S.A. ENGINEERING COLLEGE
CHENNAI-77

SAANKETHIKA2K19

Annual Magazine,May 2019

DEPARTMENT OF
ELECTRONICS AND COMMUNICATION ENGINEERING

DEPARTMENT OF ELECTRONICS & COMMUNICATION

Electronics and Communication Engineering is one of the most upcoming areas of Research & Engineering among all other branches of engineering. As of today, Electronics and Communication Engineers are working in all spheres of modern industry. The goal of this course is to impart all around technical education to the students to fulfill requirements of new challenges of industries as well as to find new waysto solve the practical problems of our daily life.

The Department of Electronics and communication Engineering was established in the year 1998-99. It inculcates a spirit of scientific temper and analytical thinking and trains the students in contemporary technologies in Electronics and communication to meet the needs of the industry. The Department is well-equipped with laboratories i.e. Digital Design, Digital Signal Processing, Microprocessor, Electronic Circuits Analog & Digital Communications, , RF &Microwave ,Computer Networks and VLSI Design which cater to program needs.The M.E degree course in communication systems was started in the academic year 2006-07.The Department has extensive and fruitful interactions with the industry, R & D organizations and other professional bodies, the interactions with them culminate into professional activities, research agendas and partnerships through MOUs.An excellent academic environment is available for creative and productive work both for faculty as well as students.

MESSAGE

*It is a great pleasure to see the creative expressions of students who had contributed to "**SAANKETHIKA 2K19"**. Our faculty members do support and play a vital role in the overall development of our students and the institute.I am confident that the initiative will not only bring laurels to the student community but will also open new vista for further innovations. I convey my regards and hearty felicitation to the organizers for the successful release of the e-magazine "**SAANKETHIKA 2K19**".*

Dr.D. Dasarathan

Secretary

S.A.Engineering College

MESSAGE

I am very glad that the Department of Electronics & Communication Engineering of S.A.ENGINEERING COLLEGE is bringing out the ***SAANKETHIKA 2K19.****I hope this magazine will be a treasure for those associated with Electronics & Communication Engineering and will help in providing a platform for sharing experiences & learning in this area.I once again congratulate the Electronics &Communication Engineering Department and the entire team on this endeavor and wish the Technical Magazine all success. The passage of time will ensure the acceptability of the contributions of the writers. The critical feedback of the readers shall build a continuous improvement system that will lead the SAANKETHIKA towards excellence.*

Wishing ***SAANKETHIKA 2K19*** *a grand success in the future. With best wishes!!*

Mr.P.Venkatesh Raja
Director
S.A.Engineering College

MESSAGE

*I am happy to know that ECE department is bringing out its magazine "**SAANKETHIKA 2K19"** with dedicated team of staff and students. It is great to find a considerable number of articles that certainly prove that our staff and students are adequately equipped and possess necessary skill sets to express their talent. I trust this will prove a very successful endeavor in future to evolve a team of intellectuals who will share their views with such magazine for the growth of Institute and development of nation as a whole.*

With great pride, let me take this opportunity to wish the organizing committee who are working for this magazine.

Dr.P.K.Nagarajan

Principal

S.A.Engineering College

MESSAGE

I am happy to know that our students are bringing out a magazine for the department "SAANKETHIKA 2K19". This e-magazine is surely a channel to prove the hidden talents of both our faculty members and our students. Commendable job has been done by the Editorial Board in planning for and producing this magazine. The ECE Department has a vision to evolve as a department with a difference in terms of quality and innovation. I request all my students to concentrate on studies, co curricular and extracurricular activities by the vision in mind and bring laurels to the department.My Heartfelt Wishes to all

Dr.B.R.Tapas Bapu
Head of the Department
S.A.Engineering College

INSTITUTION

Vision

Transform our institution into quality technical education center imparting updated technical knowledge with character building.

Mission

To create an excellent teaching and learning environment for our Staff and Students to realize their full potential thus enabling them to contribute positively to the community.

DEPARTMENT

Vision

To achieve overall excellence in education by continuously upgrading the teaching learning process and incorporating latest technological advancements happening worldwide with ethical responsibilities.

Mission

To impart sound technical competency and quality education for students to enhance the employability and ethical values.

To provide conducive environment for faculty and students with excellent facilities to improve research activity

Programme Educational Objectives

PEOs are broad statements that describe the career and professional accomplishments that the program is preparing its graduates to accomplish.

1. *To enable graduates to pursue research or have a successful career in academia or industries associated with Electronics and Communication Engineering, or as entrepreneurs.*
2. *To provide students with strong foundational concepts and also advanced techniques and tools in order to enable them to build solutions or systems of varying complexity.*
3. *To prepare students to critically analyze existing literature in an area of specialization and ethically develop innovative and research oriented methodologies to solve the problems identified.*

PROGRAMME SPECIFIC OUTCOMES (PSO)

1. *To analyze, design and develop solutions by applying foundational concepts of Electronics and Communication Engineering.*
2. *To apply design principles and best practices for developing quality products for scientific and business applications.*
3. *To adapt to emerging Information and Communication Technologies (ICT) to innovate ideas and solutions for the existing/novel problems.*

Programme Outcomes

a. *To apply **knowledge** of mathematics, science and engineering appropriate to ECE discipline.*

b. *To formulate and analyze the complex engineering **problems** by using the principles of mathematics and engineering fundamentals.*

c. *To **design and develop system** (or) process to meet the desired needs within the realistic constraints of the societal and environmental considerations.*

d. *To **investigate complex problems** by conducting experiments, analyze interpret and synthesize the information to provide conclusions.*

e. *To select and use appropriate **modern tools** for solving complex engineering problems.*

f. *To apply **reasoning knowledge** for providing engineering solutions to societal needs with professional engineering practice.*

g. *To demonstrate the knowledge of engineering for providing **environmental solutions** and **sustainable** development.*

h. *To understand the **ethical principles** and professional responsibilities.*

i. *To function effectively as a member (or) **a leader in multidisciplinary activity**.*

j. *To deliver effective **presentations** and **communicate** at ease with the society.*

k. *To be successful member (or) leader in diverse teams with enhanced **administrative skills** and **financial management**.*

l. *To realize the need for **lifelong learning** and adopt themselves to technological changes.*

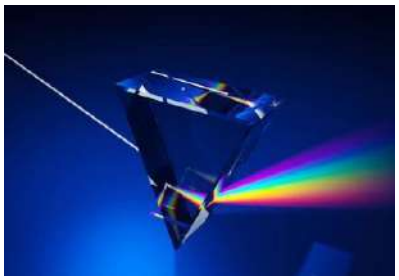
TABLE OF CONTENT

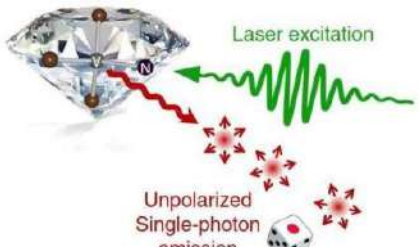
PHOTONICS(PHOTON + ELECTRONICS)

DIVYA.M,
II YEAR

What?

Light is the electromagnetic radiation within a certain portion of the electromagnetic spectrum .The particles of light is called as photon in other words photons are the fundamental building blocks of light. Photons are generally emitted when the electrons jump from its excited state to the ground or normal state.





The combination of photon and electronics is called as photonics, it deals with the science and the applications of light . Optics is the light moving through space and lenses .photonics is when the light hits the solid and turns into electronics and digital signals followed by imaging . Photonics as a field began with the invention of laser in 1960 then the term photonics came into common use in the 1980's.

Photonics is related to other fields like classical optics ,modern optics and also with the emerging fields like quantum optics. As the 20 th century depends on electronic the 21th century will depend on photonics, the emerging science.

Photonics is used everywhere; in consumer electronics (barcode scanners, DVD players, remote TV control), telecommunications (internet), health (eye surgery, medical instruments), manufacturing industry (laser cutting and machining), defense and security (infrared camera, remote sensing), entertainment (holography, laser shows), etc.

Why?

The application of photonics spreads across several sectors: from optical data communications to imaging, lighting and displays; from the manufacturing sector to life sciences, health care, security and safety.

One of the important application of photonics is integrated photonics, about seventy percent of data is transmitted everyday as files, photos and videos. The electricity that we generate is used for handling and exchange of data. Our future is getting ready for the use of integrated photonics for the transmission of data as it is faster as light, consumes less electricity and power, capital investment is also found to be less.

Photonics is nowadays widely used in health care such as detection of tumors and cancer cells through image processing ,the intensive light waves are send to hit the patient's body and the image is processed from the light reflected back.Tumors and other deadly diseases can be diagnosed easily at the early stage.

Photonics is also employed in crime detection, Forensic scientists rely on highly accurate data that will uphold in court. These methods hold an advantage over

other analytical techniques since most are non-destructive and non-invasive, and require little to no sample preparation. Today, forensic investigators utilize several different optical-based technologies to disclose evidence and collect solid data. These include ultraviolet (UV) analysis, infrared (IR) spectroscopy, Raman spectroscopy, and hyperspectral sensing.

DO YOU KNOW LI-FI IS 100 TIMES FASTER THAN WI-FI?

DIVYA BHARATHI
II YEAR

INTRODUCTION:

In the era of overcrowded world, Li-Fi is a new way of wireless communication that uses LED lights to transmit data wirelessly. The current wireless networks that connect us to the Internet are very slow when multiple devices are connected The basic ideology behind this technology is that the data can be transferred through LED light by varying light intensities faster than the human eyes can perceive. This technology uses a part of the electromagnetic spectrum that is still not greatly utilized- The Visible Spectrum, instead of Gigahertz radio waves for data transfer.

The idea of Li-Fi was introduced for the first time by a **German physicist Harald Hass** in the TED (Technology, Entertainment, Design)

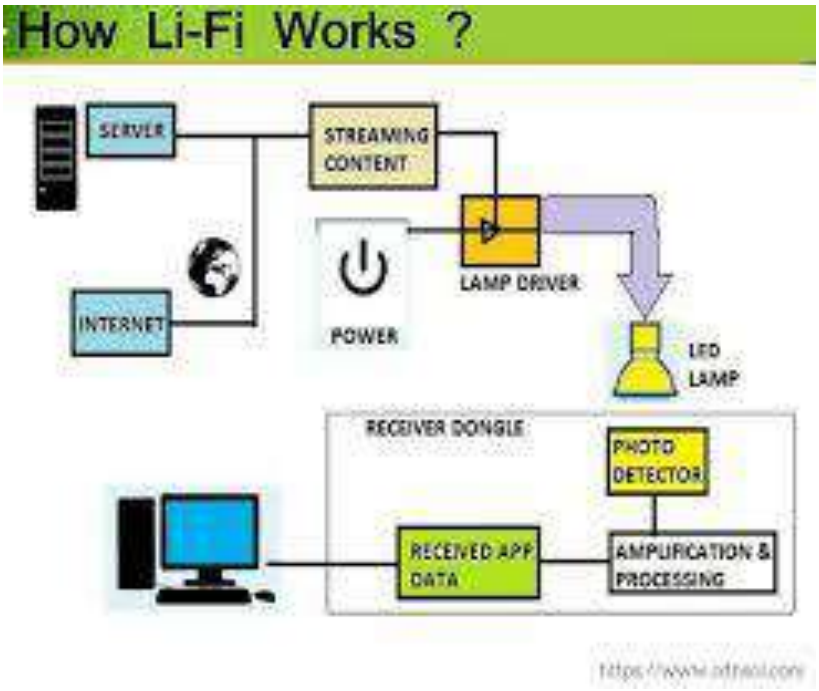
CONSTRUCTION OF WIFI:

Important factors that should be considered while designing Li-Fi are as follows:

1) Presence of Light

2) Line of Sight (Los)

3) For better performance use fluorescent light & LED



WORKING OF LIFI:

The principle of Li-Fi is based on sending data by amplitude modulation of the light source in a well-defined and standardized way. LEDs can be switched on and off faster than the human eyes can detect since the operating speed of LEDs is less than 1 microsecond. This invisible on-off activity enables data transmission using binary codes. If the LED is on, a digital '1' is transmitted and if the LED is off, a digital '0'

is transmitted. Also these LEDs can be switched on and off very quickly which gives us a very nice opportunity for Transmitting data through LED lights, because there are no interfering light frequencies like that of the radio frequencies in Wi-Fi. Li-Fi is thought to be 80% more efficient, which means it can reach speeds of up to 1Gbps and even beyond.

COMPARISION BETWEEN LI-FI AND WI-FI:

Both Wi-Fi and Li-Fi can provide wireless Internet access to users, and both the technologies transmit data over electromagnetic spectrum. Li-Fi is a visible light communication technology useful to obtain high speed wireless communication. The difference is: Wi-Fi technology uses radio waves for transmission, whereas Li-Fi utilizes light waves. Wi-Fi works well for general wireless coverage within building/campus/compound, and Li-Fi is ideal for high density wireless data coverage inside a confined area or room and is free from interference issues unlike the Wi-Fi.

ADVANTAGES OF LIFI:

- *Efficiency:* Energy consumption can be minimised with the use of LED illumination which are already available in the home, offices and Mall etc. for lighting purpose. Hence the transmission of data requiring negligible additional power, which makes it very efficient in terms of costs as well as energy.
- *High speed:* Combination of low interference, high bandwidths and high-intensity output, help Li-Fi provide high data rates i.e. 1 Gbps or even beyond

COMPARISON BETWEEN LI-FI AND WI-FI

Sl.No	Parameters	Light Fidelity	Wireless Fidelity
1	Speed for data transfer	Faster transfer speed (>1 Gbps)	Data Transfer speed (150 Mbps)
2	Medium through which data transfers occurs	Used Light as a carrier	Used Radio spectrum
3	Spectrum Range	Visible light spectrum has 10,000 time broad spectrum in comparison to radio frequency	Radio frequency spectrum range is less than visible light spectrum.
4	Cost	Cheaper than Wi-Fi because free band doesn't need license and it use light.	Expensive in comparison to Li-Fi because its uses radio spectrum.
5	Network topology	Point to point	Point to point
6	Operating frequency	Hundreds of Tera Hz (THz)	2.4 GHz

- *Cheaper*: Li-Fi not only requires fewer components for its working, but also uses only a negligible additional power for the data transmission.

- *Security:* One main advantage of Li-Fi is security. Since light cannot pass through opaque structures, Li-Fi internet is available only to the users within a confined area and cannot be intercepted and misused, outside the area under operation.
- *Availability:* Availability is not an issue as light sources are present everywhere

LIMITATIONS OF LIFI:

- Internet cannot be accessed without a light source. This could limit the locations and situations in which Li-Fi could be used.
- It requires a near or perfect line-of-sight to transmit data
- Opaque obstacles on pathways can affect data transmission
- Natural light, sunlight, and normal electric light can affect the data transmission speed
- Light waves don't penetrate through walls and so Li-Fi has a much shorter range than Wi-Fi
- High initial installation cost, if used to set up a full-fledged data network.
- Yet to be developed for mass scale adoption

APPLICATIONS:

- *Education systems:* Li-Fi is the latest technology that can provide fastest speed for Internet access. So, it can augment/replace Wi-Fi at educational institutions and at companies so that the people there can make use of Li-Fi with the high speed.

- *Medical Applications:* Operation theatres (OTs) do not allow Wi-Fi due to radiation concerns. Usage of Wi-Fi at hospitals interferes/blocks the signals for monitoring equipments. So, it may have hazardous effect to the patient's health, due to improper working of medical apparatus. To overcome this and to make OT tech savvy Li-Fi can be used to access internet and also to control medical equipments. This will be beneficial for conducting robotic surgeries and other automated procedures.
- *Disaster management:* Li-Fi can be used as a powerful means of communication in times of disaster such as earthquake or hurricanes. The average people may not know the Protocols during such disasters. Subway stations and tunnels, common dead zones for most emergency communications, pose no obstruction for Li-Fi
- *mobile Connectivity:* Mobiles, laptops, tablets, and other smart phones can easily connect with each other. The short-range network of Li-Fi can yield exceptionally high data rates and higher security.
- *Replacement for other technologies:* Li-Fi doesn‘t work using radio waves. So, it can be easily used in the places where Bluetooth, infrared, Wi-Fi, etc. are banned.

Future Scope:

As light is everywhere and free to use, there is a great scope for the use and evolution of LiFi technology. If this technology becomes mature, each Li-Fi bulb can be used to transmit wireless Data. As the Li-Fi technology becomes popular, it will lead to a cleaner, greener, safer Communications and have a bright future and environment.

HUMMINGBIRD ROBOT

V.S.SARASWATHI,T.SINDHUJA

II YEAR

Researchers have engineered flying robots that behave like hummingbirds, training them with machine learning algorithms based on various techniques the bird uses naturally every day.

one day offer a better way to maneuver through collapsed buildings and other cluttered spaces to find trapped victims. The combination of flying like a bird and hovering like an insect could

Artificial intelligence, combined with flexible flapping wings, also allows the robot to teach itself new tricks. Even though the robot can’t see yet, for example, it can touch

surfaces to sense them. Each touch alters an electrical current, which the researchers realized they could track.

Engineers can’t make drones infinitely smaller, due to the way conventional aerodynamics work. They wouldn’t be able to generate enough lift to support their weight. But hummingbirds don’t use conventional aerodynamics—and their wings are resilient.

Further study on the physics of insects and hummingbirds allowed researchers to build robots smaller than hummingbirds—and even as small as insects—without compromising the way they fly. The smaller the size, the greater the wing flapping frequency, and the more efficiently they fly.

Robotic hummingbirds wouldn't only help with search-and-rescue missions, but also allow biologists to more reliably study hummingbirds in their natural environment through the senses of a realistic robot.

The robots have 3D-printed bodies, wings made of carbon fiber, and laser-cut membranes. The researchers built one hummingbird robot weighing 12 grams—the weight of the average adult magnificent hummingbird—and another insect-sized robot weighing 1 gram. The hummingbird robot can lift more than its own weight, up to 27 grams.

The robots could fly silently just as a real hummingbird does, making them more ideal for covert operations. And they stay steady through turbulence, which the researchers demonstrated by testing the dynamically scaled wings in an oil tank.

The robot requires only two motors and can control each wing independently of the other, which is how flying animals perform highly agile maneuvers in nature.

"The robot can essentially create a map without seeing its surroundings. This could be helpful in a situation when the robot might be searching for victims in a dark place—and it means one less sensor to add when we do give the robot the ability to see,"

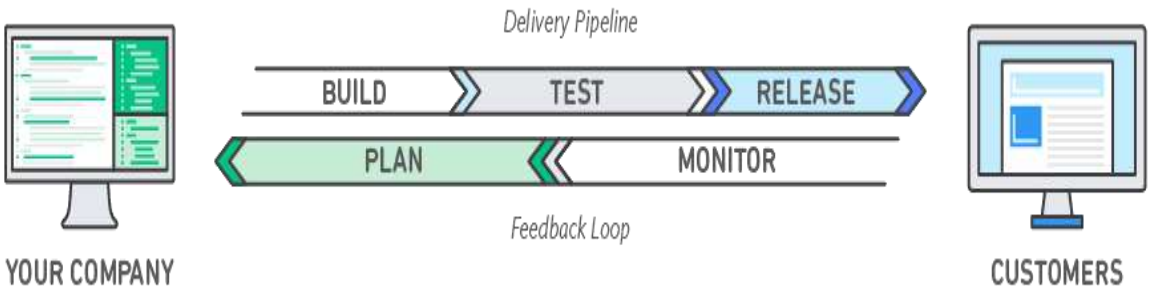
"We learned from biology to build the robot, and now biological discoveries can happen with extra help from robots,"

FUTURITY is on engineer's hands….

DevOps THE FUTURE TECHNOLOGY

K.AROMA K.LUCAS,
IV YEAR

DevOps is the combination of cultural philosophies, practices, and tools that increases an organization's ability to deliver applications and services at high velocity: evolving and improving products at a faster pace than organizations using traditional software development and infrastructure management processes. This speed enables organizations to better serve their customers and compete more effectively in the market.



How DevOps Works

Under a DevOps model, development and operations teams are no longer "siloed." Sometimes, these two teams are merged into a single team where the engineers work across the entire application lifecycle, from development and test to deployment to operations, and develop a range of skills not limited to a single function.

In some DevOps models, quality assurance and security teams may also become more tightly integrated with development and operations and throughout the application

lifecycle. When security is the focus of everyone on a DevOps team, this is sometimes referred to as DevSecOps.

These teams use practices to automate processes that historically have been manual and slow. They use a technology stack and tooling which help them operate and evolve applications quickly and reliably. These tools also help engineers independently accomplish tasks (for example, deploying code or provisioning infrastructure) that normally would have required help from other teams, and this further increases a team's velocity.

Benefits of DevOps

- Speed

Move at high velocity so you can innovate for customers faster, adapt to changing markets better, and grow more efficient at driving business results. The DevOps model enables your developers and operations teams to achieve these results. For example, microservices and continuous delivery let teams take ownership of services and then release updates to them quicker.

- Rapid Delivery

Increase the frequency and pace of releases so you can innovate and improve your product faster. The quicker you can release new features and fix bugs, the faster you can respond to your customers' needs and build competitive advantage. Continuous integration and continuous delivery are practices that automate the software release process, from build to deploy.

- Reliability

Ensure the quality of application updates and infrastructure changes so you can reliably deliver at a more rapid pace while maintaining a positive experience for end users. Use practices like continuous integration and continuous delivery to test that each change is functional and safe. Monitoring and logging practices help you stay informed of performance in real-time.

- Scale

Operate and manage your infrastructure and development processes at scale. Automation and consistency help you manage complex or changing systems

efficiently and with reduced risk. For example, infrastructure as code helps you manage your development, testing, and production environments in a repeatable and more efficient manner.

- Improved Collaboration

Build more effective teams under a DevOps cultural model, which emphasizes values such as ownership and accountability. Developers and operations teams collaborate closely, share many responsibilities, and combine their workflows. This reduces inefficiencies and saves time (e.g. reduced handover periods between

developers and operations, writing code that takes into account the environment in which it is run).

- Security

Move quickly while retaining control and preserving compliance. You can adopt a DevOps model without sacrificing security by using automated compliance policies, fine-grained controls, and configuration management techniques. For example, using infrastructure as code and policy as code, you can define and then track compliance at scale.

Why DevOps Matters

Software and the Internet have transformed the world and its industries, from shopping to entertainment to banking. Software no longer merely supports a business; rather it becomes an integral component of every part of a business. Companies interact with their customers through software delivered as online services or applications and on all sorts of devices. They also use software to increase operational efficiencies by transforming every part of the value chain, such as logistics, communications, and operations. In a similar way that physical goods companies transformed how they design, build, and deliver products using industrial automation throughout the 20th century, companies in today's world must transform how they build and deliver software.

How to Adopt a DevOps Model

DevOps Cultural Philosophy

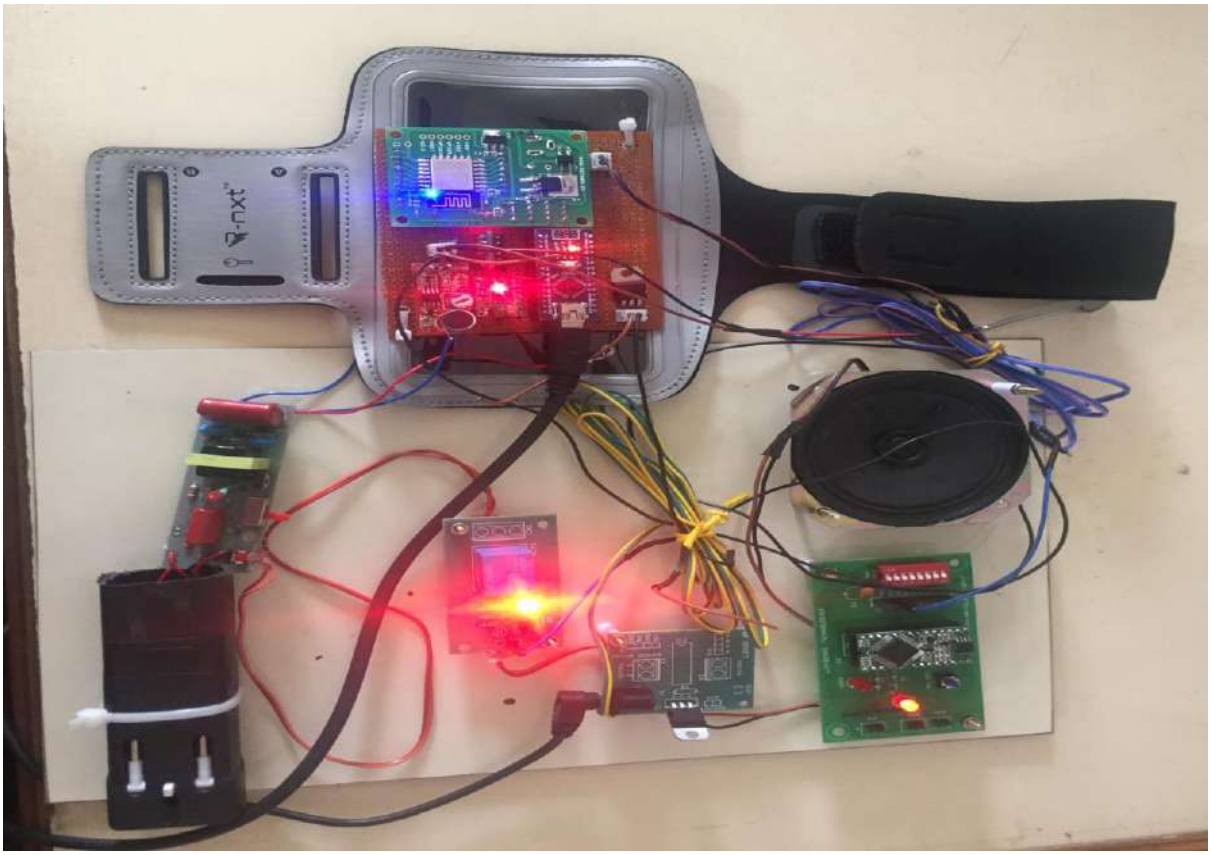
Transitioning to DevOps requires a change in culture and mindset. At its simplest, DevOps is about removing the barriers between two traditionally siloed teams, development and operations. In some organizations, there may not even be separate development and operations teams; engineers may do both. With DevOps, the two teams work together to optimize both the productivity of developers and the reliability of operations. They strive to communicate frequently, increase efficiencies, and improve the quality of services they provide to customers. They take full ownership for their services, often beyond where their stated roles or titles have traditionally been scoped by thinking about the end customer's needs and how they can contribute to solving those needs. Quality assurance and security teams may also become tightly integrated with these teams. Organizations using a DevOps model, regardless of their organizational structure, have teams that view the entire development and infrastructure lifecycle as part of their responsibilities.

ARDUINO BASED SYSTEM FOR WOMEN SAFETY

K.AROMA K.LUCAS,ARULRAJ & DAKSHNA
IV YEAR

Security for women has become a massive concern in most of the countries. Contemplation results shows that every year around 25000 felony against women were logged across India. From the last ten years, the statistics among women abuse, sexual harassment have been steadily increasing. It has become obligatory to come up with a solution to gaurd the women from being a sufferer and to reduce the attacks. The main objective of this system is to design and implement a highly reliable system for protecting women from being harassed. In this system, a smart intelligent women safety system using IOT is developed. This system has a set of electronic devices that can check various parameters of a woman who is in trouble. When there is an abnormality suspected then, the person harassing the woman is given a shock and her instant location is sent as an SMS to the mobile phone the woman has already registered with. These electronic components are a force sensor, mems accelerometer or the mems sensor, heartbeat sensor and a sound sensor. All these will be connected to a Nano Arduino. It is coded in the arduino stating that if the mems sensors reads a value beyond the threshold, all other parameters from the sensors mentioned above should be collected and compared. If an abnormality is sensed by most of the sensors, then an automatic shock will be activated which would, give the harasser a small amount of shock, while the woman gets a chance to escape. At unavoidable circumstances, where the woman is said to be unconscious, her voice calling out for help due to danger or emergency, that was previously recorded will be played time

and again. At the same time her locations gets updated constantly, to the number with which she has previously registered.



INTERNET OF THINGS ADVANCED LEVEL

K. UDHAY,
II YEAR

INTRODUCTION

Internet of Things (IoT) has acquired a remarkable attention in the last decade. This phenomenal innovation designs a world where billions of smart, interacting things are able to offer wide range of services to near and remote entities.

There is a comfort has shown up with IoT. First advantage is the fact that smart products are intelligent items. They are able to recognize their production process and they can communicate with smart machines. Secondly, smart planner can optimize the process in real time. Finally, the innovative information and communication technologies (ICT) enable humans as smart operators to control and supervise activities. Smart products are highly intelligent to plan and dispose tasks. Machine learning, machine to machine communication, human machine interaction, visualization and data analysis allow cyber physical systems to create self-learning. They can change production methods when it is necessary in the factory (Wittenberg, 2016 & Neugebauer et al., 2016). Kevin Ashton defined IoT for the first time in 1999. This definition claims that ordinary objects can be combined with the sensors and Radio Frequency Identification Technology (RFID) thereby; things evolve into internet of things (Ashton, 2009). Despite of this definition, the first application of IoT has shown up in 1991 with the Trojan Room Coffee Pot(Ashton, 2009 & Santucci, 2009).

A videcamera was inserted into a coffee machine in order to pursue emptiness. In this way, the liquid level . (Lopez de Armentia et al., 2012). RFID plays a key role for IoT with its pursuit ability through Electronic Product Codes (EPC). Besides,

large scale embedded sensors with 2D codes, common sensor devices and barcodes are well-known tools of IoT. Since these tools can be addressable and connected to the internet, their data can flow over the computers connected to internet. These items are able to solve the confusion by perceiving the environment and communicating with each other. Also, they can provide autonomous response in difficult scenarios

- **Semantic Open IOT Service Platform**

Current IoT services require IoT applications to have knowledge of IoT middleware and sensors or sensor networks for accessing IoT resources. For example, heterogeneous IoT middleware are not easy to be accessed by applications since each IoT middleware has proprietary Application Programming Interface (APIs) and therefore it is not easy to access various IoT resources which directly attached to different IoT middleware. Even when the applications have access to multiple IoT middleware, applications have to search, collect, analyze and process the sensed data by themselves. These limits can be overcome by providing unified access method for IoT resources via heterogeneous IoT middleware. Figure 1shows current IoT service platform and open IoT service platform.

In the current IoT service platform, each application needs to know how to access heterogeneous IoT middleware and which IoT resources should be accessed. In the open IoT service platform, each application does not need to know how to access heterogeneous IoT middleware nor which IoT resources should be accessed. In the open IoT service platform, IoT application only requests to open IoT service platform and remaining processing is done by the open IoT service platform. The open IoT platform converts request from applications into specific request for different IoT

middleware. The ultimate goal of the open IoT service platform is to provide the application with the following services;

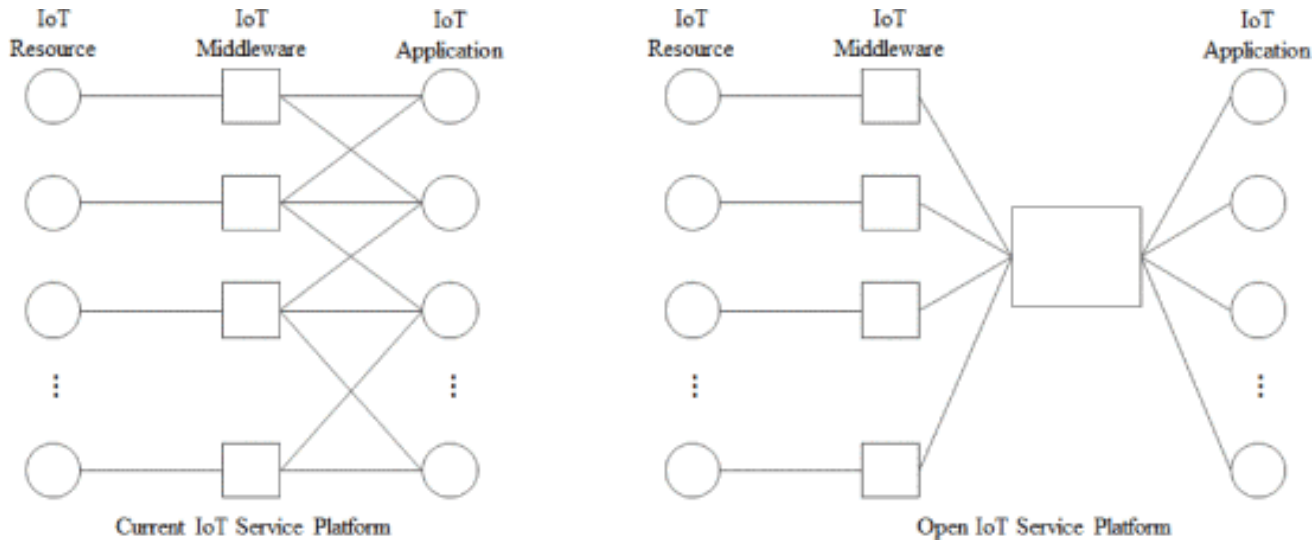
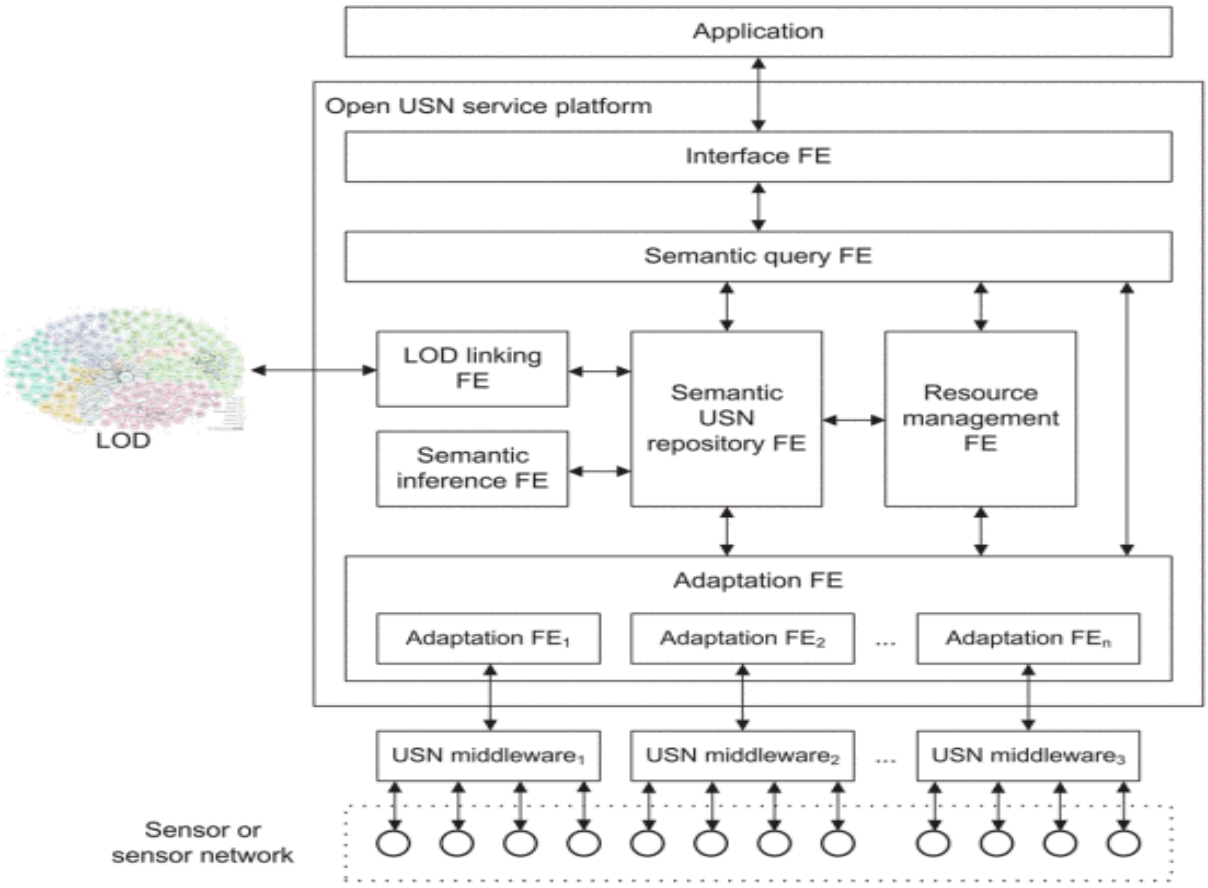


Figure 1. Current IoT Service Framwork and Open IoT Service Platform

Easy access to and use of the global IoT resource and sensed dataeasy connection.The functional architecture of open USN service platform consists of open USN platform and heterogeneous USN middleware. The open USN platform consists of seven functional entities (FEs): interface FE, LOD linking FE, Semantic inference FE, Resource management FE, Semantic USN repository FE, Semantic query FE and Adaptation FE. The heterogeneous USN middleware are integrated into the open USN platform through the Adaptation FEs and USN resources and sensed data are shared with the other services through LOD linking FE.

Figure 2. Funtional Architecture of Semantic Open IoT Service Platform



A. Interface FE

Interface FE provides the functions which enables USN application to obtain open USN services and/or the sensed data from the open USN service platform. Also, it supports the functions which allow establishment or maintenance of connections or disconnection according to the type of a request for data, and access control to handle access rights for user authentication

Challenges of ioT Applications in Developing Countries

however, there are some challenges to apply IoT. While the world is taking a digital shape, the countries import technology instead of producing. This approach makes them dependent on designers of digital world. For this reason, developing countries have to suitable for adoption of new technology. The main objective of this study is to reveal the usability challenges of IoT in the developing countries. The speed and method for implementing IoT differs from country to country. The priority of countries holding high product range is to benefit from flexibility to increase productivity. On the other hand, quality-focused approach is adopted by countries in order to decrease deficient products. This approach requires IoT in order to optimize systems through data mining. Contrary to this, developed countries are focused on increasing automation rate due to the high labor force. There are some structural hurdles for developing countries to implement IoT. Limited labor force skill is one of them. This obstacle slows down to adopt new technology. Also, the quality of labor force differs from industry to industry. Considering that the demand for value-added products increases rest of the world, low share of value-added

products creates another drawback. IoT practitioners suffer from lack of standardization. Standards evolve day after day so that makes the implementation of technology complicated. Also, lack of mobility is another challenge faced by IoT practices. This innovative technology delivers its many services to mobile users (Al-Fuqaha et al., 2015). Infrastructure is a crucial challenge for developing countries. It is obligatory for IoT applications to have a higher infrastructure. Therefore, interconnected devices can work efficiently and rapidly (Botta et al., 2016). Poor internet connectivity shows up as a challenge for developing countries.

COMPUTING -MACHINARY &INTELLIGENCE

D.VIGNESH
II YER

BCI: Aiding Medical Science by Synchronizing Mind with Machine

• New approaches in augmenting human-machine interaction (HMI) have found to be extremely useful in mitigating effects of neurological diseases and injuries. Before we delve into the intricacies of these technologies, let us learn how HMI works in simple terms.

• Technologies and computer systems are assuming important tasks in our everyday life and work either visibly or behind the scenes. It is well known now that the smooth communication between people and machines requires interfaces – the place where or action by which a user engages with the machine. Using certain sensors and interfaces, these machines can be controlled by a mouse, touch screens, voice, or gestures. At a more advanced level, virtual reality (VR) glasses enable engineers to walk through planned factory buildings, reply automatically to requests from customers.

The advent of BCI

BCI can be defined as a direct communication pathway between an enhanced or wired brain and an external device. Directed at researching, mapping, assisting, augmenting, or repairing human cognitive or sensory-motor function, BCI has made even complex systems easier to use. These machines are able to adapt more

towards human habits and needs and with this humans are expanding their realm of experience and field of action.

Brain-Computer Interface (BCI) is an advanced form of HMI that involves the analysis and translation of brain signals into commands that are relayed to output devices that carry out desired actions. It has proven to be a very useful tool for providing alternative communication and mobility to patients suffering from nervous system injuries.

How BCI technology works?

BCI technology is used to record and analyze brain signals to determine the output that is desired by the user; for example, which letter to select for spelling a word or to indicate which direction to move a cursor and so on. The main purpose of clinical BCI systems is to help patients communicate with their environment or to aid in their recovery. BCI can be used to replace, restore, enhance, supplement or improve natural Central Neural System (CNS) output

Phase involved in this process ;

- **Extraction**
- **Translation of signals**

The first phase is known as feature **extraction** which is the measurement of the characteristics of the signals that encode the output To provide effective BCI performance, the feature- extraction component of the signal processing stage needs to focus

on features that encode the relevant output and needs to extract those particular features accurately.

The second phase of BCI signal processing is the **translation of signals** features into device commands using a translation algorithm. Certain brain signal characteristics such as rhythm amplitudes or neuronal firing rates are translated into commands that specify outputs, such as letter selection, cursor movement, or prosthesis operation. Translation algorithms can be simple or complex like neural networks or support vector machines.

BCI technologies may turn out to be boon for people for whom conventional assistive communication methods are not effective, because severe motor disabilities will preclude their use of voluntary muscle control on which conventional methods depend.

Representational Image Of Management Plastic Arm With Help Of Thought

Need for balance

The more complex the contribution made by machines, the more important is to have efficient communication between them and users. Hence the question arises - Does the technology enable the machine to exactly understand the command as it is meant? If not, then there is always a risk of misunderstanding makingthe system often not work as it should.

It can be said that BCI technology still has a long way in presenting an adequate replacement of the existing technologies for communication and control in patients with a minimum of preserved motor and cognitive function. Rehabilitation in neurological disease and injury seems to be the area which provides the most immediate measure of benefit to a user but this is typically performed in a clinical environment operated by clinically trained persons.

Benefits of BCI technologies

Allowing a form of interaction between a human and a machine via messages or voice command, BCI applications have many possible uses ranging from simple to unlimited clinical use. These include systems for answering “yes” or “no” to questions, managing basic control of the user’s environment like lights and temperature, controlling a television or opening and closing a hand orthotic. The functions of these systems include basic word processing, sending emails, accessing the internet, or operating a motorised wheelchair.

Some limited virtual sensations can be sent back to the brain, by delivering electrical current inside the brain or to the brain surface.

Not all BCIs, however, are invasive. Noninvasive BCIs that don't require surgery do exist; they are typically based on electrical (EEG) recordings from the scalp and have been used to demonstrate control of cursors, wheelchairs, robotic arms, drones, humanoid robots and even brain-to-brain communication.

What about our main senses of sight and sound?

Very early versions of bionic eyes for people with severe vision impairment have been deployed commercially, and improved versions are undergoing human trials right now.FinallyFinally, there is the problem of damage. Brain tissue is soft and flexible, while most of our electrically conductive materials – the wires that connect to brain tissue – tend to be very rigid. This means that implanted electronics often cause scarring and immune reactionsthat mean the implants to lose effectiveness over time. Flexible biocompatible fibers and arrays may eventually help in this regard.

Conclusion

Applications of these technologies and how to design and use them in practice. It examines the neuroscientific foundations of BCIs, that is, the knowledge of brain structures and electrophysiological phenomena involved in controlling a BCI, and this for different types of BCIs, such as invasive, non-invasive, active, reactive and passive. It analyzes the different algorithms for preprocessing, processing, describing or even classifying brain signals, notably electroencephalogram (EEG)

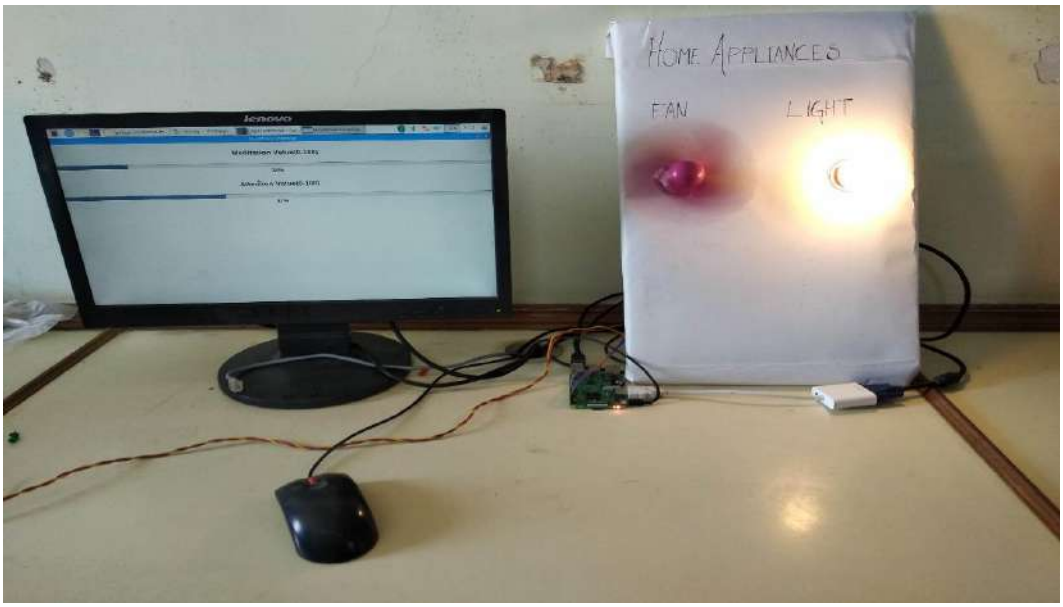
- **"AI is likely to be either best or worst thing to happen to humanity" -Stephen Hawking**
- **AI is about replacing human decision making with more sophisticated technology -Falguni Desai**

HOME AUTOMATION FOR PHYSICALLY CHALLENGED BASED ON FEATURE EXTRACTION AND CLASSIFICATION OF EEG SIGNAL

AKASH D,DUDIGAM SRI HARSHA D,JOHN PREM KUMAR S

IV YEAR

In this modern era of world everything is being automated. In order to make automation useful for physically challenged and enable them to make advanced operations over appliances, we have been proposed this automation using brain waves. It involves operation of electronic appliances in our home by collecting different states of mind as EEG waves using neurosky headset which has electrodes connected to brain, ear and forehead.The data collected from the headset are processed by algorithms of each state like meditation,attention and eyeblink using Raspberry pi 3.These data are used to actuate the electronic appliances.




MON
TUE
WED
THU
FRI
SAT
S.A. POLYTECHNIC (W)

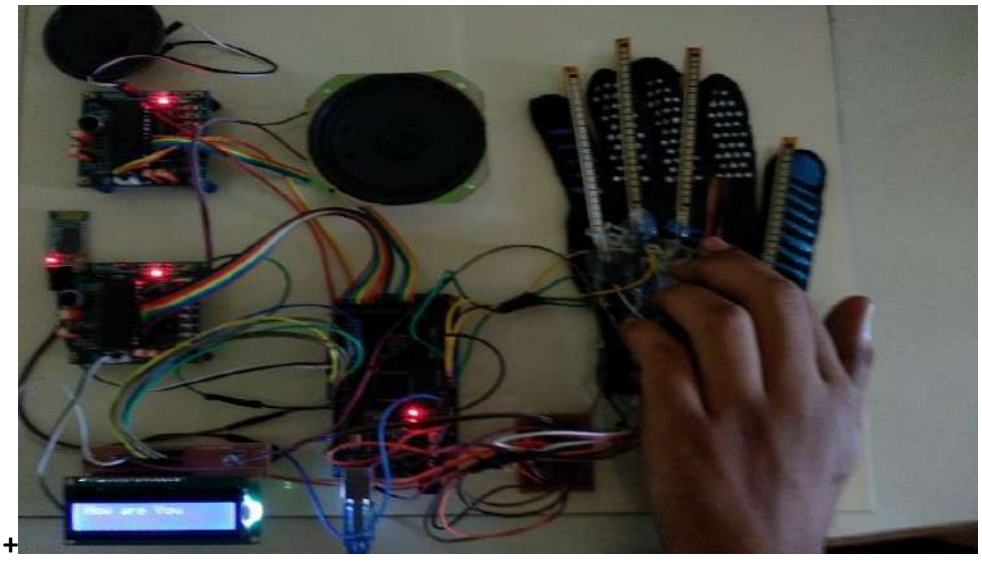
A NOVEL APPROACH FOR COMMUNICATION AMONG BLIND, DEAF AND DUMB

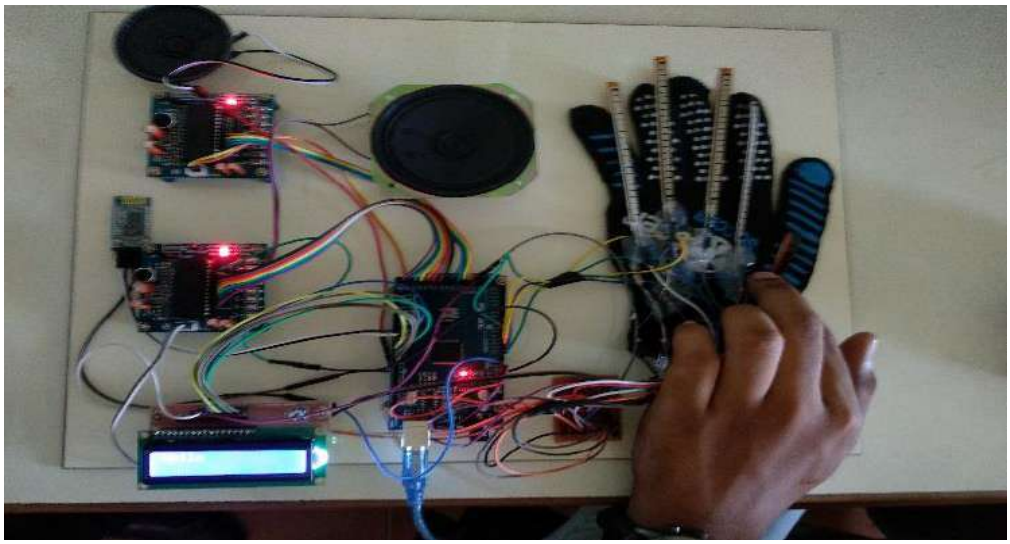
S. DEEPAK ,S. DINESH ,F. FERDIN SAMUEL

IV YEAR

Technology have made Human life addictive to comfort but still there exists an underprivileged group of people who are fighting for finding an innovative way that can make the process of communication easier for them. SHAROJAN BRIDGE concept is implemented to bridge the gap in the process of communication between the Blind, Deaf and Dumb people. The SHAROJAN BRIDGE will make use of the Wearable Technology and Arduino Circuit Boards to provide a means of communication to differently-abled people having one or all of the above mention disabilities.

WORKING HARDWARE



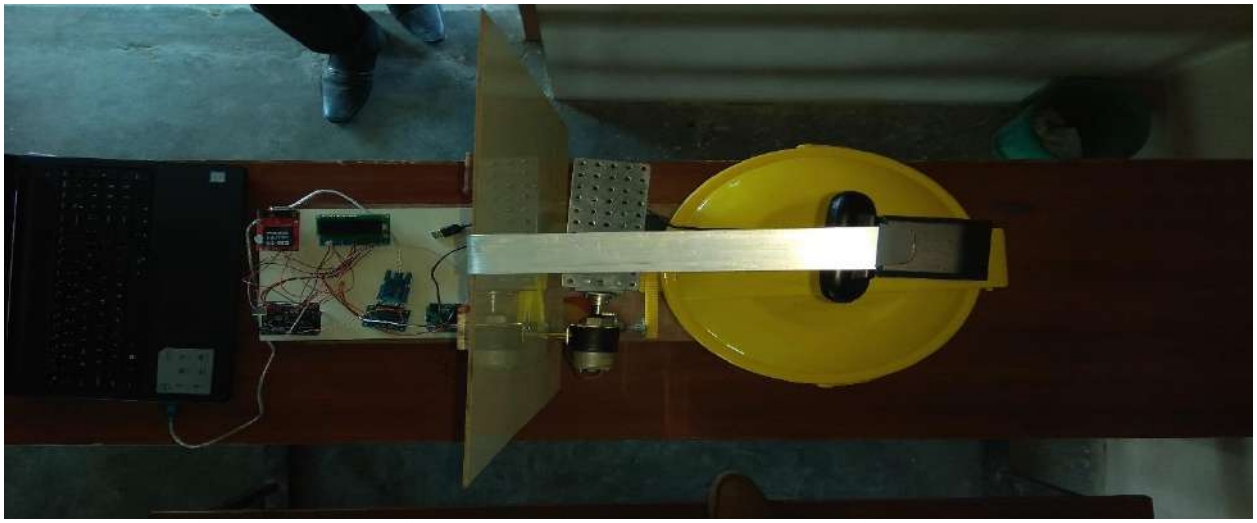


A SMART DUSTBIN FOR PLASTIC DISPOSAL AND MONEY CREDITING SYSTEM

AMIRTHARAJ M , ATHISAYARAJ E, DANUSSH P

IV YEAR

It is known that the technological advancements are increasing at a faster pace. But the utilization of technologies in various sectors is very low. It is known that there are no proper measures for waste disposal. Since the use of plastics is constantly increasing in our day-to-day life, there is no proper waste disposal for plastics. So we propose a system where the plastics are detected using image processing technique. And an automated money crediting technique is also used for increasing the plastic disposal awareness among public.



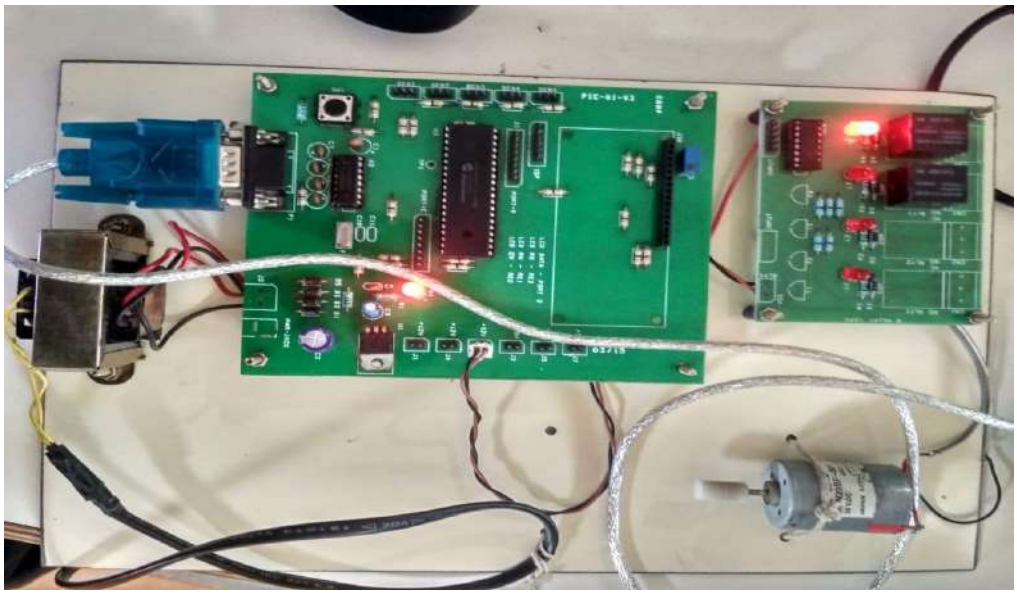
DRIVER GAZE DETECTION AND EYE OFF THE ROAD PRVENTION SYSTEM

K.S.ABRAR SHERIF,S.JESWIN SAMRAJ,A.JOHN SANTHOSAM

IV YEAR

In India ,the main causes of vehicle collisions is distracted driving. By continuously monitoring a driver's activities of automobile safety system can reduce the number of accidents. This paper propose a method to accurately detect Eyes Off the Road (EOR) of driver's gaze detection using vision-based system. The system has three main components. They are robust facial feature tracking; head pose and gaze estimation; and 3-D geometric reasoning to detect EOR. Continuous video stream of a camera mounted on the steering wheel, our system tracks facial features from the driver's face. Using the tracked landmarks and a 3-D face model, the system computes head pose and gaze direction. The head pose estimation algorithm is robust to no rigid face deformations due to changes in expressions. Finally, using a 3-D geometric analysis, the system reliably detects EOR. This system does not require any driver-dependent calibration or manual initialization, during the day and night. To validate the performance of the system in a real car environment, we conducted a comprehensive experimental evaluation under a wide variety illumes- nation conditions, facial expressions, and individuals. More than 90% EOR detects accurately for all tested scenarios. With the help of detected output, we can reduce the speed of the vehicle which intern reduce number of the accidents.

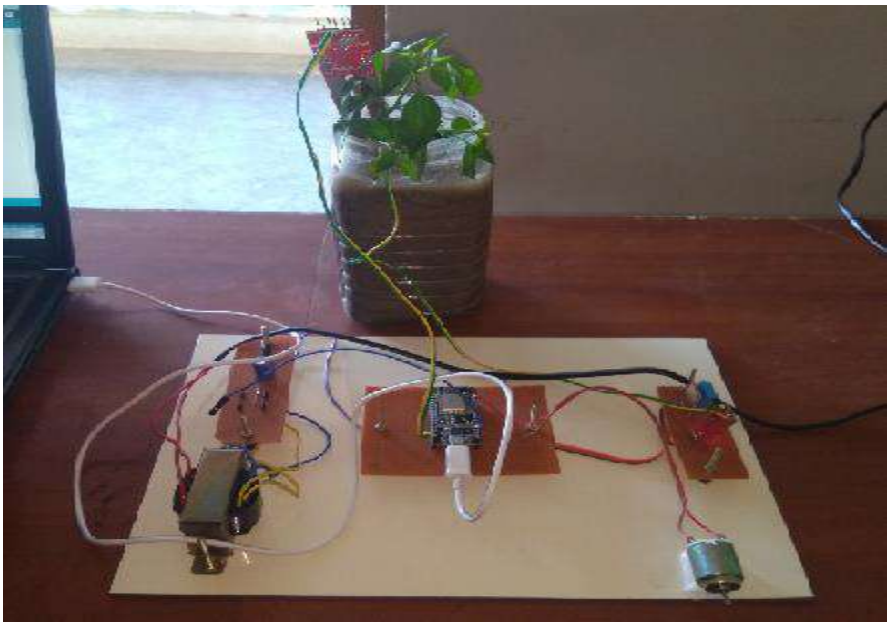
Output:



FIELD VARIABLE MONITORING IN REAL TIME WITH PRECISION FARMING

M.A.GNANASUNDARAM,B.GOKULRAJ,.HARIHARA SUDHAN

IV YEAR



Agriculture remains the sector which contributes the highest to India's GDP. But, when considering technology that is deployed in this field, we find that the development is not tremendous. Now a day's there is huge enhancement in technologies which have a significant impact on various fields like agriculture, healthcare etc. Agriculture is the primary occupation in our country. India's major income source is depending on agriculture therefore the development of agriculture is important. In today also most of the irrigation system are operated manually.

MODERN POWER CONSERVATION USING HYBRID POWER SUPPLY SYSTEM

A.ARAVIND , D.BENSON PRASANTH, D.GOKUL RAJ

IV YEAR

In modern days we are seeing that the usage of electricity is at peak. We are paying much money for per unit of electricity. For that we are implementing a project by which we can produce electricity from wind mills, solar energy etc. With the help of this project we can able to generate electricity from nature. This green energy gradually replaced for traditional energy such as fossil energy. Several methods have been used to capture green energy from environmental source. One of the most popular method is using solar energy and from wind energy. They energy such generated are used for public use.

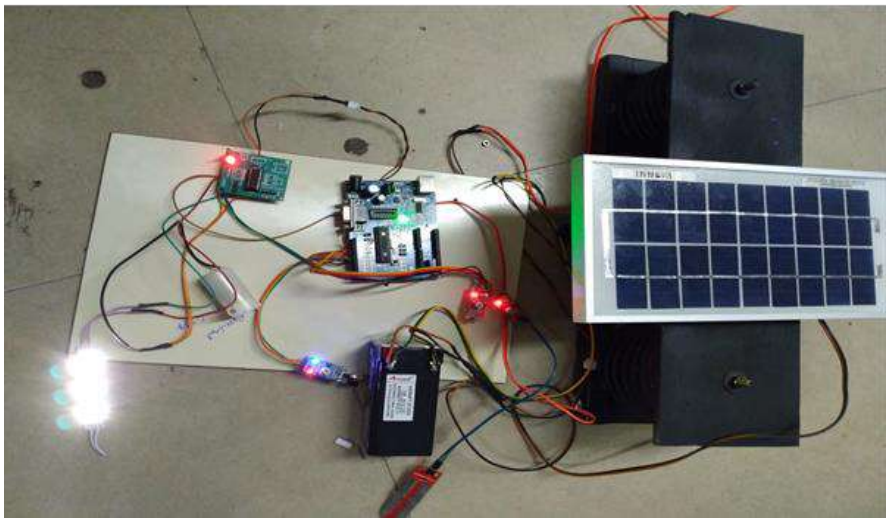


Fig:WORKING MODULE OF HYBRID POWER SUPPLY SYSTEM

ELECTRONICS CROSS WORD

S.VINOTHINI,

III YEAR

Electronics adapt to the advancements of technology. At some point, devices were bulky, then made smaller, thinner, and now, nano. But before digging in to the deeper scale of Electronics, one needs to know its basic terms and concepts.

It's never easy to learn something new. A fun way to do this is by incorporating it into a game. This quiz is a crossword puzzle of some basic terms in electronics. Have fun!

Across

2. A diagram that shows the electrical connections of the electronic components
5. Current is considered to be the movement of _____.
6. A voltage source that converts chemical energy to electrical energy
8. A flow of electric charge
10. A characteristic of a secondary cell
11. A material that is composed of a mixture of elements
12. The term used to designate electrical pressure
15. A short circuit will have a _____ current flow.
16. The part of an atom that has no electric charge

Down

1. A voltmeter is used in _____ with the circuit.
2. A device that opens or completes an electrical path

3. A material that opposes the movement of free electrons

4. One coulomb passing a point in one second

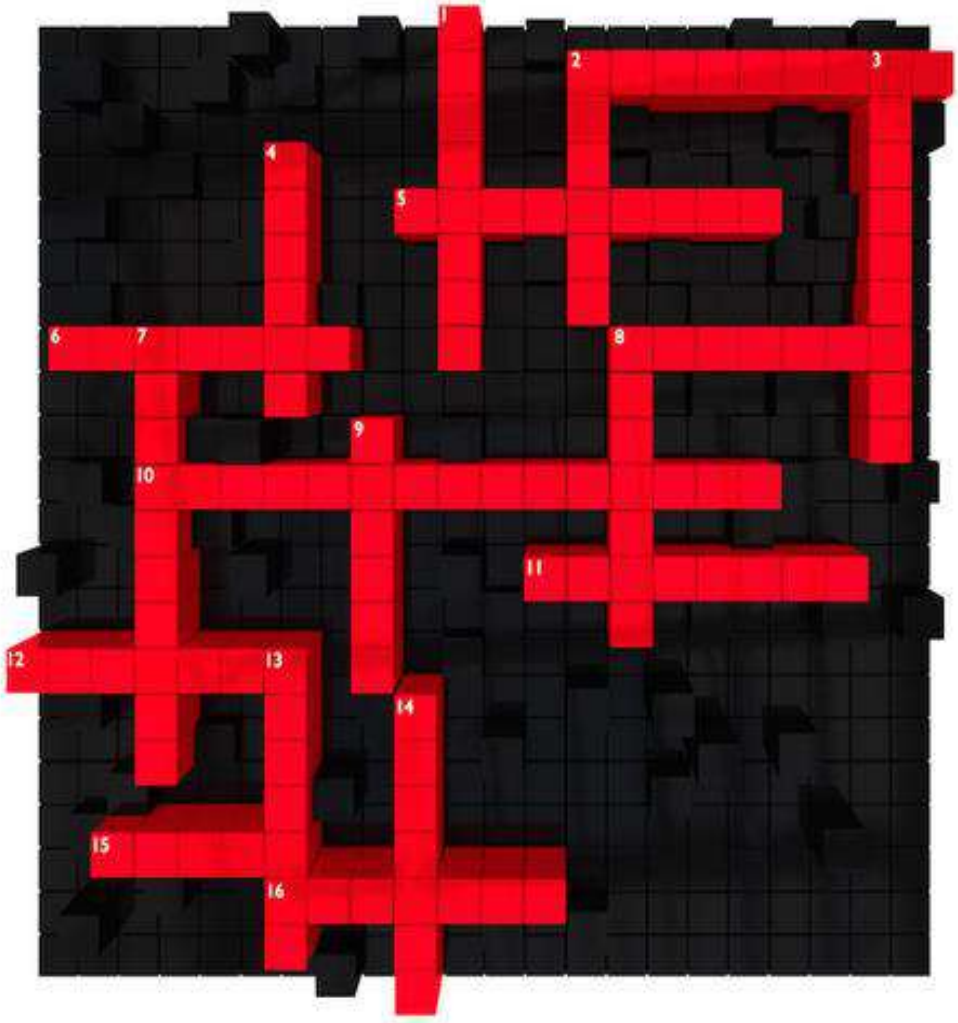
7. A resistive component that is designed to be temperature sensitive

8. A unit of charge that contains 6.25 × 10^18 electrons

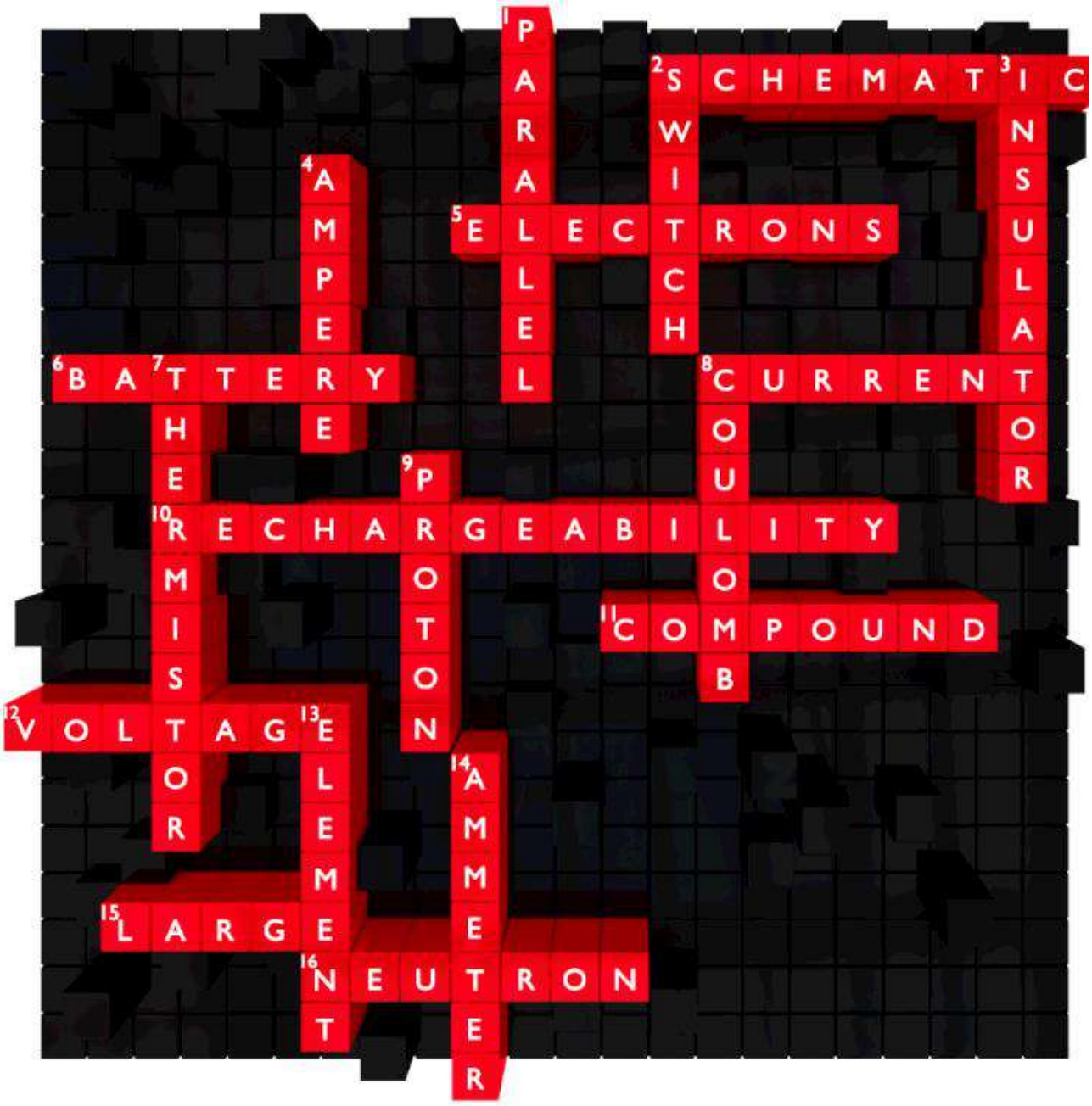
9. An atom's atomic number is determined by its number of _____.

13. A substance that is found only in its pure form

14. It is used to measure current.



ANSWER:


1 PARALLEL
2 SWITCH
3 INSULATOR
4 AMPERE
5 ELECTRONS
6 BATTERY
7 THEVENIN
8 CURRENT
9 PROTON
10 RECHARGEABILITY
11 COMPOUND
12 VOLTAGE
13 ELEMENT
14 AMMETER
15 LARGE
16 NEUTRON

BLOOD IS HERE

S.DHILIP KUMAR
AP/ECE DEPARTMENT

Blood delivering Drones. Rwanda is land of thousand hills, and drones are used to go over every one of them. The blood carrying drone will make the trip in under 14 minutes. Zipline is an American medical product delivery company headquartered in Half Moon Bay, California, that designs, builds, and operates small drone aircraft for delivery of medical products, with a focus on providing services in Africa. In 2014, Zipline is created to deliver medicine to those who need it most. Since then, they built the world's fastest and most reliable delivery drone, the world's largest

autonomous logistics network, and a truly amazing team. Their drones were able to fly through rain or shine.

Delivery by drone is a futuristic idea that has caught the public's imagination, and there are plenty of attempts to turn it into a commercial reality. Amazon, Google, and Domino's Pizza have all pulled off carefully controlled demonstrations and pilot

projects, delivering items such as sunscreen, burritos, and (of course) pizza to backyards and fields. But the world is waiting to see whether any company can find a business model that makes drone delivery a sustainable and profitable endeavour.

The answer may be here in Rwanda, where Zipline is delivering blood to 25 hospitals and clinics across the country every day. Zipline is betting that transporting lifesaving medical supplies, which are often lightweight and urgently needed, will be the killer app for delivery drones.

For hospitals in need of critical medical supplies, Rwanda's roads pose a real problem. Hospital administrators worry most about blood and blood products, which have a short shelf life and strict storage requirements. It's also difficult to predict how many packs of each blood type will be needed at a given facility, and when. In an emergency, it can take up to 5 hours for a Rwandan hospital to receive a blood delivery via road, which could easily mean death for a patient in need.

"The blood is here!" Workers spring into action, transferring the packs of whole blood, plasma, and platelets into refrigerators. When an order comes in from a hospital via phone, website, WhatsApp, or SMS, a worker wraps the needed packs in padding and stuffs the bundle into a bright red box, which has a wax-paper parachute attached.

STUDETNS ACHIEVEMENTS AND AWARDS

Some of our students achievements and awards are

SAEC sponsored Rs.15,000/- ECE final year Students to present their project on Development of Robo Hydro Jetter Cum Cutter for Replacement of manual Scavenging at Colombo,Srilanka

- **SAEC Sponsored Rs.3,000/- to Ms.Janani of ECE Third year student to attend Conference at Goa organized by IEEE Students Chapter.**

- **ECE students involved in NSS Unit of S.A.E.C organized the Tree Plantation and Perceptions of Dr.A.P.J.ABDUL KALAM on his remembrance 26.07.18.**

A.R.Naveen Kumar & P.Srinivas of ECE department Students has Participated and Won Runner In Anna University Zonal Match On 11-09-18 At Vellammal Engineering College Chennai.

S.Dharanidevi, P.Jayabarathi, R.Anisha & P.Kaviyavarshini has won first prize in treasure hunt held on 11.9.18 at Shri Shankarl al Sundar bai Shasun Jain College for women Chennai.

GALLERY

ECE Department organized Guest lecture on "Environmental Science and Engineering " Dr.G.SEKARAN,Fmr.Chief Scientist & Cluster Chairman,Environmental Technology Division CLRI,Chennai.was the resource person on 23.07.2018.

ECE Department organized Guest lecture on "Oops and Data Structure " Dr.P.MALLIGA,Sr.System Anayst, NITTTR,Chennai..was the resource person on 18.07.2018.

IEEE International Conference on "Photonics and High Speed Optical Networks ICPHON 2018.

Department of Electronics and Communication Engineering at S.A. Engineering College, Chennai organized, Guest Lecture on **"RECENT TRENDS AND ADVANCEMENTS IN WIRELESS NETWORKS"** on 24.12.2018. **Mr.V.Sasikumar**, Senior Network Engineer. DELL Chennai**,** was the Chief Guest.

The department of Electronics and Communication Engineering has organized **"IEEE AWARENESS PROGRAM"** for ECE students on 27.12.2018. **Mr.B.Ashvanth,** Assistant System Engineer, TCS Public Relation, Chennai**,** was the resource person.

Department of Electronics and Communication Engineering, Chennai organized, BRNS sponsored Two days Workshop on **"Recent Advancements in Artificial Intelligence and Machine Learning Techniques A Special Focus on Oncology"** from 14.11.2018 to 15.11.2018.

Department of Electronics and Communication Engineeringat S.A. Engineering College, Chennai organized,IEEE Photonics Society Sponsored Mini Colloquium on**"Advancements in Photonics and Optical Networks"** from 29.08.2018 to 31.08.2018.

ECE Department organized Value Added Training on "C with Data Structure" Mr. Rajendran Subramanian Founder & CEO, Silicon Software Services,Chennai from 26.06.2018 to 29.06.2018.

ECE Second year students went for industrial visit at ICF Chennai on 20.07.2018.

ECE Third year students went for industrial visit at National Institute of Wind Energy Chennai on 10.08.2018.

Editorial Board

THANK YOU