track their water usage with user friendly applications.

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 our project

- **Job Creation:** Workers needed to plan, develop and implement the project which will create numerous job opportunities and in turn help to decrease the unemployment rate.
- **Addressing UN-SDG:** The 6th goal of the United Nation Sustainable Management Goals is addressed through our Project- Ensure availability and sustainable management of water for all.
- **It helps to preserve our environment:** Reducing our water usages reduces the energy required to process and deliver it to homes, businesses, farms, and communities, which, in turn, helps to reduce pollution and conserve fuel resources.

COST OF PROJECT

- Cost of manufacturing of the existing model is around five thousand per unit.
- In our model, flutter technology is used for app building which is comparatively cheaper and cost of manufacturing is almost zero.

CONCLUSION

Water equals life. It is a non-renewable resource therefore it is our duty to conserve it for future use. Conservation of water not only saving it for coming generations but also to make efficient use of existing resource. Advancement in IoT and communication technologies has improved the traditional techniques used for conservation of resource in every aspect of life. Water usage monitoring system aims at creating a complete module that can track usage by every user, generate bills, and notify users if they exceed each metered range. Leakage detection should be notified to the intended user so that further actions can be taken to avoid wastage. Automatic Tank filling takes care of Water underflow and overflow conditions avoiding manual control of it. Proposed system can automate the overall water usage making it easy to maintain. User friendly

applications makes it easy for a user to keep track of usage and billing. Implementation of the proposed system in large scale can help in efficient water monitoring and leakage detection.

The Proposed model caters to the National missions namely:

- **MAKE IN INDIA** – The whole project can be setup completely here.
- **START-UP INDIA** – Our Further plan for the model is not only a business plan but also will create job opportunities.

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17. REAL TIME FACE MASK DETECTOR

COLLEGE	Ajay Kumar Garg Engineering College, Ghaziabad
GUIDE	Mr. Saket Kumar Singh
COLLEGE STUDENTS	Nandini Gupta, Riya Goel
SCHOOL STUDENTS	Neha Goutam, Prachi Kashyap
SCHOOL	Government Girls Sr Sec. School, Mubarakpur Dabas, Delhi

ABSTRACT:

The corona virus COVID-19 pandemic is causing a global health crisis so the effective protection methods is wearing a face mask in public areas according to the World Health Organization (WHO). The COVID-19 pandemic forced governments across the world to impose lockdowns to prevent virus transmissions. Reports indicate that wearing facemasks while at work clearly reduces the risk of transmission. An efficient and economic approach of using AI to create a safe environment in a manufacturing setup. A hybrid model using deep and classical machine learning for face mask detection will be presented. A face mask detection dataset consists of with mask and without mask images, we are going to use OpenCV to do real-time face detection from a live stream via our webcam. We will use the dataset to build a COVID-19 face mask detector with computer vision using Python, OpenCV, and Tensor Flow, Keras and CNN. Our goal is to identify whether the person on image/video stream is wearing a face mask or not with the help of computer vision and deep learning. It restricts access for those not wearing the mask by not opening the entrance and notifies the authorities by sending the messages or e-mail with attached photograph of that person.

KEY WORDS: Machine Learning, Computer Vision, OpenCV, Tensorflow, Keras.

INTRODUCTION:

Wearing Mask is among the non-pharmaceutical intervention (NPI) measure that could be effectively implemented at a minimum cost. It also demotivates virus reproduction number and infection attack rate in general population.

However, many people do not practice wearing of mask fearlessly even in public and populated areas. Not wearing mask leads to spread of particles from speaking, coughing or sneezing which increases the risk of infecting another person. Also, the one with weak immunity suffers the most.

Many people are responsible but many are not. It is necessary and worthy activity against this novel disease but ensuring that it is being followed by all is must. It is necessary for safe and protected surrounding. It is necessary so that the people should be safe, secure and sound.

Here we introduce a mask face detection model that is based on computer vision and deep learning. The proposed model can be integrated with surveillance cameras to impede the COVID-19 transmission by allowing the detection of people who are wearing masks not wearing face masks. The model is integration between deep learning and classical machine learning techniques with opencv, tensor flow, keras and CNN. We have used deep transfer learning for feature extractions and combined it with three classical machine learning algorithms. We introduced a comparison between them to find the most suitable algorithm that achieved the highest accuracy and consumed the least time in the process of training and detection.

SILENT FEATURES:

- Facial Recognition
- Camera Agnostic
- Easy Implementation
- Staff Friendly
- No New Hardware Needed
- Intelligent Alerts

OBJECTIVES AND SCOPE:

Our goal is to identify whether the person on image/video stream is wearing a face mask or not with the help of computer vision and deep learning. Our software can be equated to any existing USB, IP cameras, and CCTV cameras to detect people without a mask. This detection live video feed can be implemented in web and desktop applications so that the operator can see notice messages. Software operators can also get an image in case someone is not wearing a mask. Furthermore, an alarm system can also be implemented to sound a beep when someone without a mask enters the area. This software can also be connected to the entrance gates and only people wearing face masks can come in.

METHODOLOGY:

Machine learning

Machine learning (ML) is the study of computer algorithms that improve automatically through experience. It is seen as a subset of artificial intelligence. Machine learning algorithms build a mathematical model based on sample data, known as "training data", in order to make predictions or decisions without being explicitly programmed to do so. Machine learning algorithms are used in a wide variety of applications, such as email filtering and computer vision, where it is difficult or infeasible to develop conventional algorithms to perform the needed tasks.

Computer vision

Computer vision is an interdisciplinary scientific field that deals with how computers can gain high-level understanding from digital images or videos.

From the perspective of engineering, it seeks to understand and automate tasks that the human visual system can do, Computer vision tasks include methods for acquiring, processing, analyzing and understanding digital images, and extraction of high dimensional data from the real world in order to produce numerical or symbolic information

OpenCV

OpenCV (Open Source Computer Vision Library) is an open source computer vision and machine learning software library. The library has more than 2500 optimized algorithms, which includes a comprehensive set of both classic and state-of-the-art computer vision and machine learning algorithms. These algorithms can be used to detect and recognize faces, identify objects, classify human actions in videos, track camera movements, track moving objects, extract 3D models of objects, produce 3D point clouds from stereo cameras, stitch images together to produce a high resolution image of an entire scene, find similar images from an image database, remove red eyes from images taken using flash, follow eye movements, recognize scenery and establish markers to overlay it with augmented reality, etc.

Tensorflow

TensorFlow is a free and open-source software library for dataflow and differentiable programming across a range of tasks. It is a symbolic math library, and is also used for machine learning applications such as neural networks. It is used for both research and production at Google, TensorFlow is Google Brain's second-generation system. Version 1.0.0 was released on February 11, While the reference implementation runs on single devices, TensorFlow can run on multiple CPUs and GPUs (with optional CUDA and SYCL extensions for general-purpose computing on graphics processing units).

Keras

Keras is an API designed for human beings, not machines. Keras follows best practices for reducing cognitive load: it offers consistent & simple APIs, it minimizes the number of user actions required for common use cases, and it provides clear & actionable error messages. It also has extensive documentation and developer guides. Keras contains numerous implementations of commonly used neural network building blocks such as layers, objectives, activation functions, optimizers, and a host of tools to make working with image and text data easier to simplify the coding necessary for writing deep neural network code.

Convolutional Neural Network (CNN)

A convolutional neural network, or CNN, is a deep learning neural network designed for processing structured arrays of data such as images. Convolutional neural networks are widely used in computer vision and have become the state of the art for many visual applications such as image classification, and have also found success in natural language processing for text classification.

In neural networks, Convolutional neural network (ConvNets or CNNs) is one of the main categories to do images recognition, images classifications. Objects

detections, recognition faces etc., are some of the areas where CNNs are widely used.

PROPOSED SYSTEM:

The proposed system focuses on how to identify the person on image/video stream wearing face mask with the help of computer vision and deep learning algorithm by using the OpenCV, Tensor flow, Keras and CNN.

We are going to build a **CNN** model using TensorFlow to detect if we are wearing a face mask by using the webcam of your PC.

Steps involves:

➤ **Dataset:**

For building this model, we will be using the face mask dataset downloaded from github.com

This dataset consists of 1,376 images belonging to two classes:

- *with_mask*: 690 images
- *without_mask*: 686 images



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

1. Training set
2. Testing set

➤ **Building the Model:**

In the next step, we build our **Sequential CNN model** with various layers such as *Conv2D*, *MaxPooling2D*, *Flatten*, *Dropout* and *Dense*. In the last Dense layer, we use the '**softmax**' function to output a vector that gives the *probability* of each of the two classes.

➤ **Pre-Training the CNN model**

After building our model, let us create the **'train_generator'** and **'validation_generator'** to fit them to our model in the next step. We see that there are a total of **2200** images in the **training set** and **551** images in the **test set**.

➤ **Training the CNN model**

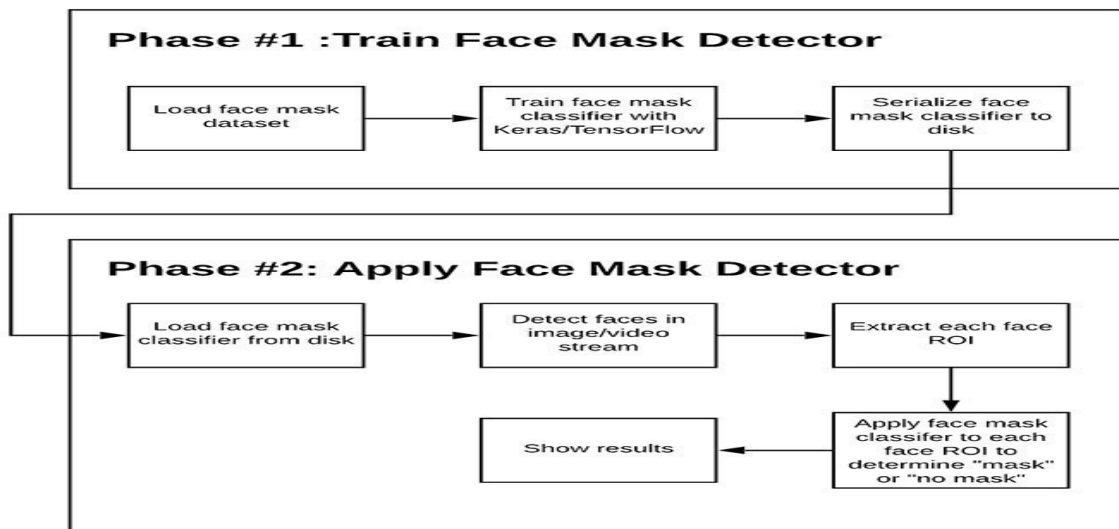
This step is the main step where we fit our images in the training set and the test set to our Sequential model we built using **keras** library. I have trained the model for **30 epochs** (iterations). However, we can train for more number of epochs to attain higher accuracy lest there occurs *over-fitting*.

We see that after the 30th epoch, our model has an accuracy of **98.86%** with the training set and an accuracy of **96.19%** with the test set. This implies that it is well trained without any over-fitting.

➤ **Labeling the Information**

After building the model, we label two probabilities for our results. **['0' as 'without_mask' and '1' as 'with_mask']**. I am also setting the boundary rectangle color using the RGB values. **['RED' for 'without_mask' and 'GREEN' for 'with_mask']**

Flow Chart:



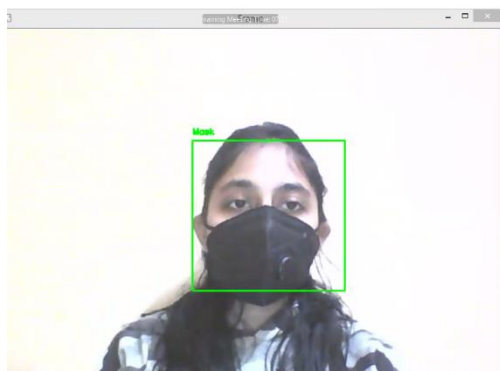
➤ **Detecting the Faces with and without Masks**

In the last step, we use the OpenCV library to run an infinite loop to use our web camera in which we detect the face using the *Cascade Classifier*. The code `webcam = cv2.VideoCapture(0)` denotes the usage of webcam.

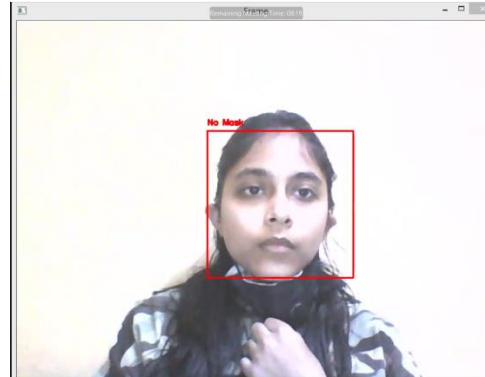
The model will predict the possibility of each of the two classes (**[without_mask, with_mask]**). Based on which probability is higher, the label will be chosen and displayed around our faces.

INFERENCE:

We implemented our model on images containing one face. We also implemented it on videos and live video streams by removing and wearing masks one by one. Some screenshots of the results are shown below:



Person with mask



Person without mask

CONCLUSION:

As the technology are blooming with emerging trends the availability so we have novel face mask detector which can possibly contribute to public healthcare. We used OpenCV, tensor flow, keras and CNN to detect whether people were wearing face masks or not. The models were tested with images and real-time video streams. The accuracy of the model is achieved and, the optimization of the model is a continuous process and we are building a highly accurate solution by tuning the hyper parameters. Furthermore, the proposed method achieves state-of-the-art results on a public face mask dataset. By the development of face mask detection, we can detect if the person is not wearing a face mask and do not allow their entry would be of great help to the society.

18. MASK AND THERMAL SENSITIVE DOOR

COLLEGE	Dronacharya Group of Institution, Greater Noida
GUIDE	Mr. Chandan Choubey
COLLEGE STUDENTS	Vikash Kumar, Priyanshu Pallav
SCHOOL STUDENTS	Ayush Kumar Jha, Eshan Aditya Puri
SCHOOL	Rajkiya Sarvodaya Bal Vidyalaya, No-2, Shakarpur, Delhi

ABSTRACT:

We have made a project which is used for detecting whether an individual is wearing a mask or not. As we can see we are living in a pandemic of COVID so it is compulsory for everyone to wear a mask. Few of us took it seriously and some people also forgot to wear a mask. Sometimes a person who has to check whether someone is wearing a mask or not is not able to check properly. So, the main motive behind the project is to reduce human use and make all the functions contactless and touch less. Here we check whether a person is wearing a mask or not. Along with that we will also focus on the sanitization process. Healthy sanitization is very necessary during covid. So, we make an automated touch less sanitizer kit by which one can sanitize themselves without touching. For all these setups we have planned to attach these circuits on a main entrance of the society/home/office etc. We also use an RF-ID scanner by which any unauthorized person is not able to enter without permission. Due to these conditions, any person cannot open the gate forcefully. If all these conditions are satisfied, then only the gate will automatically open and close. We don't need to touch/push/pull the gate/gate handle.

INTRODUCTION

The mask and thermal sensitive door project is for both commercial and official use. Only an authorized person is able to enter. An unauthorized person will not be able to use it. The complete mechanism will work in the 4 stages:

- Mask detection
- RF-ID scanner
- Sanitization
- Door opening mechanism

We developed an app especially for our system that will help us to identify whether a person is wearing a mask or not. We use an RF-ID smart card authorization to ensure security and make the entire process fool-proof. For this purpose, we use two arduino nano; one as master and other as slave. Master arduino will help us to monitor a mask, RF-ID module, IR temperature sensor and slave arduino is used for control motor mechanism.

COMPONENTS:

- ARDUINO NANO
- RF-ID Module
- Ultrasonic sensor
- Bluetooth Module
- Lcd display
- I2C Module
- DC motor (10 RPM)
- L298N Motor Driver Module
- DC Water pump motor
- 9/12 v battery
- Breadboard
- Connecting wires
- Pipe
- Wheel

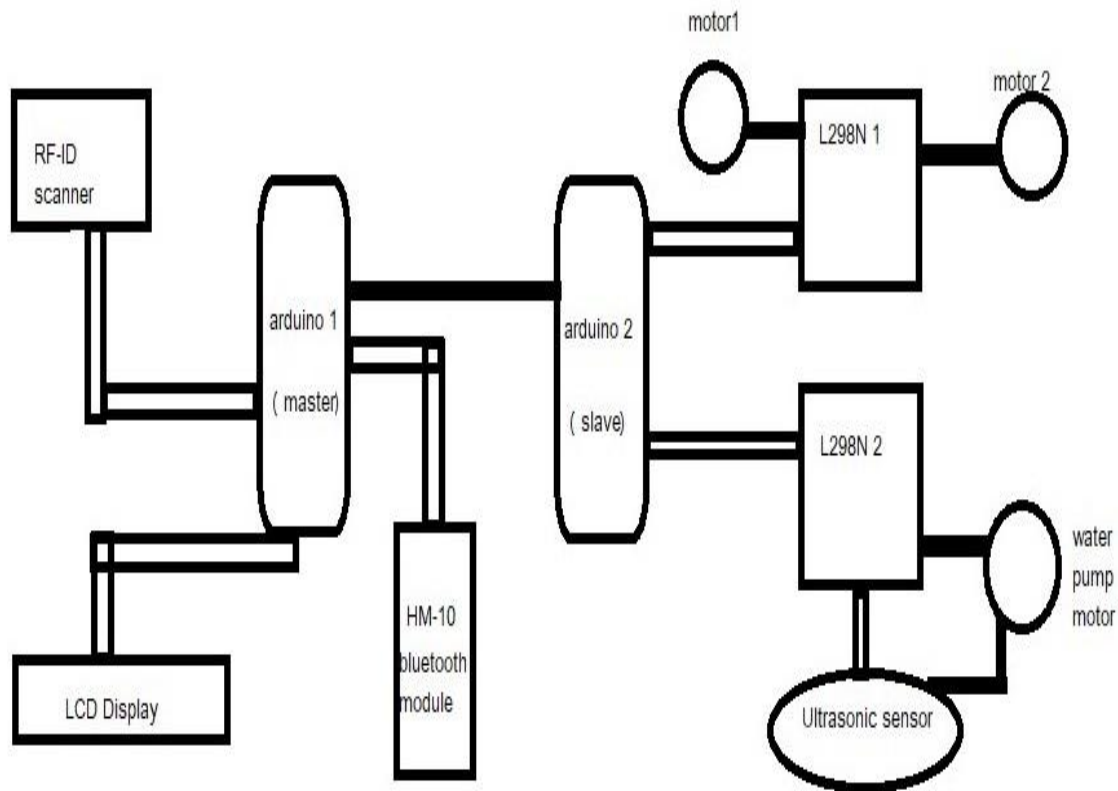
OTHER TOOLS AND EQUIPMENTS:

- Soldering Iron
- Glue Gun
- Wood
- Nuts and Bolts
- Screw Drivers

APPS AND ONLINE SERVICE:

- Thunkable
- Fritzing
- Voice Access

BLOCK DIAGRAM



MASK AND THERMAL SENSITIVE DOOR

Working:

Stage-1

MASK DETECTION USING PHONE CAMERA AND BLUETOOTH

We create an app that helps us to detect whether a person is wearing a mask or not. For this purpose, we used HM-10 bluetooth module, arduino nano, and jumper wire. In order to communicate with the hm-10 bluetooth module on the arduino nano, our app will use bluetooth low energy (BLE). To make it untouchable, voice command is used to make it contact free. A certain voice command from the individual will help to operate the system. After that the application will take a picture of the user to identify the mask. After the image is taken, if the app detects a cloth material on the face of the user, it sends a signal to the arduino using bluetooth. If the user is not wearing a mask, then a user is guided to wear a mask and go to the next stage using the speaker and also displayed the instruction in LCD display.

Stage-2

RF-ID SCANNER

Once the Mask is detected, the system will remind the user on the LCD display to swipe their RF-ID smart card on the RF-ID scanner. We use an RF-ID smart card in order to make sure that the user is an authorized person or not. Master arduino is used to connect the RF-ID scanner.

Stage-3

SANITIZER MECHANISM

Once the RF-ID tag is detected, the system will remind the user on the LCD display to sanitize. The sanitizer dispenser kit is a contactless sanitizer kit. It is a touchless sanitizer kit which will use a DC water pump motor, L298N Motor driver module, ultrasonic sensor along with an arduino nano. The ultrasonic sensor will detect the presence of the hand of the user and dispense the sanitizer. For the sanitization purpose, slave arduino is used.

Stage-4

Door opening mechanism

After the compilation of all the formalities the system will automatically unlock and open the door without touching the door handle. For this purpose, we will use two DC motors of 10 RPM one for opening and closing the gate and another for opening and closing the lock of the gate. L298N motor driver module along with the Arduino nano is used to control the motor mechanism. The motors operate in clockwise and anticlockwise directions to open the gate and close it respectively after entering the person.

COST: Rs.9500

CONCLUSION:

We set up all these functions such as mask detection, RF-ID scanner and sanitization kit on the main entrance of the office/home/collage/school etc. First the system will detect whether he/she is wearing a mask or not. After this, the system will check whether the user has authorization for entering in or not using RF-ID SCANNER once the system will confirm that the user is authorized person then the system will give permission for the next step. Now the user will sanitize their hands and the gate will open and close automatically once the person enters.

19. ARANYANI

COLLEGE	Bharati Vidyapeeth's College of Engineering, Delhi
GUIDE	Mr. Neeraj Kumar
COLLEGE STUDENTS	Amit Kumar, Sidhant Raghav
SCHOOL STUDENTS	Bhimakshi Bhardwaj, Anjali
SCHOOL	Govt. Girls Senior Secondary School, Nangloi, Delhi Govt. Girls Sr. Sec, School, Hastal, Delhi

ABSTRACT

Aranyani was started with the deed to fight against the problems faced by urban, landless farmers who migrate in search of better opportunities. Initially, we started the project at the hilly regions in Nainital, providing our beneficiary with a Hydroponic set up. Hydroponic farming is an innovative technique of farming which has a number of benefits over traditional methods.

Through Aranyani, we aim to reduce land usage by at least 75 per cent. Being highly efficient in terms of water consumption, we expect that through our products, we will be able to cut down the use of water. It promises a faster growth rate, which will give incentives to small-scale farmers to grow crops hydroponically.

We are also targeting corporates and educational institutions which can use our setups to ensure pure air indoors.

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 project's principle is to:

- Increase efficiency.
- Reduce Water wastage.
- Utilize minimal land.

SALIENT FEATURES:

Aranyani has following features:

- Plants grow upto 50% faster
- Eliminates the need for herbicides and pesticides
- Crops use 90% less water.
- High density cropping.
- Uses 1/4th of the space.
- The freedom of cultivating anywhere in the globe
- The continuous cultivation of the same crop in the same production area, with no need for crop rotation
- Reduced attacks of plant pests, as an indoor environment can be protected more easily.

OBJECTIVE AND SCOPE

Aranyani was started with the deed to fight against the problems faced by urban, landless farmers who migrate in search of better opportunities. Initially, we started the project at the hilly regions in Nainital, providing our beneficiary with a Hydroponic set up. We are currently developing 2 more setups to tackle the market of home decoration and help provide air purifying plants grown using these setups. We aim to implement the running of these setups on solar power by the end of this year, which will help support at least three small farmers.

Various stages of project implementation along with the timelines:

Aranyani's working can be explained in four phases:

The first step for us was to set the base for Aranyani by identifying the problems. Once we established the problems, we researched on the feasibility of using hydroponics as a method to grow plants. Based on our findings, we identified our beneficiaries- small-scale farmers, carpenters, gardeners, vendors. We also identified our target communities- households, public transport and institutions, educational and healthcare institutions.

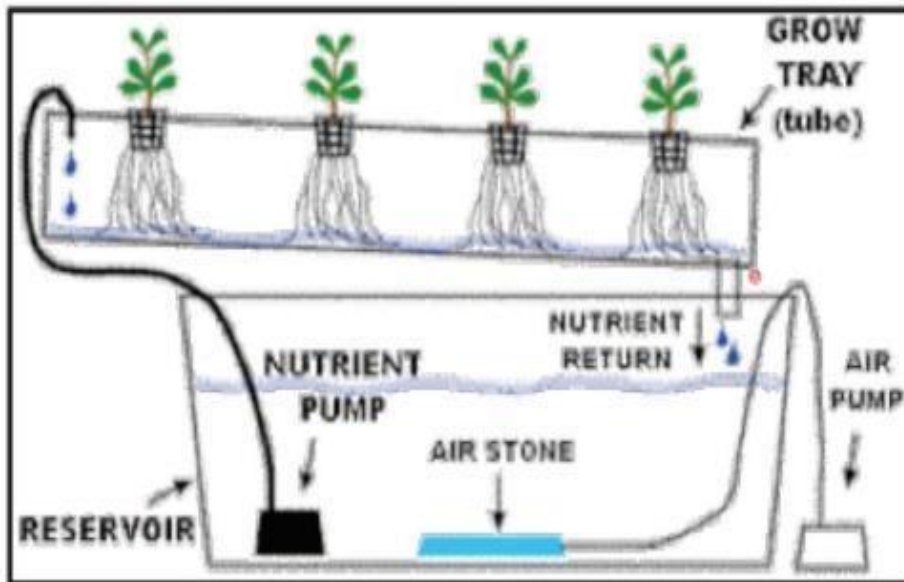
In the second phase, which commenced in December in Bhowali, Nainital, we built a hydroponic setup containing the space to hold 30 strawberry plants in 6 pipes within a height of 5 feet. Three such setups were deployed

For the third phase which started in May 2019, we shifted our objective and identified air- purifying and mosquito repellent plants and the two final set-ups to grow these plants, that is, the vertical garden, Vardaan and verdant photo frame, Vaatika. Once we developed these, our focus was on creating a supply chain between the beneficiaries and millennial households. This helps not just our

beneficiaries, but also gives the customers an opportunity to help contribute towards the maintenance of the ecological balance.

For the last phase, we aim to develop large-scale hydroponic farms and introducing solar energy to the setups, thus creating a sustainable chain.

BASIC STRUCTURE OF ARANYANI



VARIOUS COMPONENTS

1. PVC pipes.
2. Net cups.
3. Plant saplings.
4. Cocopeat.
5. Micro-nutrients.
6. Nutrients.
7. Frame.

SOCIAL IMPACT:

Our model's aim is to maximize the earth's resources and conserve them. Many social benefits can result from our Projects Aranyani. Once we identified the problem and tested the feasibility, we were able to categorize our beneficiaries into carpenters, gardeners, small-scale farmers and fruit and vegetable vendors. Our beneficiaries have been successful in growing strawberries hydroponically and sell it to fruit vendors. We have also been working with a carpenter who constructs our succulent frame from plywood and other materials and benefits from the sale of these frames. In addition, we are also closely working with a gardener who helps us prepare our vertical garden setup and benefits from its sale.

COST OF PROJECT

S. No.	Expenditure heads	Approximate cost (in Rs.)
For Vardaan (Vertical Garden) per unit		
1	Pipe (4 inches)	350
2	Net caps	50
3	Plants	250
4	Cocopeat	100
5	Miscellaneous	130
Total		880

CONCLUSION

We concluded that our project Aranyani helps to solve real world problems. Through Aranyani we can increase land utilization and drastically decrease water consumption. Through this project, we aim to achieve the sustainable development goals of No Poverty, Zero Hunger, Economic Growth, Sustainable Communities, Responsible Consumption, Good Health and Climate Action. Aranyani incorporates the elements of nature:

Air- Purification, detoxification and fragrance

Water- Reduce, Reuse and Recycle

Land- Reduction and Enhancement

Keeping in mind the environmental benefits, we also wish to empower small-scale landless farmers and other beneficiaries financially so that they can earn a livelihood.

20. Waste Collector and Recycling

COLLEGE	Sagar Institute of Science and Technology, Gandhi Nagar, Bhopal
GUIDE	Dr. Sanjay Chhalotre
COLLEGE STUDENTS	Anshul Raj, Kundan Kumar
SCHOOL STUDENTS	Aditya Bharti, Rajendra Lodhi
SCHOOL	Govt. Naveen Girls H. S. School, Tulsi Nagar, Bhopal Mahatma Gandhi Higher Secondary School, Barkheda

ABSTRACT

The proposed “**Waste Collector and Recycling**” is a research model which is designed keeping in view the need for proper disposal of waste, in today scenario there is much need of proper disposal of waste. It is an innovative model which involves the different method of collecting waste from home and providing the suitable method of collecting as well as the proper method of disposal of waste.

INTRODUCTION

- In recent decades, the increasing awareness of environmental sustainability has encouraged the government asking for the proper collection and disposal of waste from every house so that there should not be the waste hill in any part of the city and the environment should be clean.
- The project is economic and social in nature. It has got several advantages which is unbeatable such as **environment friendly & secure**.

SALIENT FEATURES

1. Segregation of waste expenses are saved.
2. Digging of sand is also reduces which causes less soil erosion and deforestation.
3. Less amount of energy use
4. Contact less waste collector
5. Reduce of casteism

OBJECTIVE AND SCOPE

- ❑ Here we directly focus on the waste management and recycling of it by using the chemical and mechanical aspect and providing a clean and healthy environment for the population.
- ❑ Our goal is as mentioned is to ensure the good management of sanitation and waste.
- ❑ By the recycling we are making the product which will be used by the people and for their development like production of wax-based material and land filling materials.

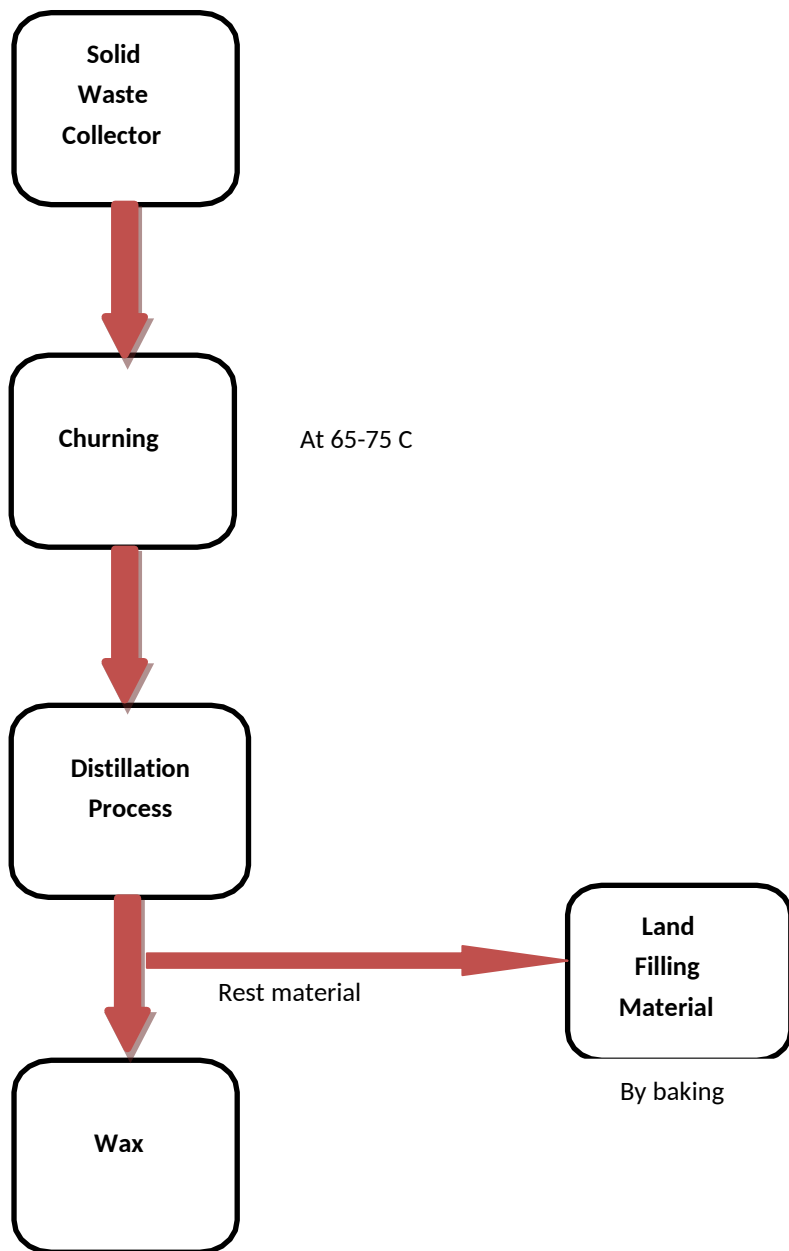
METHODOLOGY

In the collection process we will be having all kind of waste especially plastic, waste food, hairs, small pieces of glasses etc. The collection process will be totally done by the Solid waste collector. The solid waste collector system will be completely mounted on a four-wheel vehicle and will attach with a suction fan at the bottom of the vehicle.

Then the processing starts by churning of the waste at 65-75degree Celsius temperature and the steam or vapour coming out by the distillation process of the gases released during the churning. Those distilled steam is then collected in the tank. The layer of hydrocarbon will be floated up the water which will be collected and further send to process for the production wax-based material which can be used in many different purposes.

The remaining slurry material is then placed into the mould of different thickness level for example of 1inch or 2 inches etc. This baked material will take the shape of tiles and further used as land filling materials.





HARDWARE COMPONENTS

- 4 wheeler vehicle
- Collection tank fitted with suction fan
- A boiling and churning tank
- Tank
- Wax collector
- Oven
- Tray

COMPARITIVE STUDY

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

- As it has a single unit function and no human contact with the waste directly.
- Has a low maintains cost.

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 waste management.

□ Job Creation:

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

□ Reduction in quantity of waste

As the recycling process the 100% of the waste is recycled.

COST OF PROJECT

□ Cost of manufacturing of the existing model is around **fifty thousand rupees**.
Excluding the cost of Vehicle

□ If the project implantation is done on the existing municipal vehicle, then cost will be reduced more.

□ As government is also focusing on the recycling then we can have the subsidiary also in this.

CONCLUSION

We concluded that in the country like India, where waste is one of the biggest problems, waste collector and recycling is the best alternate means of reduction of waste. The Proposed model caters to these three National missions namely:

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

CLEAN INDIA – Basis team of the project.

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

21. HUMAN COUNT DETECTOR

COLLEGE	GL Bajaj Institute of Technology and Management, Greater Noida
GUIDE	Dr. Piyush Yadav
COLLEGE STUDENTS	Somya Singh, Sahil Soni
SCHOOL STUDENTS	Sheetal Khurana, Evenjlin Ekka
SCHOOL	Sarvodaya Kanya Vidyalaya, Arambagh Lane, Delhi

Abstract

The project titled as "**Human Count Detector**" is focusing on the detection of person entry or exiting in room or in any hall by applying the limits of person entry as per their body temperature.

It is very hard to maintain social distancing in today's population, so we focus on designing an electronic circuit which will be help to maintain a social distancing in halls. Specially, in "Covid-19" situation where it is necessary to maintain a social distancing for our health.

Circuit Equipment

Arduino uno, 1 channel relay, contactless temperature sensor (GY906), solenoid electric lock, LEDs, buzzer, 9v and 12v adaptors, Resistor, IR sensor

Introduction

According to Centers for Disease Control and Prevention Social Distancing, also called "physical distancing", means keeping a safe space between yourself and other people who are not your household. As per today's scenario this become an important point but prior this pandemic we need this type of distancing because as we've seen accidents happen due to overcrowding, harassment happen due to jam packed. Study shows that high overcrowding problem with 88% and about 72% of the people in the community involved in accidents inside their houses due to improper arrangement of items and limited space.

But now a day's physical distancing become the need of hours due to the COVID-19 pandemic but again we are overcrowded population where we have seat for 4 people but number of people were 8 so we need a proper plan or proper arrangement because now if we didn't take care of these things we can't came up forward, because for now we have to walk together with this pandemic as well. But now the question is how to recognize those people who are even few symptoms of COVID-19 and these symptoms are:

Researchers in China found that the most common symptoms among people who were hospitalized with COVID-19 include:

- Fever: 99%
- Fatigue: 70%
- A dry cough: 59%
- Loss of appetite: 40%
- Body aches: 35%
- Shortness of breath: 31%
- Mucus or phlegm: 27%

Thus body temperature plays an important role as far as COVID-19 fever shows 99% symptoms same for other bacterial infection we always see few changes in our body temperature when we suffer from any kind of bacterial infection. As our normal body temperature is 98.6°F (37°C) may be slightly higher or lower. A body temperature reading that's above or below the average doesn't automatically mean you're sick.

Your body's ability to regulate temperature changes as you get older.

In general, older people have more difficulty conserving heat. They're also more likely to have lower body temperatures.

Below are average body temperatures based on age:

- **Babies and children.** In babies and children, the average body temperature ranges from 97.9°F (36.6°C) to 99°F (37.2°C).
- **Adults.** Among adults, the average body temperature ranges from 97°F (36.1°C) to 99°F (37.2°C).
- **Adults over age 65.** In older adults, the average body temperature is lower than 98.6°F (37°C).

A higher-than-normal thermometer reading can be a sign of a fever.

Among babies, children, and adults, the following thermometer readings are generally a sign of a fever:

- rectal or ear readings: 100.4°F (38°C) or higher
- mouth readings: 100°F (37.8°C) or higher
- armpit readings: 99°F (37.2°C) or higher

Research from 2000 suggests that fever thresholds for older adults might be lower, since older individuals have more difficulty conserving heat.

So our device solves all age issue that for any other part of our body to measure and count person is difficult. So, irrespective of all temperature we consider average Human hand temperature which is in range of 17.7 degrees C (63.9 degrees F) to 28.9 degrees C (84.0 degrees F).

Impact of covid-19 pandemic according to World Health Organization WHO

The COVID-19 pandemic has led to a dramatic loss of human life worldwide and presents an unprecedented challenge to public health, food systems and the world of work. The economic and social disruption caused by the pandemic is devastating: 10 of millions of people are at risk of falling into extreme poverty, while the number of undernourished people, currently estimated at nearly 690 million, could increase by up to 132 million by the end of the year.

- WHO has declared the COVID-19 pandemic as a global health emergency?
- It affected society and global economy and affected global environment.

Throw this device we also reduce harassment in public place, self-bombing issue (terrorist attack), health issue like physiological issue on place of overcrowding.

Future Scope:

In this project we will update this device in future we connect this with the Internet of Things (IOT) like presently we see jams in Google at any place. Similarly, in future we connect this to show any visitor place is safe or not for visit.

Hardware and Software components:

1) Arduino uno/Microcontroller:

A **microcontroller** is a mini computer on a single metal oxide semiconductor (MOS) Integrated circuit (IC) chip. A microcontroller contains one or more CPU along with memory (the Random-Access Memory (RAM), the Flash Memory, the Serial Bus Interface and in many cases, the Electrical Erasable Programmable Read-Only Memory (EEPROM)) and programmable input – output peripherals. Microcontrollers are designed for embedded applications, in contrast to the microprocessors used in personal computers or other general purpose applications consisting of various discrete chips. Purpose applications consisting of various discrete chips.

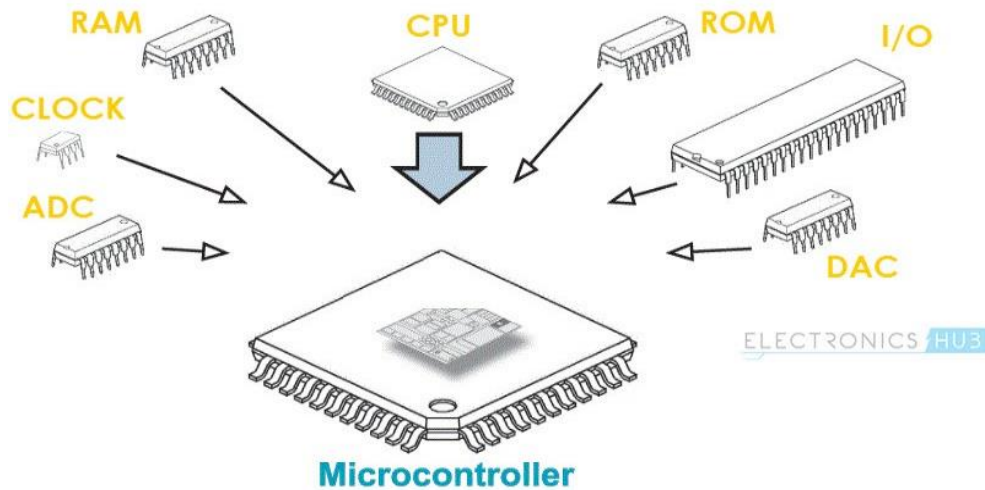


Figure 1

We are using Arduino uno for model purpose because it is easy to use for model purpose.

2) Contactless Temperature Sensor:

The IR thermometer works by light that is coming from the object in the form of IR rays and funnelling that light into a detector - which is also known as a thermopile. It is in the thermopile that the IR radiation is turned into heat then turned to electricity, which is measured.

And we use GY906 whose range is $-40+125^{\circ}\text{C}$ for sensor temperature, $-70+380^{\circ}\text{C}$ for object temperature

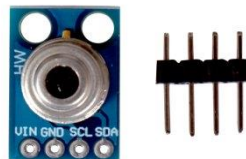


Figure 2

3) 1 channel relay:

The 1 Channel Relay Module is a convenient board which can be used to control high voltage, high current load such as motor, solenoid valves, lamps and AC load. It is designed to interface with microcontroller such as Arduino, PIC and etc. It also comes with a LED to indicate the status of relay.



Figure 3

4) **Solenoid Electric Lock:**

12V Solenoid lock is mainly use for safety purpose. It's basically work on electromagnetic field by supply voltage of 9-12 VDC then after passing current it generates in solenoid coil and rod is attract after stopping the supply of current it repels.



Figure 4

5) **LEDs (Light Emitting Diode), Resistance, Buzzer on PCB:**

- **LED:** light-emitting diode is a semiconductor device that emits light when an electric current is passed through it.
- **Resistance:** *resistance* is a measure of the opposition to current flow in an electrical circuit. *Resistance* is measured in ohms.
- **Buzzer:** A buzzer is an audio signalling device, which may be mechanical, electromechanical, or piezoelectric.
- **PCB:** printed circuit board mechanically supports and electrically connects electrical or electronic components.

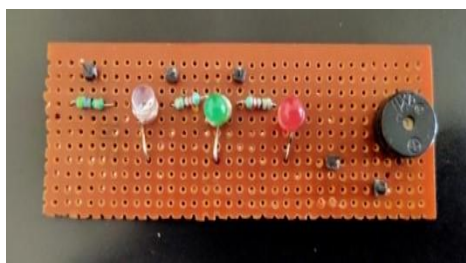


Figure 5

6) **Charger or adaptor:**

A voltage converter is an electric power converter which changes the voltage of an electrical power source. It may be combined with other components to create a power supply.



Figure 6

7) **IR sensor:**

An infrared (*IR*) sensor is an electronic device that measures and detects infrared radiation in its surrounding environment.

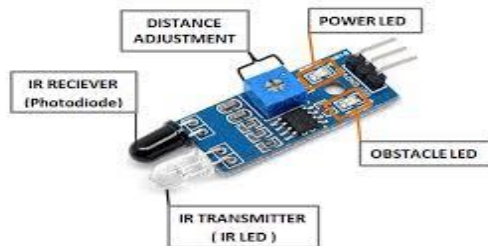
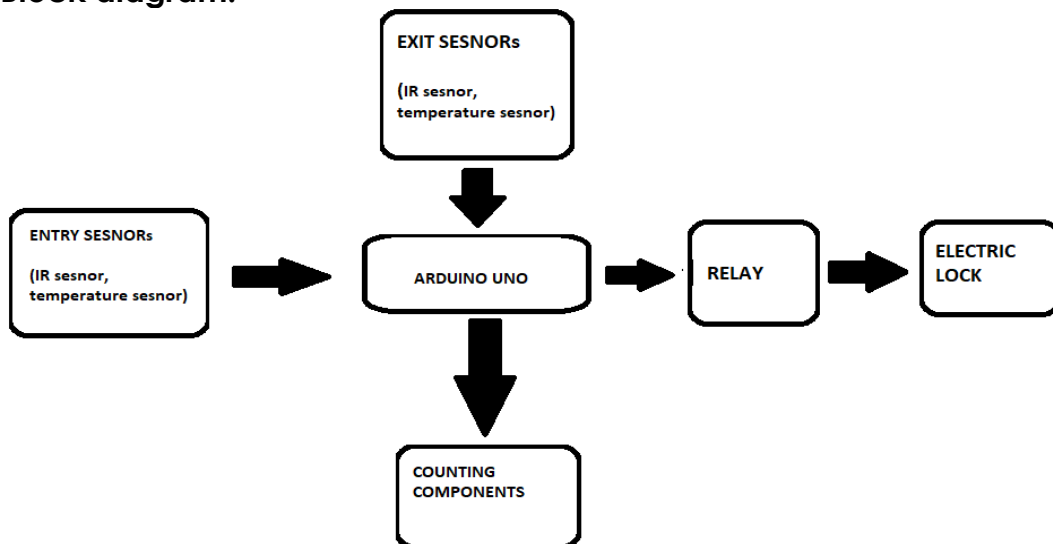


Figure 7

Block diagram:



Software part (Arduino uno programming):

```
#include <Wire.h>
#include <Adafruit_MLX90614.h> //contactless temperature sensor header
int led = 8; int led1 = 9; int led2 = 10; int n = 0 ; float value = 0.0 ; int speakerPin =
3;
#define RELAY 6 // the number of the relay pin
int sensorPin1 = 2; int sensorPin2 = 7; int data1,data2;
Adafruit_MLX90614 mlx = Adafruit_MLX90614();
void setup() {
  mlx.begin();
  pinMode (led , OUTPUT); pinMode (led1, OUTPUT);
  pinMode (led2, OUTPUT); Serial.begin(9600);
  pinMode(RELAY, OUTPUT); pinMode(speakerPin , OUTPUT );
  pinMode(sensorPin1,INPUT); pinMode(sensorPin2,INPUT); }
void loop() {
  data1=digitalRead(sensorPin1); Serial.println(data1);
  data2=digitalRead(sensorPin2); Serial.println(data2);
  if(data1 == 0) {
    value = digitalRead( mlx.readObjectTempF());
    Serial.println(mlx.readObjectTempF());
    if(value>68 and value<84.0) {
      digitalWrite( speakerPin , HIGH ); delay(100);
      digitalWrite( speakerPin,LOW);
        n++;
      } }
  if(data2 == 0) {
    value = digitalRead( mlx.readObjectTempF());
    Serial.println(mlx.readObjectTempF());
    if(value>68 and value<84.0) {
      digitalWrite( speakerPin , HIGH ); delay(100);
      digitalWrite( speakerPin,LOW);
        n--; } }
    if(n == 0) {
      digitalWrite(led , HIGH); digitalWrite(led1 , LOW);
      digitalWrite(led2 ,LOW ); digitalWrite(RELAY,HIGH); }
    else if(n == 1) {
      digitalWrite(led , LOW); digitalWrite(led1 , HIGH);
      digitalWrite(led2 , LOW); digitalWrite(RELAY,LOW); delay(2500);
      digitalWrite(RELAY,HIGH); }
    else if(n == 2) {
```

```
digitalWrite(led , LOW); digitalWrite(led1 , LOW);  
digitalWrite(led2 , HIGH); digitalWrite(RELAY,LOW); delay(2500);  
digitalWrite(RELAY,HIGH); }  
    else if(n > 4 ) {  
digitalWrite(led , LOW); digitalWrite(led1 , LOW);  
digitalWrite(led2 , HIGH); digitalWrite(RELAY,HIGH); }  
    else if(n < 0) {  
digitalWrite(led , HIGH); digitalWrite(led1 , LOW);  
digitalWrite(led2 , LOW ); digitalWrite(RELAY,HIGH); }    }
```

Conclusion:

The idea behind the project is very different and simple and very useful for dealing with huge problem such as COVID-19. This project is quite realistic as it represents the accurate temperature reading and set a limit on person entry with healthy condition. 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 in cheap cost. The electronic plays a great role in developing the circuit which meets the needs of various problems like due to this device is reduce harassment, self-bombing and many more problem.

22. HLED

COLLEGE	Bharati Vidyapeeth's College of Engineering, Delhi
GUIDE	Mrs. Shashi Gandhar
COLLEGE STUDENTS	Sahil Khurana, Ayushmaan Khurana
SCHOOL STUDENTS	Somya, Harshvardhan Chaudhary
SCHOOL	Govt. Sarvodaya Co-ed Vidyalaya, Sec-8, Rohini, Delhi

ABSTRACT

LED's are the most efficient lights and the most used lights in 2020. LED lamps have a lifespan many times longer than equivalent incandescent lamps, and are significantly more efficient than most fluorescent lamps, with some LED chips able to emit up to 303 lumens per watt. LED's even have a lot of limitations on human body. The directional emission characteristics of LEDs affect the design of lamps. So we Propose a project which is 'HLED': a key step towards the future of healthy and safe lighting which is Environment Friendly and healthy too.

KEYWORDS – Solid State Lighting, Optical filter, Polyamide, Electroluminescence, circadian rhythm

INTRODUCTION

- Many LED lamps have become available as replacements for screw-in incandescent or compact fluorescent light bulbs, ranging from low-power 5-40 watt incandescent bulbs, through conventional replacement bulbs for 60 watt incandescent bulbs (typically requiring about 7 watts of power), and as of 2010 a few lamps were available to replace higher wattage bulbs, e.g., a 13-watt LED bulb which is about as bright as a 100W incandescent.
- The technology is improving rapidly, and new energy-efficient consumer LED lamps have been announced by big companies in lighting industry such as Osram Sylvania, Philips, and General Electric etc.
- The project is economic and social in nature. It has got several advantages which is unbeatable such as environment friendly, abundant & secure, Healthier, no dependence on fossil fuels and varied use. The most important concern now-a-days is Global Warming; our project promotes "GREEN & CLEAN LIGHTING".
- Also with the upcoming LIFI technology we need to optimise the LED to get a better way of transferring data through light.
- LIFI {light fidelity} is a way to transfer data by modulating the intensity of LED and by a receiver, its scope is infinite.

SALIENT FEATURES

The HLED has following features:

- ✓ Prevents eye strain.
- ✓ Does not disturb the circadian rhythm.
- ✓ Attracts less insects.
- ✓ Environment Friendly

OBJECTIVE AND SCOPE

LED are said to be the safest and Environment-friendly version of lighting available yet, though no one tries to observe that they cause a lot of negative effects on the human body like eye strain, headaches, deprivation of sleep and can even affect the skin of some classes causing skin conditions such as lupus as said by **Cosmin Ticleanu** in his research paper at **Building Research Establishment (BRE), Bucknall's Lane, Watford WD25 9XX, UK** in December 2015

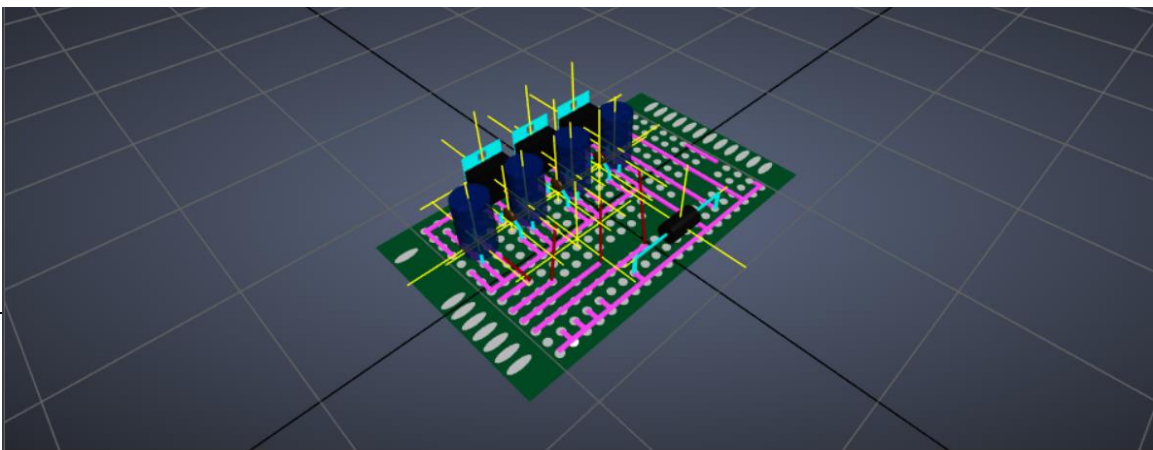
Also, this project can help the national project of **National Mission for Enhanced Energy Efficiency** because of which 45.9 million LED bulbs have been distributed under the Domestic Efficient Lighting Programme and with the upcoming new LIFI technology, the project is now of more importance than ever.

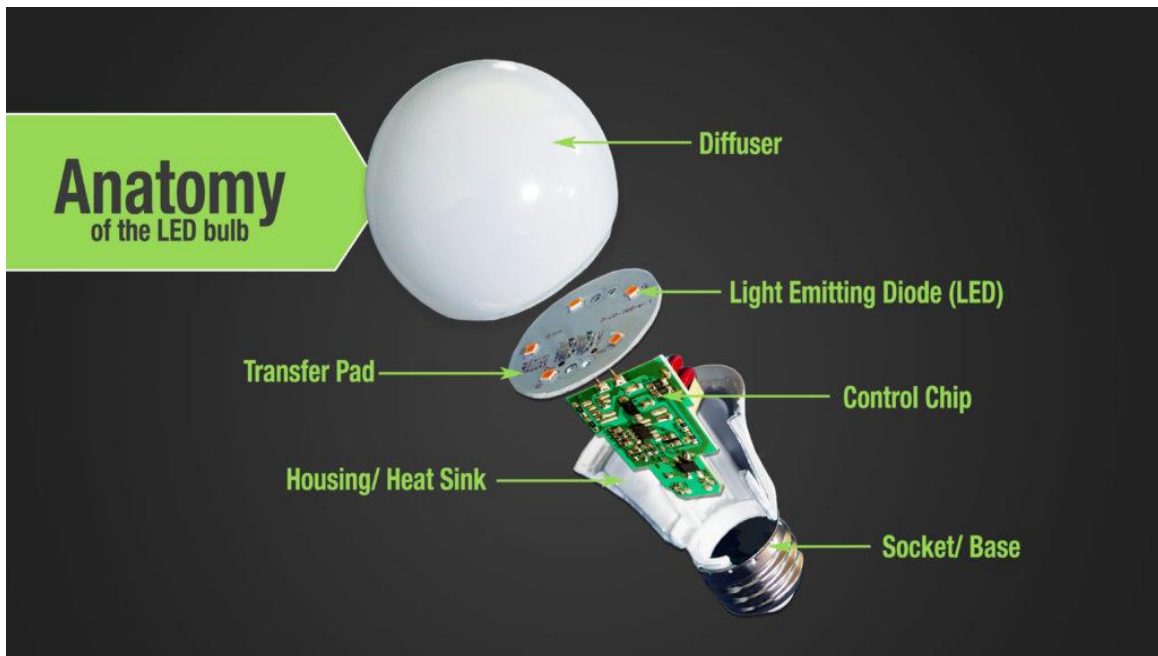
As said that **'Health is the most important piece of life, when not cared for can give you the ultimate pain'**. Thus our project will counteract some of the limitations with current LED.

BASIC WORKING:

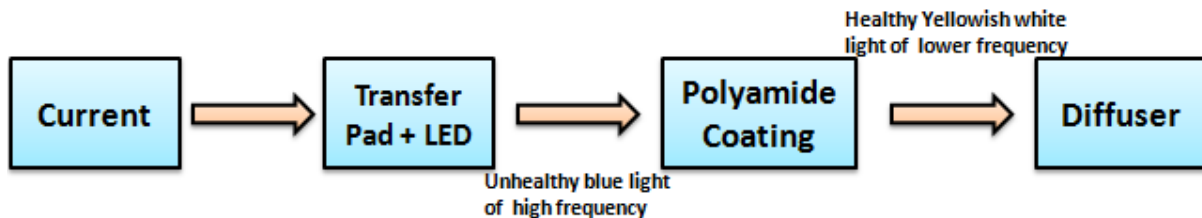
Current enters bulb through socket passes through the control chip and reaches transfer pad enables led to emit light by the principle of electro luminance. This light has high level of blue wavelength which causes headache and strain our eyes. This light is passes through the polyamide filter which is coated in the inner side of diffuser The polyamide coating is stable at high temperature and acts as Optical filter, which reduces the excess emission of light of blue wavelength which as a result reduces headache and strain on eyes that is caused by traditional LED When working for long hours under it.

Then filtered LED light after passing from polyamide filter reaches diffuser and is evenly spread in all direction





FLOWCHART:



HARDWARE COMPONENTS

1. Diffuser
2. LED Modules
3. Heat Sink
4. Polymide
5. Control Chip

COMPARITIVE STUDY

The advantages and disadvantages of the proposed project 'HLED' with current LED present in commercial market are as follows:

Features	Traditional LED	Proposed HLED System
Eye strain prevented	No	yes

Headaches prevented	No	yes
Environment friendly	yes	yes
Attracts insects	48% more than rest.	Less than any other lighting device available.
Circadian Rythem	Affected	Not Affected
Pocket friendly	Yes	yes

SOCIAL IMPACT

Light bulbs that use LED technology not only bring down your energy bills but are also more environmentally friendly when compared to incandescent bulbs and compact fluorescent lights (CFLs). Both the manufacture and use of LED bulbs causes less damage to the environment than the other two alternatives.

For starters, a 6-to-8-watt LED bulb, with a light output of 800 lumens, will last for 50,000 hours. In comparison, incandescent bulbs last 1,200 hours and consume 60 watts, while CFLs last for 8,000 hours and use 13-15 watts.

LED bulbs consume less power per unit (lumen) of light emitted. This reduces greenhouse emissions from power plants. Carbon dioxide emissions for LEDs are also low. Roughly, one LED bulb will minimize greenhouse gas emissions by almost half a ton.

The annual energy consumption for an LED bulb is around 30 times lower than for a corresponding incandescent bulb. According to the U.S. Department of Energy, lighting accounts for a fifth of the energy consumption in a U.S household. LED lights can bring lighting costs to 5 percent of the total electricity consumption in homes.

LEDs generate less heat during use and hence associated cooling costs are comparatively lower. Incandescent bulbs release 90 percent of the energy as heat. While LED lamps lose around 5 percent of the energy generated to heat, the rest is converted to light.

- **Cold temperature operation**

LEDs love the cold unlike fluorescent lamps. At low temperatures, higher voltage is required to start fluorescent lamps, and luminous flux (the perceived power or intensity of light) is decreased. In contrast, LED performance increases as operating temperatures drop. This makes LEDs a natural fit for refrigerated display cases, freezers and cold storage spaces in addition to outdoor applications such as the parking lot, building perimeter and signage.

- **No IR or UV Emissions**

Less than 10 percent of the power used by incandescent lamps is actually converted to visible light; the majority of the power is converted into infrared (IR) or radiated heat. Excessive heat and ultraviolet radiation (UV) presents a burn hazard to people and materials. LEDs emit virtually no IR or UV. Rapid advancements in LED lighting technologies, with more improvements on the horizon, have resulted in lowered costs and increased reliability of LEDs. And while it may be tempting to assume LEDs are the right choice for all applications because of their energy efficiency, selection should be based on a combination of factors, including light quality and distribution, dimmability, and expected lifetime.

- **They have low carbon emission**

Home lighting stands as one of the biggest culprits as far as carbon emission to the environment is concerned. However, this impact can be reduced drastically by switching to the use of LEDs which release a negligible amount of carbon into the atmosphere. This lighting does not emit any nuclear or sulphur dioxide waste. Light-Emitting Diode bulbs do not have toxic mercury unlike fluorescent bulbs. Their disposal therefore does not have any impact on the environment.

COST OF PROJECT

The cost of creating LED not only depends upon the materials but due to miniature circuit the assembly and crafting requires certain machines as

- LED PCB assembly machine
- LED lights assembly machine
- High speed LED mounting machine
- LED chip SMD mounting machine
- Candle light assembly machine for LED
- LED tube light assembly machine etc.

So, the cost of single LED is dependent on all factors. Therefore, the cost of HLED is proportional to that of LED, but it is almost negligible if we produce it in a presently manufacturing industry.

Conclusion

LEDs are directional by nature and hence can be very bright and glaring light sources. Very bright LEDs may cause retinal damage if viewed directly. Night-time exposure to bright LEDs rich in blue light can also alter the body clock and lead to various health problems. LEDs can exhibit flicker, which can cause

headaches, eyestrain or epileptic seizures in some people. As European legislation bans electrical and electronic equipment that contains toxic levels of chemicals, LEDs currently available on the market should not contain chemicals above human toxicity levels. However, further research is needed to investigate potential health hazards caused by VOC emissions from LEDs that incorporate plastic compounds. On the other hand, LEDs also have benefits, as they do not contain mercury, emit little or no UV and do not generate electric or magnetic fields that can damage human health. In order to minimise health risks and maximising health benefits of LED lighting, a number of measures should need to be considered by lighting designers and building owners and occupiers. Glare should be controlled using suitable shielding of high luminance parts of the lighting system or using luminaires that generate glare rating indices within standard recommendations. Bright light with a high blue content, such as that emitted by high power cold white LEDs, should be prevented from shining directly in occupants' eyes. LEDs should have suitable drivers and compatible lighting controls should be used in order to avoid flicker, and dimming should be considered to allow lower light levels in the evening. This project also helps in the following national missions:

- **MAKE IN INDIA** – Automated machinery can be setup completely here.
- **START-UP INDIA** – Our Further plan for the model is not only a business plan but also will create job opportunities.
- **National Mission for Enhanced Energy Efficiency** - 45.9 million LED bulbs have been distributed under the Domestic Efficient Lighting Programme

23. MUSICAL HYDROPONICS

COLLEGE	GD Goenka University, Gurugram
GUIDE	Dr. Anindita Roy Chowdhury
COLLEGE STUDENTS	PTSN Sai Vasavi, S. Prudvi Raj
SCHOOL STUDENTS	Ankit Pandey, Sagar Pandey
SCHOOL	Govt. Model Sanskritl Sr. Sec. School, Sushantlok, Gurugram

ABSTRACT

The proposed “Musical Hydroponics” is a model designed keeping in view of future as an alternative to traditional/conventional farming. The mission is to make the world end hunger and hidden hunger, i.e. under nourishment due to nutrient deficiency. It uses resources like water and space efficiently and gives high yield. The addition of music promotes faster and better yield.

KEYWORDS

Music, Nutrients, LED lights, PVC tubes/tray

INTRODUCTION

It is estimated that by the year 2050, more than 80% of the world's population will be living in urban areas. This will place a huge burden on our ability to feed everybody with conventional methods. On top of this, freshwater supplies are at an all-time low, and will continue to drop off in the coming years, allowing less water available to grow these crops. Through Musical Hydroponics we can overcome the problems mentioned above.

The overlapping aspects of sustainable development are: **Environmental and Social**. Our proposed model uses 90% of water efficiently and doesn't let the earth get barren with pesticides and weedicides.

Project has got several advantages such as environment friendly, water efficient and space efficient.

SCOPE AND OBJECTIVES

With hydroponic farming method, the arable space problem in India will be solved in the future. More cultivars of staple crops can be grown, and consumption of soil and water will be reduced, or just not required. In terms of farming systems, Ruthenberg classified hydroponic cultivation as a “high input – high output – high risk” system. Before going for a large scale hydroponic system, the growers should be much more critical with regard to site selection, structures, the growing system, pest control and markets.

Develop protocols for evaluating selected cultivars of leaf, fruit, and seed yielding speciality vegetables, herbs and spices and to determine factors to sustainable hydroponic culture under controlled environment agriculture (CEA) systems.

To assess the relative suitability of different mineral nutrient solution formulations for growth, development and yield.

To develop nutrient management strategies for optimizing nutrient-use efficiency.

METHODOLOGY

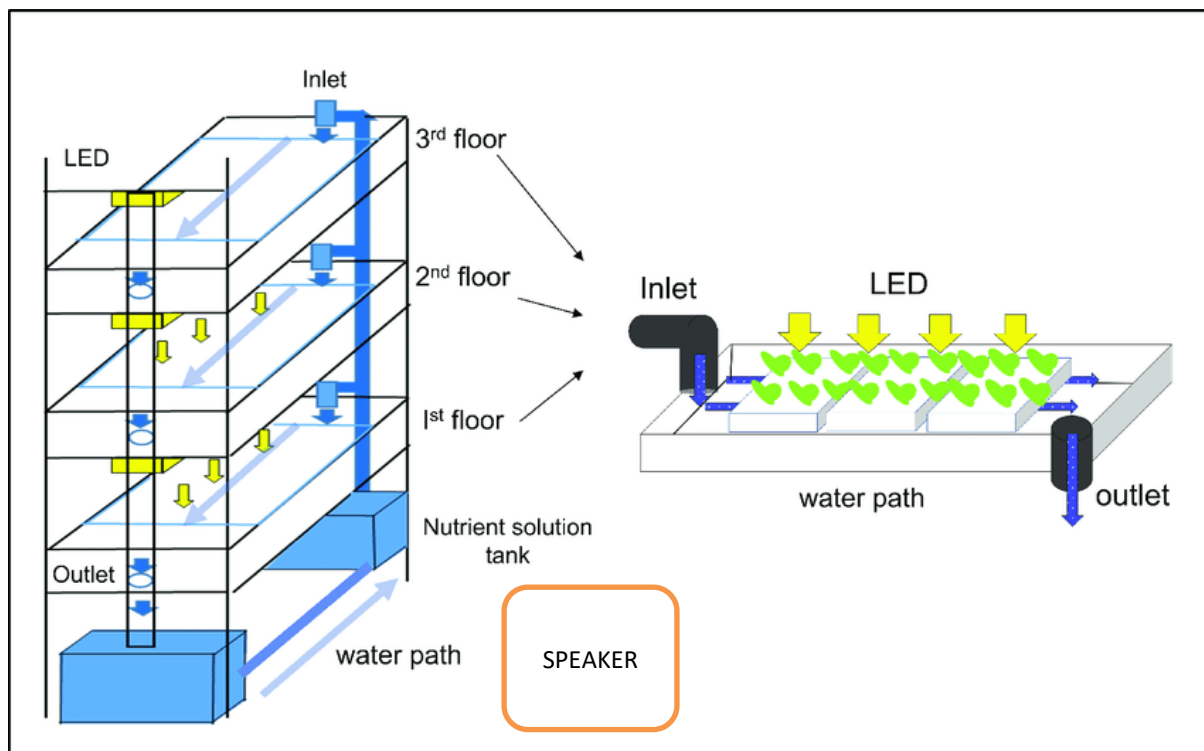


Fig 1: Basic structure and model of hydroponics

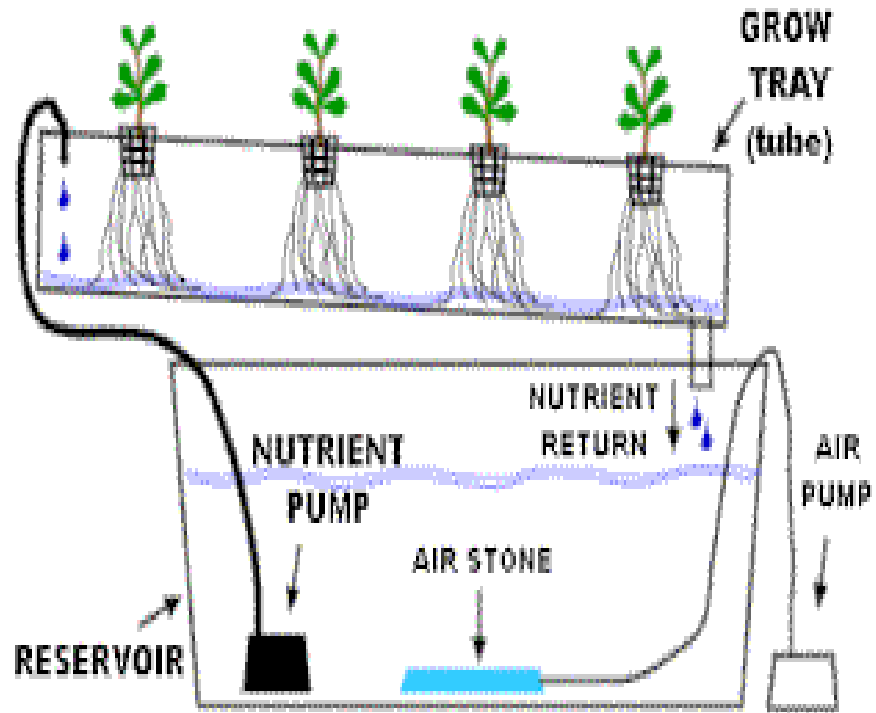


Fig 2: Hydroponics system

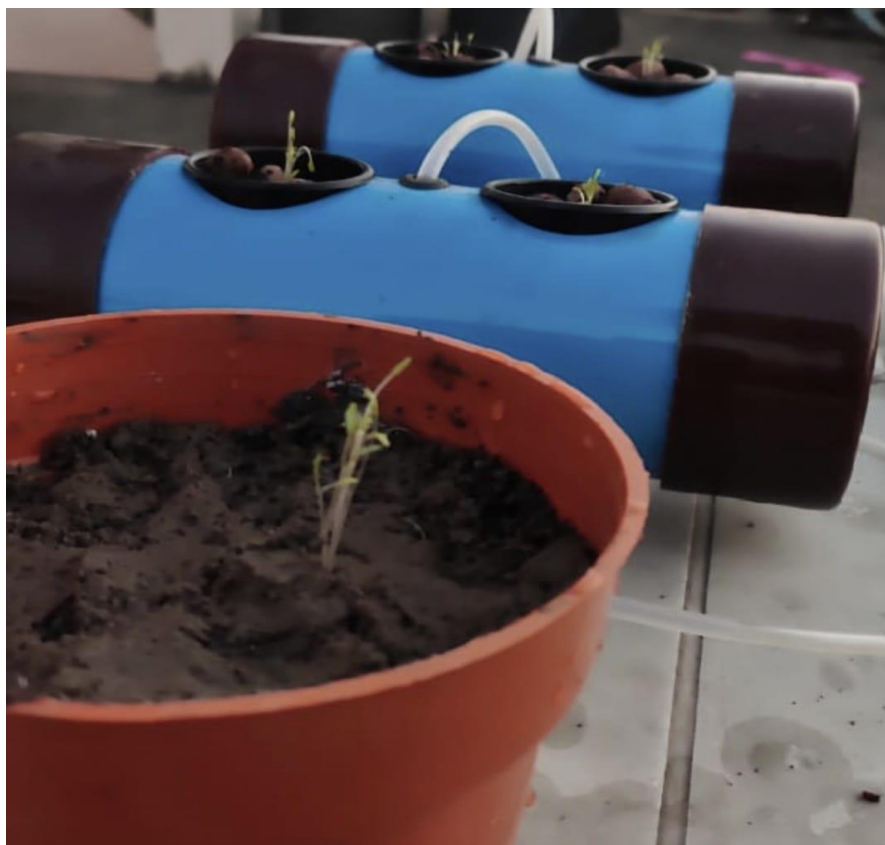


Fig 3: Hydroponics model

COMPARITIVE STUDY

Hydroponics is water efficient, space efficient and high production system than conventional farming.

Musical Hydroponics shows faster and higher produce than hydroponics and conventional farming. Vibrations of music like classical and devotional music promotes streaming of cytoplasm which cause increase in growth hormones which further increase leaf size and height of the plant which promotes more photosynthesis and thus help in getting high yield and result in high returns.



VS



HYDROPONICS

- **Less Land**
- **Environmentally Friendly**
- **No Need Of Pesticides**
- **Water Consumption Is Less**

CONVENTIONAL FARMING

- **More Land**
- **Land Contaminating**
- **More Use Of Pesticides**
- **More Water Is Required**

Fig 4: Hydroponics vs Conventional Farming








Crop	Soil Agriculture Avg Per Acre	Hydroponic Agriculture Avg Per Acre
Lettuce 	9-10 tons	300 – 400 tons
Strawberries 	20 – 25 tons	50 tons
Cucumber 	15 – 20 tons	200 tons
Tomato 	10 – 12 tons	180 – 200 tons
Bell Pepper 	10 – 12 tons	120 – 140 tons
Potato 	8 – 10 tons	60 – 70 tons
Cabbage 	6 – 7 tons	10 – 12 tons

Fig 5: Yield comparison of hydroponics and soil cultivation

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 musical hydroponics.

Job creation: Skilled labours are required to grow plants in hydroponics.

Music changes mind: Pleasant soothing music not only activates plants but also humans.

COST OF THE PROJECT

Capital costs would include the cost of Land, Green house, Soil preparation, Drip system, Mulching sheet, Project consultancy

Operational costs would include the cost of Poly bag, Coco peat, Nutrients, Seeds, Electricity

Revenue flow:

Capital costs: (when land is owned)

Cost of land	Rs 0 lakhs
Cost of green house	Rs 19 lakhs
Drip irrigation	Rs 5 lakhs
Soil preparation	Rs 40,000
Mulching sheet	Rs 20,000
Project consultancy	Rs 6 lakhs
Grand Total (Every 5 yrs)	Rs 30.5 lakhs (approx.)

Operational costs: (1 acre)

Poly bags	Rs 24,000
Coco peat	Rs 1,35,000
Trellising thread and clips	Rs 25,000
Nutrients per cropping cycle	Rs 1,00,000
Organic pesticides per cycle	Rs 30,000
Seeds	Rs 1,44,000
Salary for 2 employees	Rs 2,40,000
Electricity	Rs 60,000
Grand Total (per year)	Rs 9 lakhs (approx.)

Revenues: (assuming for 1 year)

Number of Kgs yield per plant	6kg
Number of plants per yield	12,000 plants
Number of yields per year	2 yield
Price per Kg sold in the market	Rs 20 per kg
Total calculation	$6*12000*2*20$
Grand Total	Rs 33.5 lakhs (approx.)

➤ **Equated profit about 19 lakhs per year**

If the land is leased, based on the rent the amount gets deduced from profits.

CONCLUSION

In highly populated country and developing country like India there is a greater need of hydroponics as it can feed the whole nation. The proposed model caters the different UN goals.

- No hunger
- Good health
- Sustainable cities and communities
- Protect the planet
- Not only the UN goals but also it helps to protect our mother earth and save water.

24. MODISH LITTER BASKET

COLLEGE	Sharda University, Greater Noida Aligarh Muslim University, Aligarh
GUIDE	Dr. Anupam Agarwal
COLLEGE STUDENTS	Jyotishna, Puneet Kumar
SCHOOL STUDENTS	Charu, Aditi
SCHOOL	Ramanujan Sarvodaya Kanya Vidyalaya Mehrauli, Delhi

ABSTRACT

The proposed “Modish-litter-basket” is an incorporative research model which is designed keeping in view the need to clean our environment and make use of waste material by using some innovative technology, and to segregate biodegradable waste from non-biodegradable and ferrous material, so that it can be recycled. Our project is very cost effective and easy to carry from place to place. We have make our model semi-autonomous and based on Internet of things.

KEYWORDS- Inductive sensor, capacitive sensor, microcontroller, temperature sensor, ultrasonic sensor, heating coil.

INTRODUCTION

✘ As we know before use of any waste first we have to segregate waste into its suitable categories like biodegradable and non-biodegradable, this technique resolves this problem of segregation and it can be used at both small scale and large scale. So, that we are able to do further process of producing biogas, electricity, fertilizers and recycling of products as well.

✘ Our system is fully autonomous and based on Internet of things (IOT). In this non-biodegradable wastes such as high density plastic and low density plastic can be separated by boiling waste at certain temperature from the common waste. And the biodegradable waste transform into next bin which is underground, it produces methane when boil it with sand.

✘ After this we can further utilized it and make electricity, fertilizers, biogas.

SALIENT FEATURES

The modish litter basket has following features:

- Requires less energy
- Affordable
- Easy to use
- Can be used at small scale as well as large scale
- Easy to carry from one place to other
- Semi-autonomous
- NO harmful gas evolved
- Helpful in cleaning heap of garbage
- Occupy less space

OBJECTIVE AND SCOPE

The main objective of our model is to separate waste very effectively, we can segregate biodegradable, non-biodegradable, magnetic materials after segregation we can recycled the waste into various new products. Here we produce energy from waste and no further waste generated in this so here we are making eco-friendly model which can be found in the home of each citizen of our India, Government can implement it at small as well as large scale. Helps in reduction of garbage from the society.

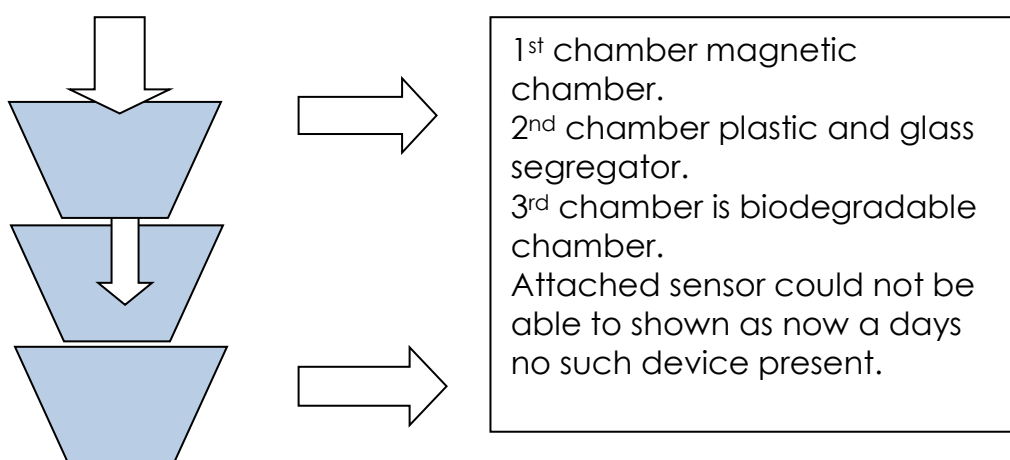
METHODOLOGY:

Our basket consists 3 chambers, one is for magnetic material, second is for plastic / non- biodegradable material and third is for biodegradable material.

First we placed our garbage in magnetic chamber where all magnetic materials stack on the surface of the basket, then we passed garbage through shedder or cutter in which garbage will get some equal size then we pass garbage slowly in which capacitive sensor / inductive sensor present which get a command from

Microcontroller and sense plastic and glass after segregating these two, then we pass garbage into third chamber in which biodegradable waste will segregate completely from non-biodegradable. Now micro controller gives the command to ultrasonic sensor to sense the height of waste, after getting desired height sensed by ultrasonic sensor, Microcontroller will start the relay, Relay will make the heating coil to work which heat the waste with water after reaching optimal temperature to make high density to float. And then we remove the plastic further if present by rotator and segregate out biodegradable-waste.

BASIC STRUCTURE OF Modish litter basket



SOFTWARE AND TECHNOLOGICAL COMPONENTS

- Microcontroller
- Algorithm
- Internet of things (IOT)

1. Microcontroller: It is a small computer on an integrated circuit. Used to give the commands to the system
2. Ultrasonic sensor: It measures distance by using ultrasonic waves in this sensor emits the rays and receive it when reflected back.
3. Relay: It is electrically operated switch, relays are used where it is necessary to control a circuit by separate low power signal, or several circuits controlled by one signal.
4. Temperature sensor: It is a device used to detect measures degree of hotness and coldness and converts it into electric signals.
5. Servo: It is an automatic device that use error sensing negative feedback to correct the action of a mechanism. It includes built in encoder and other position feedback mechanism to ensure the output is achieving the desired effect.

6. SHREDDER: To chopped the waste into required size

COMPARITIVE STUDY

✘ TRASHCON: It is machine developed by Nivedha, a machine segregate different types of waste by using mechanical way it requires a lots of energy and occupy space it's not possible on small scale. Here we use the concept of Internet of things in which low mechanical technology used so it requires less energy.

✘ Her model cost Rs. 9 lakh in starting which is not affordable and applicable on small scale. Our project is affordable and can be used at small and large scale

✘ Other than this, no plan is invented yet

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 IOT.

In today's civilized world waste is also become more complicated, there are techniques which are used for recycle & reuse it but before this, first we have to identify the nature of waste and segregate it. And we have found a peaks of waste in India which consists a mixture of biodegradable and non-biodegradable waste, metallic and non-metallic waste sanitary napkins cover with polythene bags and usually these heaps are not focused, if focused then waste is segregated manually which is very dangerous for workers and then further process of like recycling and reuse or making biogas begins. So here is the problem of segregating biodegradable and non-biodegradable waste.

COST OF PROJECT: It is variable and depends on how much garbage you want to separate out.

CONCLUSION

The Proposed model caters to these **FOUR** National missions namely:

- **MAKE IN INDIA** – Automated machinery can be setup completely here.
- **CLEAN INDIA-** A lot of garbage heaps is converted into a usable product, energy, electricity etc.
- **START-UP INDIA**–Our Further plan for the model is not only a business plan but also will create job opportunities.
- **Municipal Solid Waste Management** -There are many goals in sustainable cities and communities, but here I am targeting on 'Municipal **Solid Waste Management**'.

25. FOREST-DESERT LAND SEGREGATION

COLLEGE	JSS Academy of Technical Education, Noida
GUIDE	Ms. Deepti Aggarwal
COLLEGE STUDENTS	Gunjan Yadav, Mehak Mittal, Shreyansh Sengar
SCHOOL STUDENTS	Vaishnavi Sharma, Jyoti
SCHOOL	Rajkiya Balika Inter College, Sector 51, Noida,

ABSTRACT

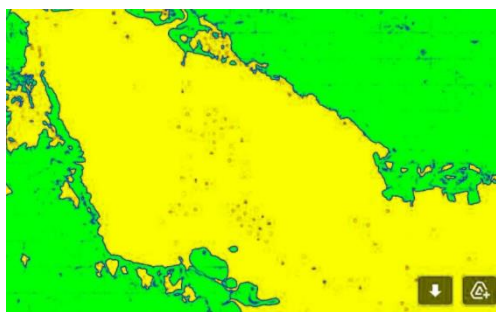
Deep Learning is getting used for a spread of tasks in many fields for segmentation, self-driving cars, and terrain analysis. The key point is that altogether of the tasks the model is getting used is a few combinations of the Fully Connected Neural Network (FCNN), Convolutional Neural Network (CNN).

With the forests being wiped out, this project aims to mark the forest and land areas on satellite images. This will help researchers calculate the rate at which trees are disappearing for particular areas. This will also help to take necessary steps for prevention.

SATELLITE IMAGE



SEGMENTED IMAGE

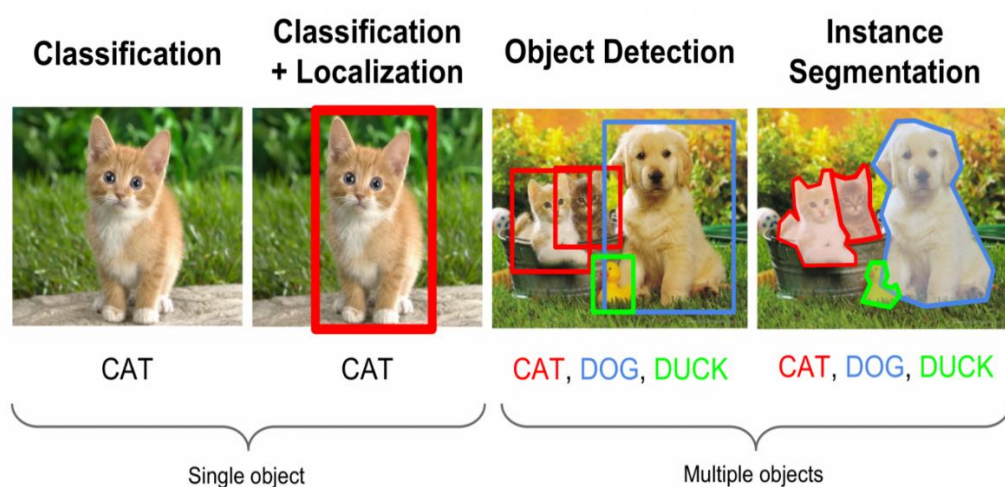


Inspired by earlier works, we study the appliance of deep learning models to detect FOREST and DESERTED LAND from the satellite images. In this project we are going to use this dataset containing satellite images of forests. A small subset has been labelled with binary pixel masks depicting the area of interest.

INTRODUCTION

Computer Vision and Pattern Recognition problems are categorized into 3 major categories of problems.

1. Image Classification: Image classification is that the process of categorizing and labelling Groups of pixels or vectors within a picture supported specific rules.
2. Image Detection: Image or Object Detection may be a technology that processes the image and detects objects in it.
3. Image Segmentation, this is often the toughest and doubtless the foremost useful class of problem among the three.



We can divide the input image into various parts called segments in the output map. It's not an excellent idea to process the whole image at an equivalent time as there'll be regions within the image which don't contain any information. By dividing the image into segments, we will make use of the important segments for processing the image. That is how image segmentation works.

We can broadly divide image segmentation techniques into two types.

1. Semantic segmentation.
2. Instance aware segmentation

Consider the following images:

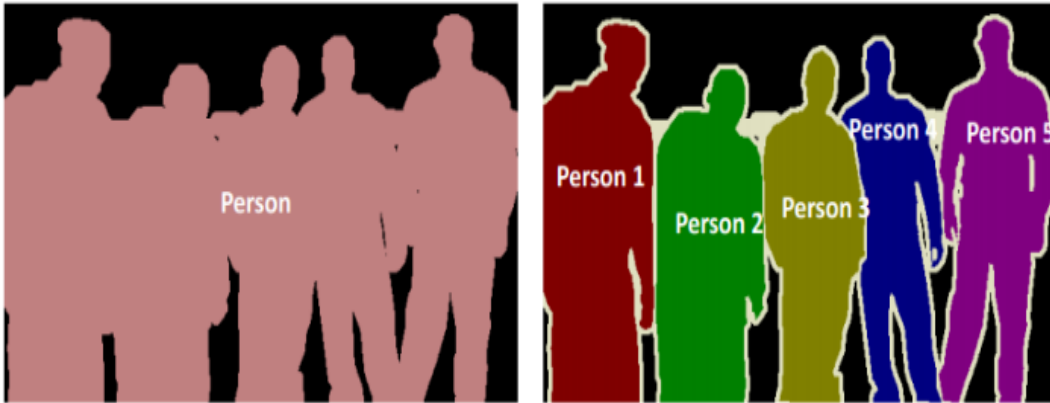


Image 1

Image 2

In image 1, every pixel belongs to a specific class (either background or person). Also, all the pixels belonging to a specific class are represented by an equivalent color (background as black and person as pink). This is often an example of semantic segmentation

Image 2 has also assigned a specific class to every pixel of the image. However, different objects of an equivalent class have different colors (Person 1 as red, Person 2 as green, background as black, etc.). This is often an example of instance segmentation

Image segmentation helps us understand the content of the image and should be an important topic in image processing and computer vision. It's many applications like compression, scene understanding, locating objects in satellite images, etc. Over time, many algorithms are developed for image segmentation but with the arrival of deep learning in computer vision, many deep learning models for image segmentation have also emerged.

SOLUTION APPROACH

Since this is an image segmentation problem as discussed above, we will be using an encoder decoder architecture named U-Net.

The base architecture will be normal U-Net with a following change in the architecture:

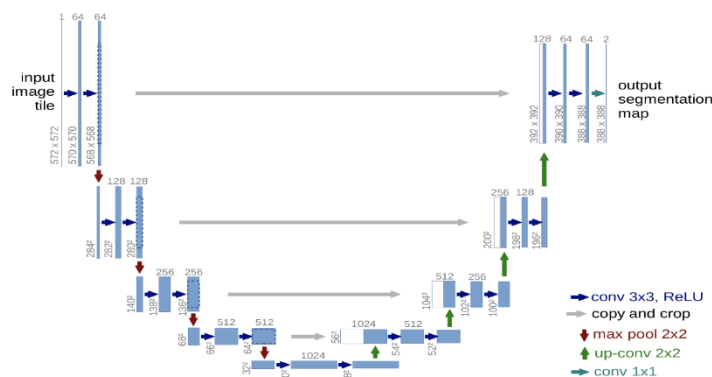
1. Integration of attention gates on top of the skip connections in the U-Net.
2. A ResNet-34 based encoder in place of standard encoder.

U-Net:

The U-NET was developed by Olaf Ronneberger et al. for Bio Medical Image Segmentation. U-Net is a fully convolutional encoder decoder network. Unlike normal encoder decoder networks what makes u-net special is the presence of skip connections to transfer higher semantic information from down-sampling path to the up-sampling path. Thus, providing additional semantic information to the up-sampling layers. Its architecture is small and is extended to work with fewer training images and to yield more precise segmentations.

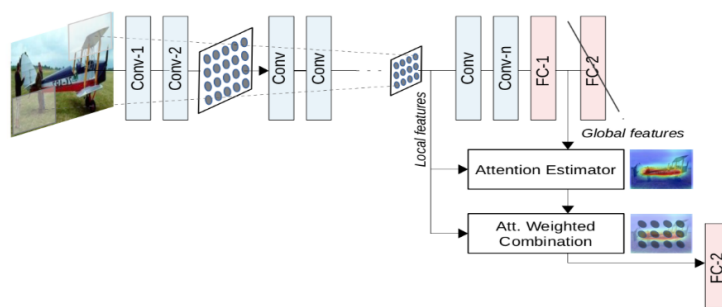
U-Net Architecture:

U-Net has u-shaped architecture, which has a down sampling and a similar up sampling path, yielding a u-shaped architecture.



Attention:

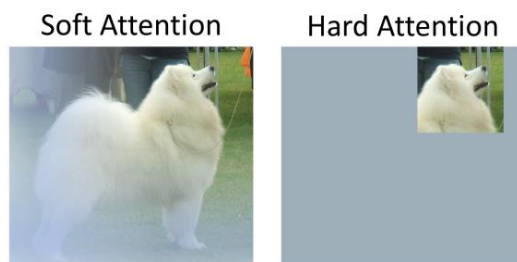
“Need to pay attention” by Jetley et al. introduced end-to-end-trainable attention module for images.



Attention is to give more preference to activations thus engaging the resources onto the relevant features only, providing the network with better generalization power. Essentially, the network can pay “attention” to certain parts of the image relevant to the objective instead of looking at the whole image. Attention helps in giving more priority to the features relevant to the current objective.

Types of Attention:

a. Hard Attention: It pays attention to the relevant features in an image by cropping the image region of interest. Hard attention can select only one area of interest in an image at a given instant of time, that is the hard attention output can only be 0 or 1, thus it has its implications, it is non-differentiable in nature. Since hard attention is non-differentiable, as a result, standard methods of optimization of a loss function with backpropagation cannot be applied with hard attention.

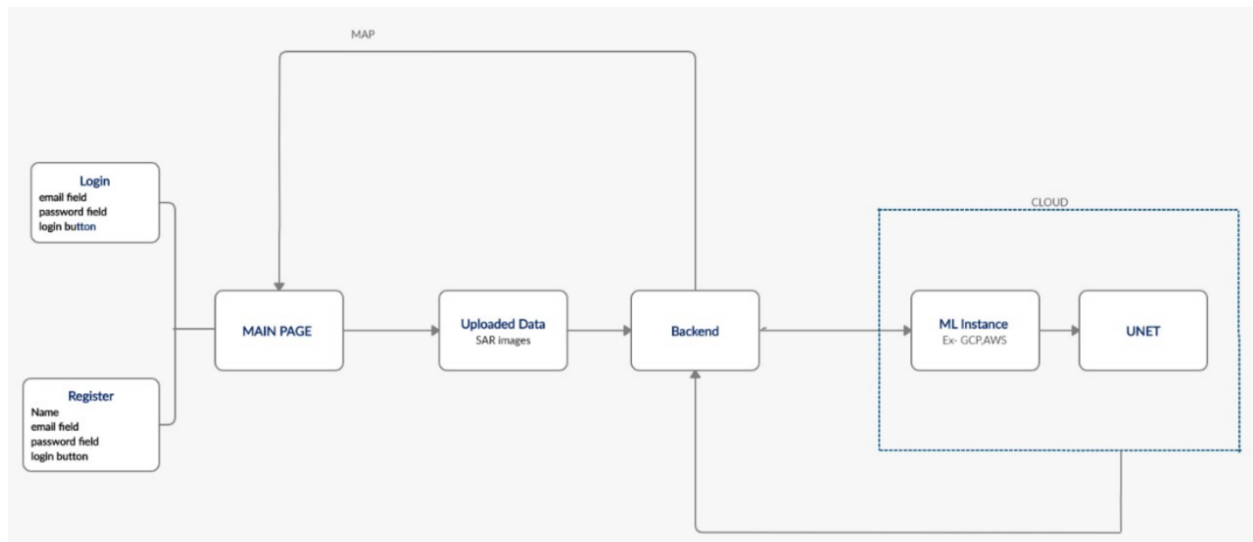


b. Soft Attention: It works by giving weights to different parts of the image between 0 and 1. Areas of high relevance are given a larger weight and areas of low relevance are given a smaller weight. As the model training continues, more and more focus is paid to the regions of interest by giving them higher weights. Soft attention is differentiable in nature thus the standard method of optimization of loss function can be applied with soft attention.

TECHNOLOGY STACK

1. FRONT-END: ReactJS (uses JavaScript)
2. BACK-END: Flask (uses python)
3. CLOUD: AWS

WORKFLOW



CONCLUSION

We concluded that in the time of technological advancement we need our issues to be resolved on time, with this thing in mind we created an online portal for solving the environmental issues too.

With the introduction of portal which automatically detect the variety of land we are not only ensuring the solution to the prevailing issues on policies management but also providing these benefits:

- 1) **Low cost**
- 2) **Less requirement of man-power**
- 3) **Time-saving**
- 4) **Real -time monitoring**

26. PORTABLE ECG MACHINE

COLLEGE	Maharaja Agrasen Institute of Technology, Rohini, Delhi
GUIDE	Ms. Poonam Juneja
COLLEGE STUDENTS	Aakash Kardam, Tanuj Kher, Rohan Singh
SCHOOL STUDENTS	Bhawna Bansal, Muskan Tiwari
SCHOOL	Govt. Girls Senior Secondary School, Nangloi, Delhi Govt. Sarvodaya Co-ed Vidyalaya, New Multan Nagar

ABSTRACT:

The proposed topic “Portable Electroencephalogram Machine for Basic Brain-wave Data Capturing” is a research based model to make possible the availability of EEG machine at the grass-root levels in order to facilitate autonomous and interdisciplinary research prospects, which can then be, in turn, used for understanding, analysing and tracking the mental health of the public in general and drive valuable conclusions to fuel concrete developments in the respective field.

We therefore expect that the developed EEG system, though basic, will contribute towards the developments in this field and, though in infinitesimally small paradigm, help those in the pursuit of developing portable, simple and easy-to-handle EEG machines for general good and research-oriented purposes. Not only this, if this can be well founded then, it can also be used as a part of distant health monitoring systems wherein various disorders as well as day-to-day factors such as stress, sleep cycle etc... Can be tracked and analysed to develop personalised plans for a better and healthy lifestyle.

KEYWORDS:

EEG: Electroencephalography

CMRR: Common Mode Rejection Ratio

CPU: Central Processing Unit

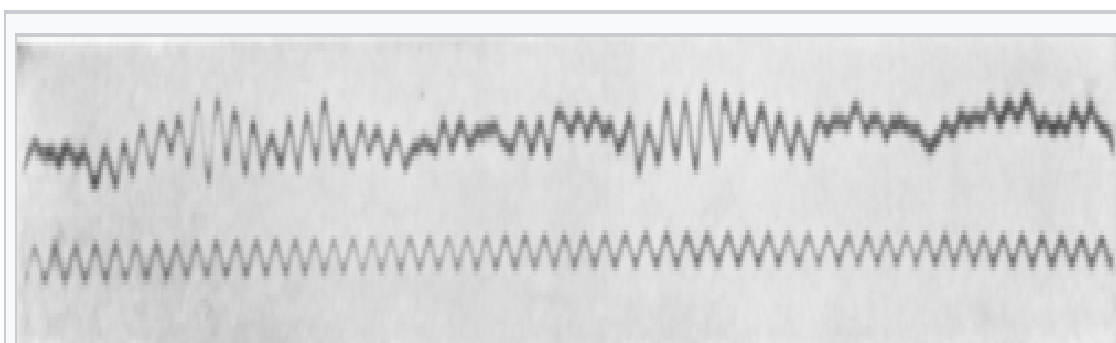
MUX: Multiplexer


IA: Instrumentational Amplifier

PCB: Printed Circuit Board

INTRODUCTION:

- Electroencephalography (EEG) is an electrophysiological monitoring method to record electrical activity of the brain.
- EEG measures voltage fluctuations resulting from ionic current within the neurons of the brain. Clinically, EEG refers to the recording of the brain's spontaneous electrical activity over a period of time, as recorded from multiple electrodes placed on the scalp.
- Diagnostic applications generally focus either on event-related potentials or on the spectral content of EEG. EEG is most often used to diagnose epilepsy, which causes abnormalities in EEG readings.
- It is also used to diagnose sleep disorders, depth of anaesthesia, coma, encephalopathies, and brain death.
- EEG used to be a first-line method of diagnosis for tumours, stroke and other focal brain disorders, but this use has decreased with the advent of high-resolution anatomical imaging techniques such as magnetic resonance imaging (MRI) and computed tomography (CT).



The first human EEG recording obtained by Hans Berger in 1924. 

The upper tracing is EEG, and the lower is a 10 Hz timing signal.

SALIENT FEATURES:

The proposed EEG model will have following features:

- Efficiency
- Portability
- Accessibility to data collected
- Easy to use
- Reduced cost

OBJECTIVE AND SCOPE:

The main objective of this project and our model is to capture brain wave for brain wave data monitoring purpose for study purposes.

Though there are several products and projects which are out there in the market which can do the same job but the point which differentiate our model from all others out there in the market are

1. Simplicity
2. Low cost

Simplicity of this model is ensured due to fact that a common man who wants to monitor its brain activity might not be aware of the technicalities so it would be better to keep it simple.

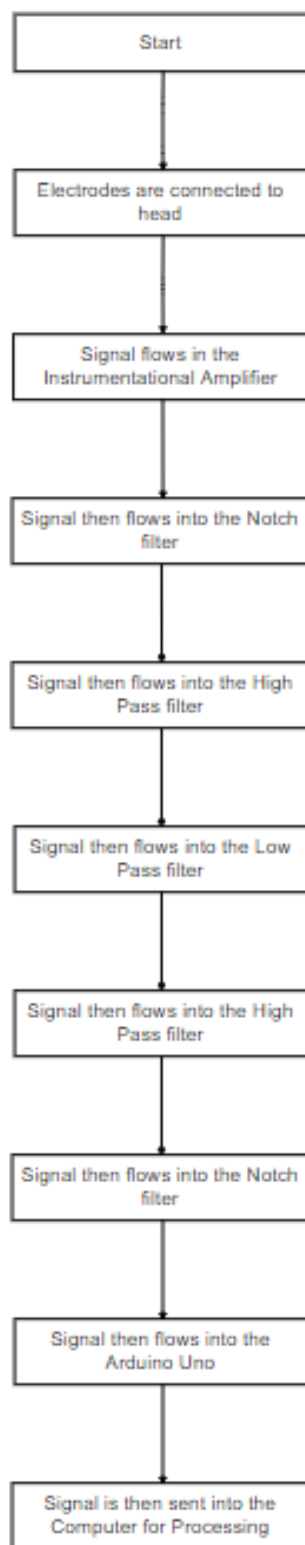
And the point of low cost is taken into consideration just to ensure that every person from all financial backgrounds can have access to this device.

The future objectives related to this project are:

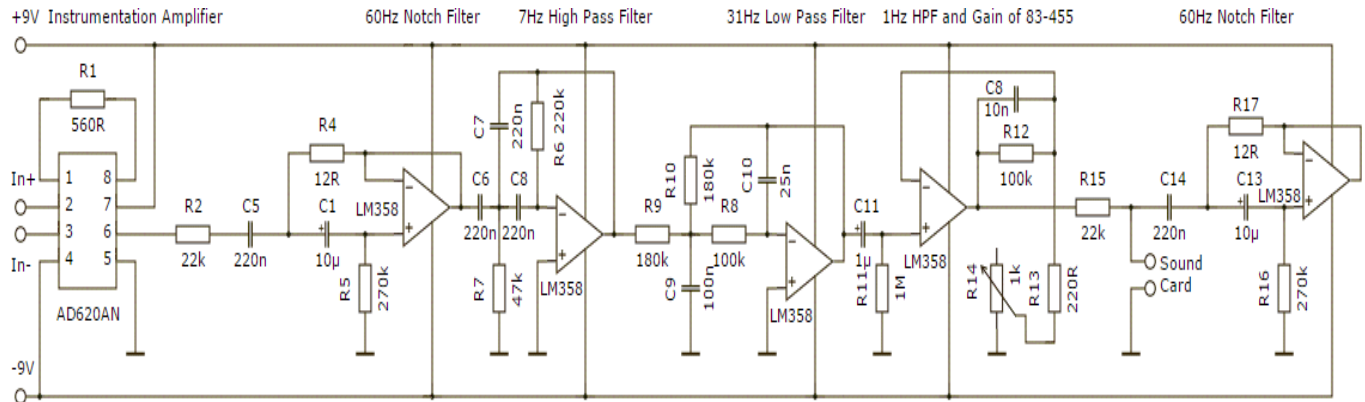
- To develop a software-based simulation of the portable electroencephalogram machine.
- To analyse the associated parameters of the EEG machine thence developed in a simulated environment and compare and contrast it against those presently available in physical.
- To attempt an increase in the efficiency of the model, thus optimising it.

METHODOLOGY:

To understand the architecture or working of the proposed system, a complete flow chart is drawn.



CIRCUIT DIAGRAM:



HARDWARE COMPONENTS:

1. Instrumentational Amplifier (AD620AN)
2. IC LM358
3. ARDUINO UNO
4. Resistor
5. Capacitor
6. Power supply
7. Bread board
8. Jumping wires
9. Electrodes (Gold dry electrodes)

SOFTWARE AND TECHNOLOGICAL COMPONENTS:

- MATLAB
- ARDUINO IDE

SOCIAL IMPACT:

▪ Health monitoring at door steps

With the help of a portable EEG machine, the brain activity of a person can be measured at any time we want and that data can be used for predicting various outcomes like caesuras and various brain activities.

▪ Job creation

Workers needed to plan, develop and implement the project which will create numerous job opportunities thereby when the prototype can be made as a retail or consumer unit to be sold.

COST OF PROJECT:

1. The cost of manufacturing of the existing model will be sum up to be around five thousand rupees.
2. The costliest component in our project are the electrodes because they are gold-electrodes and will be used in capturing the EEG signals from our brain.

CONCLUSION:

We concluded that the brain is the most important organ of our body and the healthy functioning of brain is always good. So Due to this portable EEG machine, we can monitor the brain activity of our brain at any time we want and can analyse and do predictions based on the results we will be getting after the brain monitoring.

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

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

27. FOREST FIRE ANALYSIS USING GIS

COLLEGE	Ajay Kumar Garg Engineering College, Ghaziabad Jaypee Institute of Information Technology, Noida
GUIDE	Mrs. Sonali Patle
COLLEGE STUDENTS	Pawan Kumar Gupta, Himanshu Maurya
SCHOOL STUDENTS	Pratik Sidhant Thakur, Aditya Joshi
SCHOOL	Rajkiya Sarvodaya Bal Vidyalaya, No-2, Shakarpur, Delhi Rajkiya Srvodaya Bal Vidyalaya, Laxmi Nagar, Delhi

ABSTRACT

Forest fires in Uttarakhand have been regular and historic feature. Every year forest fires in Uttarakhand causes great loss to the forest ecosystem, diversity of flora and fauna and economic wealth. Remote sensing and GIS technology that has been used to detect forest fires and recent technology can send an early warning to prevent forest fires. Remote sensing has also been effectively used in the study monitoring, detection of forest fire and future planning. Thus the main aim of this study is the causes and where the forest fire takes place by preparing fire events density map on the bases of using Remote Sensing real time forest fire data from EOSDIS NASA and GIS techniques. Outcome of the study demonstrate that the proximity to inhabited places, dry climatic conditions and dry Chir pine forest cover are mainly responsible forest fire in the state. These types of studies are helpful to suggest preventive measures in different risk areas of Uttarakhand.

Keywords: Remote sensing and GIS technology, forest fires, detect forest fires techniques.

INTRODUCTION

Forest fire is one of the major disasters in the forests of Uttarakhand. These are many indigenous and endangered species which are adversely affected due to forest fires. Basically forest fires have been categorized into three types, ground fires, surface fire and crown fires. Ground fires are not easily predictable as it spread within rather than top of organic matter. It consumes organic matter like duff, musk or peat present beneath the surface litter of the forest floor. Second is surface fire characterized by the fast moving fire which consumes small vegetation and surface litter along with loss debris and third one is crown fire that burnt top trees or shrubs without any close link with surface fire. Current trend of increasing day by day rate of forest fire events in state, there is an

urgent need to generate a geo-spatial fire events data base that help in planning, decision making measures.

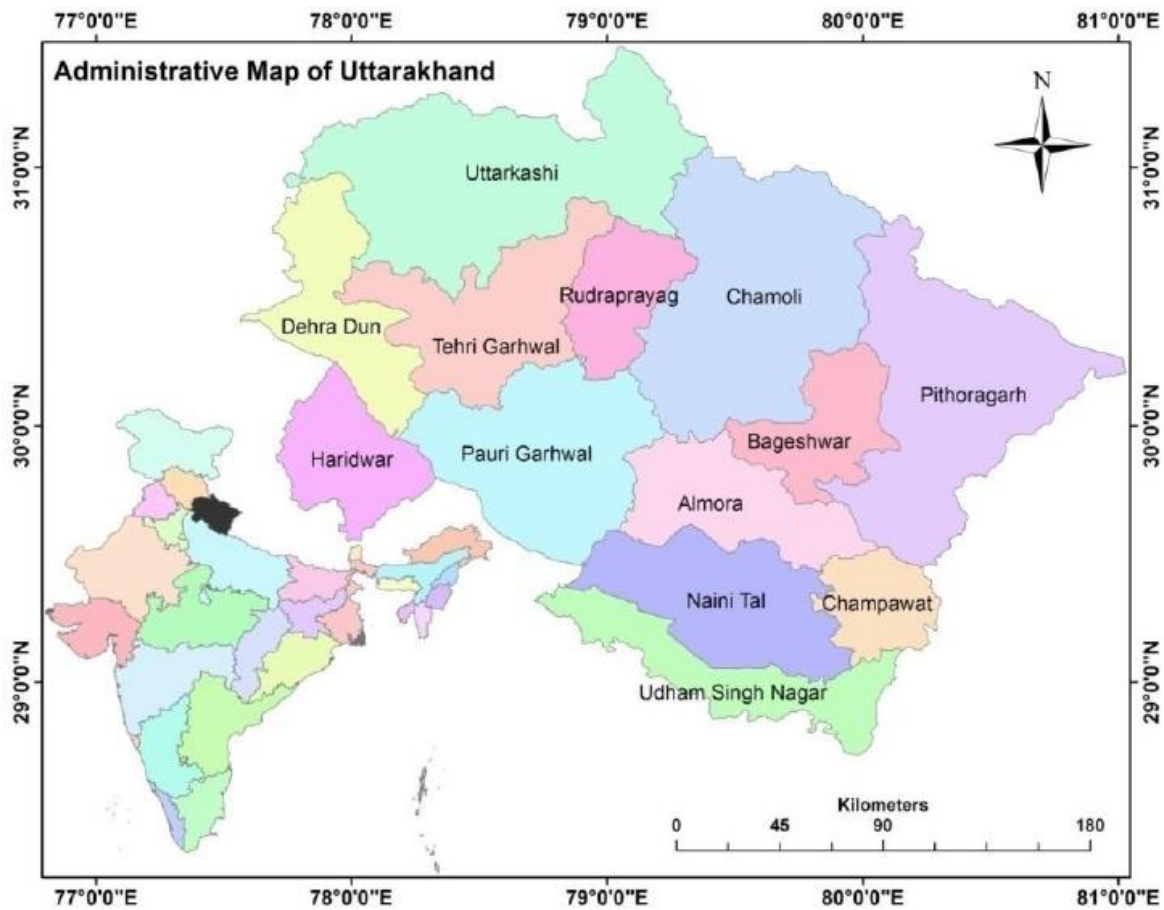


Fig. 1 Administrative Map of Uttarakhand

MATERIAL AND METHODOLOGY

Installing QGIS <https://qgis.org/en/site/forusers/download.html>

Installing Plugins One of the strengths of QGIS is the availability of capable plugins that have been written for it.

- To see what plugins are installed, open QGIS by double-clicking on the “QGIS Desktop” icon on your desktop or in your start menu.
- Then, click the Plugins menu at the top of the main QGIS window, and navigate to “Manage and Install Plugins”.
- When the Plugins window opens, search for the following plugins and install them if they are not indicated as already installed (having a checked- or unchecked-box to the left of the name; uninstalled plugins will have a puzzle piece emblem next to the name):
 - o Quick Map Services
 - o Processing (installed by default)

- To ensure these plugins are active, make sure the box next to the name has a check-mark in it.

Overview of QGIS

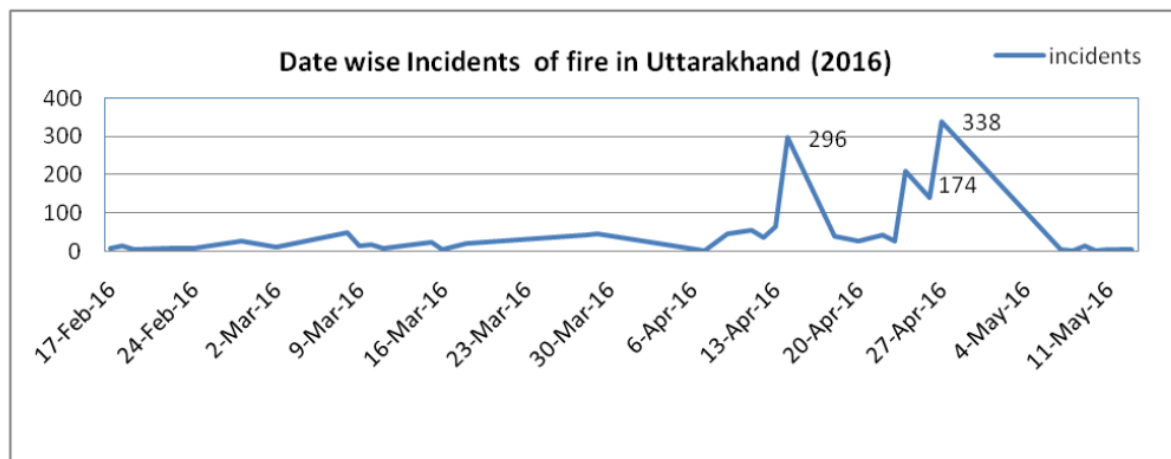
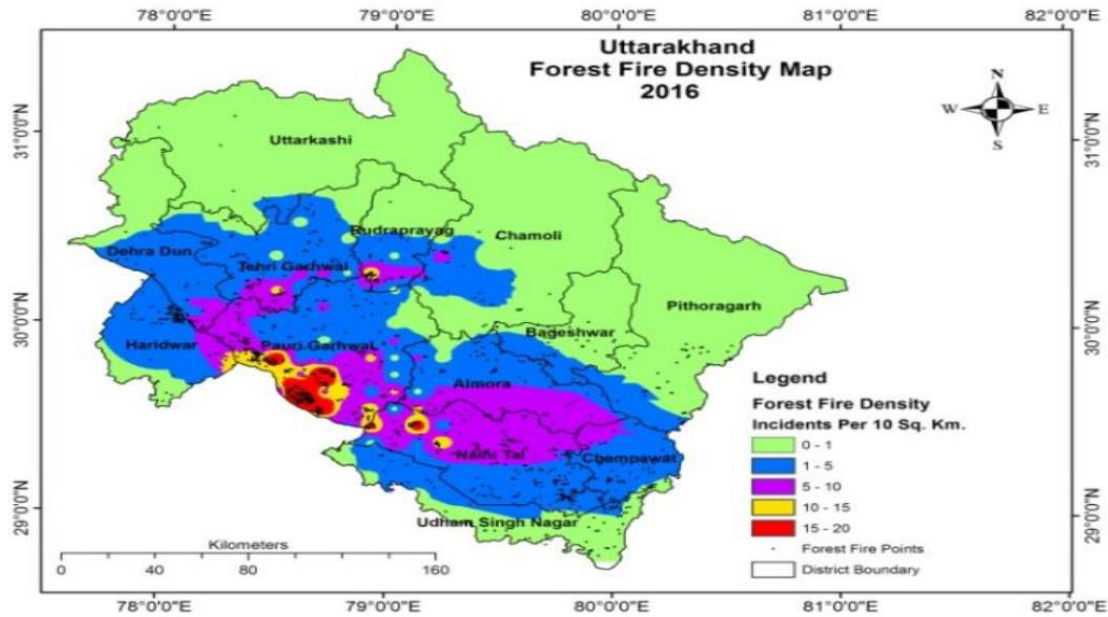
The biggest area is reserved for the map. To the left of the map, there are the Layers and Browser panels. Under the map, we can see the information bar, which includes (from left to right):

- Search box
- The current map Coordinate
- Map scale
- Magnifier
- Rotation
- A checkbox for render
- The project coordinate reference system (CRS)
- Messages (logs)
- Updates available for plugins.

MAP	SOURCE OF SATELLITE
Relief and Slope Map	ASTR DAM
Land use and forest type	BHUVN
Uttarakhand forest	EOSDIS
Department	NASA

CAUSES OF FOREST FIRE IN UTTARAKHAND

Dense and dry vegetation are more susceptible to forest fire drier the climate the more prone is site for fire. Aspect play one of the major roles in the spread for fire like southern slope which are more vulnerable region like topography influence the wind as a particular region like fire treeless more rapidly in up slope. The road plays vital role in chance of fire and physical activities by man, animals or vehicle on the road can cause an unwanted fire. In settlement lots of human activities can causes fire in the proximity to settlement, which can spread forest fire and causes of lot of havoc in the area.



HARDWARE COMPONENTS:

Hardware is the computer on which a GIS operates. Today, GIS software runs on a wide range of hardware types, from centralized computer servers to desktop computers used in stand-alone or networked configurations.

SOFTWARE COMPONENTS:

GIS software provides the functions and tools needed to store, analyze, and display geographic information. Key software components are: -

- Tools for the input and manipulation of geographic information
- A database management system (DBMS)
- Tools that support geographic query, analysis, and visualization
- A graphical user interface (GUI) for easy access to tool

POSSIBLE EFFECTS OF FOREST FIRE:

In short term effects of forest fire consumes vegetation woody debris and soil organic matter. It also heats soils and water streams. It kills animals, increases air pollution and effects the daily earners who are depend on various forest products for their livelihood.

In long term of forest fire, soil productivity is greatly affected which changes the forest structure and due to which future vegetation development will be affected and it may induce soil erosion. It will be adversely affected abundance, density and distribution of creature right from microbes to Fire vane become a threat of many forest wind their Biodiversity

A regional level biomass stock and hydrological cycle are adversely affected. Due to increased percentage of smoke in environment photosynthetic activity is reduced and thus health of human being and animals is also affected. In the long run, the many stresses by fire, cattle, and fuelwood cutting can lead to the complete destruction of Himalayan forests. The fire, as such, influences the structure and process of a natural forest ecosystem. The periodicity, spatial coverage, and severity of such fires vary temporally and these fires are generally associated with excessive accumulation of dry pine needles and leaf litter in pine and oak forests of Uttarakhand State.

CONCLUSION

Fires are lit by people for various reasons but fire become rampant when the fuel load is not removed and fire lines are not cleaned. Some measures to mitigate the impact of forest fire in the area. Some applied measures can be followed by the peoples where the forest fire took place with the help of forest department and government should come in the action also to make policy and planning implementation. Most of the local people utilize the forests resources, therefore if efforts are made to provide them subsidies and involve them in forest management practices. Their indigenious knowledge will definitely help us in controlling to some extent. The assessment of forest fire and degradation is most important factor to be considered for better management of forest resources of Uttarakhand. The satellite based remote sensing enabled to map and monitor vegetation resources in varying scale and time. The GIS and Remote sensing techniques enables to organise datasets to analysis and decision making process. The satellite images have a considerable value for forest fire mapping and ecological degradation assessment. It helps in decision making process and proper establishment of a management plan for the green cover areas. We have to understand that we cannot stop forest fires but we can successfully control the fires so that it does not work havoc.

28. BOOKHUB

COLLEGE	Sagar Institute of Research and Technology, Bhopal
GUIDE	Dr. Rakesh Kumar
COLLEGE STUDENTS	Anjali Pandey, Jyoti Rajput
SCHOOL STUDENTS	Vaidilka Sharma, Shalini Tomar
SCHOOL	Govt. Adarsh Residential Girls Institute For Sanskrit, Bhopal

ABSTRACT

As we know that in our India the population is very high due to which poverty is very high and there are some children who want to study but they do not have any medium. They are not able to afford such kind of books which are very expensive. These children want to read, but they do not have books so that they are unable to read and there are some people who have this book, but they not have any medium to donate the book.

We will create a platform through our website where the donor can donate the book and that book will go to the student who will need it. Through this website, we will create a platform where students will be able to take the book without paying any money and can use it as much as possible and get their goals in their life. For website we are using html, CSS and javascript for frontend and for backend we are using java and nodejs.

INTRODUCTION

In this project, we are creating a website through which we will help those students who are unable to afford an expensive book. Through this website, anyone who has a book available can donate it and the student who needs the book can receive it, the student who will receive this book it may only last for a time period. Student must then return this book. If students want to read the book again, student will have to renew the book. So far such a website has not been created which provides the book for free, then our website will be used more and more through this website donor will get a platform where they can donate the books.

Book hub has not been created which provide books for free, then our website will have maximum usage and through this website donor will get a platform where he can donate more and more books.

Through our project we want to solve the problem of education. We will create a platform through our website where the donor can donate the book and that book will go to the student who will need it. We will create a platform through our website where the donor can donate the book and that book will go to the student who will need it. Through this website, we will create a platform where students will be able to take the book without paying any money and can use it as much as possible and get their goals in their life.

SILENT FEATURE:

- 1.) **Donor:** - Through our website donor will get the platform to donate books.
- 2.) **Receiver:** - Through our website receiver get the platform for taking books according to needs.
- 3.) **Mobile Compatibility:** - As more and more people use their mobile phones to access the Internet, creating a mobile optimized website has become a necessity.
- 4.) **Accessible to all Users:** - A user-friendly website should also be accessible to everyone including blind, disabled or the elderly. These users typically use screen-readers to access the Internet. The 508 website accessibility guidelines highlight simple web design techniques that can be applied to make sure your website can be accessed easily on-screen readers, making your website available to a larger audience.
- 5.) **Fast Load Time:** - Nothing is more annoying for website visitors than a website that takes long to load. In fact, slow speed is one of the main reasons why visitors leave a website. Making sure your website loads within 4 to 6 seconds is important for good usability. It also affects your search engine ranking.
- 6.) **Browser Consistency:** - Browser compatibility can be easily overlooked. Even the websites of some of the most reputable companies suffer from this problem due to neglect. This is bad for branding and has a negative effect on website usability.
- 7.) **Effective Navigation:** - Good navigation is one of the most important aspects of website usability. Simple HTML or JavaScript menus tend to work best and appear consistent on all browsers and platforms.
- 8.) **Contrasting Color Scheme:** - It is equally important for the navigation to be clutter-free. Try to limit the number of menu items as far as possible. A drop-down menu or sub-navigation may work better on large site with many sections and pages.
- 9.) **Good Error Handling:** - Good error handling and description on-screen messages are very important for good usability. However, it is often overlooked.

Correct handling of errors at a code level ensures the website is robust and free from bugs. Displaying the right error message improves the user experience and overall usability.

FUTURE SCOPE:

First year: In the first year, we will focus on programming and designing and publish at city level and provide all the books related to education.

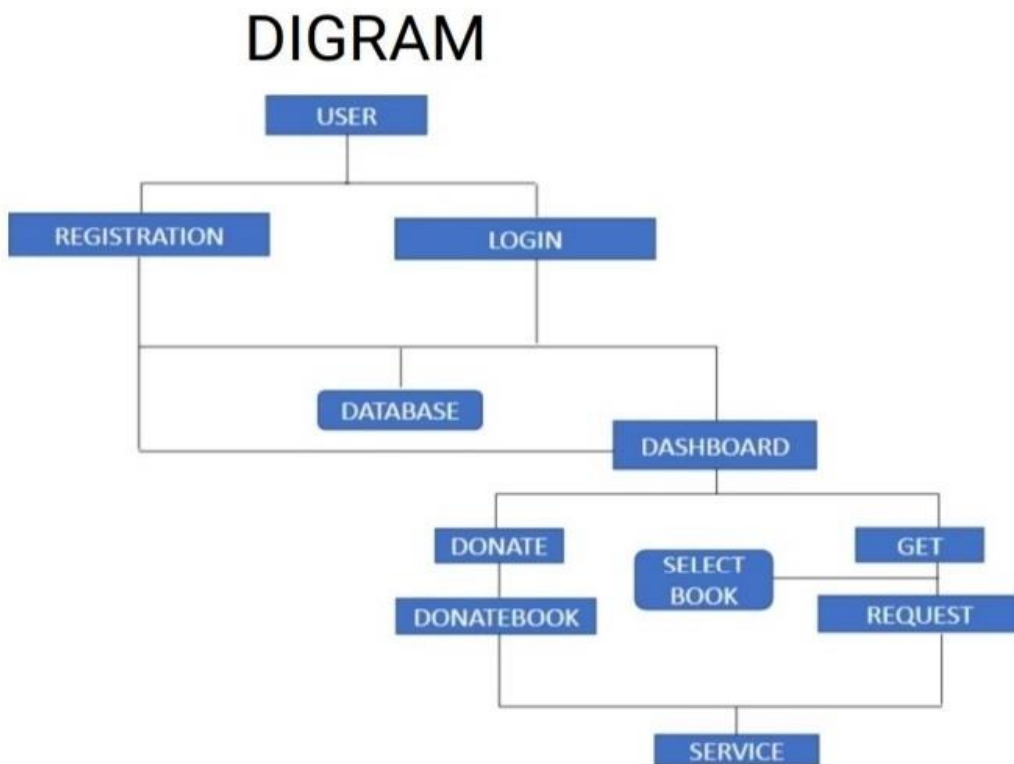
In the first year, we will check that what kind of book is getting more demand then we will provide that book in next year.

Second year: In the second year, we will expand our website a little more and try to make it publish at the state level. Students are benefiting through our website, so we try to provide more books in this website.

And we will try to benefit many students through this website, due to which they can complete their education.

Third year: In the third year, we will try to publish our website at national level and will also try to provide all types of books.

STRUCTURE OF BOOKHUB:



DEVELOPMENT OF WEBSITE:

FRONTEND: - The *front end* of a website is the part that users interact with. Everything that you see when you're navigating around the Internet, from fonts and colors to dropdown menus and sliders, is a combo of HTML, CSS, and JavaScript being controlled by your computer's browser.

Hyper Text Markup Language:

Hyper Text Markup Language (HTML) is the backbone of any website development process, without which a web page does not exist. Hypertext means that text has links, termed hyperlinks, embedded in it.

▪ **Cascading Style Sheets (CSS):**

Cascading Style Sheets (CSS) controls the presentation aspect of the site and allows your site to have its own unique look. It does this by maintaining style sheets which sit on top of other style rules and are triggered based on other inputs, such as device screen size and resolution.

▪ **JavaScript:**

JavaScript is an event-based imperative programming language (as opposed to HTML's (model) that is used to transform a static HTML page into a dynamic interface. JavaScript code can use the (DOM), provided by the HTML standard, to manipulate a web page in response to events, like user input.

BACKEND: - In the computer world, the "**backend**" refers to any part of a website or software program that users do not see. It contrasts with the frontend, which refers to a program's or website's user interface. Everything that happens before the page is displayed in a web browser is part of the **backend**

Back-end focused:

- Scripting languages like PHP, Python, Ruby, Perl, Node.js, or Compiled languages like C#, Java or Go
- Automated testing frameworks for the language being used
- Application Data Access
- Application Business Logic
- Database administration
- Scalability
- High availability
- Security concerns, authentication and authorization
- Software Architecture
- Data transformation

- Backup methods and software

COST OF PROJECT:

The cost could be less than 70000 or more than 50000 to build a website for **books** in terms of actual prize. To create a site, the upfront cost, which includes **launching and designing** it. To develop a **complex custom website**, you might have to shell out even more to buy a perfect domain and hosting for the website.

Some of the significant factors that determine the average cost to build a custom website include:

- Factors by types and purpose
- Factors by phases
- Essential factors

CONCLUSION:

- So far such a website has not been created which provides the book for free, then our website will be used more and more through this website donor will get a platform where they can donate the books.
- We will try to make our website different but our goal is how easily we available the book to the students.

29. ORIPANEL

COLLEGE	Indraprastha Engineering College, Shahibabad, UP
GUIDE	Dr. Pooja Tripathi
COLLEGE STUDENTS	Nishant Mishra
SCHOOL STUDENTS	Samkit Shah, Anumita
SCHOOL	S.S.L.T Gujarat Sr. Sec. School, Raj Niwas Marg, Delhi

ABSTRACT

The proposed Project **ORIPANEL** is which is a unique project to provide foldable solar sunshades and window blinds for house balconies and storefronts such that even people living in small houses can get benefits of free solar energy and reduce their electricity bills. 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. It is an innovative model which involves making low-cost Origami inspired foldable solar sunshades and window blinds as lots of people live in small houses and they can't install large solar panel setup on their houses and they are getting high electricity bills as well, so this project will enable people living in small houses to install foldable solar panel in their houses and reduce their electricity bills.



SMALL HOUSES
IN METRO CITIES

POWER SHORTAGES
& HIGH ELECTRICITY
BILLS



CONVENTIONAL SOLAR PANEL
INSTALLATION NEEDS LARGE AREA



BUT A LARGE POPULATION
DOESN'T HAVE LARGE TERRACE
AREA FOR SOLAR PANEL
INSTALLATION

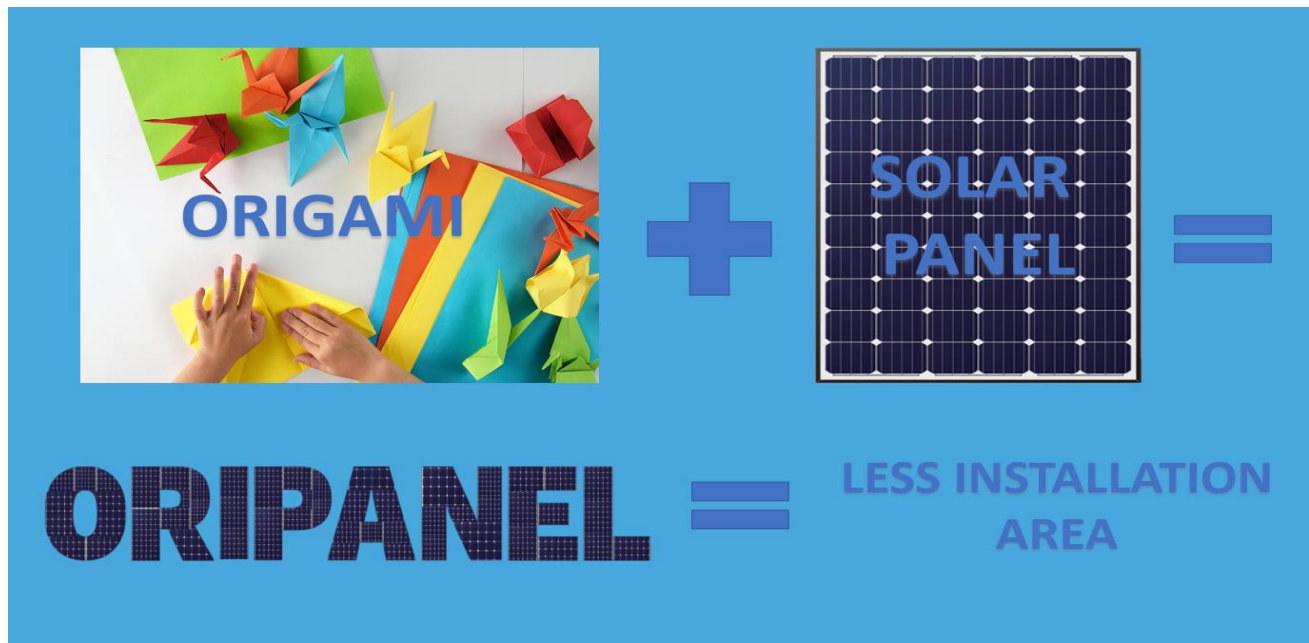
KEYWORDS- Origami, Foldable Solar Panels, Sustainable Development, Renewable Green Energy.

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.
- In present times, the world has been adopting renewable power at a rapid rate. India is also emerging in the global arena as a leading generator of renewable energy in its efforts to move further towards sustainable development. But there is a problem that, in cities like Delhi, Mumbai, Chennai, Kolkata there are many people who live in small flats, apartments and Houses and they can't compromise their terrace area and they can't afford large solar panel setup. And they have to pay expensive electricity bills.
- People living in small houses can't install large solar panel setups on their houses that's why we have developed our origami inspired foldable Solar panel sunshade and solar window blind which can be installed in balconies and windows of people living in small houses.
- Ultimately our project **ORIPANEL enables** people living in small houses get solar energy and reduce their electricity bills as well as decreasing pollution and global warming.
- 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:

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



SALIENT FEATURES

The **ORIPANEL** has following features:

1. Less Installation Area
2. Easy cleaning.
3. Increased efficiency.
4. Compact.
5. Reduced Cost.
6. High Voltage Generation

OBJECTIVE AND SCOPE

- In cities like Delhi, Mumbai, Chennai, Kolkata there are many people who live in small flats, apartments and Houses and they can't compromise their terrace area and they can't afford large solar panel setup. And they have to pay expensive electricity bills.
- People living in small houses can't install large solar panel setups on their houses
- With an aim to introduce a unique solution for the above mentioned problem, we took inspiration from NASA's satellite engineering. One day, I saw a video in which NASA engineers were talking about using an Ancient Origami technology to install foldable solar panels on their satellites so that they can fit in less area in

rockets.

- So, I thought why not we use this origami technology to make foldable solar sunshades for house balconies and storefronts such that even people living in small houses can get benefits of free solar energy and reduce their electricity bills.

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

METHODOLOGY

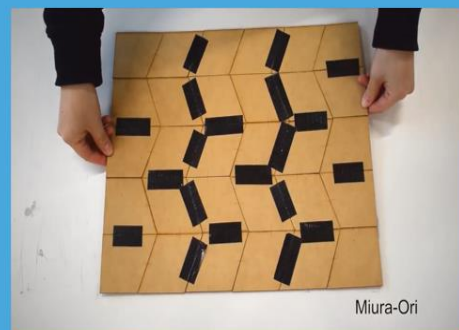
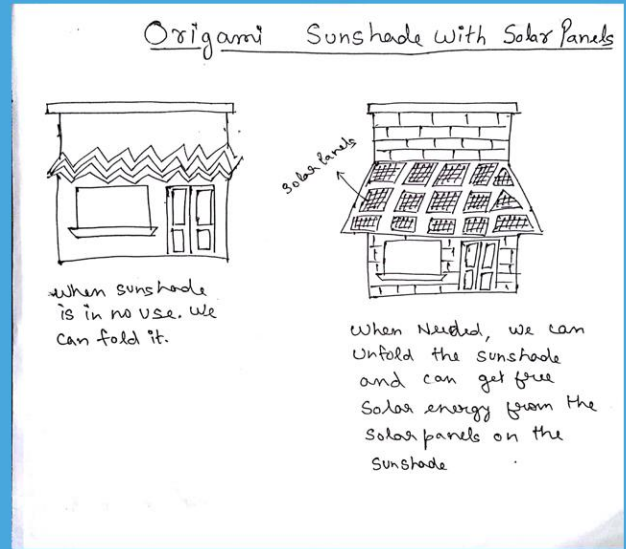
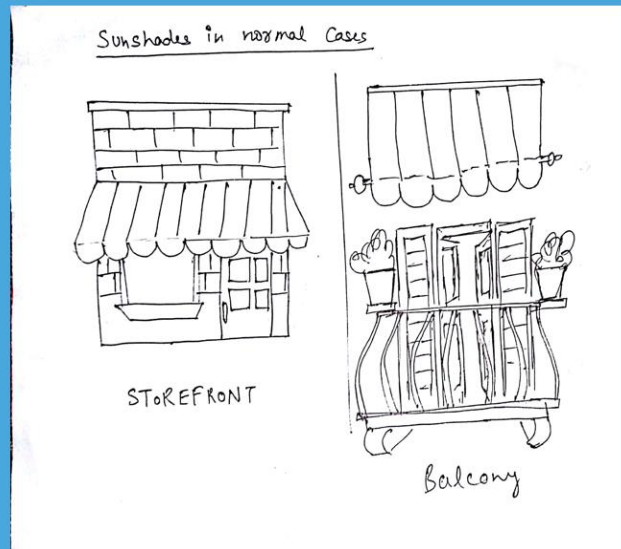
➤ **Solar Sunshade**

- In our solution, we are using Miura origami fold and scissor mechanism to fold and unfold the solar panel array.
- These fold-able, solar panel array can be used in place of conventional foldable sunshades, which are very commonly used in front of any storefront, or in our house's balconies.
- Thus, making these sunshades with solar panels, and keeping them foldable will take less space in small houses and stores and will generate free electricity as well.



“We are replacing the conventional balconies and storefront sunshades with our foldable and adaptive origami based solar panel cum sun shade.”

OUR SOLUTION



- We will place solar panel in the similar fashion as shown in the above image to fold and unfold the solar panel array, so that the solar panel can be used as a foldable solar sunshade.

➤ **Solar window Blinds**

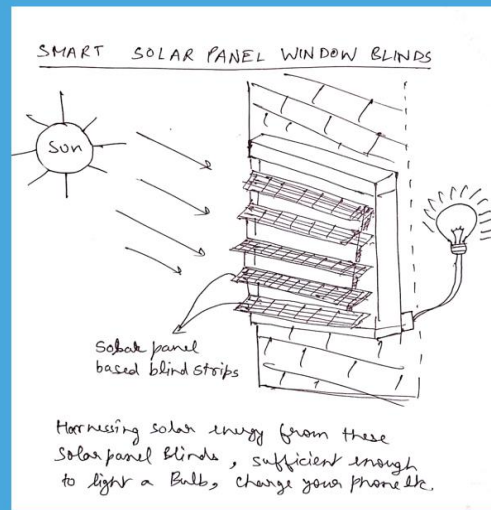
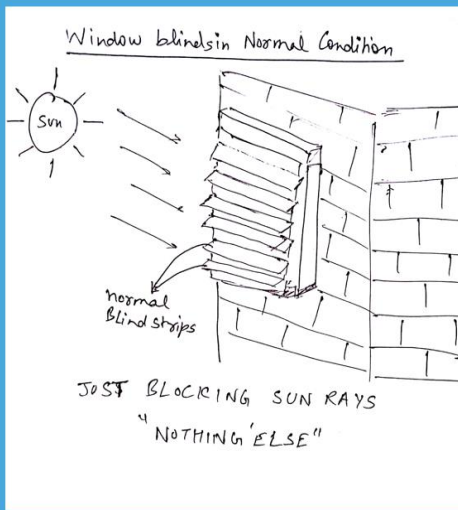
- In our next solution, we are going to convert a conventional window blinds into solar panel blinds.
- These, solar panel blinds can be used in place of conventional window blinds, which are very commonly placed on our house's windows.
- Thus, making these solar panels blinds, and installing them on windows will take less space in small houses and stores and will generate free electricity as well.



AS WINDOW BLINDS

“We are replacing the conventional window blinds with our solar panel blind.”

OUR SOLUTION



- We will replace the normal blind strips of a conventional window blinds with solar panel strips.

HARDWARE COMPONENTS

1. Mini solar panels
2. Arduino board
3. Wooden flex.
4. Servo motor.
5. Linear actuators.
6. Battery.

COMPARITIVE STUDY

Features	Traditional System	Proposed System
Installation Area	Large	Small
Cost	High	Low
Easy Cleaning	NO	YES
Efficiency	Low	Moderate

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.

- **Everyone can Adopt Solar Energy**
- **Fulfilling SDG 7: to ensure clean, green and affordable energy for all.**
- **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**.

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.

30. HYDROGEN FUEL

COLLEGE	GD Goenka University, Gurugram
GUIDE	Mr. Mayank Sehdev
COLLEGE STUDENTS	Kanchan, Vaidehi Vats
SCHOOL STUDENTS	Isha, Anjali Chauhan
SCHOOL	Govt. Girls Senior Secondary School, Ghamroj

ABSTRACT

The IPCC report expresses that the increment of climatic ozone depleting substance focuses has caused an overall temperature increment of 0.56 to 0.92 °C over the most recent 100 years, which brought about an ocean level ascent of around 17 cm because of the warm extension of ocean water and the dissolving of ice over land (e.g., icy masses).

Hence there is the need to bring the change in automobile industry so the companies have introduced electric driven cars and the ones based on hydrogen fuel. The developed countries like United States and Europe have introduced the concept but it's very difficult to replace the complete segment of automobile of petrol and diesel which is responsible for the major emissions of carbon monoxide and carbon dioxide. Hence it is the need of the hour to bring a product in these countries that can enhance the fuel needs and reduce the emissions.

INTRODUCTION

The current industry practices the use of hydrogen in hydrogen fuel cell and that needs the new transducer to convert energy and that is quite expensive. Our product is the one which will add power to the existing transducer (IC engine – petrol variant) to partially power it with hydrogen which will be on demand produced by the distilled water so that again eliminates the use of hydrogen storages which is another difficult* task so our product is the most cost efficient in the industry and hence can do wonders in the industry. Since we do not have the set competition in the market so we will introduce a new business model. The new business model will be based on the pull customer strategy. Since the public of developing countries is very inclined towards the cost efficiency. So we will introduce the product as the product to convert the current vehicle to the water driven automobile which will be a new technology for the layman of these countries. So they should be attracted to the product for converting the

vehicle fuel partially. There may be few products in the market but no proper research has been done by any company yet.

The project's principle is to:

- **Increase efficiency.**
- **Reducing fossil fuel dependency.**
- **Reducing Greenhouse gas emission.**
- **Increasing energy security.**
- **Environment Friendly.**

The automobile sector is very expansive sector in its own and our product can create wonders in any vehicle. Due to adverse climate conditions and inappropriate use of resources, the researchers have already started working on new technologies for the automobile sector to change the type of fuel used to reduce the emissions and increase the efficiency and make the thing cost effective. The research done yet needs the complete replacement of the transducer (here IC engine) as the new vehicles introduced are either battery operated or by hydrogen fuel cell.

It is fine with developed economies but in developing economies are new technologies are not affordable enough that it can reach to all of the public and can be of use and lead to the expected plan. Our product eliminates the harmful emissions and also makes the drive of the vehicle cheap. Here comes the role of our product which can be an addition to the existing engine and can fulfil the fuel requirements without any changes in the current technology which makes it very affordable to use and easily accessible to the entire domain. Since our product partially powers the vehicle with distilled water so it can make the vehicular run also cost effective.

OBJECTIVE AND SCOPE

The motto of our company is to bring innovation with excellence and efficiency. So our product is entirely different from any of the product available in organized market. But our company believes in creation of competition rather than jumping into the existing competition. The potential products of our competition are all the products/companies that are making products to shift the paradigm from the current petroleum as a fuel thing to the new fuel. So the competition is with the Honda Clarity fuel cell, hydrogen driven bike of Honda and Hyundai Nexo for instance. According to official website of Honda (<https://automobiles.honda.com/clarity-fuel-cell#technology>) Fuel cell vehicles typically have range ratings of 300 miles or more and refuelling times of approximately five minutes or less, along with a highly efficient fuel cell to create the on-demand electricity for power with no emissions.

A battery electric vehicle (BEV) obtains its power from electricity stored in highly efficient and powerful batteries that require recharging via a power outlet.

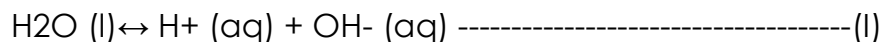
A BEV also produces no emissions and has range ratings that can vary from 50 to 315 miles, depending on battery capacity. With a Level 2 charger, recharging times can vary from 1 to 10 hours. Plug-in hybrid vehicles use a traditional gasoline engine as well as an electric motor with a battery to allow all-electric driving capability. By utilizing this hybrid powertrain, the vehicle can be driven fuel-efficiently for long driving distances. When driven in EV mode, it produces zero emissions. The battery can be recharged from a power outlet much like a battery electric vehicle.



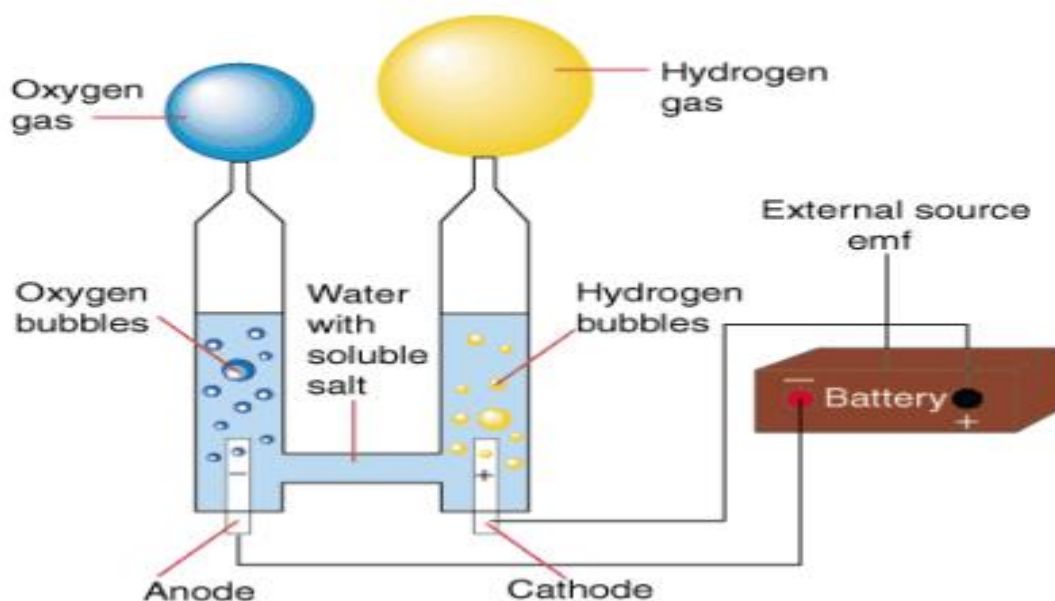
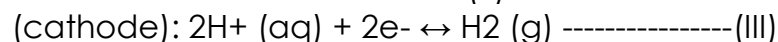
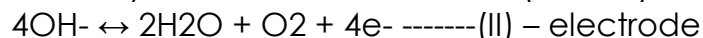
PRINCIPLE

The electrolysis of water is considered a well-known principle to produce oxygen and hydrogen gas. In Figure 3 a schematic of an electrochemical cell is presented. The core of an electrolysis unit is an electrochemical cell, which is filled with pure water and has two electrodes connected with an external power supply. At a certain voltage, which is called critical voltage, between both electrodes, the electrodes start to produce hydrogen gas at the negatively biased electrode and oxygen gas at the positively biased electrode. The amount of gases produced per unit time is directly related to the current that

passes through the electrochemical cell. In water, there is always a certain percentage found as ionic species; H^+ and OH^- represented by the equilibrium equation:



Oxygen and hydrogen gas can be generated at noble metal electrodes by the electrolysis of water: + electrode (anode):



Electrolysis we are performing

We are doing alkaline electrolysis with the help of stainless because the conventional electrodes made up of metal are not economical and the battery is not able to supply a high voltage. From the above theory it is clear that the hydrogen is very eminent fuel but is not used widely due the problem of its storage hence to overcome this problem our product is not storing hydrogen rather it is producing an on demand hydrogen to fulfil the needs of the automobile.

METHODOLOGY

Methodology The data to be collected ranged from the overheating of the engine which can be at different temperatures by different manufacturers hence the methodology opted was to install the kit on the liquid cooled Yamaha R15 and to check whether the overheating red lamp lights up or not.

To check the average of the vehicle with the kit and without it the vehicle was driven almost under same traffic conditions and at the same speed and by the same driver so as to get the best possible comparison. For the pollution data the vehicle under testing has been taken to pollution control booth and the data collected from there has been recorded in the sheets. The data for the production of hydrogen was collected in the company itself in which the time was calculated to electrolyze 100 ml of distilled water which further with calculations led to the amount of hydrogen produced by our kit. While collecting the temperature, average and the pollution the kits from the competition were also analyzed. The coolant temperature sensor -The Engine Temperature sensor of Yamaha R15. The engine temperature sensor is a type of sensor that changes its resistance with temperature. Many critical engine functions such as selection of air-fuel ratio, fuel injection timing, ignition timing etc. depend on the engine's temperature. This is because a cold engine requires a rich air-fuel mixture; whereas the engine running at optimum operating temperature requires a lean mixture.

The engine temperature sensor informs the engine's ECU about the current & ongoing variations in the engine temperature. ECU, in turn, adjusts and regulates the fuel quantity & ignition timing. The data from the engine temperature sensor provides readings for engine temperature gauge on the dashboard. Based on this data, the ECU also controls the additional functions such as switching on / off the engine cooling fan. Since this is a startup company so no laboratory testing has been done and we came up with the new product by complete hit and trial method over the previous technology that the company was using. The new kit developed will be sent for laboratory testing after testing it in the company for about 4 months.

DATA COLLECTED

8. Data collection

Table 4: Data of pollution and average.

	Engine temperature Light blink	Average before kit (kmph)	Average after kit (kmph)	MEASURED LEVEL OF CO Without kit	MEASURED LEVEL OF HC without kit	MEASURED LEVEL OF CO with kit	MEASURED LEVEL OF HC with kit
1.1	-	30	43	1.497	321	0.002	0.00
1.2	-	32	44	0.006	147	0.000	0.00
1.3	-	31	40	0.030	70	0.000	0.00
1.4	-	30	42	1.207	200	0.010	0.00
1.5	-	32	42	0.004	0.00	0.000	0.00
2.1	-	31	48	0.005	150	0.003	0.00
2.2	-	38	47	1.570	250	0.056	0.00
2.3	Red Blink	39	52	0.536	154	0.000	0.01
2.4	Red Blink	40	55	0.780	147	0.001	0.00
2.5	Red Blink	35	50	0.056	207	0.000	0.00
3.1	Red Blink	32	48	1.498	252	0.005	0.00
3.2	-	33	45	0.007	158	0.008	0.00
3.3	-	35	48	0.030	140	0.009	0.00
3.4	-	36	49	1.200	207	0.007	0.01
3.5	-	37	45	0.045	321	0.004	0.00
4.1	-	38	52	0.035	142	0.005	0.00
4.2	Red Blink	39	53	1.585	89	0.012	0.00
4.3	Red Blink	40	54	0.540	210	0.007	0.00
4.4	Red Blink	40	56	0.790	78	0.009	0.00
4.5	Red Blink	39	55	0.064	205	0.002	0.00

Table 5: Data of production of hydrogen.

Volume of distilled water in kit (in ml)	Time taken in seconds	Volume of water electrolysed in one second (in ml)	Volume of hydrogen produced per second in ml
2	30600	0.000065	0.08
5	76923	0.000065	0.08
7	107100	0.000065	0.08
10	171000	0.000058	0.07

If everything is ideal. On an average the hydrogen produced per second is 0.077 mL.

Approximately we are getting 116.08 KJ in one second by using our kit. The consumption of petrol of the said automobile is 2.88 ml per second. (Calculated using the average when operating at a constant speed of 40 Km/hr)

Approximate need of the engine per second is 131.904 KJ According to our investigations if we inlet the hydrogen at the above said amount the engine is

overheated in about 2-3 seconds and hence we cannot even achieve the target of replacing 50% of petroleum with hydrogen. The best combination obtained is reducing the amount of petroleum by 20%-25% for the normal operation of the vehicle.

INDUSTRIAL APPLICATION

The kit supports the hydrogen fuel in the normal engine and increases the efficiency. The results have been demonstrated in the conclusion. Basically this product can be implemented in electricity generators to make it cost effective. The future of the product lies in which any sought of water uses the heat of engine to do distillation of water which can further be sent to the kit for the production of hydrogen and oxygen.

COST

Estimate the expenses in creating, operating, and marketing the business and its product/service. You will need to include the proposed team budget for attending the Innovation Summit should your team advance to the Final Round.

When it comes to creating a business we should kickstart it with the minimum possible expenses. The product needs a setup which consists of a moulding for making shape of our product. The cost of one moulding is approximately 175 USD and we require 3 units for a constant production in which out of 3 one will be spare and 2 will be inline production house. The cost of space will be about 3000 USD for one year's office and production house lease. So the fixed cost is 3525 USD.

The material cost will be 10USD per piece and the operating cost of the machinery including the electricity expenditure and labor costs is 5USD, compiling everything the product cost per piece is 15 USD. We will be selling it at a very decent price of 25 USD. The breakeven point with these costings is at 300 units with total revenue is 375000 USD, with the total cost 228000 USD and the profit of 147000 USD with expected sales to be 15000 units.

The cost calculated is without the marketing costs, since product of this kind is not a common one so the marketing is very important. Marketing is to be one in such a manner that layman should also understand the technical concept and the overall benefits of this product which are directly to the consumer and to the surroundings.

The marketing cost initially we are considering to be fixed cost, so floating advertisements on social media, newspapers and campaign is another 2000 dollars for a year.

The patenting costs are about 9000 USD and registering a company is about 100 USD. Considering these all to be the fixed costs. The total fixed cost is 14625USD.

The breakeven point with such expenditure is at 1463 units with total revenue is 375000 USD, with the total cost 239625 USD and the profit of 135375 USD with expected sales to be 15000 units. As per the need of the hour if everything falls in place it should not take more than 3 moths to sell 1463 units to reach the breakeven point and then it should not be late then another 4-5 months to sell 15000 units to attain our profits as calculated.

CONCLUSION

Our device is used to reduce the amount of fuel in the two wheeler vehicles with the capacity of 200cc by supplying hydrogen which is one of the cleanest fuel and can be obtained by the most abundant source of energy that is water. Though water in any form cannot be an inlet for the device hence distilled water is used, further we are working on the distillation of water in an automobile itself. Our device at this level uses the distilled water which is easily available at the price of rupees 15-20 per 2L and hence our device is quite cheap and increases the mileage of the engine moreover when the hydrogen burns less amount of petrol is used which further leads to less amount of carbon deposited in the engine which simply leads to increasing the life of the engine. If this setup will be installed in the vehicles in a country like India where vehicles are in a very large number, pollution can be reduced up to a very large content. On an average our kit increases the average of the kit by 13Km and reduces the amount of pollution almost to the negligible. Considering the cost of petroleum to be 64 rupees/L if the vehicle will run without kit and will run 30 Kms per L the cost of operating it for 100 Kms is 213.33 rupees whereas if our kit is installed in it the cost of petroleum for running 100 Kms can be reduced to 148.83 rupees and it will consume about 2.5 mL of water whose cost is not even one rupee. So a total difference of 64.5 rupees can be saved with our kit in just 100 Kms and on an average if the automobile operates for about 3000 Kms in a month total monthly savings can be 1935 rupees.

31. Smart Hacker

COLLEGE	Sagar Institute of Research and Technology, Bhopal
GUIDE	Dr Rakesh Kumar
COLLEGE STUDENTS	Jyoti Rajput, Anjali Pandey
SCHOOL STUDENTS	Sakshi Dwivedi, Anchal Pandey
SCHOOL	Govt. Adarsh Residential Girls Institute For Sanskrit, Bhopal Govt. Naveen Girls H. S. School, Tulsi Nagar, Bhopal

ABSTRACT

Rape is the fourth most common crime against woman in India. As we know that girls are not safe in our India. In our India 106 girls are raped in 1 day. This watch will not only be used to stop rape in India, but the kidnaps that occur in our India will also be used to stop them. There are 174 people kidnaps daily in our country so this is not only to prevent rape in our country, but also to stop the number of kidnaps that happen in our India.

The government wants to have such a device at the earliest, which reduces the number of raps and kidnaps in India.

INTRODUCTION

In this project we are making a watch which will be used for the safety of girls. In our hand watch there will be a code instead of a button. This code will be default it can be changed. If someone is following girl she will speak the code and her location reaches her family and the police station nearby her.

Benefits is that it is look same as normal smart watch we just want to add one feature to prevent rap cases. This watch will not have a button it will be a code in the first such watch was made there was a button as soon as someone presses the button the information and location reach home and nearby police station but that button can be tuned on for any reason by hitting something so wants to resolve this problem through our project.

In our watch use-

- Microcontroller
- Microphone
- Wifi Module
- Global positioning system
- GSM (global system for mobile communication)



Microcontroller

Microcontroller - A microcontroller (MCU for microcontroller unit) is a small computer on a single metal-oxide-semiconductor (MOS) integrated circuit (IC) chip. A microcontroller contains one or more CPUs (processor cores) along with memory and programmable input/output peripherals.

A microcontroller is an integrated circuit (IC) device used for controlling other portions of an electronic system, usually via a microprocessor unit (MPU), memory, and some peripherals.



voice recognition - Alternatively referred to as speech recognition, voice recognition is a computer software program or hardware device with the ability to decode the human voice. Voice recognition is commonly used to operate a device, perform commands, or write without having to use a keyboard, mouse, or press any buttons.



GSM- The Global System for Mobile Communications (GSM) is a standard developed by the European Telecommunications Standards Institute (ETSI) to describe the protocols for second-generation (2G) digital cellular networks used by mobile devices such as mobile phones and tablets.

GSM is an open and digital cellular technology used for transmitting mobile voice and data services operate at the 850MHz, 900MHz, 1800MHz, and 1900MHz frequency bands. GSM technology was developed as a digital system using the time division multiple access (TDMA) technique for communication purposes.

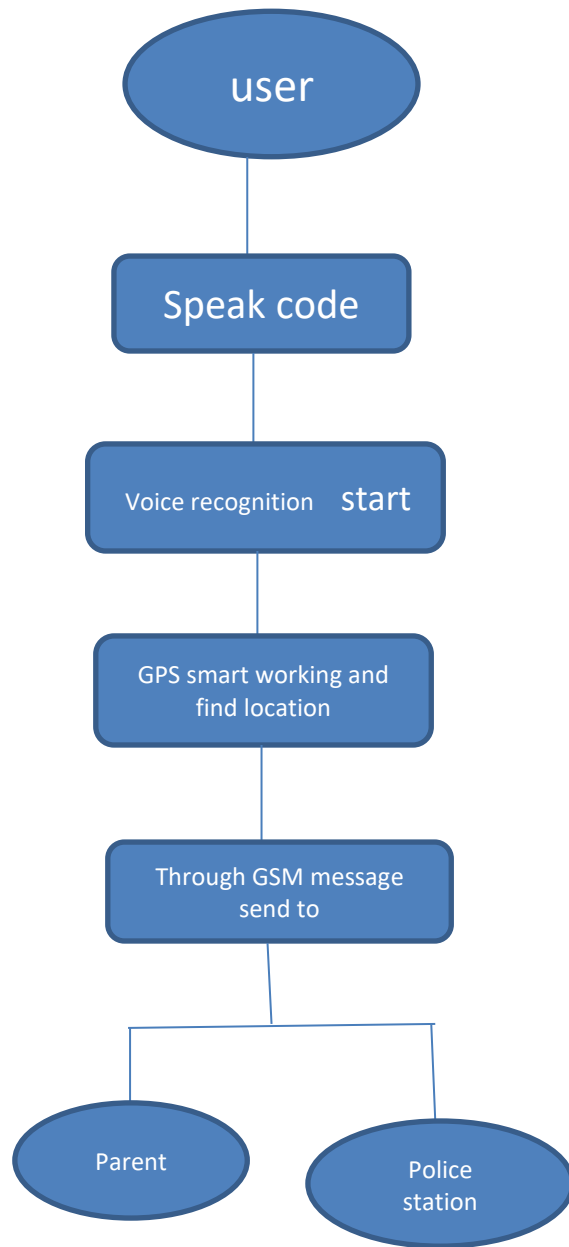


GPS- GPS modules contain tiny processors and antennas that directly receive data sent by satellites through dedicated RF frequencies. From there, it'll receive timestamp from each visible satellites, along with other pieces of data.

Working

If you worry about being alone when something happens, a smart Hacker ensures you are always connected and protected. In an emergency we often don't have the time to call for help, however with a smart Hacker you can quickly send an SOS alarm to your friends and family, so they can get you the help you need. Smart Hacker really is the best safety device when every second counts.

If you are not safe and you speak code, then our project smart working and the whole process is start and when your Guardians open your alert message they first see a your GPS location along with the following critical features: 1. Listen to a live stream recording 2. Ability to Call Emergency Services 3. Indicate that they are "On their Way" to help you 4. Guardians also have the ability to see each other's locations and discuss with each other how they are going to help.



ADVANTAGES- In the first such watch was made, there was a button. As soon as someone presses the button, the information and location reach home and nearby police station. But that button can be turned on for any reason by hitting something. Benefits is that it is look same as normal smart watch we just want to add one feature to prevent rape cases. The watch will not have a button; it will be a code.



Look like same as normal watch

The Safelet is another wearable device allowing users to send alerts to predetermined friends and family without using their phones who can then call 911. Similar to setting a watch, users can activate the Safelet by simultaneously pressing two buttons located on either side of the face. It looks and is worn like a regular bracelet, and once activated, syncs with the user's mobile phone and starts recording sound.

32. Solar Power Forest Fire Detector

COLLEGE	Poornima College Of Engineering, Sitapura, Jaipur
GUIDE	Mr. Sugreev Choudhary
COLLEGE STUDENTS	Yashdeep Saini, Vartesh Raj Singh
SCHOOL STUDENTS	Arun Manjhi, Arun Kumar Soni
SCHOOL	Govt. Senior Secondary School, Sanganer, Jaipur

ABSTRACT

In the recent years wireless sensor networks has attracted a lot of attention. Now a days wireless sensor networks are used for different applications like habitat monitoring, automation, agriculture and security purpose. As forest fire is prevalent type of disaster it can deal great deal of environmental impact and therefore the early detection of fire is important. With the help of temperature sensor, mq2 sensor network and NodeMCU it is possible. This article presents the design of a system for temperature and smoke detection by using wireless sensor network to avoid the forest fire that could lead to loss of a significant number of natural resources.

Keywords: DHT11, MQ2, NodeMCU and blynk.

INTRODUCTION

An uncontrolled forest fire can devastate everything in its path, spread for miles, crossing rivers and roads. Each year, between 60,000 and 80,000 forest fires occur, destroying between 3 and 10 million hectares. Depending on the different causes, there will be different effects on the environment. A few hundred years ago, forest fires were a natural “activity” caused mostly by rare phenomena, such as a volcanic eruption or an earthquake or lightning. But today, natural causes are much less frequent and now give place to human activities. Since a forest is a valuable natural resource it must be safe from frequent occurring of fire and hence we need an early warning system and real time data transfer. The use of solar power system resolves the power supply requirement to the system as well as wireless sensor in this paper presents one of the techniques for early forest fire detection

OBJECTIVES AND SCOPES

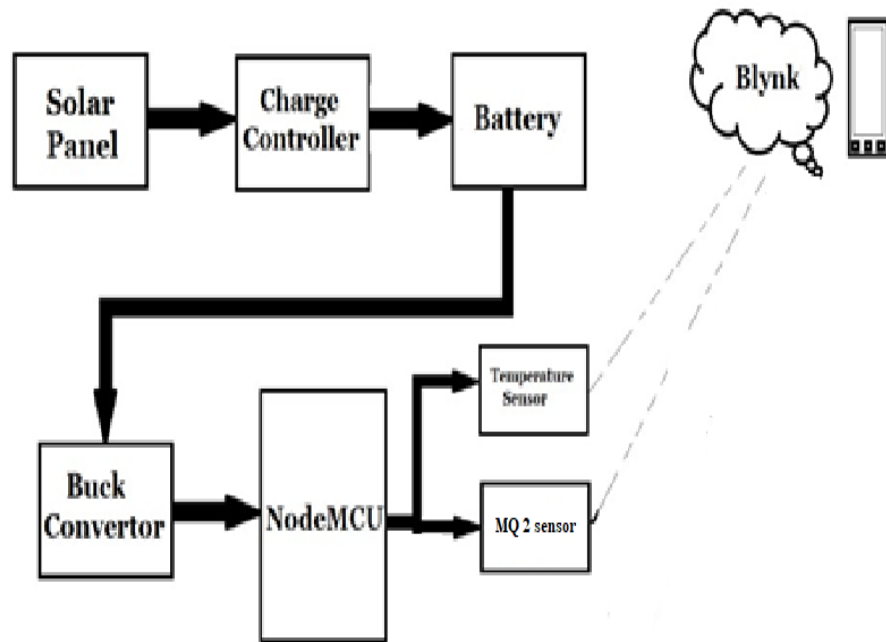
It is easier to suppress a fire in its starting stage than in the later stages. Hence, the most important goal is quick, reliable detection and localization of the fire.

The proposed fire alert system overcomes the need of a human intervention to continuously monitor the forest area. Monitoring and detecting is done by the sensors installed and message alerts are used to alert the required authorities. It gives instantaneous information on location of the fire to the authorities and help block the fire before it reaches cultural heritage sites.

This fire alert system is power efficient, low cost and low maintenance, and the equipment is durable and reliable. In future, we can install a wind sensor to the system which helps to determine the direction of the fire and the rate at which it will spread. Along with this we can implement an automatic fire extinguisher system. As soon as a sensor detects fire, extinguisher gets activated. GPS module can be added to the nodes to get the exact location of fire or smoke. By adding IOT, the data can be sent to cloud databases for storage and prediction purposes. In addition to these, many other sensors can also be implemented as per user requirement.

METHODOLOGY

The basic block diagram help us to understand the working of proposed system.



Solar Panel

Solar panels are those devices which are used to absorb the sun's rays and convert them into electricity or heat. Description: A solar panel is actually a collection of solar (or photovoltaic) cells, which can be used to generate electricity through photovoltaic effect.

Advantages of Solar Energy

1. Renewable Energy Source

Among all the benefits of solar panels, the most important thing is that solar energy is a truly renewable energy source. It can be harnessed in all areas of the world and is available every day. We cannot run out of solar energy, unlike some of the other sources of energy.

Solar energy will be accessible as long as we have the sun, therefore sunlight will be available to us for at least 5 billion years when according to scientists the sun is going to die.

2. Reduces Electricity Bills

Since you will be meeting some of your energy needs with the electricity your solar system has generated, your energy bills will drop. How much you save on your bill will be dependent on the size of the solar system and your electricity or heat usage.

For example, if you are a business using commercial solar panels this switch can have huge benefits because the large system size can cover large chunks of your energy bills.

Moreover, not only will you be saving on the electricity bill, but there is also a possibility to receive payments for the surplus energy that you export back to the grid through the Smart Export Guarantee (SEG). If you generate more electricity than you use (considering that your solar panel system is connected to the grid).

3. Diverse Applications

Solar energy can be used for diverse purposes. You can generate electricity (photovoltaics) or heat (solar thermal). Solar energy can be used to produce electricity in areas without access to the energy grid, to distil water in regions with limited clean water supplies and to power satellites in space.

Solar energy can also be integrated into the materials used for buildings. Not long ago Sharp introduced transparent solar energy windows.



4. Low Maintenance Costs

Solar energy systems generally don't require a lot of maintenance. You only need to keep them relatively clean, so cleaning them a couple of times per year will do the job. If in doubt, you can always rely on specialized cleaning companies, which offer this service from around £25-£35.

Most reliable solar panel manufacturer's offer 20-25 years warranty.

Also, as there are no moving parts, there is no wear and tear. The inverter is usually the only part that needs to be changed after 5-10 years because it is continuously working to convert solar energy into electricity and heat (solar PV vs. solar thermal). Apart from the inverter, the cables also need maintenance to ensure your solar power system runs at maximum efficiency.

So, after covering the initial cost of the solar system, you can expect very little spending on maintenance and repair work.

5. Technology Development

Technology in the solar power industry is constantly advancing and improvements will intensify in the future. Innovations in quantum physics and nanotechnology can potentially increase the effectiveness of solar panels and double, or even triple, the electrical input of the solar power systems.

NodeMCU

It is an open source IOT platform. It includes firmware which runs on the ESP8622 Wi-Fi from express if system, and hardware which is based on the ESP-12 module. The term "NodeMcu" by default refers to the firmware rather than the development kits.



NodeMcu features

- Low cost, compact and powerful Wi-Fi module.
- Power supply: +3.3V only.

- Current consumption: 100mA.
- I/O voltage: 3.6V (max).
- I/O source current: 12mA.
- Built-in low power 32-bit MCU@80MHz.
- 512kb flash memory.
- Can be used as station or access point or both combined.
- Supports deep sleep.
- Support serial communication hence compatible with many development platforms like Arduino.
- Can be programming using Arduino IDE or at commands or Lua script.

Applications

- IOT Projects
- Access Point Portals
- Wireless Data Logging
- Smart Home Automation
- Learn basics of networking
- Portable Electronics
- Smart bulbs and Sockets

DHT11–Temperature and Humidity Sensor-: The DHT11 is a basic, ultra low-cost digital **temperature and humidity sensor**. It uses a capacitive **humidity sensor** and a thermistor to measure the surrounding air, and spits out a digital signal on the data pin (no analog input pins needed). It's fairly simple to use, but requires careful timing to grab data.

MQ2 Smoke Sensor-: Gas Sensor (MQ2) detects combustible gasses and smoke. ... It can detect combustible gas and smoke. The output voltage from the Gas sensor increases when the concentration of gas. The MQ-2 Gas sensor can detect or measure gasses like LPG, Alcohol, Propane, Hydrogen, CO and even methane.

Blynk-: Blynk was designed for the Internet of Things. It can control hardware remotely, it can display sensor data, it can store data, visualize it and do many other cool things. ... Blynk App - allows to you create amazing interfaces for your projects using various widgets we provide. Blynk is a new platform that allows you to quickly build interfaces for controlling and monitoring your hardware projects from your iOS and Android device. After downloading the Blynk app, you can create a project dashboard and arrange buttons, sliders, graphs, and other widgets onto the screen.

COMPARTIVE STUDY

- The present model is very complicated in design but our project is very simple in circuit design as well as working.
- We use node mcu with esp8266 Wi-Fi module thus i.e. we don't need additional option.
- The data storage of project is very cheap and easily available anywhere through any devices.
- Solar energy provides a backup power option in cloudy days thus our project always works without power problem.
- The readability of sensor is high.

COST OF PROJECT

The current project price is around 1 million at large scale but using our ideas the price reduces around 20 to 30%.

The use of microcontroller with Wi-Fi is reduce the price of project.

Developed sensor increase efficiency of reading that help for better result.

SOCIAL IMPACT

Our project has many impact on earth as well as humans.

- + The human work is reducing in forest fire detection.
- + The life of forest will safe they live in forest easily and grow up.
- + Forest is life of human because they provide us many resources and mainly pure air for life.
- + If forest is safe, then the balance of earth and life of earth will safe.

CONCLUSION

An Experimental Prototype model was fabricated and its performance is studied & analyzed. This will help to sustain the inhabitants, and maintain ECO system. An advanced system for Forest Fire Detection was developed which overcomes the demerits of the Existing technologies of Forest Fire Detection. It can be ensured that the system developed can be implemented on a large scale due to its promising results. And also we can get one-year data management records of the forest. Mechanical modelling for accessible and inaccessible areas helps in the easy implementation of the Forest Area modules.

33. SMART CYBER RAMPART SYSTEM REPORT

COLLEGE	Sagar Institute of Research and Technology, Bhopal
GUIDE	Dr Rakesh Kumar
COLLEGE STUDENTS	Bhuvneshwari Rao, Bhawna Singh
SCHOOL STUDENTS	Subhi Tiwari, Sejal Baghel
SCHOOL	Govt. Adarsh Residential Girls Institute For Sanskrit, Bhopal

ABSTRACT:

SMART CYBER RAMPART SYSTEM is an app specifically designed to prevent cybercrimes which are on high-rise in today's world. This app will tell the user beforehand if there is something malicious going on in their device or if there is a malicious attack on their device which is disguised in the form of advertisements, calls, messages and other click-baits. Usually this click-baits occur in the form of pop-ups asking to accept certain conditions when you open an unfamiliar website or a malicious website which usually people aren't aware and click it, to prevent such mishaps our app will come in action as it will analyse and warn the user beforehand if the pop-up is threatening. Along with this it will also warn a user if there is a malicious attack made on their device through probably say emails, click-bait messages and incoming calls. It will also warn user regarding spam messages and calls.

KEYWORDS:

Cyber Security, coding skills, Java language, Python language.

INTRODUCTION:

What is cybercrime: In General Cybercrime may be defined as "Any Unlawful act where Computer or Communication device or Computer network is used to commit or facilitate the commission of Crime"



DIFFERENT TYPES OF CYBER CRIMES: -

Cybercrime takes many forms, and it is therefore difficult to fight.

Common form of cybercrime: -

- Phishing: using fake email messages to get personal information from internet users.
- Misusing personal information (identity theft).
- Hacking: shutting down or misusing websites or computer networks.
- Spreading hate and inciting terrorism.
- Distributing child pornography.
- Grooming: making sexual advances to minors.

WHY CYBER CRIMES TAKE PLACE:

Cybercrime is often referred to as exploiting the vulnerabilities of systems and networks for either monetary or other purposes. It comprises all illegal Activities carried out using technology where a computer is the object of the crime or is used as a tool to commit an offense. Cybercriminals use techniques like phishing, social engineering, and all kinds of malware to pursue their nefarious plans. As the Internet of Things (IoT) evolves and smart devices become more popular, cybercriminals have increased opportunities to penetrate security measures, gain unauthorized access, and commit crimes. The proliferation of cybercrime adds up to countless costs in damages every year, impacting individuals, businesses, and even governments. Unlike crimes committed in the physical world, cybercrime requires little to no investment to be carried out. Cybercriminals always opt for an easy way to make big money and target organizations like banks, casinos and financial firms where a huge amount of money flows daily and hack sensitive information.

CYBER SECURITY:

Computer security, cyber security or information technology security (IT security) is the protection of computer systems and networks from the theft of or damage to their hardware, software, or electronic data, as well as from the disruption or misdirection of the services they provide.

The field is becoming more important due to increased reliance on computer systems, the Internet and wireless network standards such as Bluetooth and Wi-Fi, and due to the growth of "smart" devices, including smartphones, televisions,

and the various devices that constitute the "Internet of things". Owing to its complexity, both in terms of politics and technology, cyber security is also one of the major challenges in the contemporary world.



COUNTER PROTECTION:

Computer protection (countermeasures)

In computer security a countermeasure is an action, device, procedure or technique that reduces a threat, a vulnerability, or an attack by eliminating or preventing it, by minimizing the harm it can cause, or by discovering and reporting it so that corrective action can be taken.



OBJECTIVE AND SCOPE:

The objective of this project is to minimize the number of cybercrimes occurring currently and also to aware people regarding cybercrime and its severity. The scope of this project is vast as it is an application which takes very minimum storage in the phone and can be downloaded easily and can be run effectively and efficiently.

METHODOLOGY:

The application will be made on java coding language as it is the safest language currently with no external interrogation. The project will be developed with the help of coding language and it could be easily downloaded on any android or iOS device.

BASIC STRUCTURE: - HARDWARE:

PC is all we need for hardware aspect of our project.

SOFTWARE:

Jdk, command prompt, notepad, SDK (software development kit).

SOCIAL IMPACT:

Our project will be socially very much impactful as it will not meddle with users work and will work on the background of the device in which it will be installed. Also due to its compatibility it will be downloaded easily on any device. Also with its accuracy and precision it will prevent cybercrime to its max limit.

COST OF PROJECT:

The project does not have any hardware cost the only cost that will be applicable is the data cost used while developing the application

CONCLUSION:

Our team strongly believes that in the current scenario security is a must and when all our day to day work is based on using internet and all of us are connected through internet in one form or other, cyber security is of utmost priority. Or project will prevent cybercrimes at its best and will provide its user security and protection from all sorts of cybercrimes.

34. Open source ventilator

COLLEGE	Global Institute of Technology, Jaipur
GUIDE	Mr. Amit Pandey
COLLEGE STUDENTS	Ashwani Verma, Anubha Jain
SCHOOL STUDENTS	Samir Babu, Jamal Ahamad
SCHOOL	Govt. Senior Secondary School, Sukhupriya, Jaipur

ABSTRACT

This paper shows the construction of a low-cost, open-source ventilator. The motivation for constructing this kind of ventilator comes from the worldwide shortage of mechanical ventilators for treating COVID-19 patients—the COVID-19 pandemic has been striking hard in some regions, especially the deprived ones. Constructing a low-cost, open-source ventilator aims to mitigate the effects of this shortage on those regions. The equipment documented here employs commercial spare parts only. The method considers pressure measurements from the inspiratory limb and alerts clinicians in real-time whether the patient is under a healthy or unhealthy situation. Experiments carried out in the laboratory that had emulated healthy and unhealthy patients illustrate the potential benefits of the derived open-source ventilator.

KEYWORDS: mechanical ventilator; low-cost ventilator; COVID-19; pressure sensor; artificial ventilation; health monitoring

INTRODUCTION:

Ventilators are an example of technologies that are currently in critical short supply. Open source ventilators are essential for treating both influenza and COVID-19 patients in severe acute respiratory failure. Past studies have shown that intensive care units (ICUs) will not have sufficient resources to treat all patients requiring ventilator support during a massive pandemic, and ethically challenging triage would need to be used to decrease mortality over first-come first-served basis for ventilator allocation among patients. Some work has shown promise for using a single ventilator to support multiple patients during a disaster surge. This is not necessarily straightforward. Although some countries, like the

United States, have stockpiles of ventilators, there is consensus that there is not enough supply for serious pandemics and that rationing would be needed.

The current medical system relies exclusively on specialized, proprietary, mass-manufactured ventilators from a small selection of suppliers. This supply model clearly fails when there is a sudden surge in demand for a relatively low-volume specialty product such as ventilators in a pandemic as analyzed here. The vast majority of medical equipment is heavily patented by a few specialty medical firms that sell small volumes because during 'normal' times, a medium-sized hospital only needs a handful. These firms have historically aggressively protected their intellectual monopolies to the detriment of human lives. In addition, non-practicing entities continue to attempt to actively prevent medical treatments from being deployed, even during the current COVID-19 pandemic. Putting aside the absurdity of patenting and then obstructing others from using obvious inventions normal times, in the wake of a pandemic where millions of lives are at stake, it is intuitively obvious that this type of greed is no longer acceptable.

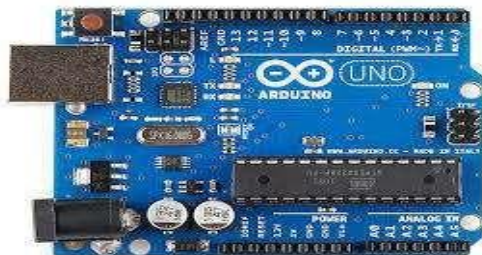
Materials and Methods

To be used in intensive care units, open source ventilator must comply with the following three guidelines: they should allow users to set

- (i) The respiratory frequency (FR),
- (ii) The ratio of inspiration to expiration at each respiratory cycle (I:E), and
- (iii) The air volume supplied to the patient (vt).

Equipment used

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



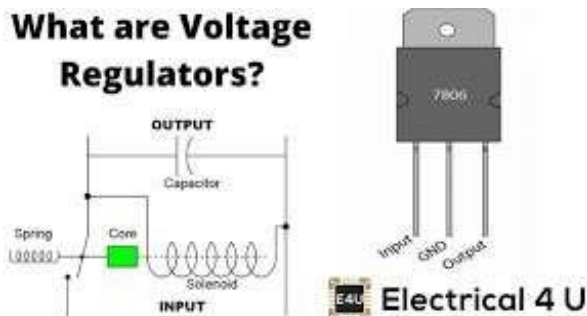
Bag valve mask: when the face mask is properly applied and the "bag", is squeezed, the device forces the air throw into the patient's lungs; when the bag is released, itself in- inflates from its other end, drawing in either ambient or a low pressure oxygen flow supplied by a regulated cylinder, while also allowing the patient's lungs.



Adaptor: In adaptor or adapter is a device that convert attributes of one electrical device or system to those of an otherwise in compatible device or system. Some modify power or signal attributes, while other merely adapt the physical form of one connected to another



Voltage regulator: A voltage regulator is a system designed to automatically maintain a constant voltage level. A voltage regulator may use a simple feed-forward design or may include negative feedback. It may use an electromechanical mechanism, or electronic components.



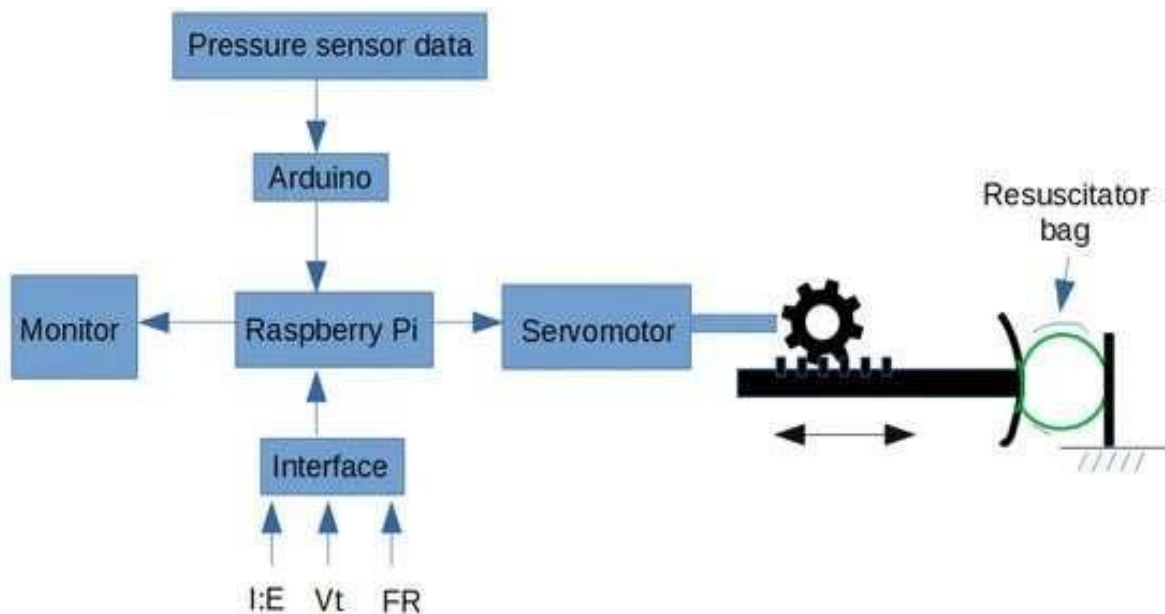
Filter: - The filter is a device that allows passing the dc component of the load and blocks the ac component of the rectifier output. Thus the output of the filter circuit will be a steady dc voltage. The filter circuit can be constructed by the combination of components like capacitors, resistors, and inductors.

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.

Servomotor FS5109M



Working Flowchart:



Features:

1. It has compact design.
2. It is relatively inexpensive to manufacture and distribute.
3. It has safety for patient and operator –IE Virus filter.
4. Simple pressure control.

Conclusions

There is clear technical potential for alleviating ventilator shortages during this and future pandemics using open source ventilator designs that can be rapidly fabricated using distributed manufacturing. The results of this review, however, found that the tested and peer-reviewed ventilator systems lacked complete documentation (with one recent exception) and that the current open systems that were documented were either at the very early stages of design or had undergone only early and rudimentary testing (although this is changing rapidly). With the considerably larger motivation of an ongoing pandemic, it is assumed these projects will garner greater attention and resources to make significant progress to reach a functional and easily replicated open source ventilator system. There is a large amount of technical future work needed to move open source ventilators up to the level considered adequate for scientific-grade equipment and further work still to reach medical-grade hardware. Future work is needed to achieve the potential of this approach not only on the technical side, but also by developing policies, updating regulations and securing funding mechanisms for the development and testing of open source ventilators for both the current COVID19 pandemic, as well as for future pandemics and for everyday use in low-resource settings.

35. Conversion of CO₂ into electricity

COLLEGE	Global Institute of Technology, Jaipur
GUIDE	Mr. Amit Pandey
COLLEGE STUDENTS	Ashwani Verma, Anubha Jain, Deepti Bansal
SCHOOL STUDENTS	Arun Kumar Verma, Mahesh Kumar Verma
SCHOOL	Govt. Senior Secondary School, Gator, Jaipur

Abstract

The purpose of establish the power plant of “conversion of CO₂ into electricity” to make environment free from pollution. To set up the idea for upcoming generation how we can use the gift of nature to generate and create into innovative things. This model will help all over the India in transmission of electricity even in hilly areas or where who are still surviving without avail of electricity. It reduces maintenance cost thus being cost effective and provides higher efficiency.

Keywords: Carbon capture technology

Introduction

"Carbon capture" technologies chemically trapping carbon dioxide before it is released into the atmosphere is one approach. A system for carbon dioxide capture/conversion and electric power generation," was published July 20 in Science Advances. The group's proposed cell would use aluminium as the anode and mixed streams of carbon dioxide and oxygen as the active ingredients of the cathode. The electrochemical reactions between the anode and the cathode would sequester the carbon dioxide into carbon-rich compounds while also producing electricity and a valuable oxalate as a by-product.

In most current carbon-capture models, the carbon is captured in fluids or solids, which are then heated or depressurized to release the carbon dioxide. The concentrated gas must then be compressed and transported to industries able to reuse it, or sequestered underground.

The group reported that their electrochemical cell generated 13 ampere hours per gram of porous carbon (as the cathode) at a discharge potential of around

1.4 volts. The energy produced by the cell is comparable to that produced by the highest energy-density battery systems.

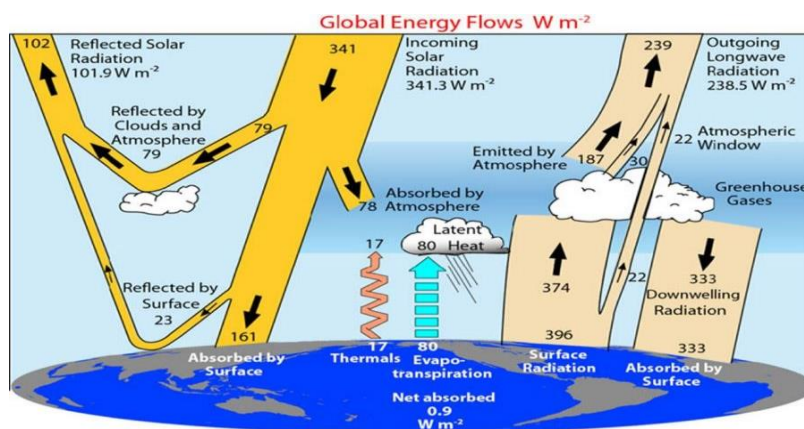
Another key aspect of their findings, Archer says, is in the generation of superoxide intermediates, which are formed when the dioxide is reduced at the cathode. The superoxide reacts with the normally inert carbon dioxide, forming a carbon-carbon oxalate that is widely used in many industries, including pharmaceutical, fibre and metal smelting. "A process able to convert carbon dioxide into a more reactive molecule such as an oxalate that contains two carbons opens up a cascade of reaction processes that can be used to synthesize a variety of products," Archer said, noting that the configuration of the electrochemical cell will be dependent on the product one chooses to make from the oxalate.

Objective of the Project

This Report provide an assessment of the current state of research into chemical pathways for the conversion of CO₂ into commodity chemicals and fuels. Areas of promise are identified and technological limitations are highlighted, focusing on the technical features of the CO₂ conversion step.

Also Concluded that aluminium is the perfect anode for this cell, as it is plentiful, safer than other high-energy density metals and lower in cost than other potential materials (lithium, sodium) while having comparable energy density to lithium. He added that many aluminium plants are already incorporating some sort of power-generation facility into their operations, so this technology could assist in both power generation and reducing carbon emissions.

A current drawback of this technology is that the electrolyte the liquid connecting the anode to the cathode is extremely sensitive to water. Ongoing work is addressing the performance of electrochemical systems and the use of electrolytes that are less water-sensitive.



“When we began to develop the idea to use Carbon Dioxide to produce geothermal energy, we wanted to find a way to make Carbon Dioxide storage cost-effective while expanding the use of geothermal energy,”

Methodology

A simple way to explain this is by using a possibly unreliable analogy. I don't know if you have ever observed a demonstration that turned chaotic. It usually starts out peacefully with the protesters in solidarity. It is very difficult to break them apart. If however, the Police come in and fire teargas at them, they quickly break apart and everyone runs from the area. It becomes easier to find and apprehend the leaders of the protest.

When the molecules (protesters) in the jar is undisturbed, it is very difficult to break them apart. But when Mg (police) comes into the jar and it is burning, the heat (teargas) excites the molecules. The heat from the burning Mg is so great, that it reaches the necessary point for a Carbon-Oxygen bond to break. This makes it easy for the Mg to grab the Oxygen and bond with it. If the police don't come with a way of breaking the protesters apart, they will be ignored just the same way if the magnesium comes into the jar without any heat, it will also be ignored.

To produce the electricity from CO₂. Describing it in the journal Environmental Science and Technology Letters, the scientists wrote about using a combination of membranes and water to derive current out of carbon dioxide. Speaking to India Today, Suddhaswata shared his modified technique which resulted to the generation of 12 volts of energy from carbon dioxide.

Equipment Used

1. Carbon Dioxide Cylinder

This is a device which used to store the gases. We will use to store the Carbon Dioxide in it.

- Odourless but can cause the nose to sting
- Colourless
- Toxic at high concentrations
- Slightly corrosive in the presence of moisture

- Can cause serious cold burn

2. Magnesium Powder

Reacted Magnesium Powder delivers 300 mg magnesium bisglycinate in a delicious, strawberry-lemonade flavoured mix that can be added to any beverage. Magnesium bisglycinate was chosen for its proven enhanced absorption.



3. Steam Turbine

A steam turbine is a device that extracts thermal energy from pressurized steam and uses it to do mechanical work on a rotating output shaft. It is particularly suited to be used to drive an electrical generator about 85% of all electricity generation in the United States in the year 2014 was by use of steam turbines.



4. Generator

In electricity generation, a generator is a device that converts motive power (mechanical energy) into electrical power for use in an external circuit. Sources of mechanical energy include steam turbines, gas turbines, water turbines, internal combustion engines and even hand cranks.



5. Reaction Tank

A chemical reactor is an enclosed volume in which a chemical reaction takes place. The design of a chemical reactor deals with multiple aspects of chemical engineering. Chemical engineers design reactors to maximize net present value for the given reaction.



Cost of project

COMPONENT	COST (RS)
REACTION TANK	1500
CARBON DIOXIDE CYLINDER	6000
MAGNESIUM POWDER	1000
TURBINE	500
PIPES	500
WOOD BOARD	150
CO ₂ SCRUBBER	2000

Conclusion

It is the great opportunity to work on this great idea which is very useful for our environment. Project is not a study about the project details but this is a way to do some creative why making the project. There, I understand working of steam turbine, generator, boiler and all equipment that are used for generating the electricity. the simulations also revealed that a plant of a design might sequester as much as 15 million tons of carbon dioxide per year, which is roughly equivalent to the amount produced by three medium size coal fired power plant in that type.

36. WEAR SMART SAFETY

COLLEGE	Sagar Institute of Research and Technology, Bhopal
GUIDE	Dr Rakesh Kumar
COLLEGE STUDENTS	Hitendra Singh Rajput, Ayushi Jain
SCHOOL STUDENTS	Kavita Kewat, Muskan Sen
SCHOOL	Govt. Higher Secondary School, Anand Nagar, Bhopal Mahatma Gandhi Higher Sec. School, Barkheda, Bhopal

ABSTRACT

The proposed “WEAR SMART SAFETY” is a model which is designed keeping in view the need to save accidents and seeing clear view of our sides. Also we are using solar energy with the mission of establishing India as a global leader in solar energy. It is an innovative model which involves multiple use and use of IOT technology in helmet. It reduces accidents and gives more comfort.

KEYWORDS

SLIDER MECHANISM, SOLAR TECHNOLOGY, IOT BASED TECHNOLOGY, NODE-MCU ESP8266.

INTRODUCTION

- All over the world there is significant increase in accidents. Our model has that sustainability to reduce it. Also we are using solar energy to give our project some power supply for multiple uses. The main aim is to reduce its weight so it will be convenient to wear or to increase the visual periphery.
- Our primary goal is to “**Make Cities and Human Settlements Inclusive, Resilient and Sustainable.**” We are making helmet in keeping in mind that as everything is proceeding towards smart, with it we are also going to make a smart device that is our smart helmet. It will not use of latest technology only but also it will save lives as well as it will collect solar energy for performing multiple functions in helmet.
- Project Principal is to:
 1. Reduce its weight
 2. Increasing its visual periphery
 3. Usage of solar energy
 4. Decreasing Accident by Detection of nearby vehicle.
 5. Mobile Charging in Emergency

SILENT FEATURE:

This Helmet has following features:

- Use Solar Energy.
- Compact.
- Safety Provider.
- Self-Storing Energy.
- Indicators for Attention.
- Emergency Power Bank.

OBJECTIVE AND SCOPE

Our Model is proceeding towards **SMART TECHNOLOGIES** which helps in reducing the Accidents rapidly. As it is the most Important thing to keep our Body Controller **SAFE** as well as it is mandatory for all to have the HELMET. As we all now the Rate of accidents is increasing day by day. So by keeping this problem in mind our concept is to reduce it. This Smart Helmet is Boost to various projects such as “**SMART CITIES**” Which is to make SAFE and SMART for EVERYONE.

It has got various applications such as:

- To store Solar Energy.
- To Detect Nearby Vehicles.
- To Charge Mobile in Emergency.
- To See Side view clearly by automatic Slider mechanism.

HARDWARE COMPONENTS

1. HELMET FRAME.
2. SOLAR PANEL.
3. BATTERY (CHARGEABLE).
4. NODE-MCU (ESP8266).
5. SERVO MOTORS.
6. ULTRASONIC SENSOR (HC-SR04).
7. BUZZER.

SOFTWARE AND TECHNICAL COMPONENTS

- ❖ SLIDER TECHNOLOGY.
- ❖ SOLAR CHARGING TECHNOLOGY.
- ❖ PROGRAMMING

SOCIAL IMPACT

Our Model's Aim is to minimize the rate of ACCIDENTS occur due to Carelessness of people and make them Smart with convenient resources, it has may SOCIAL BENEFITS which can result from the use SMART HELMET.

❑ JOB CREATION

➤ Workers need to plan, develop and implement the project which will create numerous JOB opportunities thereby fulfilling the requirements of the people by which rate of unemployment decreases.

❑ SMART HELMENT MEANS MAKE LIFE SAFTIER AMD SMARTER

➤ Generating energy from SOLAR PANELS and make it usable for multiple Works within the Helmet which also reduces the cost of making it as we take natural energy to make it workable. As it is also our emergency Power Bank which helps us to charge the mobile in Needy time.

❑ SMART HELMET STORE ENERGY AND SAVE LIVE.

➤ As the price of Sunlight is Zero. It is a renewable Resource. As sunlight is never going away. One can count on it. With this Natural resource we are actually proceeding toward the Cost free usage of energy and make it usable for multiple purposes. As in time of any unevenness it also warns you or indicate you to be in a required distance as We are facing a Pandemic Diseases so by keeping in mind we also maintain a Distance from other vehicle which is also good as it helps us to be SAFE.

PROJECT COST

➤ Cost of manufacturing the existing Model is around Rupees 8000-10000, once it will get succeed in the large scale then we will try to reduce its cost so it's around 5000-6000 Rupees.

➤ In our substitution Model, we used Comparatively Cheaper materials and the Cost of making this Module is very less. The machinery Cost of the Existing model is higher than what we are presenting.

➤ Our plan is to dedicate this project to our nation so we are.

CONCLUSION

We Concluded that in Energy Deficient Country and Large Population in INDIA. Where unemployment is still a problem or the Rate of evenness is increasing day By day so the plan is to completely overcome with these major problems. The proposed Model caters to these **FOUR** NATIONAL MISSIONS namely:

- ❖ **MAKE IN INDIA:** Automatic Machinery can be setup Here.
- ❖ **RENEWABLE ENERGY:** The energy we used in our Project is an inexhaustible source of energy and the best replacement to other non-renewable energies in INDIA.
- ❖ **SAFE INDIA:** As the rate of unevenness is increasing day by day which are also leading towards accidents and make one's life in Danger, so by some Advance technologies we are trying to reduce these problems and make the people SAFE.
- ❖ **START-UP INDIA:** Our further plan for the model is not only a business plan but also will create job opportunities. The main aim is to make the people safe and decrease the rate of unemployment.

37. VeSaFe

COLLEGE	Sagar Institute of Research and Technology, Bhopal
GUIDE	Dr Rakesh Kumar
COLLEGE STUDENTS	Ashish Kumar, Devanshu Tamrakar
SCHOOL STUDENTS	Krishna Raikwar, Shiva Kumar Chorasias
SCHOOL	Govt. Naveen Girls H. S. School, Tulsi Nagar, Bhopal

Abstract:

VeSaFe is a user friendly initiative based on Aatm Nirbhar Bharat mission, Make in India lead by our Honourable Prime Minister, Mr. Narendra Modi. VeSafe is a web development project for human health management. VeSafe aims to secure life of people suffering from various kinds' diseases as Corona, Diabetes, Cancer, Diarrhoea, Tuberculosis etc. As we Facing a many problem while we go to hospital for treatment. There is lack of knowledge about doctors, absence of doctor etc. Whenever we go for taking appointment of doctor at that time we stand in a queue and later we know the all appointments are book. As we go to new city we don't have any idea about nearest doctor, nearest hospital etc. Vesafe can solve all these problem.

Keyword:

- Book your appointment from your phone
- Save time, Resources and afford
- Use modern technology

Introduction:

VeSaFe is a user friendly initiative based on Aatm Nirbhar Bharat mission, Make in India lead by our Honorable Prime Minister, Mr. Narendra Modi. VeSafe is a web development project for human health management. VeSafe aims to secure life of people suffering from various kinds' diseases as Corona, Diabetes, Cancer, Diarrhoea, Tuberculosis etc. India is a country with population of 1.380 billion and 6.7% population comes under below poverty line and they do not have proper facilities for their health check-up and how they manage to visit doctors?

Our Project VeSaFe is a solution for all. VeSaFe make people easy to find out the nearby doctors of different specialties, notify user for free health check-up,

proper symptoms of particular disease and If a person suffers from it He / She will be able to contact doctors, provides helpline numbers for ambulance.

Facility Section:

1. **Nearest Doctor:** VeSaFe provides the list of doctor's name, specialist field, contact no. address, check-up charges. These all details will be mentioned in the Nearby Doctors section.

2. **Nearest hospital:** All the details of a hospital will be mentioned in the Nearby Hospitals section to get the address and name of hospitals. It really helps to strangers and tourists check all the details from VeSaFe.

3. **Check Symptoms:** In the Check Symptoms section user can check the symptoms of a particular disease and if user suffers from it then VeSaFe guides them to visit doctors or hospital for treatment.

4. **Log in and Notification:** User can create their VeSaFe account and get all the notification for free health check-ups and VeSaFe stores previous health check-up details and user can check it from history section.

5. **Helpline number:** VeSaFe provides all the helpline no. to people for calling ambulance for help or in accident cases

Salient Features:

1. **Nearest Doctor**
2. **Nearest hospital**
3. **Check Symptoms**
4. **Log in and Notification**
5. **Helpline number**

Objective & Scope:

Our objective is that to solve the daily problem of people while we go for hospital for treatment so VeSaFe reduce the time, resources and time. Our aim is to be India become a digital by new idea and thought and support of government and people. India have big potential of youngster (almost 67%) Almost 67% of India are youngster and this is a big positive sign of India.

Scope:

- Increase employment
- Promote doctor and hospital.

VeSaFe provides the list of doctor get the address and name of hospitals. It really helps to strangers and tourists check all the details from VeSaFe.

Why VeSaFe?

As we Facing a many problem while we go to hospital for treatment. There is lack of knowledge about doctors, absence of doctor etc. Whenever we go for taking appointment of doctor at that time we stand in a queue and later we know the all appointments are book. As we go to new city we don't have any idea about nearest doctor, nearest hospital etc.

Don't worry

Now **VeSafe** is come to solve all this problem Through VeSaFe you can book your appointment Online from your Phone Anytime anywhere. You can search nearest hospital from your location. You can find your appointment date etc. Of people suffering from various kinds diseases as Corona, Diabetes, Cancer, Diarrhoea, Tuberculosis etc. India is a country with population of 1.380 billion and 6.7% population comes under below poverty line and they do not have proper facilities for their health check-up and how they manage to visit doctors?

Our Project VeSaFe is a solution for all. VeSaFe make people easy to find out the nearby doctors of different specialties, notify user for free health check-up, proper symptoms of particular disease and If a person suffers from it He / She will able to contact doctors, provides helpline numbers for ambulance.

Some Pictures of our Project:



VeSaFe is a user friendly initiative based on Aatm Nirbhar Bharat mission, Make in India lead by our Honourable Prime Minister, Marendra Modi. VeSafe is a web

Conclusion:

We know that our coming Year India become Digital Due to this project we make India to digital.

- 1. Take appointment from phone:** Through Vesafe we can take appointment of doctor from your phone anywhere anytime.
- 2. Support digital India:** As we know our coming year India become digital That why we make VeSaFe to enhance and support Digital India.
- 3. Save time and Resources:** Through VeSaFe we can take appointment from home that save our time and resources.
- 4. Save money:** Due to take appointment from home we save our money of transportation.
- 5. Promote digital marketing:** As our India become digital in few year, Vesafe help or a part to developed India to make become digital.
- 6. Promote doctor and hospital:** Through Vesafe people know the doctor and hospital from your phone and enhance India.

38. AIR FILTER SYSTEM

COLLEGE	Sagar Institute of Science and Technology, Bhopal
GUIDE	Dr. Sanjay Chhalotre
COLLEGE STUDENTS	Ankit Singh, Anshul Raj
SCHOOL STUDENTS	Vinay Kumar, Ishan Varsi
SCHOOL	Govt. Naveen Girls H. S. School, Tulsi Nagar, Bhopal Govt. High School, Chunabhatti, Bhopal

ABSTRACT

Particulate pollution has important consequences for human health, and is an issue of global concern. Outdoor air pollution has become a cause for alarm in India in particular because recent data suggest that ambient pollution levels in Indian cities are some of the highest in the world. We study the number of particles between 0.5 μ m and 2.5 μ m indoors while using affordable air purifier. The various methods of purifying air. The most harmful of the pollutants are PM 2.5 particulates and NOx emissions. The aim has been to bring down the costs without compromising on efficiency.

INTRODUCTION

This project will enhance for air filter system. Although there are various means of cleaning air has been widest in the use of air filtration as a method for removing dust from the air. This monograph is written for the specific purpose of making the benefits of this experience available to personnel such as architects, engineers, hospital administrators, and research investigators concerned with the control of pathogenic biological organisms. Although this report is oriented to biological air filtration, certainly the information also is applicable to industries using radioactive materials and to others, such as precision instrument industries or space-craft projects that require physically clean air. Other methods of air purification, such as electrostatic precipitation and air washing, that remove the particles from the atmosphere, or ultraviolet light and incineration, which destroy the biological organisms without removing them from the air, also have been used. However, they are only mentioned here as a means, and are not discussed extensively in this monograph.

Methods of Air Cleaning

In general, most air cleaning equipment used to remove dust, mist, or fumes from air will also remove some bacteria. There are available many different types of air cleaning equipment. In most cases this equipment has been

designed for special purposes, such as the removal of zinc fumes with particle sizes less than 0.1 micron or particles of chemical sprays such as acid mists (fig. 1). Physical methods involved in air cleaning include (a) Gravitational (b) inertial (c) filtration (d) washing (e) electrostatic precipitation

OBJECTIVE

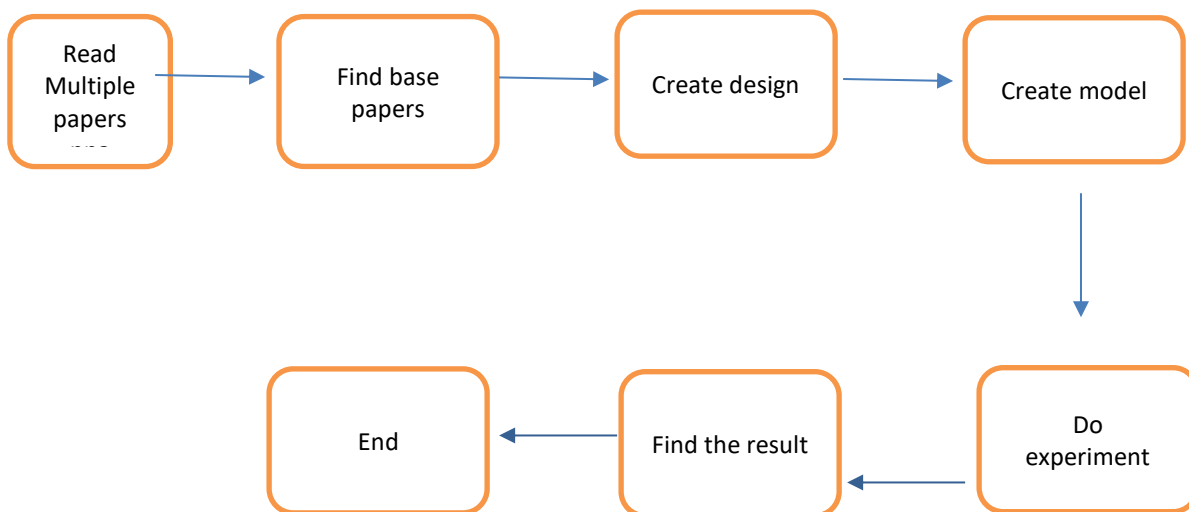
The overall objective of air purifier is to investigate potential opportunities offered by technical developments that may contribute to enhanced on-board air quality. Specific avenues that are being investigated include;

- Developing an understanding of the whole chain related to on-board air quality as a basis for recommending economically viable and technically feasible methodologies for ensuring continued air quality.
- Another aspect of the experiments performed, was to determine if the collection efficiency of the air filter varied by particle size. Three different aerosols, Arizona Road Dust, NaCl, and diesel fumes were used to conduct this experiment because of their different particle size range.
- Main focus to build low cost and eco-friendly air purifier system.

RESEARCH GAP

Lots of research has been done to increase the efficiency of the air purifier system but overall cost of air purifier is automatic increase very less research work has been carried out to make high efficiency air purifier in low cost with use of solar plane

METHODOLOGY



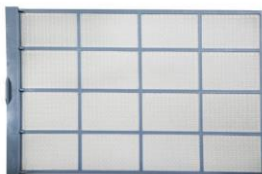
- First read the research papers and find the base papers on which we want to work.
- Then we find the effect of dust particle on the HEPA filter and granule activated charcoal
- We will make the experiment model and test the different aerosols, Arizona Road Dust, NaCl, and diesel fumes, etc.

MATERIAL DETAIL:

- **Exhaust fan**
Size 9inch
Rpm 2600rpm (max.)
Fan regulator



- **HEPA filter**
High Efficiency Particulate Air (HEPA) filters have an efficiency of removing 99.97% of particulate matter of size less than 0.3 microns from contaminated air ensuring a flow rate anywhere between 150-400 cubic feet per minute depending on the clogging of their pores.



HEPA filter

- **Activated charcoal**
Activated carbon, also called activated charcoal is a form of carbon processed to have small, low-volume pores that increase the surface area available for adsorption or chemical reactions. .



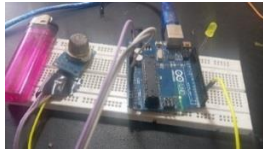
Granule activated charcoal

- **Solar panel**



Solar panel and inverter

- **IOT based Air Quality Monitoring System**



Arduino

- Copper wire
- Switch

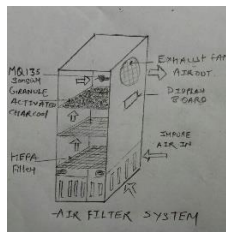


MQ135 SENSOR

EXPERIMENT SETUP

Experiment consisted of wooden box of and high power exhaust fan at the top and there are several hole in bottom to suck the impure air. The box is divided into three layer the first layer made up of granule activated charcoal which is good insulated of dust and heat it is capable to stop the dust particle of size range 0.3 to 100 μm . The second and third layer is for High Efficiency Particulate Air (HEPA) filters and also three air quality index sensors are placed inside the box two sensors for check the quality of impure air which is placed in bottom and another sensor is placed between the exhaust fan and activated charcoal layer which check the air quality after purification.

MODEL:



Block diagram



Front view



side view

Model setup diagram

Technical Specification:

Size of the machine	Height – 4 feet Width – 1.5 feet
Air flow rate	900 m ³ /min. at 1350 rpm
Electricity consumption	40 watt
Filter	HEPA filter and granule Activated Charcoal
Filter life	3 Years

WORKING

The air purifier machine made by metal structure and covered by plywood. The high speed exhaust fan which is run by solar energy as well as normal electricity. According the level of atmospheric air impurity, the fan speed can be adjusted manually also. For highly polluted air, this machine can be work at low speed, so that maximum time can be available for cleaning the polluted air. The polluted air and dust particle, mixed in the atmospheric air because of high traffic density. This polluted air initially floats up to human knee level for next few minutes and this will be the right time to suck this polluted air for filtration. The polluted air sucked by machine from lower end and then proceed to passes through two stages filtration process where in the first stage the air dirt particles are collected in multiple layers of HEPA filters. After that the dust free air passes through the activated charcoal. This activated charcoal absorbs the bad smell of the air and discharge fresh air in the atmosphere.

OBSERVATION

first we took the weight of the HEPA filter without dust of size (length 14cm and breath 9cm) and HEPA filter weight 2.5gm, then we put the HEPA filter back in the chamber, after that we kept air filter in crowd market in Gandhi Nagar, then we run the air filter for the 3 hour and note the reading every 20mintes after that we observe that weight of HEPA filter is increase by 0.5gm.



HEPA filter weight without dust



HEPA filter weight with dust



Gandhi Nagar market

READING TABLE

TIME	12:00 pm	12:20 pm	12:40 pm	1:00 pm	1:20 pm	1:40 pm	2:00 pm	2:20 pm	2:40 pm	3:00 pm
HEPA filter weight(gm)	2.0	-	-	-	-	-	-	-	-	3.0
AQI in reading(ppm) sensor 1	0.68	0.59	0.62	0.56	0.64	0.98	0.80	0.98	0.98	0.74
AQI input reading(ppm) sensor 2	0.61	0.50	0.64	0.52	0.70	0.90	0.75	0.92	0.93	0.71
AQI output reading(ppm) sensor 3	0.23	0.25	0.34	0.31	0.26	0.51	0.34	0.48	0.45	0.33

ADDITIONAL POINTS OF RELEVANCE

- Cleaning of air with solar energy
- Low cost maintenance
- Space constrain (take less area)
- Fluctuation with design
- Easy installation

RESULT

We are observed that the air purifier is capable to remove the air dust particle size range from 0.03 to 100µm.and it is also capable to remove bad odor smell and poisonous gases.

It will also filter the ash, odor, bacteria's, dust etc.

COST OF PROJECT

Cost of manufacturing of the existing model is around **six thousand rupees**. In our substitution model, technology is used which is comparatively cheaper and cost of manufacturing is less. Forecast, 2019-2026," the overall high-efficiency particulate air filters market is expected to grow from USD 2,484.4 Million in 2018 to USD 4,391.5 Million by 2026 at a CAGR of 7.4% during the forecast period.

CONCLUSION

This study confirms that the presence of air purifier system during the process of drying is indeed beneficial. During a drying event, undesirable particulate loads in the environment are at a significant risk of being elevated. Particulate present in the indoor environment is likely to come from spaces that are not normal in the breathable atmosphere within the structure, as air is moved over affected structural materials, beneath flooring, in wall cavities, and across other damaged materials. As these foreign particles are released into the air, this study indicates that those particles are distributed throughout the space and deposited on surfaces. Particulate loads in both the air and on surfaces, especially when considering the potential sources, create a concern for both occupant and worker health. The use of air purifier system will eliminate the majority of this problem, as much as 85% in just one hour of operation.

39. Power Outage Info Module

COLLEGE	Panipat Institute of Engineering and Technology, Panipat
GUIDE	Dr. Shakti Arora
COLLEGE STUDENTS	Gaurav Dhiman, Kangan
SCHOOL STUDENTS	Sakshi, Yogita Rawat
SCHOOL	Govt. Sarvodaya Kanya Vidyalaya, Amalwas, Delhi

ABSTRACT

A Power Outage Info module has been invented, designed and developed, which senses electricity supply outages at strategic "nodes" of the Low-tension distribution network. It relays the information back to the Control Room within seconds of occurrence for the Management to take necessary corrective/preventive measures. Not only does the module match the technical requisites, but also, is economic enough to meet the shoe-string budgets of the ailing utilities.

KEYWORDS-Internet of things, Arduino microchip, GSM module, Power Outage detector

INTRODUCTION

In developing countries like INDIA, Low Tension (LT) power distribution systems is not effective in terms of power outages. Currently, consumers have to call up the Control Room to report a power outage, for the agents to react and mobilize fixing team for repair. However, if this consumer response is not forthcoming, the field crew has to carry out trial and error inspections to locate the damaged transformer or junction box, resulting in a considerable delay in repair. Furthermore, a delay in knowing that an outage has occurred, from consumer phone calls, delays the overall restoration time. This problem is Unsustainable and exclusive for the human settlement as Nowadays, almost every work is dependent on Electricity. The project's principle is to:

- Increase efficiency of Electricity
- Decrease in delay to fix the power outage
- Less inconvenience to the electricity consumers
- Pocket Friendly

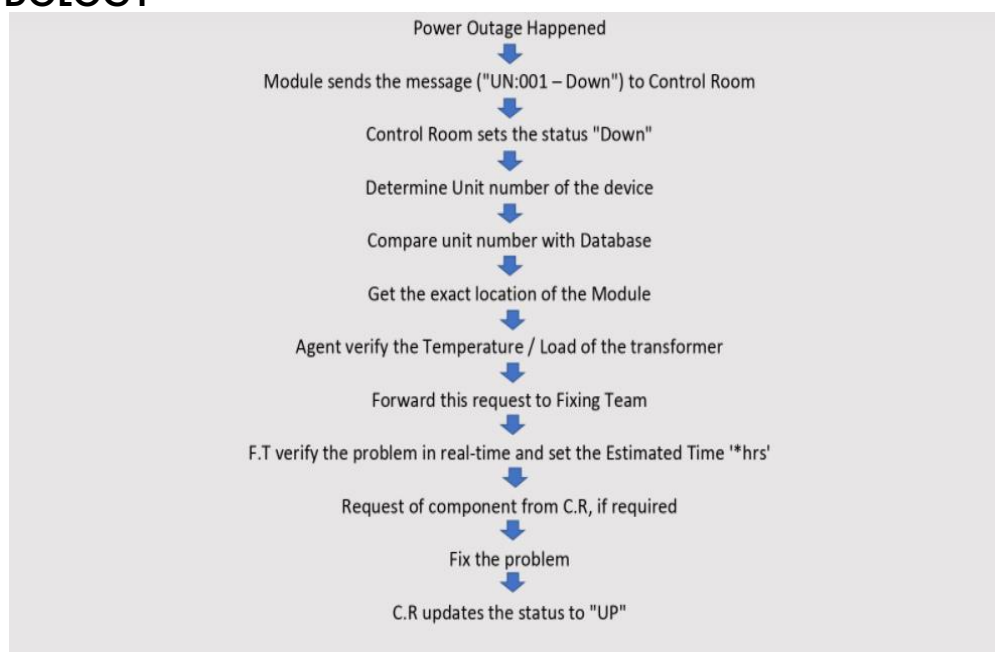
SALIENT FEATURES

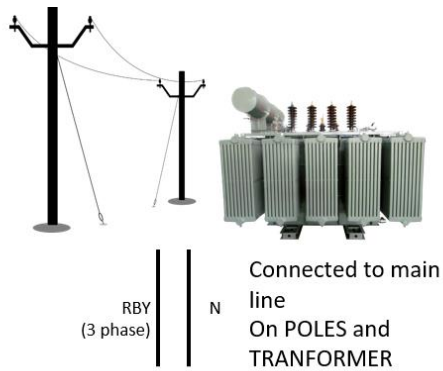
1. Senses electricity supply outages.
2. All in one pocket friendly app.
3. On-app Alerts for Power outages.
4. On-app Time left for repair the electricity supply.
5. Outage Location detect and navigation to the outage area.
6. Economic enough to meet the technical requisites.
7. Different Portals for Consumer, Fixing team and Control Room.
8. Immediate Signal response after a power outage.

OBJECTIVE AND SCOPE

On low tension transmission, the manual procedure of power outage info is outdated and time-taking. Also monitoring of transformers' health in real time is still a challenge. Lack of a reliable electricity supply is not just an inconvenience; there is a direct correlation between the extent of power outages and a village's household rate of grid electricity adoption. In view of the increasing inconvenience due to the manual procedure, an automated system for monitoring the power cuts or outages needs to be established. This gives rise to the development of 'Power Outage Info Module' It relays the information back to the Control Room within seconds of occurrence for the Management to take necessary corrective/preventive measures. Not only does the module match the technical requisites, but also, is economic enough to meet the shoe-string budgets of the ailing utilities.

METHODOLOGY





POIM
Hardware
Module

If there is electricity in lines
then **MODULE - OFF**

If there isn't any electricity in
lines then **MODULE - ON**

Signal SENT
IN FORM OF
MESSAGE
CONTAINING
UNIQUE CODE



PROCESS the info,
And take the matching
Latitude and longitude

PROCESS the MAP with
respective Info (LONG.,LAT.)

MAP sent to

CR* APP/WEB

Fixing Team APP

GOT THE PROBLEM LOCATION ON THE MAP

GOT THE PROBLEM LOCATION ON THE MAP

SET STATUS : SOLVING;
SET TIME TO APPROX. ESTIMATED TIME

CAN NOW MOVE TOWARD LOC. USING

NAVIGATION

SET TIME : NEW TIME (REPORTED FROM
TEAM)

TEAM REACHED : DIAGNOSE THE PROBLEM
SET EST. TIME;

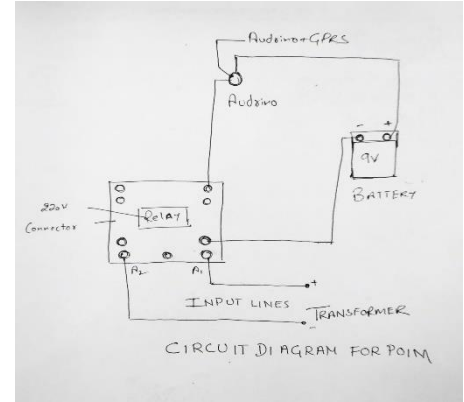
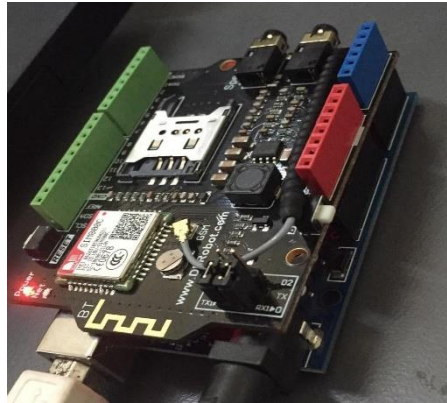
ONCE SOLVED :
SET STATUS : SOLVED

ONCE SOLVED :
SET STATUS : SOLVED

Consumer APP

*CONTROL ROOM

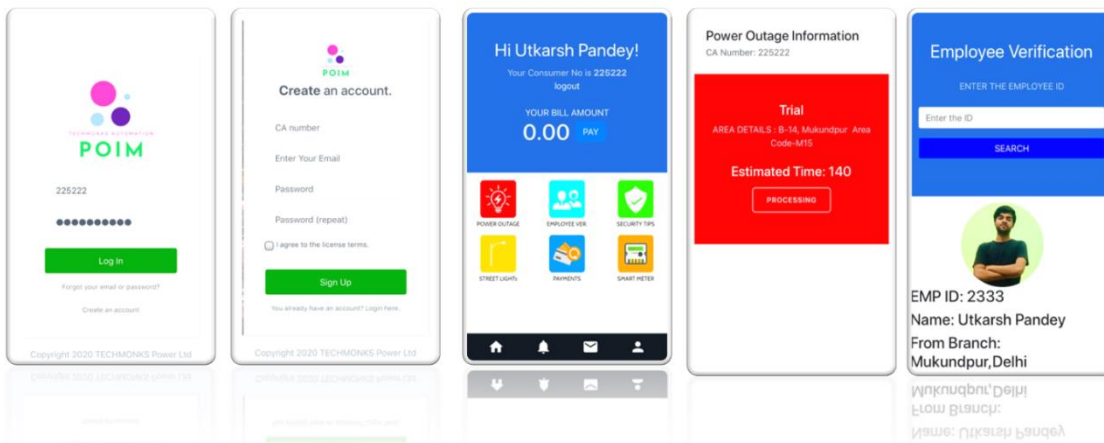
HARDWARE COMPONENTS



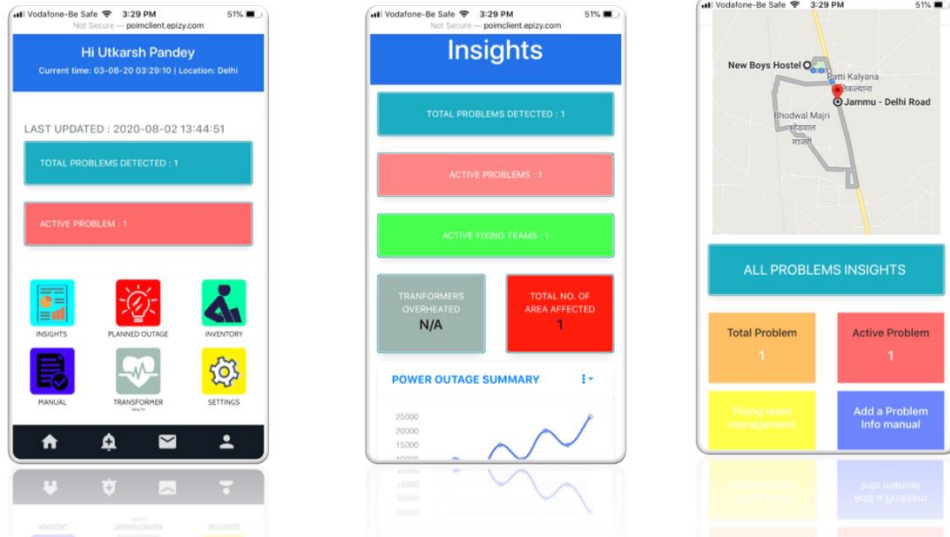
- Insulation Covering
- Arduino GSM with GPRS
- LED
- Relay
- 9V Battery

SOFTWARE:

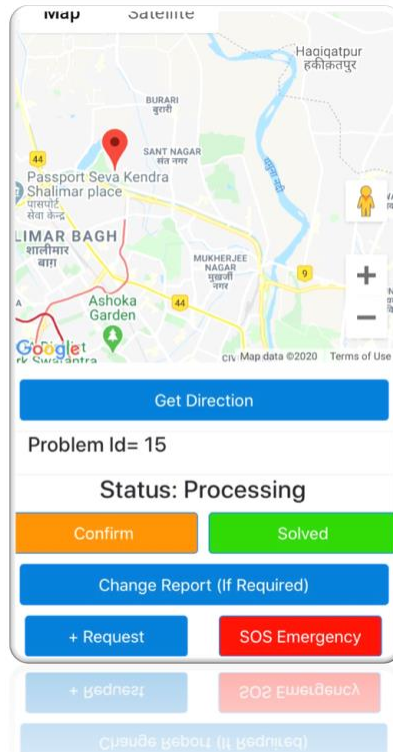
COSTUMER INTERFACE



Control Room Portal :



Fixing Team Portal:



COST OF PROJECT

- Cost of POIM Software Module: Cost of Databases and servers
- ONE TIME COST FOR DEVELOPMENT OF THE APPS AND WEBSITE
- Cost of POIM Hardware Module: 1000Rs (Prototype)
- IT WILL BE TAKEN DOWN TO AROUND 400 RS. IN UPCOMING VERSION

CONCLUSION

- Less the Power Outage, more stable electricity and increase in usage which in return gives more Profit.
- At this current stage of time, there is no means to detect current Power Outage.
- **MAKE IN INDIA** – Automated machinery can be setup completely here.
- **CONVIENCE ENERGY USE**

40. Plastic Constrains by Plastic

COLLEGE	Maharaja Agrasen Institute of Technology, Rohini, Delhi
GUIDE	Ms. Surabhi Lata
COLLEGE STUDENTS	Dev, Ankit Kumar
SCHOOL STUDENTS	Swasti Bhardwaj, Versha Rohilla
SCHOOL	Govt. Girls Senior Secondary School, Nangloi, Delhi Govt. Girls Sr. Sec. School, Baprola, New delhi

ABSTRACT

This paper discusses the design steps, working principle and structure of a small-scale thermo-plastic extrusion machine. Plastics are inexpensive, lightweight and durable materials, which can readily be molded into a variety of products that find use in a wide range of applications. Recycling is one of the most important actions currently available to reduce these impacts and represents one of the most dynamic areas in the plastics industry today. The extruder of plastic machine is consisting of the five main parts; they are hopper, drive of screw, barrel, and nozzle (die), heaters and control system. Extruder is the prime part of the machine where in the crushed particles gets drawn into wires through a die. Screw is the heart of the extruder, which employs heating element through its length. The heat for melting the Crushed plastics is controlled using a heating control unit. The Screw, which is motor driven conveys the molten Plastic to the opening of the die.

KEYWORDS: Plastics recycling, Density of polymers, Extruder of plastic machine, extrusion, design, 3D modeling

INTRODUCTION

- Extrusion as a polymer processing technology appeared at the beginning of the XIX. Century. Mc Phearson invented the screw press in 1818 that improved substantially with the development of the rubber industry. Thomas Hancock, in 1820, invented a machine that used gears to recycle rubber goods. The machine was optimized by Edwin Caffé. In 1833 Charles Good-year invented the vulcanization process of rubber.

- The extrusion process is the most widely used polymer processing technology that involves melting, homogenization and pressurization of the polymer melt, which is then forced out in a predefined cavity resulting in the formation of the final products shape.
- The aim was to build a machine that could serve as a part of a recycling line that could be used for recycling the plastic from our society and in our environment also. The design of the extruder is very similar to extruders used in the industry.

SALIENT FEATURES

The extruder has following features:

- Lower cost
- Easy to maintenance.
- Increased performance.
- Higher motor torque.
- Small in size.
- Less power consumption.
- Better screw design.
- Works on single phase Supply.
- Higher discharge rate.
- Longer life reliability.

OBJECTIVE AND SCOPE

Our product is providing the recycling of waste plastic in an easy manner. Our product can easily recycle the plastic waste Recycling is a complex method of environment protection, which aim is the limitation of the raw materials consumption and decrease of waste quantity. In practice, recycling is often the necessity and it always becomes the only reasonable strategy of the working if consider waste formation in the End of Life phase. This extruder provides the best and accurate results at the end of a die.

Our Mini extruder can recycle those plastics such as -

- PET
- LDPE
- HDPE
- PP
- PS

METHODOLOGY

Every product has to be designed, produced, sold, consumed or exploited and every product, after time, doesn't satisfy the needs because of the physical or moral consumption. It becomes waste. The EoL analysis leads to resources sustainment model. Product recovery as an elongation of product life cycle can concern the whole products, their components and materials and raw materials, generally recovered value. The basic possibilities of recovery: reuse, remanufacturing, reclaim, recycling which are shown in figure.

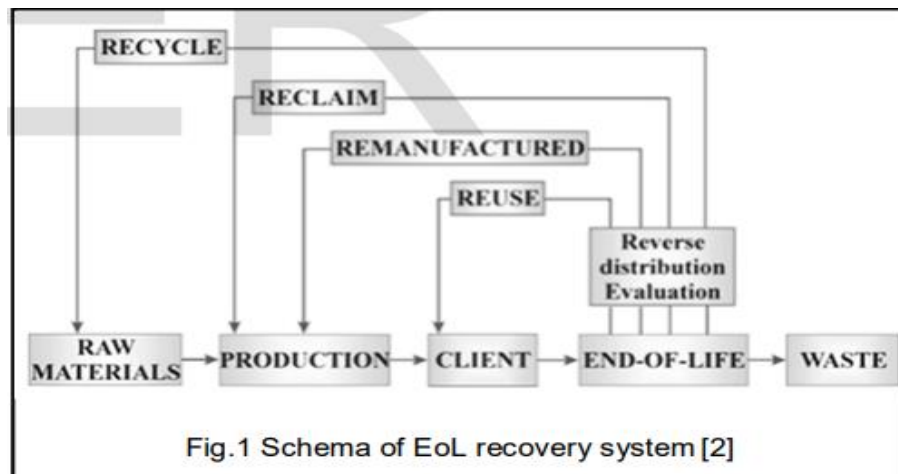
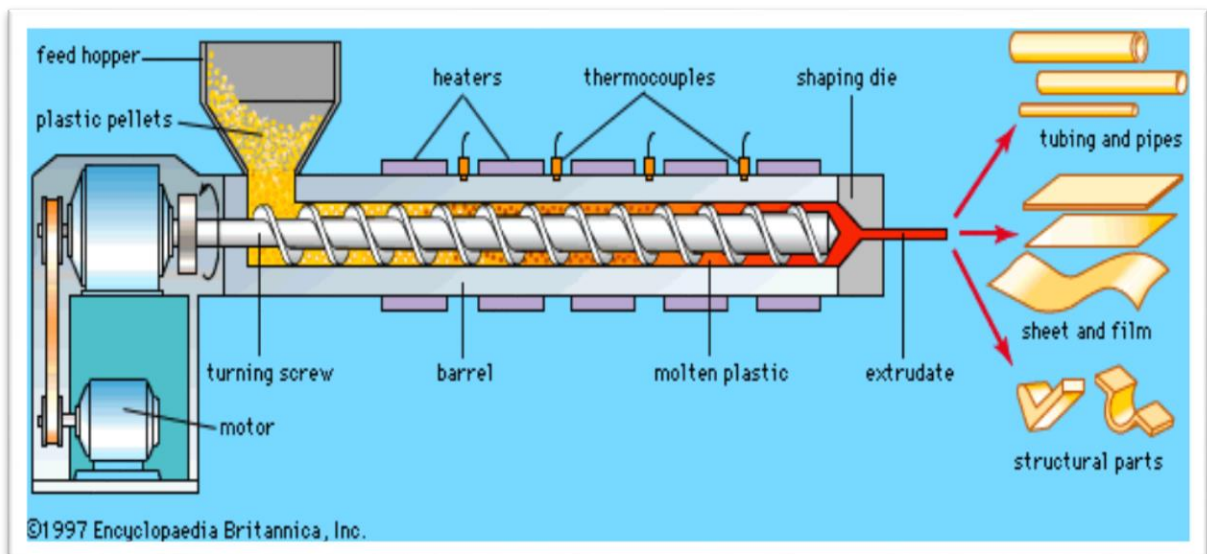


Fig.1 Schema of EoL recovery system [2]



Basic Structure of Extruder Machine

BASIC PARTS OF MACHINE -

1. MOTOR

The drill is driven by a 60W AC single phase gear motor that also equipped with a speed reducer. Its shaft rotates the screw at 45 RPM.



2. Screw or Drill

One of the most important components of the extruder is the screw. The regular extruder screw has 3 different zones: feeding, compression and homogenization zones. The inner diameter of the screw increases in the compression zone, thus reducing the space where the molten polymer material is located, resulting in the increase of the pressure. These screws are very expensive and keeping a cost-effective approach we have used a wood drill



3. Heater Bands

The barrel of the extruder is heated by three heating units, each has a power of 200 W, and a diameter of 25mm. The three heating units are connected to the temperature controllers through relays (SSR4028ZA2) that allow the supply of the heating unit with 230 V, since the output from the controller is 5 V.



4. Temperature Controller

The temperature control is achieved by a PIC controller (PID REX-C100), to which the input signal is generated by thermocouples (2M K type).



5. K-Type Thermocouple

Thermocouple is used to measure the outer temperature of barrel. We are using K type thermocouple for our machine.



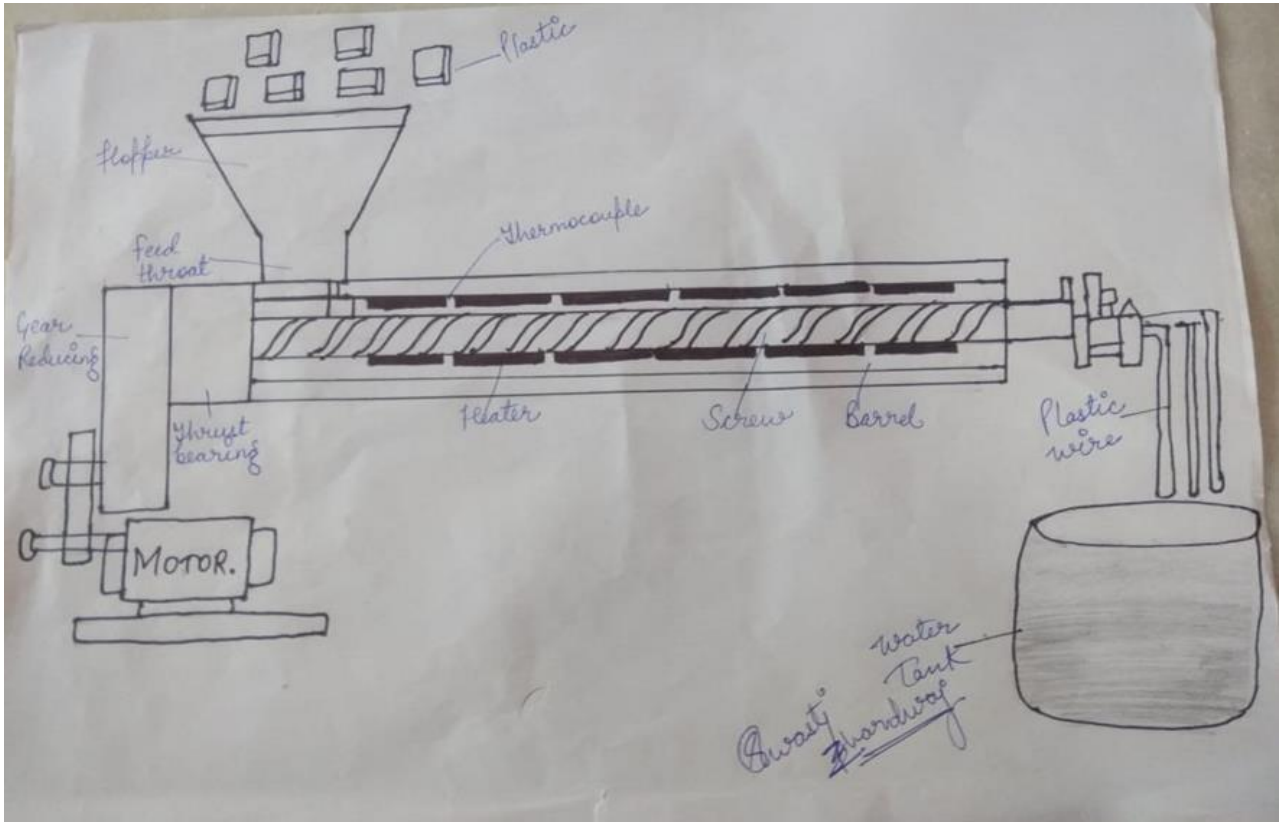
6. Barrel

The extruder barrel contains cooling lines in the proximity of the feed throat to avoid melting of the granulate in the hopper. If the plastic granulates melts at the feeding section it could form a granulate aggregate that could clog the hopper, thus preventing the granulate from reaching the extruder barrel and screw.



7. Motor Speed Controller

It is a device which is used to controlling the RPM of AC motor.

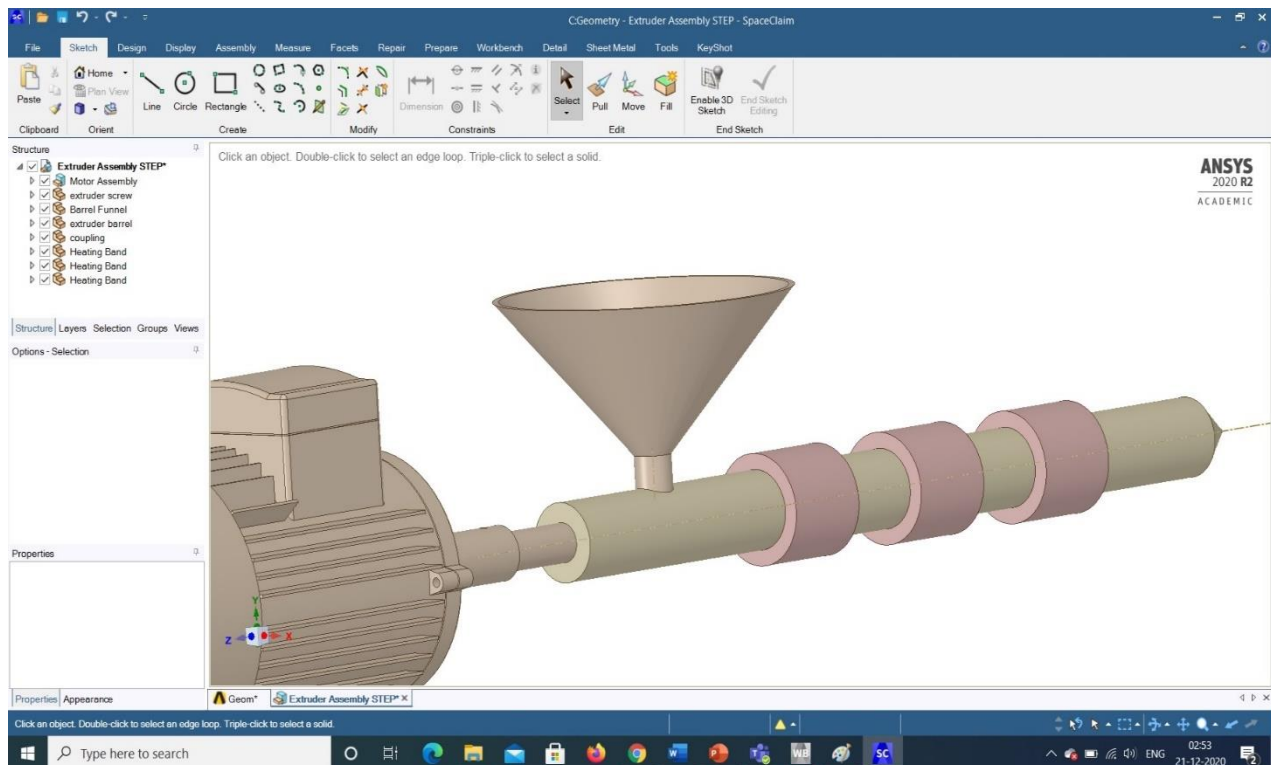


COMPARITIVE STUDY

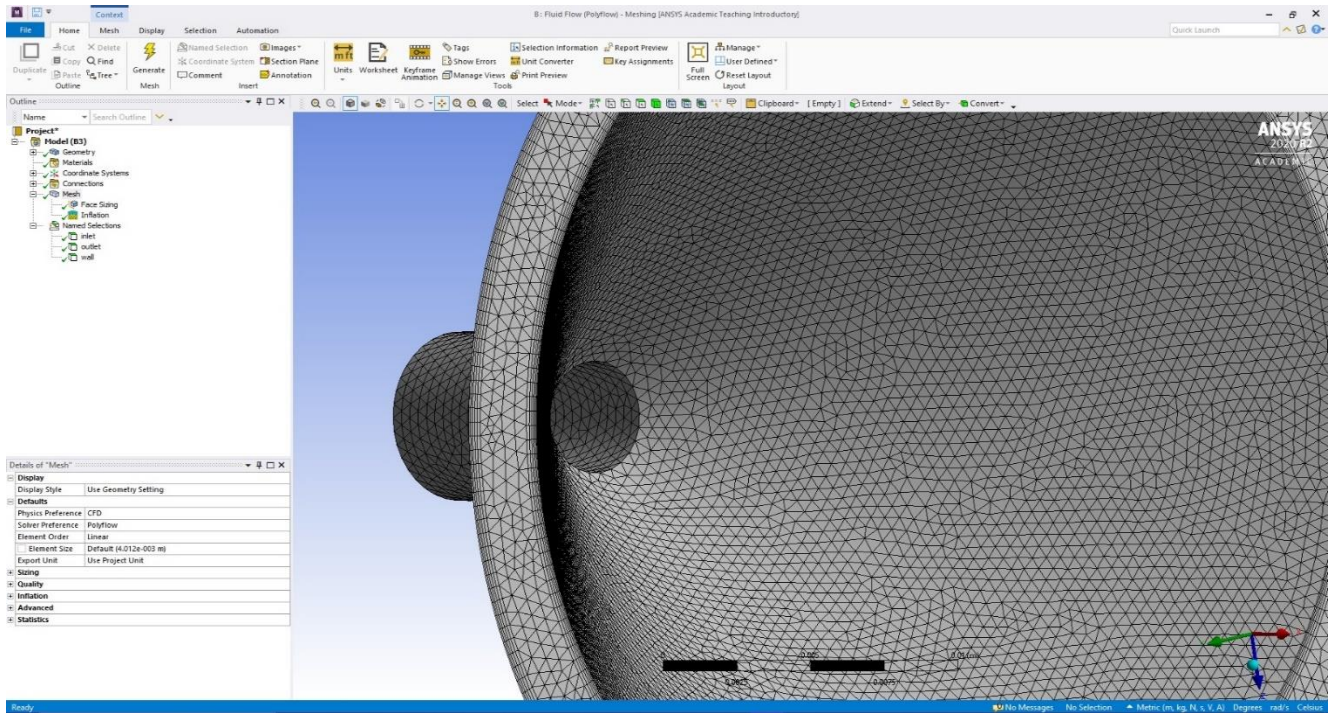
The product is better than another extruder. The designing of parts is done in Ansys 2020R2. Before fabrication the parts are needed to design on Computer so that we can achieve desired results.

The principle works of extruder is the rotation of screw by using a motor, and melt a material by using heaters, and this extruder is needed a motor and heater when capacity of motor is equal to 200W the screw rotated by 20-180r.p.m and the melting temperature of heaters between (0 – 400).

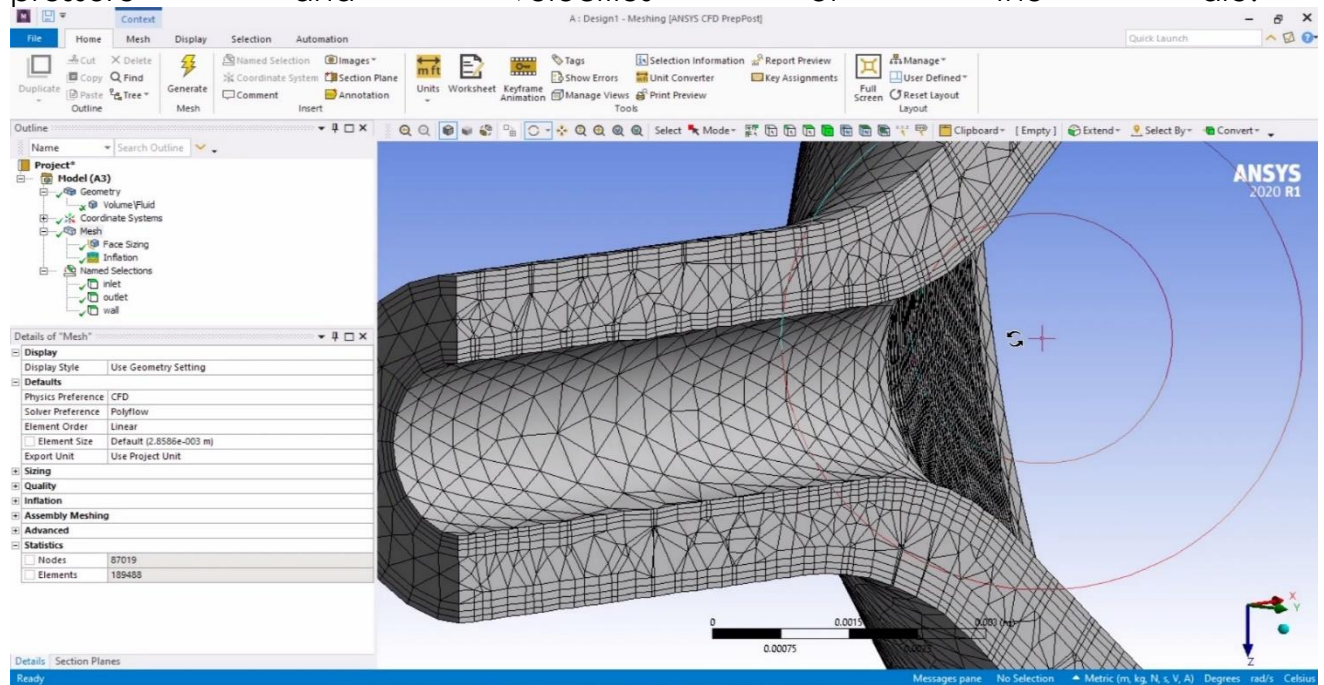
The drivetrain of the machine consists of the electric motor, a reducer and the bearing, whereas the feeding system is made up of the hopper in our case and a small opening on the barrel. The polymer turns to a melted state due the heating system and the friction generated in the barrel. There is a pressure sensor at the end of the barrel in front of the die to provide an input for a feedback mechanism that regulates the heating and of the speed of the screw. The molten plastic is then formed to the desired shape by the die. The screws are standardized by the diameter/length ratio (D/L).



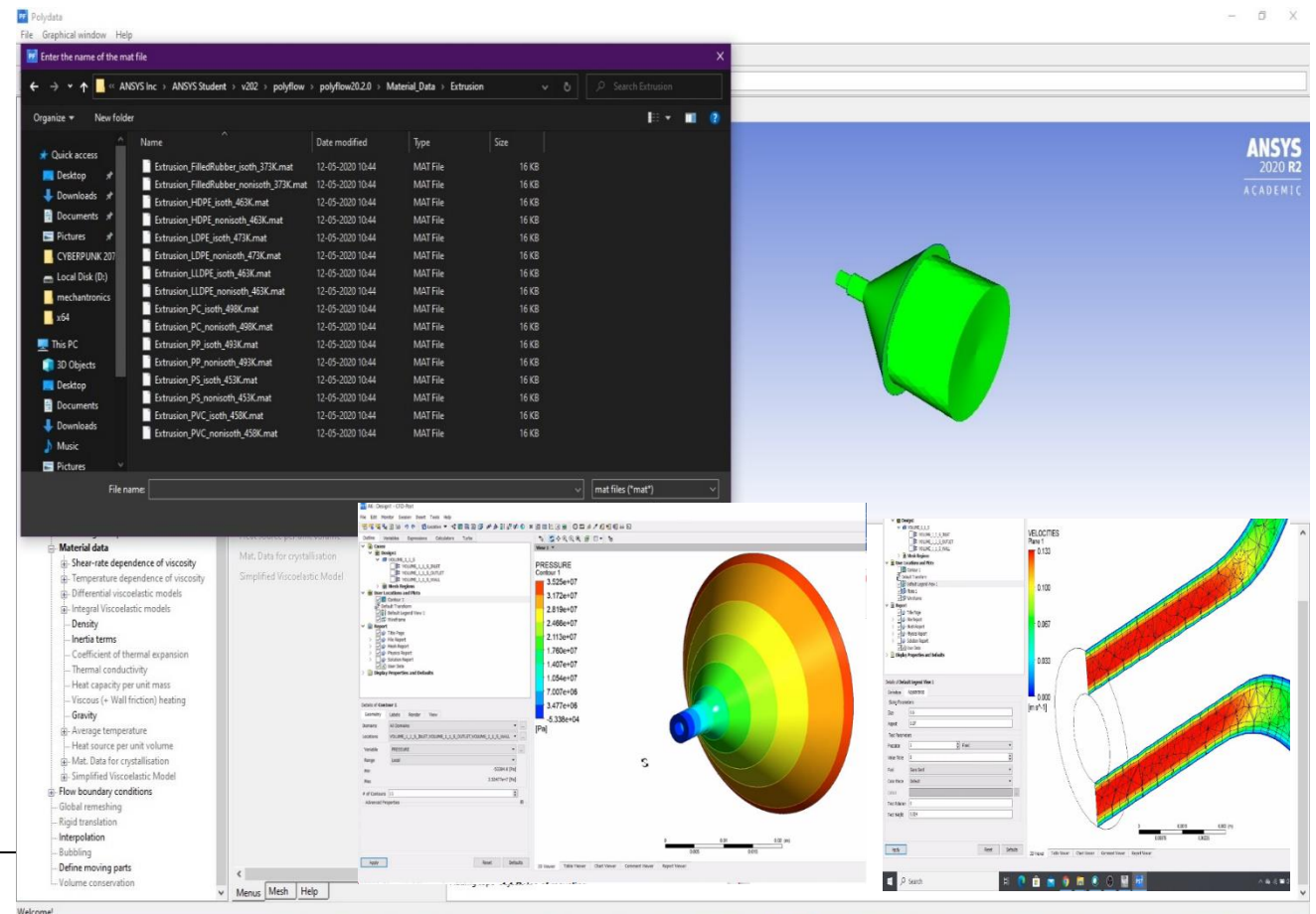
After designing the parts, the meshing generation is carried out in the second phase. As you can see in the inner die section, meshing is generated in every element of die. These meshing helps us to finding the parameters in the die at each element.

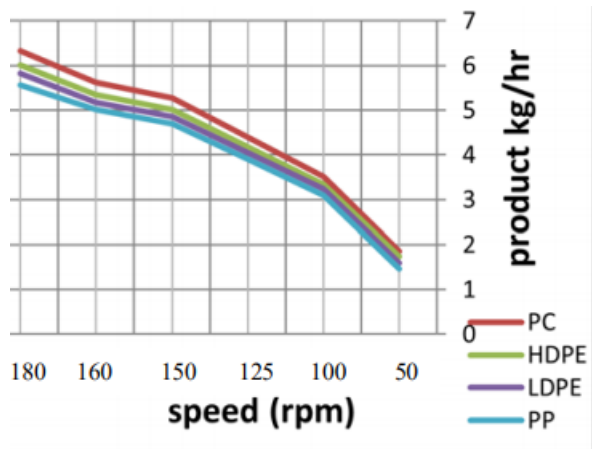


After Meshing generation, a setup is created for finding the parameters like pressure and velocities of the die.

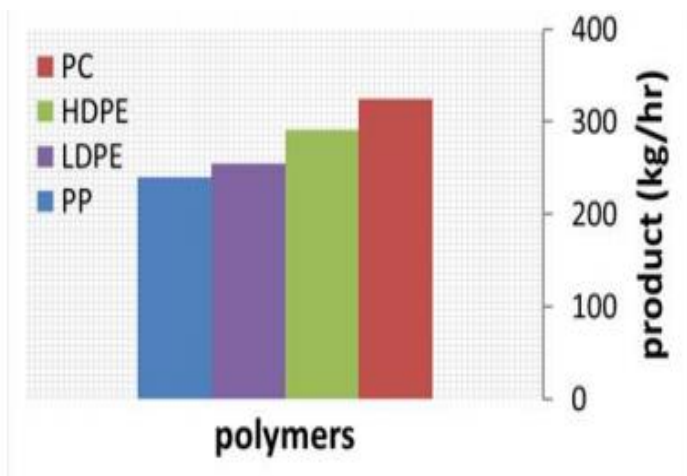


Boundaries condition are applied for the setup Phase and the material data is choosing according to our material. Then after material selection setup phase is ready for providing the results for our die.





Relationship between speed of motor (rpm) and output (kg)



After designing the parts of machine, the parts of machine are fabricated according to the drawing with the help of machine tools.



SOCIAL IMPACT

Our model's aim is to recycle the waste plastic from our environment and reuse them. This waste plastic can be used for making desire products and can be used for future generation.

- **Job Creation:**

Workers are needed to perform the work on machine which will create numerous job opportunities for our society and removes poverty also.

- **Plastic Recycling means clean environment:**

This machine helps us to increase the recycling rate as compared to current recycle rate. This will help to clean our society and our environment also.

- **Plastic recycling saves life on land and in water:**

Plastic destroy the soil life. This machine helps us to saves life of our land, life of living organisms (in water or in land)

- **Recycling makes money:**

Plastic Recycling creates an income source for the user. Recycling helps to make money in an easy manner.

COST OF PROJECT

Cost of manufacturing of the existing model is around **less than Fifteen thousand rupees only.**

CONCLUSION

- **MAKE IN INDIA** – Automated machinery can be setup completely here.
- **START-UP INDIA** – Our Further plan for the model is not only a business plan but also will create job opportunities.
- **SWACHAH BHARAT**- since it will improve hygienic level and the clean environment of our surrounding.