

TECHNICAL MAGAZINE

DEPARTMENT
OF
ELECTRICAL AND
ELECTRONICS
ENGINEERING



2020 - 2021

HINDUSTHAN

COLLEGE OF ENGINEERING AND TECHNOLOGY

MESSAGE FROM THE CHAIRMAN



It gives me immense pleasure to note that response to this magazine of our department has been overwhelming. The wide spectrum of articles in different sections gives me a sense of pride that our students and professors possess creative potential and original thinking in ample measures. Each article is entertaining, interesting and absorbing. I applaud the contributors for their stimulated thoughts and varied hues in articles contributed by them. My congratulations to the team who took the responsibility for the arduous task most effectively. I am hopeful that this small piece of technical work shall not only develop the taste for reading among students but also develop a sense belonging to the institution as well.

- Mr. T. S. R. KHANNAIYANN

MESSAGE FROM THE MANAGING TRUSTEE



Good things remain good only because they are always scarce. I am glad to pen for this wonderful magazine as an appreciation of the commendable efforts put forth by the team for its grand beginning. The efforts taken to bring about innovative content is appreciable content on the various opportunities available in the corporate world and alerts on various student level competitions shall be included hence next. Wish you all a grand operation throughout the year.

- Mrs. SARASUWATHI KHANNAIYANN

MESSAGE FROM THE EXECUTIVE SECRETARY



Present day student like anything digital and online. It is convenient in time, place, and access. It is fast and almost free. Our days never end without looking at the net for one or other purpose. I only wish that more students contribute good and useful materials for the others to read and know. Keeping it useful and interesting is a challenge. I invite all our students to contribute and make it.

- Mrs. K. PRIYA SATISH PRABU

MESSAGE FROM PRINCIPAL



The department of Electrical and Electronics have reingratiated themselves to be the worthy ones in all aspects. They have contributed with their whole heart for the welfare of the college. The dedication of the faculty members and the inspiration that let the students to proclive the talents within. The publishing of technical magazine by this department proves to be great turmoil.

- Dr. K. KARUNAKARAN

MESSAGE FROM THE HOD



I am gratified to know that the department of Electrical and Electronics Engineering is bringing out their technical magazine of this academic year. This is a productive technical material and subsidiary skill developing tool for the students. I wish this organization "Electrical and Electronics Engineering Association" a very big success in all their ventures. I also applaud the coordination and efforts.

- Prof. N. P. ANANTHAMOORTHY

VISION OF THE DEPARTMENT

VISION:

To manifest itself as a valuable global resource for industry and society with strong foundation. Abetting the students with innovative ethical and creative talents of endeavoring young professionals in Electrical and Electronics Engineering.

MISSION OF THE DEPARTMENT:

DM1: Educate the students to acquire knowledge in recent advancement of Electrical and Electronics Engineering and prepare the students for professional career and higher studies.

DM2: Inculcate the students to develop innovation for the societal needs through research oriented teaching and creative skill enhancement training.

DM3: Enunciate the students with better skills to meet the challenges of the technical world and intensify the skills towards the practical approach.

PROGRAM EDUCATIONAL OBJECTIVES - PEOs

PEO 1: Graduate will be able to execute the principles of basic science, mathematics and engineering fundamentals necessary to formulate, solve and analyze engineering problems.

PEO 2: Graduate will be able to accrete the knowledge for pursuing advanced degrees in Engineering, Science, Management, Research and Development.

PEO 3: Graduate will be able to effectuate professionalism, leadership qualities, self and continuous learning and concern for environment to meet the societal needs.

PROGRAM SPECIFIC OUTCOMES- PSOs

PSO1. Graduates will acquire the knowledge of design, performance & testing of static & dynamic Electrical Machines, Electrical Drives, Power Electronics applicable in core and related fields.

PSO2. Graduates will attain knowledge and acquire skills by applying modern software tools for design, simulation and analysis of Electrical Systems to successfully adapt in multi-disciplinary environments.

DRAWINGS:



SANJAY. K

III YEAR



JOTHIRAJ S

II YEAR



SANTHOSH KUMAR S

III YEAR



VIJAY T
II YEAR



SRI DEEPAK V

III YEAR

POEMS :

விடிந்ததும் சிரிக்கிறேன் – Chernobyl Effect

விடிந்ததும் சிரிக்கிறேன்
அதுவரை அழுகிறேன் ஆறாத
துயரங்கள் அணுவினில்
கலந்திருக்கையில் யாதும்
அறியாமல் தவிக்கிறேன்
வினையூக்கியாய் இவ்விரவது
இருளினை ஊற்றுக்கையில்
கண்ணீரின் நிறங்கள்
மாறுவதை என் குறிப்பேட்டில்
எழுதி கொள்கிறேன் நேற்றுவரை
தென்றல் என்றவை இன்று முதல்
பாதகமென்பதை உணர்ந்ததால்
சொல்கிறேன் விடியும் வரை
அழுகிறேன் விழியினில்
நிறைந்து வெளிவருந் சிறு
துளியின் பாரமது ஒவ்வோர்...

NAVANITH R

II YEAR

மீள்வாசிப்பு செய்யுங்கள்

மௌனங்களின் நிழல்களிலே
கசிந்துருகும் ஓர் பிம்பம்
நேற்றைய நாட்களின்
தேடல்களில் ஒளிந்து
கொண்டிருக்கும் பக்கங்களை
புரட்டுவதைப் போல்
வருடங்களை நகர்த்திச் சென்று
அறிந்தவர்களை ஆராய்ந்திட
புன்னகையும் ஓர் சிறு துளி
கண்ணீரும் உளவாடி
கொண்டிருக்கும் கோர்வையாய்
இல்லாமல் காலக்கோட்டில்
சிதிலடமைந்து காட்சிகள் யாவும்
தன்னை வெளிப்படுத்திக்
கொண்டேயிருக்கும் நிலை
நின்று ஓர் நிமிடம் நிசப்தத்தில்
விழி...

**BABU K,
III YEAR**

முழுதாய் முத்தமாய்...

அத்தனை வேகமாகவா கடந்து
விடும் அந்த நொடி யாரும்
கவனிப்பதாய் தெரியவில்லை
என்றதும் மெல்ல இறுகி
பிடித்திருந்த கைகளை விலக்கி
விட்டு உருண்ட விழி இரண்டும்
அதன் எல்லைகளை அடைந்து
விட்டு எனைப் பார்த்த அந்த
நொடிகள் அப்படியே என்னுள்
பதிந்து விட சட்டென என்
நெற்றியில் அவள் உதடுகள்
ஏற்படுத்திய மாயம்
நொடியினும் குறைந்த...

SUBASH R
III YEAR

அகழ்வாராய்ச்சி

இருள் கூடியிருக்கும்
அறையினில் அமைதியாய் சில
பேச்சுக்கள் அளவாய்
விசாலமாய் புதை படிமங்களை
யாதென்று தெரியாமல்
சிதைத்திட கூடாதென்று
மெதுவாய் தூசிகள்
அகற்றுவதாய் அந்த பேச்சுக்கள்
நினைவுகளை கண்டறிகின்றன
பதின்ம வயதுகள் சிதிலமாய்
அதில் சில தன்மை மாறாமல்
சிதறிய வண்ணம்
கிடைக்கின்றன கீரல்களாய்
இருக்கும் இடத்தில் தடயங்கள்
தெரிகின்றன அதில் சில
முகங்கள் தோன்றி...

GOKUL RAJ R

II YEAR

இலை விழும்துளியொன்று

இலை விழு துளியொன்று கனத்து நுனி வந்து நுனி யதன்

அரவணைப்பில் சற்றே மேனிப் பருத்து – கீழ் நோக்கி

மெல்லியவளின் கன்னம் விழ மெல்லியவள் நளினம் கொண்டு

துளியதை துடைத் தெறிய துடைத்தெறிந்த துளியது பெண்மையவள்

கூந்தலுரசி சிதற பரவியது ஈரப்பதம் நதியதன் கரையோரம்

கொண்டதொரு ஓசை போல் சிலிர்த்தது கானங்கள் துளியது

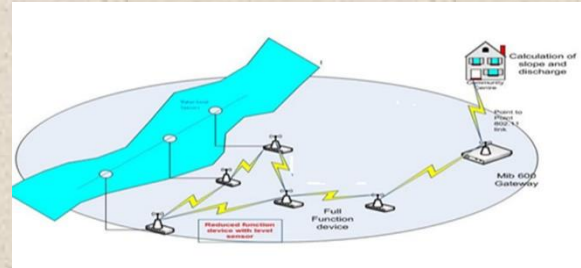
கூட்டத்துடன்...

**-SARAVANAN T
II YEAR**

ARTICLES

FLOOD WARNING SYSTEM BASED ON IoT

The flood detection system monitors and identifies the development of floods and then takes necessary actions like operating regulators and sending notifications to the control areas and inhabitation via IOT in



various forms such as alarms and real time monitoring in internet .The main objective of this project is to send an alert to riverside people, so they can be safely moved away from area which might get affected, at the same time the surplus water can be used for irrigation as well as drinking water hence wastage of water can be reduced.

The sensors sense the data of river or change in water body's due to climate changes and store it in the cloud and use this as reference for the comparison while abnormal conditions arise. This system gives alert in advanced through Internet.

ARTICLE BY

AADITYAN K

POWER LINE FAULT AND ELECTRICITY

THEFT DETECTION

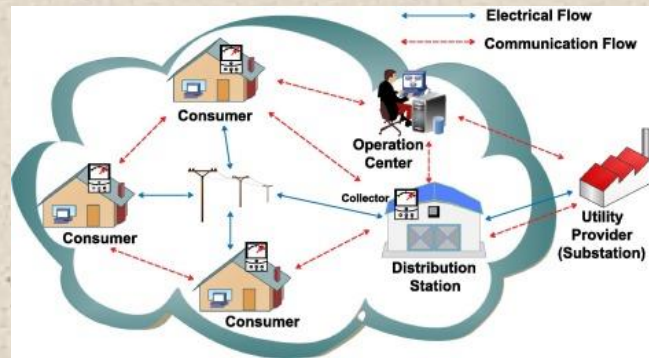
Generation, transmission and distribution of electrical energy involve many operational losses. The losses in generation technical but distribution and transmission losses cannot be precisely quantified with the sending

end information. This illustrates the involvement of nontechnical parameter in transmission and distribution of electricity. Moreover, technical losses occur naturally and are caused because of power dissipation in transmission lines, transformers, and other power system components.

Technical losses in Transmission & Distribution are computed with the information about total load and the total energy bill. While technology in the raising slopes, we should also note the increasing immoral activities. The system prevents the illegal usage of electricity. At this point of technological development, the problem of illegal usage of electricity can be solved without any human control using IoT.

With the implementation of this system will save large amount of electricity, and there by electricity will be available for a greater number of consumers then earlier, in highly populated country such as India, China. Power theft can be defined as the usage of the electrical power without any legal contract with the supplier.

The power theft and power theft location can be determined by calculating the voltage drop and additional flow of current in distribution line due to power theft. If theft current increases beyond the permissible limit then immediate action is taken



by the controller. According to the theft condition the system takes the necessary decision to prevent external tapping in distribution lines. The proposed system is having capability to resolve the most prevalent issue of Power theft .It uses the wireless network for data communication which will increase the reliability and effectiveness of the system. The system is based on real time detection and the location of power theft can be easily determined with the help of received data i.e. current and voltage readings.

ARTICLE BY
ARULMOZHI.G.G

DESIGN OF LOW VOLTAGE INDUCTION MOTOR **PUMP FOR AGRICULTURE PURPOSE**

Electrical energy is the back bone of our country. The demand in electrical power it. More recently arrival of new power plants cannot results in producing electrical energy as per our country's requirement. Electrical



motors, pumps, household appliances, electronic appliances consuming high electrical power is the main reason behind this.

In some hill stations and some vast areas around our country, electrical voltage supplied by Electricity Board is reduced by losses. So, the consumer gets 160V-180V in some hill stations and vast area instead of getting 220V-240V. Here the electrical motor used consuming more electrical energy and wastage not only through electricity and also money for the consumer. In case, 0.5HP motor is enough

for pumping water for the consumer's requirement under normal single phase voltage 220V-240V is not existing there. So the consumer will look for higher HP motor then the required HP motor.

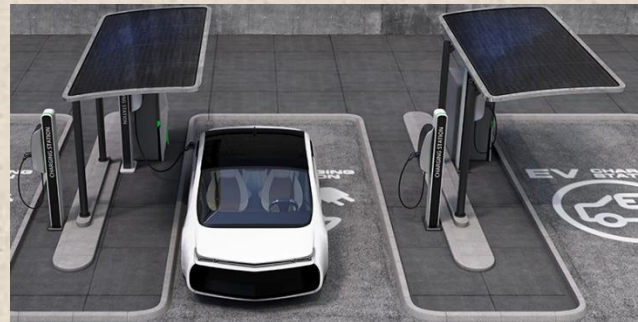
So here is going to design a single phase 24 slot, 2 pole 0.5 HP (0.375kw) motor-pump which operates on 100V-180V as its rated voltage and the performance, efficiency and all the electrical parameter values are same as the motor operated on 220V-240V. For that only changing the winding design in the stator (No. of turns and SWG). The stampings are use in AL3, 55mm core length, Class B insulation, 23SWG for starting and running winding and die cast body.

ARTICLE BY

EDWINPRABHU.M

RFID BASED SOLAR CHARGER FOR ELECTRIC VEHICLE

The Society of Manufacturers of Electric Vehicles (SMEV), 3,400 electric cars and 1.52 lakh electric two-wheelers were sold in India in financial year (FY) 19-20. The total sales grew by 20% compared to the previous financial



year. Electric vehicles are the future in automobile industries. As the use of electric vehicles are increasing day by day the need of the charging stations are also increasing. Existing charging facilities are Trickle charge, AC charge and DC charge. All electric cars currently on the market can be slow-charged using AC charging equipment. Fast charging method currently available is of high cost and slow charging take up to 8 hours for charging a EV. DC chargers also ensure a much

more efficient. The goal of our work is to layout a method for efficient EV charging with renewable strength supply.

Development on previous charging stations have limitations such as high cost and are less compact in size. The available methods are of less in count when compared to gasoline stations due to its complexity in the structure. As most of the available methods depends upon direct grid connection, constant and uninterrupted power supply is not acquired.

To surpass such limitations a layout for efficient EV charging with renewable strength supply is proposed. The solar power is utilized in this layout which gives a renewable and an uninterrupted charging can be acquired. A GSM based technology is also introduced which helps to make the system user friendly.

In this work the arrangement will help charge the electric vehicles with more efficiency and can also be user friendly system. In this prototype a layout of electric vehicle charging station connected to a solar panel is presented. The solar power derived from the solar panel is used as an un interrupted clean renewable source of energy.

The proposed prototype will utilize the solar power to charge the electric vehicles. The main aim of the prototype is to layout a method which will be user friendly to the consumers. The GSM technology is introduced in this prototype in order to make the prototype user friendly. The complexity of the prototype is less when compared to the existing methods. This is done with the use of the Arduino controller.

ARTICLE BY

AKHIL D

ENHANCE SAFETY AND SECURITY SYSTEM FOR CHILDREN IN SCHOOL CAMPUS BY USING WEARABLE SENSORS

The very precious assets of our nation are children . Unfortunately, crime against children has been increasing exponentially. The safety of school children can be maintained in a significant way with support of advance technology. There are several unfortunate incident which are continuously reported in the various media



platforms about callous approach by particular schools in accordance to the safety of school children during entry and exit from the schools . This events have resulted in major concern respected to the safety of school children. all over the world the children are abused and killed sometimes by the bad people those who are not in good attitude inside the school campus. To resolve and track such incidence and improved security system is required. Hence in this project an enhanced version of security system for children is proposed by using ‘Wearable Sensors’. In this proposed method two wearable sensors nodes such as ‘Staff Node’ and ‘Student Node’ are paired by using ‘GSM’ communication technology and Smart Watch technology is also used to transmit the necessary information to the security sensor or processing node to track the kidnaped childrens location and whether the two different nodes are moved away from the school premises . If the node of the child is inactive for a longer period then it may be notified to the centre and they will inform the issue to the security officers near the place. In the proposed method it may satisfy the school managements need about the staffs behaviour with the students and behaviour of

students to avoid unfortunate incidents. In the proposed system there is implementation RFID and sensor technology for children safety and health condition monitoring. This implementation method will overcome the fear for parents in safety zone also health issue during in this pandemic COVID-19 situation.

ARTICLE BY

AKASH S

WATER SAVING MANAGEMENT IN AGRICULTURE **USING SMART IOT**

Despite the perception people may have regarding the agricultural process, the reality is that today's agriculture industry is data centered, precise, and smarter than ever. The rapid emergence of the Internet-of-



Things (IoT) based technologies redesigned almost every industry including “smart agriculture” which moved the industry from statistical to quantitative approaches. Such revolutionary changes are shaking the existing agriculture methods and creating new opportunities along a range of challenges. This article highlights the potential of wireless sensors and IoT in agriculture, as well as the challenges expected to be faced when integrating this technology with the traditional farming practices. IoT devices and communication techniques associated with wireless sensors encountered in agriculture applications are analyzed in detail. What sensors are available for specific agriculture application, like soil preparation, crop status,

irrigation, insect and pest detection are listed. How this technology helping the growers throughout the crop stages, from sowing until harvesting, packing and transportation is explained. Furthermore, the use of unmanned aerial vehicles for crop surveillance and other favorable applications such as optimizing crop yield is considered in this article. State of the art IoT based architectures and platforms used in agriculture are also highlighted wherever suitable. Finally, based on this thorough review, we identify current and future trends of IoT in agriculture and highlight potential research challenges.

Agriculture is the main source of food production in our country. In India, agriculture contributes 18% of the country's Gross Domestic Product (GDP) which employs more than half of the total population. The Indian government has stressed and highlighted the need of innovations to be in above mentioned criteria's in agriculture, thus seeks an indication of technology exposure and innovative implementation practices to enhance the productivity. The productivity in agricultural, food security, erratic conditions in climates, soil conditions requires new ideas and innovations. While this is largely depends on irrigation system, and current techniques in irrigation which helps to achieve more productivity per drop of water. Automation in irrigation system helps to farmers to manage their work much easier and helps to take decisions even in the absence of farmers. IoT, sensors, smart phone tools are the technologies which helps farmers to know the status of their land, amount of water needed, temperature of soil, humidity, weather conditions, pH level. IoT is the term was first coined by the Massachusetts Institute of Technology in the year 1999. Definitions focus on technical aspects of IoT when the other based on the applications and functionalities. A few definition defined IoT as "an extension of the current Internet to all objects that can communicate directly or indirectly with electronic equipment and connected to the Internet". Other defined

as "a novel paradigm that is rapidly gaining ground in the scenario of modern wireless telecommunications. IoT is automating all the aspects of farming and agricultural methods to make the process more efficient and effective. The aim of this study is to analyze recently developed IoT technologies in the agriculture and farming industries to present summary of sensors, technologies, and sub-verticals such as water management and crop management.

ARTICLE BY
GOKUL .M

MICROCONTROLLER BASED PRE PROGRAMMED **SUN TRACKING SOLAR PANEL**

Solar panel absorbs the energy from the Sun, converts it into electrical energy and stores the energy in a battery. For efficient usage of solar energy, the Solar panels should absorb energy to a



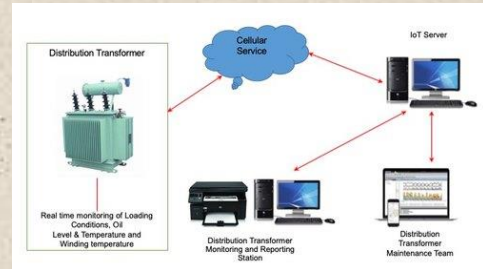
maximum extent. This can be done only if the panels are continuously placed towards the direction of the Sun. So, the solar panels should continuously rotate in the direction of the Sun. In which we will use LDRs (Light-dependent resistor) to sense the light and a servo motor to automatically rotate the solar panel in the direction of the sunlight. The advantage of this project is that the Solar panels will always follow the sunlight will always face the sun to get charge all the time and can provide the supply the maximum power.

ARTICLE BY
AANJAN.V.S

WIRELESS TRANSFORMER MONITORING AND CONTROLLING SYSTEM

Transformers play an important role in the efficient transmission of electricity. Regular monitoring and maintenance can make it possible to detect new flaws before much damage has been done. Current systems can provide information

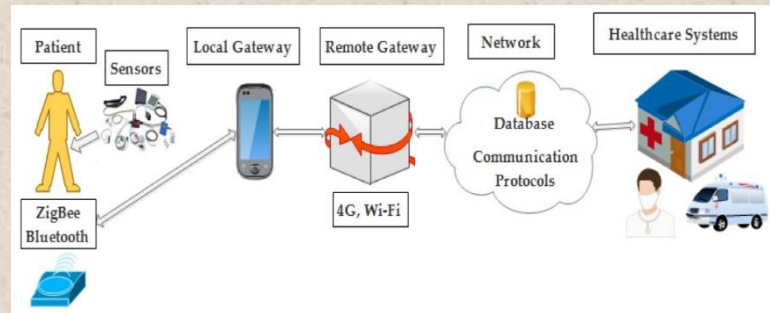
about the state of a transformer, but they are either offline or very expensive to implement. This monitoring system is primarily health monitoring equipment that can acquire, process, analyze & communicate the critical parameters to the concerned official who is at a remote place with the help of Auto dialing unit. Not only the conventional technical data, such as current, voltage, etc., but also other critical information such as frequency, oil temperature, oil level etc of transformers is required by the operators to ensure reliable power delivery and to assist the day-to-day decision making activities. Thus, the system increases the reliability of distribution network.



ARTICLE BY
ARUN THANGA BOSE.A

FINGERPRINT BASED MEDICAL INFORMATION SYSTEM AND ONLINE FIRST AID RECOMMENDER FOR EMERGENCY USING IOT

Fingerprint Based Medical System introduces the efficient way to store patient's clinical records. It is used to determine the patient's past



health record quickly and easily by using the fingerprint recognition technology. The medical information system which will enable a reliable electronic medical record system stored in the database. To provide security to the information many MQTT algorithms are introduced. The sensitive medical information is protected by using IoT techniques and thus sending the information message to the doctor like blood group, BP value, glucose level and cardiac pulmonary.

This system replaces the conventional paper-based medical records with electronic medical record system. This system also takes the current health details of the patients like temperature, respiratory rate and heart beat rate. By considering the past and present medical data of the emergency people, this system helps the doctors to decide the type of first aid to be given on emergency situations like accident occurrence place or ambulance.

ARTICLE BY
GURU KALAI KANNAN.M

WIRELESS CHARGING FOR ELECTRIC VEHICLES

In recent years with the rapid development of the electrical vehicle (EV) of new energy industry, higher requirements are put forward for convenience, safety and reliability of the charging of electric vehicles. Wireless



power charging is done by inductive coupling. Inductive coupling can be done in both stationary and dynamic conditions. By reconfiguring the transformer and altering high frequency, energy is being transferred with low energy loss and fewer demands on the primary circuit. Sufficient power for the battery can be transferred by the primary to the secondary without sufficient energy loss. Electric power is then transmitted to the chargeable battery which is electrically coupled to the secondary circuit through the air core transformer. In case of shuttle bus services, buses can be charged when it waits at bus station. It can also be implemented in rental taxi parking. Thus the battery in electric buses only needs enough charge to go to the next stop. This decreases the battery size and promotes significant cost saving in electric vehicles. This technology enables efficient opportunities in charging stations, for predefined routes and planned stops reducing down the time of charging. The dynamic charging will promote the use of electric vehicles and reduce petroleum fuel consumption. Delays in traffic signals can now be provided with longer periods of charging and even when the electric vehicle is in movement. Bad weather conditions like rain and snow do not affect the charging capabilities of electric vehicles.

ARTICLE BY
ARUN KUMAR M

Performance analysis of Solar Photovoltaic System using LUO converter for agricultural water pumping application



- This project proposes a solar operated photovoltaic water pumping system to fulfill the irrigation requirement.
- Solar photovoltaic water pumping system can provide water without the need of any kind of fuel or the extensive maintenance as required by diesel pumps.
- The LUO converter is used for PV application.
- A LUO converter is an advanced dc-dc converter which uses voltage lift technique so voltage is increased.
- The LUO converter is used along with a coupled inductor for the purpose of high gain.
- In this paper MPPT (Maximum Power Point Tracking) is regulated by controlling the input voltage to the converter that optimizes the match between the solar array (PV panel), and the battery bank or utility grid.
- In the project, the fuzzy control is used in the process of converting a crisp input value to a fuzzy value, which is called fuzzification.

- A fuzzy control system is a control system based on fuzzy logic it is used for controlling.
- The aim of this paper is to explain the working of solar photovoltaic water pumping of irrigation purpose.

ARTICLE BY

MANOJ S

MITIGATION OF SOLAR PV GRID POWER LOSS **USING QUASI -Z SOURCE INVERTER**

Quasi Z-Source inverter (qZSI) is becoming a popular inverter topology that can buck or boost input voltage without a DC-DC converter and hence can be used in transformer-less configuration. Due to its single stage conversion,



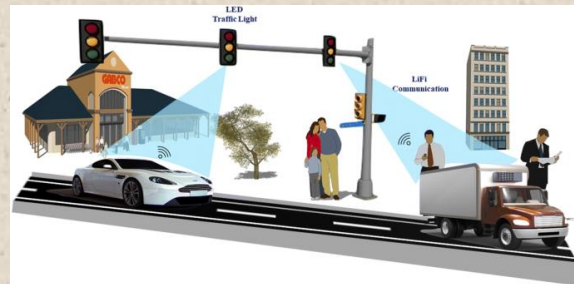
the qZSI can be used as an efficient transformer-less grid-tie inverter. However, the common mode current is a major problem in transformer-less topologies due to the absence of galvanic isolation. This paper proposes a modified Pulse Width modulation (PWM) technique to control the qZSI, along with two extra semiconductor switches, to reduce the common mode current. The proposed method offers an efficient solution for grid integration of solar photovoltaic systems. The proposed topology can efficiently control the reactive power and the suitable PWM scheme is also reported. Simulation results has been performed with the Standard Test conditions of the PV panel. Experimental results for a single phase 500W prototype are presented to validate the proposed PWM scheme for the qZSI.

ARTICLE BY

MANOJ S

VECHICLE MONITORING BASED ON LI-FI TECHONOLGY

Now a days, traffic accident detection is becoming one of the interesting fields due to its tremendous application in intelligent transportation systems. Main causes behind these road

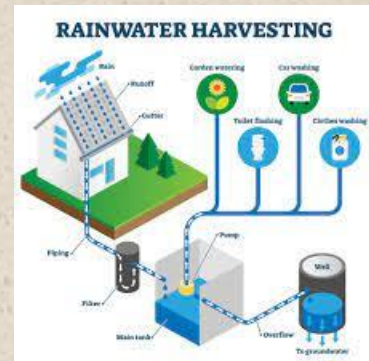


accidents are lack of unskilled drivers, consuming alcohol while driving, over speed, sleep while driving. Plenty of solutions have been applied to prevent these road accidents. But most of them were failed to prevent this. In this work we present an advanced accident detection using LIFI technology. This work provides an intelligent system for accident prevention and detection for human life safety. That prevention part has various sensor like eye blink sensor, alcohol sensor and ultrasonic sensor. If the sensor detects whether the rider consumes alcohol or the distance between two vehicles is low then it sends that information to another vehicle which is going in front it. So that they can be alert. And if the driver is sleeping while driving means then the eye blink sensor detects it and give an alert to the driver.

ARTICLE BY
NAVEEN S

SMART RAINWATER HARVESTING SYSTEM

Scarcity of water has become a predominant problem all over the world. Water plays an important role in agriculture. With majority of the Indian population dependent on farming for their daily needs, it's important to find a solution for scarcity of water. This paper mainly focuses on rain water harvesting. The



The Federal Energy Management Program (FEMP) identified rainwater harvesting systems as an alternative water technology. This technology overview is intended to provide agencies with key information to deploy rainwater harvesting systems. This project presents a model that does smart rainwater harvesting using IoT. The model consists of a structure with segregation that separates the rain water collected into the two tanks. A rainfall detection sensor is mounted on the top of the structure to detect whether it's raining or not. A pH sensor then determines the pH value of the rainwater and if the pH of the water is greater than 5 then the pump motor 1 inside the main tank transfers the water to the tank A. If the pH of the water is less than 15 the pump motor 2 inside the main tank transfers the water to the tank B. The segregation is done so as to separate portable water. The water level sensor inside the tank A transfers the data in a timely manner to the cloud using IOT technology. GPS is implemented to track the location of the main tank.

ARTICLE BY

NIMAN SRIKANTH M

SMART AUTONOMOUS REMOTE MONITORING

SYSTEM FOR HORTICULTURE

Despite the perception people may have regarding the agricultural process, the reality is that today's agriculture industry is data-centered, precise, and smarter than ever.

The rapid emergence of the Internet-of-Things (IoT) based technologies redesigned almost every industry including "smart agriculture" which moved the industry from statistical to quantitative approaches. Such revolutionary changes are shaking the existing agriculture methods and creating new opportunities along a range of challenges. This highlights the potential of wireless sensors and IoT in agriculture, as well as the challenges expected to be faced when integrating this technology with the traditional farming practices. IoT devices and communication techniques associated with wireless sensors encountered in agriculture applications are analyzed in detail. Sensors are available for specific agriculture application, like soil preparation, crop status, irrigation, temperature are listed. This technology helping the growers throughout the crop stages, from sowing until harvesting. State-of-the-art IoT-based architectures and platforms used in agriculture are also highlighted wherever suitable. Finally, based on this thorough review, currently and future trends of IoT in agriculture and highlight potential research challenges.



ARTICLE BY
RUDHRAN.K M

SMART E-LOCK FOR INDUSTRY ORIENTED

TRANSPORTATION

Nowadays Internet of Things (IOT) technology plays a vital role in all aspects of human's life. Lock system is one of those aspect that has been impacted by the massive Development of IOT. At present thefts from good



carrying vehicles are a major problem Faced by the owners, for example, on the way to the destination the vehicles carrying goods are stolen by unknown person is the major problem faced by the owners. Hence, there is a need for effective and secure locks in goods carrying container trucks. This lock system which is applied in goods carrying vehicles will help to reduce theft rate. It also involves smart phone app, cloud, web application, RESTful API, hardware with GPS and GPRS and actuators. This project develops a lock for the container and the lock will be opened only to the authenticated person by the use of key generated. In case of unauthenticated person the door will remain closed. It can also deliver message to the mobile device about the distance.

ARTICLE BY
SAI ABILASH.G

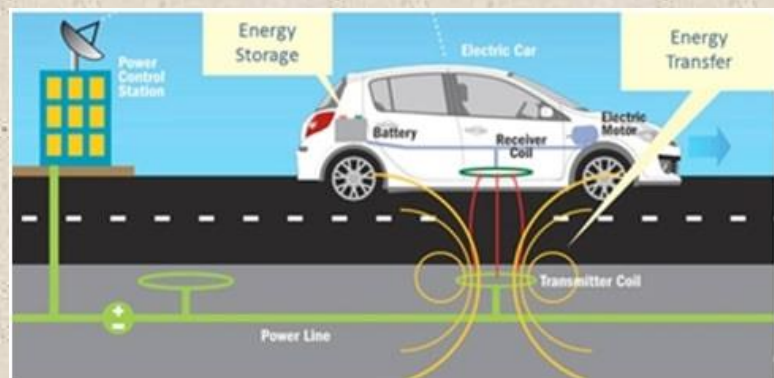
IoT BASED SMART BOTTLE FOR HEALTHCARE

Saline, one of the most popular intravenous (IV) therapy plays a major role in the management of patients who are critically ill. Surveillance of saline bottle level is very important because when the bottle is emptied and the needle is not removed from the vein then the blood flows outward into the bottle. In hospitals, the nurses or caretakers are responsible for monitoring the saline bottle level. Mostly, due to negligence and any unusual condition, the exact timing of removing the needle from the patient's vein is ignored which causes a serious casualty and may lead to death as well. Furthermore, remote monitoring is a need to provide tele health services. To prevent the accident due to the ignorance of caretakers and to provide remote surveillance in telehealth services, we have proposed the cost-effective smart saline level monitoring device which includes the combination of sensor and Internet of Things (IoT) technologies. We have built his system by using load sensor and ultra-low power low cost ESP8266 Wi-Fi System on Chip (SoC) microcontroller. The load cell sensor calculates the weight of the bottle. The ESP8266 microcontroller generates and publishes the data from the sensor. To publish and present the messages to the devices (e.g. smartphone, tablet, laptop etc.) of subscribers like doctors, nurses or caretakers, we have used MQTT-S publish/subscribe protocol which runs over TCP. It serves the level monitoring, data recording, gives infotainment, notification alert to nurse. Our project can be used in all scales of hospitals, medical departments and also it useful during home care. Finally with the help of our project can reduce patients hazards and increases the accuracy of the health care in hospitals. This proposed monitoring system fulfils the reliable delivery of messages to the subscribers which is very important for healthcare.

ARTICLE BY
SADAM HUSSAIN N

WIRELESS POWER TRANSFER USING ELECTROMAGNETIC INDUCTION CHARGING FOR FUTURE HYBRID VEHICLE

Due to barriers of low electricity density, high fuel and heavy weight etc., the development and software of battery-powered devices is dealing



with remarkable technical challenges. As a singular pattern of energization, the wireless energy switch (WPT) offers a brand new way to the strength acquisition for electric powered-driven devices, therefore assuaging the over-dependence on the battery. This article gives an overview of WPT strategies with emphasis on working mechanisms, technical challenges, metal materials, and classical programs. Focusing on WPT systems, this paper elaborates on cutting-edge principal studies topics and discusses approximately future improvement traits. This novel energy transmission mechanism indicates considerable meanings on the pervasive software of renewable energies in our day by day existence, and then using to a battery charger to be operate in function has been finally charge level.

**ARTICLE BY
SUDHARSAN K**

INTELLIGENT ROAD LIGHT FOR CONTROLLING ENERGY UTILIZATION

Street light are among the most common infrastructure in cities & rural areas. Lighting sector accounts for about 20% of the total electricity consumption in India. Solar energy is the most direct, common, and clean



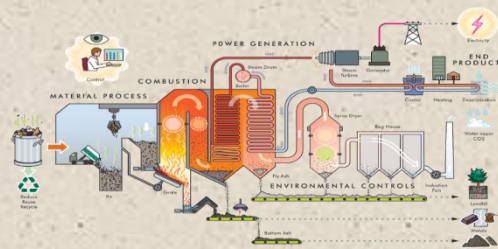
energy on our planet we have already found until now. Total solar energy absorbed by the Earth is about 3,850,000 exajoules (EJ) in one year, which is even twice as much as all the non-renewable resources on the earth found and used by human being, including coal, oil, natural gas, and uranium etc. The solar resources can be seemed inexhaustible. When energy crisis is a big threat and unscheduled power cuts are the order of the day, street lights can be seen burning during daytime in many parts of the city & rural areas. so that the stand-alone street lamp is a fine solution to save the energy and also the use of non – conventional energy source. This highly efficient system configuration solves the lane lamp issues both highway & pedestrian roads. the configuration having intensity controller & pedestrian/Vehicle identifying systems to managing the street lights. By using this system energy consumption is also reduced because nowadays the manually operated street lights are not switched off even the sunlight comes and also switched on earlier before sunset. In this project, no need of manual operation like ON time and OFF time setting. In the present project solar street lights are taken into consideration where the above discussed factors are rectified in them.

ARTICLE BY

THAAMARAI KANNAN SAS

POWER GENERATION USING NON-BIO DEGRADABLE WASTE

Green energy harvesting aims to supply electricity to electric or electronic systems without grid connection. The incineration process is done via a grate system that combusts the waste, which is not refined and



is crude. Here we design to generate electrical energy from non biodegradable waste by burning it. So Here we design to generate electricity from Waste Materials And Store electricity in Battery. Incineration is used to reduce the effect of harmful environmental and health problems resultant from waste dumping into unsuitable landfills. The aim of this paper is to use incineration method to produce electrical energy from waste treatment. It is a new technology that destructs the solid waste by controlled burning at high temperatures.

ARTICLE BY

RIYAS AHAMED N

SMART TRASH RECEPTACLE MONITORING AND ALERTING MANAGEMENT SYSTEM

In the present scenario, we see the garbage bins being overloaded and the garbage spills out resulting in pollution. The detection, monitoring and management of waste is one of the primary problems of the present era. The traditional way of monitoring the waste in waste bins is complex, cumbersome process which takes more human effort, time and cost which is not compatible with the present day technologies in any way. Hence our problem statement is to design a system based on microcontroller using GSM module for collecting garbage from particular area whose garbage bins are overflowing with prior concern. This system monitors the garbage bins and informs about the level of garbage collected in the garbage bins via a text message.



ARTICLE BY

NAVEEN GK

TECHNOLOGY

SpaceX Starship

Starship is a fully reusable two-stage launch vehicle under development by American company SpaceX, comprising of a first stage booster named Super Heavy and a second stage spacecraft named Starship. The launch vehicle is expected to be the tallest, heaviest, and most powerful rocket in the world, capable of producing 72 meganewtons or 17,000,000 pound-force of thrust at lift-off—more than twice that of a Saturn V rocket. Starship can launch 100 t (220,000 lb) to low Earth orbit and with the same capacity to higher Earth orbits, the Moon, or Mars via transferring propellant in orbit. To accommodate Starship's features, a non-traditional launch complex would be used, including a launch tower that can lift and recover both stages. Both stages will be powered by Raptor engines and constructed out of stainless steel.



A Starship-like vehicle was first envisioned by SpaceX in 2005. After many changes to the vehicle design, SpaceX started developing the launch vehicle at its South Texas launch site, also known as the Boca Chica launch site. The first full-sized prototype Starship Mk1 was unveiled on 29 September 2019. The first successful hop was performed by Starhopper—a simplified prototype—on 25 July 2019. Upcoming space missions, including the dearMoon project, NASA's Artemis program, and the SpaceX Mars program, are projected to use Starship.

ABOUT THE VEHICLE :

The Starship spacecraft is 50 m (160 ft) tall, 9 m (30 ft) diameter and has a total propellant capacity of 1,200 t (2,600,000 lb). The bottom-most section,

informally called the "skirt," houses the Raptor engines, as well as composite overwrapped pressure vessels that store helium gas used to spin up the Raptor turbopumps. Positioned above, sits the liquid oxygen and liquid methane propellant tanks, separated by a "common dome" containing a small, spherical methane "header tank" that contains propellant for landing. Six Raptor engines power the spacecraft, three optimized for atmospheric pressure, and three for the vacuum of space.

The payload section—positioned above the propellant tanks—houses cargo, crew, or both, and a liquid oxygen header tank. A large clamshell fairing door replaces conventional rocket payload fairings or spacecraft specialized to transport, capture and return satellites and space debris to Earth. The door would be closed during launch, opened to release payloads once in orbit, and closed again during the re-entry to Earth. In the crewed variant, the payload bay would house cabins. To control the spacecraft attitude during re-entry and descent, Starship actuates two pairs of flaps installed perpendicularly to the body of the spacecraft—one pair of larger "aft flaps" sit at the bottom of Starship; a smaller pair of "forward flaps" is placed on the nose cone. The windward side of the spacecraft is covered by hexagonal ceramic tiles that make up Starship's heat shield. The heat shield protects the spacecraft from the extreme heat of atmospheric entry. Simulations from SpaceX have shown that 99.9% of the vehicle's kinetic energy would dissipate upon re-entry to Earth, however, Mars's much thinner atmosphere only dissipates 99% of Starship's kinetic energy.

ARTICLE BY
PRABHA MATHAN M

Vertical farming

Vertical farming is the practice of growing crops in vertically stacked layers. It often incorporates controlled-environment agriculture, which aims to optimize plant growth, and soilless farming



techniques such as hydroponics, aquaponics, and aeroponics. Some common choices of structures to house vertical farming systems include buildings, shipping containers, tunnels, and abandoned mine shafts. As of 2020, there is the equivalent of about 30 ha (74 acres) of operational vertical farmland in the world. The modern concept of vertical farming was proposed in 1999 by Dickson Despommier, professor of Public and Environmental Health at Columbia University. Despommier and his students came up with a design of a skyscraper farm that could feed 50,000 people. Although the design has not yet been built, it successfully popularized the idea of vertical farming. Current applications of vertical farmings coupled with other state-of-the-art technologies, such as specialized LED lights, have resulted in over 10 times the crop yield than would receive through traditional farming methods.[failed verification]

The main advantage of utilizing vertical farming technologies is the increased crop yield that comes with a smaller unit area of land requirement. The increased ability to cultivate a larger variety of crops at once because crops do not share the same plots of land while growing is another sought-after advantage. Additionally, crops are resistant to weather disruptions because of their placement indoors, meaning fewer crops lost to extreme or unexpected weather occurrences. Because of its limited land usage, vertical farming is less disruptive to the native plants and animals, leading to further conservation of the local flora and fauna.

Vertical farming technologies face economic challenges with large start-up costs compared to traditional farms. In Victoria, Australia, a “hypothetical 10 level vertical farm” would cost over 850 times more per square meter of arable land than a traditional farm in rural Victoria. Vertical farms also face large energy demands due to the use of supplementary light like LEDs. Moreover, if non-renewable energy is used to meet these energy demands, vertical farms could produce more pollution than traditional farms or greenhouses.

ARTICLE BY
RAMAJEYAM R

Home automation

Home automation or demotics is building automation for a home, called a smart home or smart house. A home automation system will monitor and/or control home attributes such as lighting, climate, entertainment



systems, and appliances. It may also include home security such as access control and alarm systems. When connected with the Internet, home devices are an important constituent of the Internet of Things ("IoT").

A home automation system typically connects controlled devices to a central smart home hub (sometimes called a "gateway"). The user interface for control of the system uses either wall-mounted terminals, tablet or desktop computers, a mobile phone application, or a Web interface that may also be accessible off-site through the Internet. While there are many competing vendors, there are increasing efforts towards open-source systems. However, there are issues with the current state of home automation including a lack of standardized security measures and deprecation of older devices without backwards compatibility. Home automation has high potential for sharing data between family members or

trusted individuals for personal security and could lead to energy saving measures with a positive environmental impact in the future.

ARTICLE BY
KIRAN R

Self-driving car

A self-driving car (sometimes called an autonomous car or driverless car) is a vehicle that uses a combination of sensors, cameras, radar and artificial intelligence (AI) to travel between destinations without a human operator. To qualify as fully autonomous, a



vehicle must be able to navigate without human intervention to a predetermined destination over roads that have not been adapted for its use.

How self-driving cars work

AI technologies power self-driving car systems. Developers of self-driving cars use vast amounts of data from image recognition systems, along with machine learning and neural networks, to build systems that can drive autonomously.

The neural networks identify patterns in the data, which is fed to the machine learning algorithms. That data includes images from cameras on self-driving cars from which the neural network learns to identify traffic lights, trees, curbs, pedestrians, street signs and other parts of any given driving environment.

For example, Google's self-driving car project, called Waymo, uses a mix of sensors, Lidar (light detection and ranging -- a technology similar to RADAR) and cameras and combines all of the data those systems generate to identify everything around the vehicle and predict what those objects might do next. This happens in fractions of a second. Maturity is important for these systems. The

more the system drives, the more data it can incorporate into its deep learning algorithms, enabling it to make more nuanced driving choices.

Companies developing and/or testing autonomous cars include Audi, BMW, Ford, Google, General Motors, Tesla, Volkswagen and Volvo. Google's test involved a fleet of self-driving cars -- including Toyota Prii and an Audi TT -- navigating over 140,000 miles of California streets and highways.

Cars with self-driving features

Google's Waymo project is an example of a self-driving car that is almost entirely autonomous. It still requires a human driver to be present but only to override the system when necessary. It is not self-driving in the purest sense, but it can drive itself in ideal conditions. It has a high level of autonomy. Many of the cars available to consumers today have a lower level of autonomy but still have some self-driving features. The self-driving features that are available in many production cars as of 2019 include the following:

- **Hands-free steering** centers where the car without the driver's hands on the wheel. The driver is still required to pay attention.
- **Adaptive cruise control (ACC) down to a stop** automatically maintains a selectable distance between the driver's car and the car in front.
- **Lane-centering steering** intervenes when the driver crosses lane markings by automatically nudging the vehicle toward the opposite lane marking.

ARTICLE BY

RANJITH S

Blockchain

A blockchain is a growing list of records, called blocks, that are linked together using cryptography. It's also described as a "trustless and fully decentralized peer-to-peer immutable data storage" that is spread over a network of



participants often referred to as nodes. Each block contains a cryptographic hash of the previous block, a timestamp, and transaction data (generally represented as a Merkle tree). The timestamp proves that the transaction data existed when the block was published in order to get into its hash. As blocks each contain information about the block previous to it, they form a chain, with each additional block reinforcing the ones before it. Therefore, blockchains are resistant to modification of their data because once recorded, the data in any given block cannot be altered retroactively without altering all subsequent blocks.

Blockchains are typically managed by a peer-to-peer network for use as a publicly distributed ledger, where nodes collectively adhere to a protocol to communicate and validate new blocks. Although blockchain records are not unalterable as forks are possible, blockchains may be considered secure by design and exemplify a distributed computing system with high Byzantine fault tolerance.

Structure:

A blockchain is a decentralized, distributed, and oftentimes public, digital ledger consisting of records called blocks that is used to record transactions across many computers so that any involved block cannot be altered retroactively, without the alteration of all subsequent blocks. This allows the participants to verify and audit transactions independently and relatively inexpensively. A blockchain database is managed autonomously using a peer-to-peer network and

a distributed timestamping server. They are authenticated by mass collaboration powered by collective self-interests. Such a design facilitates robust workflow where participants' uncertainty regarding data security is marginal. The use of a blockchain removes the characteristic of infinite reproducibility from a digital asset. It confirms that each unit of value was transferred only once, solving the long-standing problem of double spending. A blockchain has been described as a value-exchange protocol. A blockchain can maintain title rights because, when properly set up to detail the exchange agreement, it provides a record that compels offer and acceptance.

Logically, a blockchain can be seen as consisting of several layers:

- infrastructure (hardware)
- networking (node discovery, information propagation and verification)
- consensus (proof of work, proof of stake)
- data (blocks, transactions)
- application (smart contracts/decentralized applications, if applicable)

Uses of the Blockchain:

Blockchain technology can be used to create a permanent, public, transparent ledger system for compiling data on sales, tracking digital use and payments to content creators, such as wireless users or musicians. The Gartner 2019 CIO Survey reported 2% of higher education respondents had launched blockchain projects and another 18% were planning academic projects in the next 24 months. In 2017, IBM partnered with ASCAP and PRS for Music to adopt blockchain technology in music distribution. Imogen Heap's Mycelia service has also been proposed as blockchain-based alternative "that gives artists more control over how their songs and associated data circulate among fans and other musicians."

New distribution methods are available for the insurance industry such as peer-to-peer insurance, parametric insurance and microinsurance following the adoption of blockchain. The sharing economy and IoT are also set to benefit from

blockchains because they involve many collaborating peers. The use of blockchain in libraries is being studied with a grant from the U.S. Institute of Museum and Library Services.

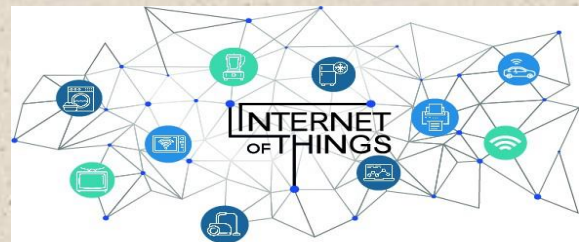
Other designs include:

- Hyperledger is a cross-industry collaborative effort from the Linux Foundation to support blockchain-based distributed ledgers, with projects under this initiative including Hyperledger Burrow (by **Monax**) and Hyperledger Fabric (spearheaded by IBM).

ARTICLE BY
TAMIL MANI E

Internet of Things (IoT)

Another promising new technology trend is IoT. Many “things” are now being built with WiFi connectivity, meaning they can be



connected to the Internet—and to each other. Hence, the Internet of Things, or IoT. The Internet of Things is the future, and has already enabled devices, home appliances, cars and much more to be connected to and exchange data over the Internet.

As consumers, we’re already using and benefitting from IoT. We can lock our doors remotely if we forget to when we leave for work and preheat our ovens on our way home from work, all while tracking our fitness on our Fitbits. However, businesses also have much to gain now and in the near future. The IoT can enable better safety, efficiency and decision-making for businesses as data is collected and analyzed. It can enable predictive maintenance, speed up medical care, improve customer service, and offer benefits we haven’t even imagined yet.

And we’re only in the beginning stages of this new technology trend: Forecasts suggest that by 2030 around 50 billion of these IoT devices will be in

use around the world, creating a massive web of interconnected devices spanning everything from smartphones to kitchen appliances. The global spending on the Internet of Things (IoT) is forecast to reach 1.1 trillion U.S. dollars in 2022. New technologies such as 5G is expected to drive market growth in the coming years.

And if you wish to step foot in this trending technology, you will have to learn about Information security, AI and machine learning fundamentals, networking, hardware interfacing, data analytics, automation, understanding of embedded systems, and must have device and design knowledge.

ARTICLE BY
MADHANKUMAR P

Portable Power



Laura Stachel, a U.S. obstetrician--gynecologist, was observing a complicated baby delivery in Nigeria when the power went out. Electricity cuts are common in the country, which also has one of the world's highest maternal--mortality rates. So Stachel asked her husband, a solar--power expert, to build an easy-to-use, suitcase--size solution that could run lights for a delivery room along with a fetal heart monitor for her next trip. When she returned to the Nigerian hospital with the first Solar Suitcase, the midwives begged to keep it. Now, Stachel's NGO has shipped nearly 4,000 units to 27 developing countries, putting an end to deliveries in darkness.

Water, Out of Thin Air



Whether you're in a developing country or on the scene of a natural disaster, water is usually the No. 1 need in times of crisis. Watergen, an Israeli company, thinks GENNY could be the answer. The machine, which looks like an office water cooler, pulls moisture from ambient air to create drinkable water through a patented filtration process, much

like a fancier dehumidifier. One GENNY unit can produce up to 7 gal. of water a day, and all it needs is electricity or solar -power—no plumbing required. The multistage purification process can make clean water even in areas with high air pollution, and larger units are already being used in disaster--relief efforts. But GENNY isn't only for those in need. For an estimated \$1,500 (units will be priced by distributors), consumers can cut down on buying bottled water and reduce their water use at home.

Tracking Water Pollution



Take a sample from almost any major body of water, and you're likely to find microplastics, or bits of plastic pollution less than 5 mm long. Many experts agree that microplastics are a cause for concern, as they may harm marine life or taint our fish and water supplies. But little is known about them beyond their -prevalence—in an August report, the World Health Organization said getting more microplastics data is an “urgent concern.” That's where the Microplastics--Sensing Autonomous Underwater Vehicle comes in. Designed jointly by Draper and Sprout working alongside the Environmental Protection Agency, the raylike drone is meant to swim around a body of water, collecting and analyzing samples for their microplastics content. Draper project lead Lou Kratchman says that data can be a jumping-off point for more advanced microplastics research. “We need something that's comparable to the world Air Quality Index,” he says. “Kind of a global weather map that, in real time, we can look and see how the microplastics situation is changing.” While the drone is still a concept, a simpler prototype is already being successfully used in Hawaii.

Greener Flight



Flying is dirty work—the aviation industry emits nearly a quarter of total transportation--related greenhouse--gas emissions in the U.S., according to the EPA. One way to clean it up could be -Eviation’s all-electric Alice, an Israeli-made nine-seater meant to convince the gas--guzzling aviation world that electric power is ready for takeoff. “The real innovation is in the lightweight materials rather than the batteries and motors and controllers and all that,” says Eviation CEO Omer Bar-Yohay. If successful, the design could pave the way for larger electric commercial aircraft. Alice, which has a range of 650 miles and should be quieter than gas--powered aircraft, begins flight testing in 2020

Harnessing Wind, More Efficiently



As temperatures rise, political pressure has grown to move the world toward clean energy. GE’s Haliade-X offshore wind turbine, the first of which was raised this year, offers one piece of the puzzle. Each blade of the world’s largest offshore wind turbine stretches more than the length of a football field, and its height tops that of the Washington Monument. This is a significant advance: when it comes to offshore wind turbines, bigger often means better. With digital controls and other upgrades, it’s the most efficient in the industry, churning even when the wind is not strong enough to drive other turbines. Soon, GE expects it to enter service in the Northeast U.S. as well as across Europe, China and Japan.

Repurposing Plastic



Just 9% of all -plastic—which almost never fully degrades—has ever been recycled. Because of odors, colors and contaminants, much of what we put in our bins is not reusable. Hoping to remedy this, Pure Cycle Technologies is using a new method to restore used polypropylene into resin that’s effectively as good as new. This purification process churns out colorless pellets hygienic enough for even food-grade applications, Pure Cycle says. And it uses only a fraction of the energy involved in making virgin resin. “We’re actually taking plastic that wouldn’t ever be recycled again and making it indefinitely recyclable,” says Mike Otworth, Pure Cycle’s CEO. Production is scheduled to start in 2021, but it’s already so popular it’s presold for the next 20 years.

A New Way to Connect



Helium Hotspot become like a miniature cell tower in a peer-to-peer wireless internet network that connects small, low-power devices like pet collars and scooter trackers from miles away through Helium’s “LongFi” protocol. The logic is that Hotspot owners would be compensated for the use of their data through a specialized blockchain currency, creating a self-sustaining wireless ecosystem. Helium Hotspots are a peer-to-peer wireless network that allows low-power IoT devices to send data to and from the internet. Users who own a hotspot are able to earn Helium, a cryptocurrency, as an incentive for providing public coverage, Mong said. The hotspots are powered by open-source blockchain technology that can create a blanket of connectivity when connected with other nearby hotspots. Each hotspot can cover up to 10 square miles, so the more people who invest in

hosting hotspots, the bigger the network becomes. After spreading through 1,000 North American cities within just one year, Helium has decided to expand the network to Europe, with Helium Hotspots expected to begin shipping in early July 2020, according to a press release. As for the Helium Tabs, the company was inspired to create the IoT devices after seeing the widespread success of the "people's network," per the release.

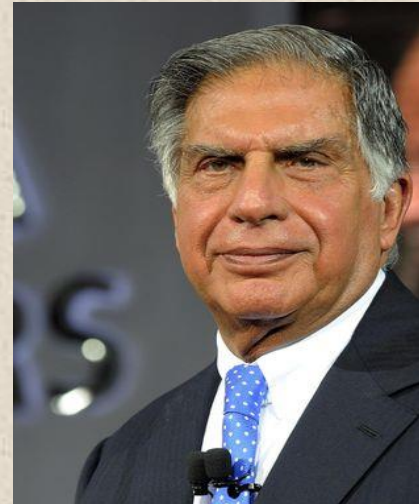
ARTICLE BY
GOPALAKRISHNAN D

BIOGRAPHY

Ratan Tata

One of the most well-known and respected industrialists in India, Ratan Naval Tata is the Chairman of Tata Sons and Tata Group. At the age of 73, Tata heads one of the country's largest conglomerates which comprise nearly 100 firms with revenues totaling about USD 67 billion. He is also the chairman of major Tata companies such as Tata Steel, Tata Motors, Tata Teleservices. Power, Tata Consultancy Services, Tata Tea, Tata Chemicals, and The Indian Hotels Company.

Tata was born on December 28, 1937 in Mumbai, in one of the richest families. His great grandfather was Jamsedji Tata, founder of the Tata group. As a young boy, Tata had a disturbed childhood after his parents split. He was raised by his grandmother, Lady Navajbai in the lap of luxury at Tata Palace.



America held a special fascination for the Tata scion and he went to Cornell University to study architecture and structural engineering. Later he pursued a management course from Harvard University.

In 1962, he joined the Tata Group and his first job involved working with the Tata Steel division in Jamshedpur, where he worked with the blue-collar employees shoveling stone and working with the furnaces. He was appointed the Director-in-Charge of the National Radio & Electronics Company Limited (Nelco) in 1971 and was successful in turning Nelco around.

Tata later paved his way to become the Chairman of Tata Industries and was instrumental in ushering in a wide array of reforms. It was under his stewardship that Tata Consultancy Services went public and Tata Motors was listed in the New York Stock Exchange giving it more international power and recognition. He is credited with leading the Tatas' successful bid for Corus- an Anglo-Dutch steel and aluminum producer as well as Jaguar and Land Rover brands from the Ford Company.

During his tenure the company witnessed the launch of india's first truly Indian car, 'Indica'. The car was the brainchild of Tata.

In 2000 Tata's food division acquired tea firm Tetley for GBP 70 million. In the year 2009-10 the group's revenues have grown nearly 12-fold, totalling USD 67.4 billion. Tata also serves on the boards of Fiat SpA and Alcoa and is also on the international advisory boards of Mitsubishi Corporation, the American International Group, JP Morgan Chase, Rolls Royce, Temasek Holdings and the Monetary Authority of Singapore.

In year 2000, he was honored with Padma Bhushan by the government of India. He was also conferred an honorary doctorate in business administration by Ohio State University, an honorary doctorate in technology by the Asian Institute of Technology, Bangkok, and an honorary doctorate in science by the University of Warwick. Tata has a personal fortune of GBP 300 million and owns less than 1% of the colossal group. Over two thirds of Tata Group is owned by charitable trusts that finance good causes. Tata set a perfect example of generosity and leadership during the 26/11 attacks. Unarmed he stood all alone outside the Taj hotel and supervised the activities to help the victims. He showcased his humane gesture by personally visiting the families of all the 80 employees who were killed or injured. He left no stone unturned to provide relief to the victims and even asked the families and dependents as to what they wanted him to do.

His retirement may still be a year away, but Tata has started chalking out plans on his post-retirement. He plans to set up a design centre of international standards and scale. He has led development of many innovative designs and products, the most celebrated being Nano. The idea of Nano was born with his concern for the safety of nuclear families commuting on two-wheelers. He was the one who suggested that the miniature car should be fitted with just one windscreen wiper. This reduced its price and maintenance cost.

His also steered plan to provide cheap and clean drinking water and helped a few Pune-based designers develop a sub-Rs 1,000 water purifier, Swach. Design Directions Private Limited took more than three years to make this 560-mm unit for purifying water. A bachelor in real life, Tata loves privacy and shuns media spotlight. He has only CDs, books and dogs for company. The business baron drives himself to work in an unremarkable Tata sedan.

Standing tall with his contemporaries with a staggering fortune and world recognition, Ratan Tata has amazingly never featured in the 'Forbes billionaires lists.

BY LAKSHMI NARAYANAN V

(III YEAR)

