S.A. ENGINEERING COLLEGE

(An Autonomous Institution ,Affiliated to Anna University, Chennai.)

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SAANKETHIKA2k20

Annual Magazine, May 2020

DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

DEPARTMENT OF ELECTRONICS & COMMUNICATION

Electronics and Communication Engineering is one of the most upcoming areasof 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 ways to 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 CircuitsAnalog & 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 bothfor faculty as well as students.

MESSAGE

I am delighted to know that the Department of Electronics & Communication Engineering of S.A.ENGINEERING COLLEGE is bringing out the ***SAANKETHIKA 2K20.****I hope this magazine will bring out an array of creative and technical expression with distinct individual flavours. With great pride, let me take this opportunity to wish the organizing committee and Faculty members for their hard work and commitment in bringing out this magazine.*

Dr.D. Dasarathan,
Secretary,
S.A.Engineering College

MESSAGE

*I am gratified to know that the department of Electronics and communication Engineering is bringing out their technical magazine "**SAANKETHIKA 2K20**" of this academic year (2019-2020). This is a productive technical material and subsidiary skill developing tool for the students. I wish this department"Electronics and communication Engineering " a very big success in all their ventures. I also applaud the coordination and efforts behind the team to bring out this issue.I wish them all success.*

Dr. G.S.Kumarasamy,
Principal,
S.A.EngineeringCollege.

MESSAGE

*I am pleased to know that our Electronics and Communication Engineering Department students are once again successful in bringing their magazine "**SAANKETHIKA 2K20**" for this academic year. Our ECE students have established a joint to venture, in bringing out a technical magazine with their contributions. I express my compliments to the editors and their dedicated committee for their valuable efforts in bringing out this issue. I wish them all triumph.*

Dr.B.R.Tapas Bapu
Head/ ECE 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 diversified technical competency and quality education for studentsto enhance the employability and ethical values.

To provide conducive environment for faculty and students with excellent facilities toimprove research activity.

PROGRAMME EDUCATIONAL OBJECTIVES

- *Our graduate Engineers will have diversified professional competency in Electronics and Communication Engineering and allied technologies with good foundation in Mathematics and basic sciences.*
- *Our graduates will possess lifelong learning process and augment their engineering skills for new challenges with sustainability.*
- *Our graduates will have effective communication skills and work in Multidisciplinary team with critical thinking.*
- *Our graduates will practice the profession with ethics, integrity, leadership and social responsibility.*

PROGRAMME SPECIFIC OUTCOMES (PSO)

- *To inculcate the ability to design quality products and to develop solutions which suits the real time societal needs by applying modern tools and the best universal practices.*
- *To define and adhere the communication standards leading towards green communication.*
- *To adapt to emerging Information and Communication Technologies (ICT) and 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 CONTENTS

S.NO	TITLE OF THE ARTICLE	PAGE NO
1.	COZMO THE AI ROBOT	10
2.	WIRELESS POWER TRANSMISSION TECHNOLOGY	14
3.	DIGITAL TWIN – AN ASSET TO INDUSTRY 4.0	20
4.	MACHINE LEARNING	24
5.	DESIGN AND FABRICATION OF IOT ENABLED WHEELCHAIR CUM STRETCHER WITH HOME AUTOMATION AND PATIENT MONITORING SYSTEM	27
6.	REVESE ENGINEERING (A MOBILE PHONE)	29
7.	AN OVERVIEW OF TECHNICAL INTERVIEW QUESTIONS	32
8.	HOW THANOS WAS DEFEATED USING TIME DILATION	36
9.	LPG GAS DETECTOR	39
10.	AUTOMATICAIRFILLING AND PRESSURE MONITORING OF TYRES IN BIKE	42
11.	CROSS WORD	44
12.	GALLERY	52

COZMO THE AI ROBOT

K.PUVEEYARASI,

II YEAR ECE

Anki'sCozmo robot is the new, adorable face of artificial intelligence.In the near-term, robots are supposed to pose a threat to our livelihood, with automation promising to replace human workers while the steady march of artificial intelligence puts a machine behind every fast food counter, toll booth, and steering wheel. Here comes Cozmo. The palm-sized robot, from San Francisco-based company Anki, is both a harmless toy and a bold refutation of that uneasy relationship so loved by film and television. The $180 bot, which starts shipping on October 16th, is powered by AI, and the end result is a *WALL-E*-inspired personality more akin to a clever pet than a do-everything personal assistant.

AI promises to change our lives in drastic ways. With Cozmo, Anki wants to show AI can also be a source of joy and a unique way to deepen our relationship with technology beyond the tired crusades to reinvent productivity and connect the world.

The time with Cozmo , it’s been an endearing experience to discover all of the robot’s many subtle quirks, and to revisit what it’s like to play with something that feels mysteriously organic in ways you can’t quite understand.This is intentional. Cozmo is supposed to appeal to young kids and early teenagers. It’s the same

demographic Anki targeted with its first product line: a series of smartphone-controlled toy cars that can deftly maneuverer a circuit-embedded track.

The company, founded by Carnegie Mellon roboticists, has always proclaimed its interest in AI and robotics. Yet until the unveiling of Cozmo earlier this year, it was unclear how a toy car startup could make use of such expertise. Now, it's evident all the software and hardware experience has paid off.

The robot also emits a wide-ranging series of emotive chirps to give it a sense of constant awareness in your presence.To further keep Cozmo feeling like a living, breathing machine, Anki uses a number of popular AI staples. The robot can employ facial recognition to remember faces and recite names. It also uses sophisticated path planning — aided by its three sensor-imbued toy cubes — to maneuver environments and avoid falling off tables. Most of these computations are not happening on the robot's internal hardware, which keeps it light and relatively durable. Instead, Cozmo connects to a iOS or Android app, which communicates with Anki's servers where more of heavier lifting is taken care of.

You can play a number of games with the robot using the three cubes which include a Whac-A-Mole game and your standard keep-away, where Cozmo tries to snatch a cube from your hand before you can pull it back. This is all coordinated through the mobile app, which uses a gamification system to let you unlock more skills for Cozmo by completing one of three daily goals. Those can include simple things like letting Cozmo free roam on your coffee table for 10 minutes. Others give you specific scenarios to create, like beating Cozmo at a game of "tap the cube" after reaching a 4-4 tie. One of the most fun features the app.

allows is a remote-control mode, where you can see through Cozmo's camera and use him as a kind of reconnaissance tool.

Overall, the biggest criticism you can direct toward Cozmo at the moment is that it's just a toy, one best enjoyed by young smartphone-savvy kids. That presents a bit of a problem, because Anki's most impressive achievements here — facial recognition, its versatile emotion engine — will be lost on the target audience. Meanwhile, adults who find Cozmo fascinating, enough to plunk down $180 at least, will be frustrated by the robot's initial limitations. Walking that line, between appealing to kids with a fondness for Pixar films

and impressing robot-loving older customers, will be difficult.

There are other downsides to Cozmo at its initial launch. Though the robot is controlled by the relatively simple mobile app, younger children will most likely need a parent or sibling's help in getting Cozmo set up. It needs to be activated every now and again through a special Wi-Fi network, and getting it to wake up can sometimes be tricky unless Cozmo is kept in its charging dock when not in use. Being tied to the special Cozmo Wi-Fi network means the phone can't connect to the internet, and exiting the app will put Cozmo to sleep after a few moments. These kinks may be ironed out with future software updates, but they'll likely frustrate kids who expect toys to work out of the box or want Cozmo to have a persistent, always-on mode less reliant on a phone.

The robot does have a great deal of potential. Anki is releasing a finished software development kit in the coming months to let developers take advantage of the robot's advanced capabilities to perform unforeseen tasks. Anki wants Cozmo to have an impact similar to Microsoft's original Kinect motion camera, which roboticists tapped for computer vision capabilities that were at the time available only with far more expensive components. One possibility the company has floated in the past is programming Cozmo to work with smart appliances and your media center, so it can dim your Philips Hue lights and put on Netflix when it recognizes two different people sitting on the couch.

WIRELESS POWER TRANSMISSION TECHNOLOGY

JAYALAKSHMI.V

LOUIS PRAVEEN.P.T

VIGNESH.K

II YEAR ECE

Wireless Power Transmission

Nowadays electricity is considered as one of the basic needs of human beings. The conventional power transmission system uses transmission lines to carry the power from one place to another, but it is costlier in terms of cable costs and also there exists a certain transmission loss. One maintainable technology leading this charge is a wireless power transmission (WPT) . It is also known as inductive power transfer (IPT).

Wireless Power Transmission Technology

Wireless power transmission technology is not a new technology. In 1980, it was demonstrated by Nikola Telsa. There are three main systems used for wireless electricity transmission: solar cells, microwaves and resonance. In an electrical device, microwaves are used to transmit electromagnetic radiation from a source to a receiver. The name wireless power transmission states the transfer of electrical power from a source to an electrical device without the help of wires. Basically, it involves two coils: a transmitter and a receiver coil. The transmitter coil is powered by an AC current to produce a magnetic field, which in turn induces a voltage in the receiver coil.

The basics of WPT involve the inductive energy transmission from a transmitter to a receiver through an oscillating magnetic field. To get this DC current, that is supplied by a power source, it is converted into high -frequency AC current by the specially designed electronics built into the transmitter.

In the transmitter section, the AC current boosts a copper wire, which generates a magnetic field. Once a receiver coil is placed within the close vicinity of the magnetic field, the field can induce an AC current in the receiving coil. The electrons in the receiving device, then converts the AC current back into DC current, which becomes utilizable power.

Wireless Power Transmission Through Solar Power System &Working

Traditional wired power transmission systems usually require lying of transmission wires between the distributed units and the consumer units. This produces a lot of constraints as the cost of the system-cost of the cables, the losses incurred in the transmission as well as in distribution. Just imagine, only the resistance of the transmission line results in loss of about 20-30% of the generated energy.

If you talk about DC power transmission system, even that is not feasible as it requires a connector between the DC power supply and the device.

Imagine a system completely devoid of wires, where you can get AC power to your homes without any wires. Where you can recharge your mobile without having to physically plug in to the socket. Where the battery of the pacemaker (placed inside a human heart) can be recharged without having to replace the battery. Of course such a system is possible and that's where the role of Wireless Power Transmission comes.

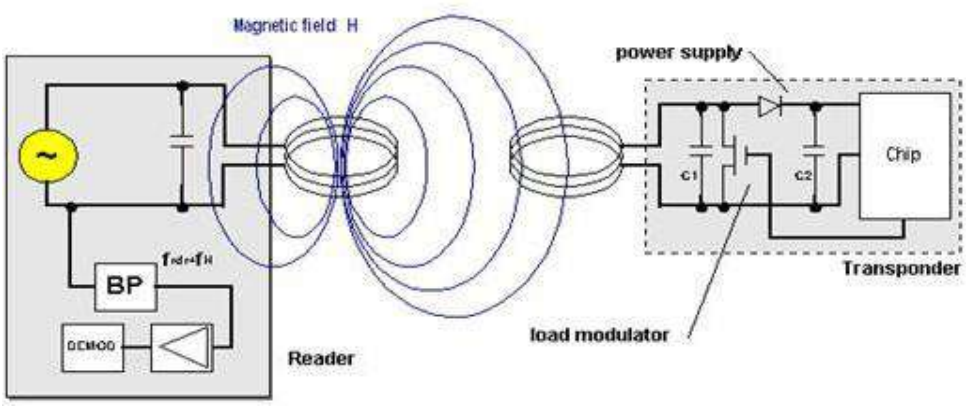
This concept is actually not a new concept. This whole idea was developed by Nicolas Tesla in 1893, where he developed a system of illuminating vacuum bulbs using wireless transmission technique.

We cannot imagine a world without Wireless Power Transfer is feasible: mobile phones, domestic robots, MP3 players, Computer, laptops and other conveyable gadgets fit for charging themselves while never being connected too, liberating us from that final and ubiquitous power wire. Some of these units may not even require much number of electric cells/batteries to operate.

Types of Wireless Power Transfer Methods:

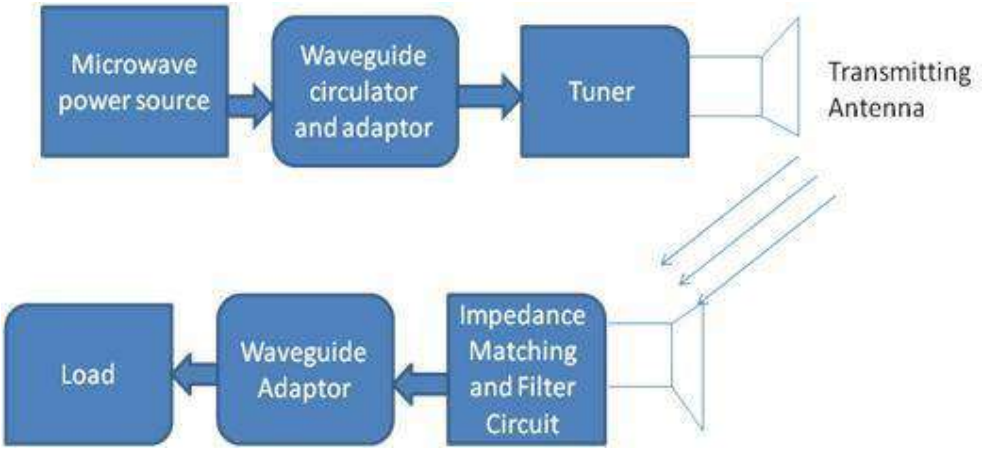
Inductive Coupling: One of the most prominent methods of transferring energy is through inductive coupling. It is basically used for near field power transmission. It is based on the fact that when current flows through one wire, a voltage is induced across the ends of the other wire. The power

transmission takes place through mutual inductance between the two conductive materials. A general example is the transformer.



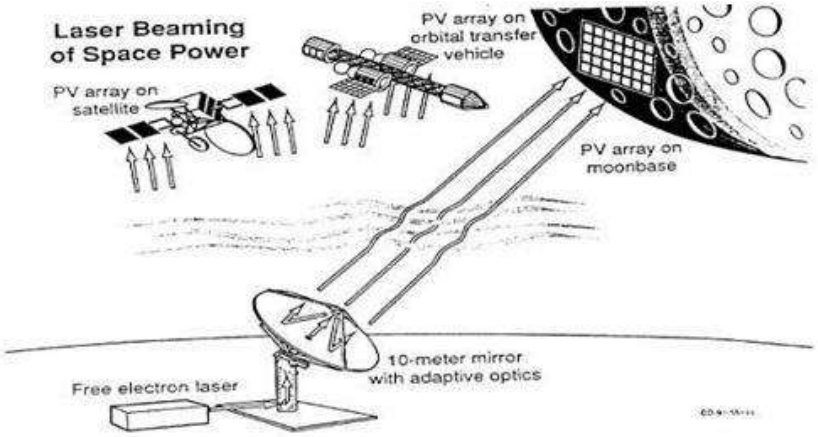
Power Transmission using Inductive Coupling

- **Microwave Power Transmission:** This idea was developed by William C Brown. The whole idea involves converting the AC power to RF power and transmitting it through space and again reconverting it to AC power at the receiver. In this system power is generated using microwave power sources like klystron, and this generated power is given to the transmitting antenna via the waveguide (which protects the microwave power from reflected power) and the tuner (which matches the impedance of the microwave source with that of the antenna). The receiving section consists of the receiving antenna which receives the microwave power and the Impedance matching and filter circuit which matches the output impedance of the signal with that of the rectifying unit. This receiving antenna along with the rectifying unit is known as the Rectenna. The antenna used can be a dipole or a Yagi-Uda Antenna. The receiver unit also consists of the rectifier section consisting of schottkey diodes which is used to convert the microwave signal to DC signal. This transmission system uses frequencies in the range of 2GHz to 6GHz.



Wireless Power Transmission using Microwave

- **Laser Power Transmission:** It involves the use of LASER beam to transfer power in form of light energy, which is converted to electric energy at the receiver end. The LASER gets powered using sources like Sun or any electricity generator and accordingly generates high intensity focused light. The beam size and shape are determined by a set of optics and this transmitted LASER light is received by the photovoltaic cells, which convert the light to electrical signals. It generally uses optical fiber cables for transmission. Like in basic solar power system, the receiver used in LASER based transmission is the array of photovoltaic cells or solar panel which can convert the incoherent monochromatic light into electricity.



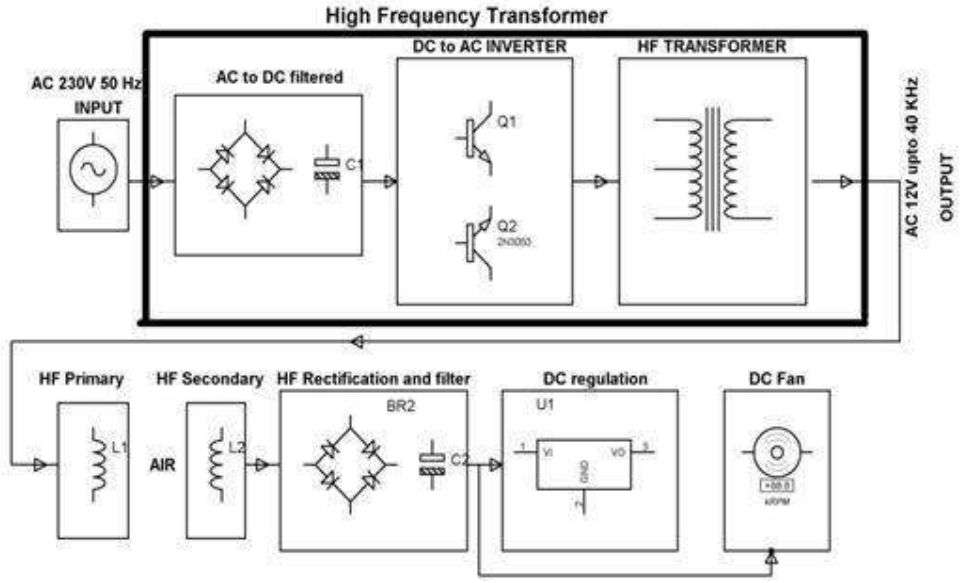
Wireless Transfer of Solar power

One of the most advanced wireless power transfer system is based on transferring solar power using microwave or LASER beam. The satellite is stationed in the geostationary orbit and consists of photovoltaic cells which convert sunlight into electric current which is used to power a Microwave generator and accordingly generate microwave power. This Microwave power is transmitted using RF

communication and received at the based station using a Rectenna, that is a combination of an antenna and a rectifier and is converted back to electricity or required AC or DC power. The satellite can transmit up to 10MW of RF power.

Working Example of Wireless Power Transfer

The basic principle involves converting the AC power to DC power using rectifiers and filters and then again converting it back to AC at high frequency using inverters. This low voltage high frequency AC power then passes from transformer primary to its secondary and is converted to DC power using rectifier, filter and regulator arrangement.



Block Diagram showing Wireless Power Transmission by Edgefx Kits

- The AC signal is rectified to DC signal using a bridge rectifier section.
- The obtained DC signal passes through the feedback winding1, which act as oscillator circuit.
- Current passing through the feedback winding1 causes the transistor1 to conduct, allowing DC current to flow through the transistor to the primary of the transformer in left to right direction.
- When current passes through the feedback winding2, the corresponding transistor starts conducting and the DC current flows through the transistor, to the primary of the transformer in right to left direction.
- Thus an AC signal is developed across the primary of the transformer, for both half cycles of the AC signal. The frequency of the signal depends on the oscillation frequency of the oscillator circuits.
- This AC signal appears across the secondary of the transformer and as the secondary is connected to primary of another transformer, a 25 KHz AC voltage appears across the primary of the step

- down transformer.
- This AC voltage is rectified using bridge rectifier and is then filtered and regulated using LM7805 to obtain a 5V output to drive an LED.
- The voltage output of 12 V from capacitor is used to power the DC fan motor to operate the fan.

Benefits of WPT:

- WPT system completely reduces existing high-tension power transmission cables, substations and towers between the consumers and generating station.
- The cost of the distribution and transmission become less.
- The cost of the electrical energy to the consumers also reduces.
- The power could be transmitted to places to which the wired transmission is not possible.

Applications of Wireless Power Transmission:

- The largest application of the WPT is the production of power by placing satellites with giant solar arrays in Geosynchronous Earth Orbit and transmitting the power as microwaves to the earth known as Solar Power Satellites (SPS).
- WPT is used in moving targets like fuel-free-electric vehicles, fuel- free airplanes, fuel-free rockets and moving robots.
- The other applications of WPT are Wireless power source or Ubiquitous Power Source, RF Power Adaptive Rectifying Circuits and Wireless sensors.

DIGITAL TWIN – AN ASSET TO INDUSTRY 4.0

JANANI. R,

IV YEAR ECE

The commencement of digital twin technology makes way for a new era.

Whenever the industrial revolution is launched, it embarks a significant role in influencing every aspect of our daily life. It not only results in the sustained growth of income but also helps to increase the people's standard of living. In the new arrival Industry 4. 0, IoT marks a perfect position in developing new products and processes in the automation industry. It also recreates a significant impact on the manufacturing technologies where the data exchanges are involved. Moreover, the most exciting fact is that from the earlier days of space exploration, NASA has been using the pairing technology, the precursor to digital twin technology. Also, now NASA uses digital twin technology to explore next-generation vehicles and aircraft.

What is a digital twin?

A digital twin is an integration of the Internet of Things, Machine learning, Artificial Intelligence, and software analytics with spatial network graphs. They are used to stimulate the advanced digital models which could change and update itself as their physical counterparts change. It acts as a bridge between the physical and the real world by providing the digital replica of a living or non-living physical entity. There are more than a dozen of definitions and explanations for a digital twin technology, but the research emphasizes only two essential characteristics. First one, every description articulates the relation between the physical model and the virtual model: the second one, the relationship which is established during the generation of real-time data using sensors.

Where does it originate?

The concept and the model of Digital twin were introduced over more than a decade ago by Dr.Michael Grieves in 2002. During a seminar on Product Lifecycle Management (PLM), he related it as the mirrored space models. Later in 2005, it was referred to as Information Mirroring model, and it continued till the Grieves 2011, a journal where the concept of the digital twin was expanded. However, it was the point where the term "Digital Twin" was attached to it by the co-author's way of describing this model. During this period, the digital twin has evolved from the position of simple PLM tool to a powerful tool for business decision assistance. Now it is also referred to as twins, shadows, device virtualization, and much more.

How does it work?

The digital twin concept is a potent one in today's automated platform, and it provides invaluable insights on every aspect of the manufacturing, and the production line. Its working depends on three essential elements, and they are

Past data: It includes the records on the historical data of the overall processes performance, individual machines, and specific systems.

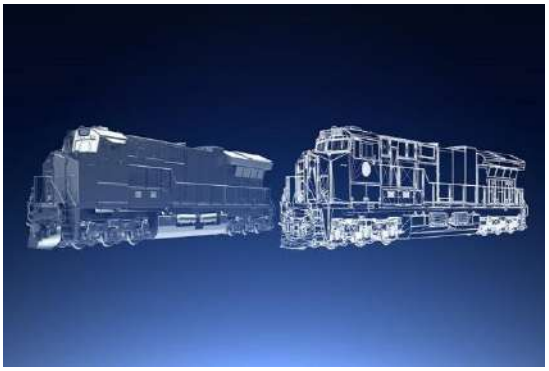
Present data: It is the data from sensors, outputs from business units, including purchasing and customer service on a real-time basis — also, the outputs from the systems in the manufacturing platform and over across the distribution chain.

Future data: The data used here are the inputs from the developers, engineers, and Machine Learning.

Digital twin- a game-changer in the manufacturing industry

Digital twin represents a sea change in the field of manufacturing in this new era. The factories are

using digital twins at a significant extent to stimulate their processes to test their new products before launching them into the real world. It serves as the greatest asset in the manufacturing industry by ensuring optimal production output and also in reducing the maintenance issues. It is advantageous because it involves value- centered pricing by pushing the traditional methods of purchasing the products.



The different levels at which the digital twin is being used in the manufacturing field are

Asset level: Creates a digital twin within the production line for equipment or a physical model.

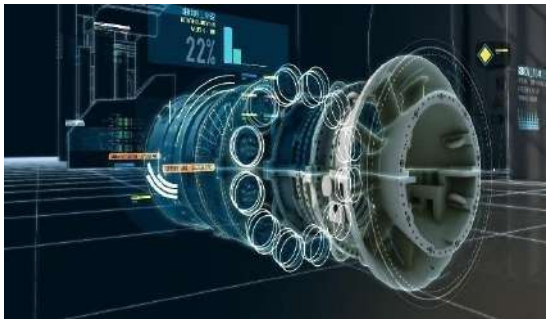
Component level: This level emphasizes a highly critical, single component within the manufacturing process.

System-level: Monitors and improves the entire production line.

Process level: Looks and verifies the overall process of manufacturing from design and development to production and manufacturing. Then, from distribution to end product which is used by consumers throughout the life cycle. It is also an asset for the development of products in the future.

Does it do anything with space?

The space industry is the most adaptive one of all the previous sectors we have discussed in embracing the capabilities of simulation technology. The process used to execute successful space journeys and operations like stimulating the crucial factors such as air friction strength, heart levels, fuel compression exceeds the expectations of every layperson and even to the competent engineers out there. The digital twin technology is the greatest blessing to the astronauts out there in ensuring the success of the space shuttle journeys and also adding another layer of security in preventing the failures. Another unknown factor is that it can even predict and avoid the catastrophic scenarios and the potential risks up to 90 per cent, which can happen during their venture to the orbit.



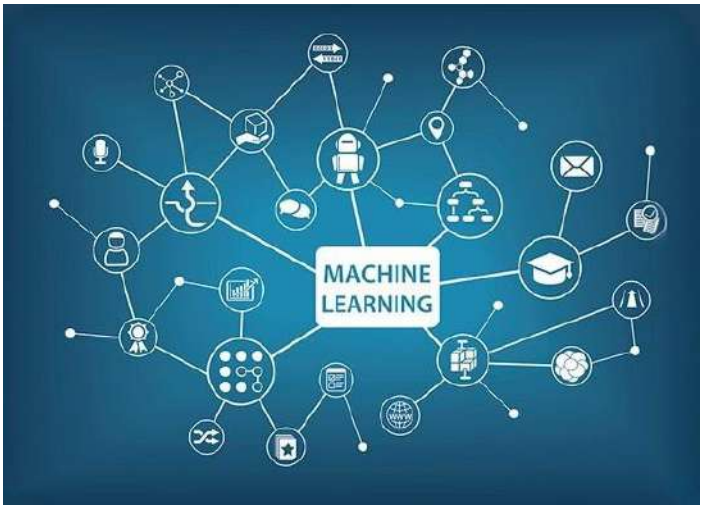
A life savior technology

Recent advancements in medical technology like digital twins promise to improve both health care delivery and the patient's experience through effective and efficient patient-centric care. One of the recent researches has explored a way in building the comprehensive digital model of brains; it is using the twins for treating brain aneurysms. This simulation has improved the results of endovascular repairs, and it also resulted in the reduction of pressure on the aneurysms caused by irregular blood flow. The digital twin technology gradually increases the health systems to provide a more holistic and realistic portrait for each patient than ever before.

MACHINE LEARNING

HARI PRIYA R
JERISHA JERALD S J
II YEAR ECE

One of the most exciting tools that have entered the material science toolbox in recent years is machine learning. This collection of statistical methods has already proved to be capable of considerably speeding up both fundamental and applied research. At present, we are witnessing an explosion of works that develop and apply machine learning to solid-state systems. We provide a comprehensive overview and analysis of the most recent research in this topic.



Machine learning is an application of artificial intelligence (AI) that provides systems the ability to automatically learn and improve from experience without being explicitly programmed. Machine learning focuses on the development of computer programs that can access data and use it learn for themselves.Automated machine learning is the process of automating the process of applying machine learning to real-world problems. Machine automation is any information technology that is designed tocontrol the work of machines. In many cases, machines are also integrated with business systems that provide control inputs. For example, a machine may be controlled by a factory automation system that manages a production line.

HOME AUTOMATION:

Home automation is building automation for a home, called a smart home or smart house. A home automation system will control lighting, climate, entertainment systems, and appliances. It may also include home security such as access control and alarm systems.

The home automation market was worth US$5.77 billion in 2013, predicted to reach a market value of US$12.81 billion by the year 2020.

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.

APPLICATIONS AND TECHNOLOGIES:

- **Heating, ventilation and air conditioning (HVAC)**: it is possible to have remote control of all home energy monitors over the internet incorporating a simple and friendly user interface.
- **Lighting control system**: a "smart" network that incorporates communication between various lighting system inputs and outputs, using one or more central computing device.

- **occupancy-aware control system**: it is possible to sense the occupancy of the home using smart meters and environmental sensors like CO2 sensors,which can be integrated into the building automation system to trigger automatic responses for energy efficiency and building comfort applications.
- **Home robots and security**: a household security system integrated with a home automation system can provide additional services such as remote surveillance of security cameras over the Internet, or access control and central locking of all perimeter doors and windows
    - **Indoor positioning systems (IPS):** Home automation for the elderly and disabled.Pet and Baby Care, for example tracking the pets and babies' movements and controlling pet access rights.Air quality control. For example, Air Quality Egg is used by people at home to monitor the air quality and pollution level in the city and create a map of the pollution.Smart Kitchen and Connected Cooking. Using voice control devices like Amazon Alexa or Google Home to kitchen appliances.

CONCLUSION:

Recently, the home automation and IoT (Internet of things) market are growing very fast and need vast range of development that can be carried out in the concept of smart home-automation.

Design and Fabrication of IoT Enabled Wheelchair cum Stretcher with Home Automation and Patient Monitoring System

JANANI R,
KEERTHANA T R S,
REENA JOSELINE A,
PRASANNA KRISHNAN P
IV YEAR ECE

The Wheel chair cum stretcher with patient monitoring and home automation has been proposed mainly to eliminate the medical complications that are caused while transferring the patient from wheel chair to stretcher, stretcher to bed and vice versa.

The proposed project has three main purposes:

Used for Elderly and Disabled People in Home

The wheel chair cum stretcher is developed in such a way that it can operate in three positions which will be a greatest asset to the elderly and disabled people in home. It can be operated by the patients without any assistance and it also plays a major role in monitoring their medical parameters and also used to access the home appliances independently by using patient monitoring and home automation. The main advantages are it will monitor the vital details of the patient for every second and the data will be collected from their respective homes and stored for the references of the doctor to analyze the health condition of the patient.

Used in hospitals for transferring patients

The developed model will play an impeccable position in hospitals hence it is used for shifting the patient from wheelchair to stretcher, stretcher to bed,bed to wheelchair and vice versa without any assistance. The shifting process will be easier and it will provide an injury free transportation of the patients. The attenders who are helping the patient for shifting from one ward to another, i.e. those who help in the mobility of the patients are affected by some physical problems like disc herniation, IT band syndrome, Achilles tendonitis. To overcome these issues, we can use the proposed project.

Used in ambulances for the movement of the patients in a convenient manner and to send vital details of the patients before the patient reach hospital

In this, mechanical operation of the proposed project plays a major role, the people who met with an accident may get fractured or may get injured severely, when the injured person is in unconscious state, the person who is handling the injured one, don't know where they are injured and fractured, so their handling towards the affected person may cause more injury over an affected part, it will leads to a breakage of bones. To overcome these risk factors, the proposed project is developed with three locked positions chair, semi chair and stretcher. The three positions are controlled by knob will avoid the transferring or shifting of the patient from one position to other.The advantage of the proposed project is that the patient monitoring fixed in the wheel chair will collect the vital details of the injured person and will send the collected data to the hospitals before the ambulance reaches the hospital.This will enable the doctors to analyze about the health conditions of the injured person or patient in advance, so the doctors with the help of the details obtained, they will set up all the necessary requirements for the treatment process before the patients reach the hospitals. Due to this feature, the death rates can be exponentially reduced.

REVERSE ENGINEERING (A MOBILE PHONE)

DIVYA M

III YEAR ECE

Reverse engineering is also known as back engineering. It is the process of deconstructing an object that is constructed into parts to find its design, architecture so that one can extract knowledge from that particular object. Reverse engineering is used in many fields like computer, mechanical, electronics, software, chemical engineering etc.

When it comes to a smart phone being reverse engineered, we can find the following parts inside it,

- Display (LCD or LED)
- Battery
- System on a chip (SOC)
- Memory and storage (RAM & ROM)
- Modem
- Camera (sensor, lens, image processor)
- PCB (with electronic parts)
- Sensors
    - Accelerometer
    - Gyroscope
    - Proximity sensor
    - Ambient light sensor
    - Digital compass
    - Finger print sensor

DISPLAY:

The main part of a mobile phone is its display the majorly used display technologies are LCD and LED the other technologies include OLED and AMOLED.

BATTERY:

It is the source of power to the smart phone. Batteries of phones normally use lithium-ion technology that are either removable or non-removable in mobile devices.

SOC:

This is one of the most important parts of a smartphone because it is here where we will find the device's CPU, LTE modem, GPU, video and display processors, and other essential bits of the smart phone. Some SOC's manufacturers are Qualcomm, MediaTek, Samsung, Huawei's own Kirin and Apple's own developed chipsets, they are using the same system architecture from ARM.

MEMORY AND STORAGE:

- Smartphones needs instant access memory for multitasking which is RAM (memory) delivers. Android phone has moved from 2GB to 4GB and now 6GB or 8GB.
- ROM is a specific part of a phone which is not accessible by the user where android and another operating system are stored.It loads the current operating program in a mobile phone. It is the internal storage, it exists as the flash memory, ranging from 32GB, and can go all the way up to 256GB on some phones.

MODEM:

For the need of communication, components to receive and send text messages and calls. That's where modems come in, and every SoC manufacturer has their own brand of modems, and this includes Qualcomm, Samsung, Huawei and several others.

CAMERA:

Now a day's smartphones come with a rear-facing and front-shooting camera. A smartphone comprises up of three main parts:

- The sensor (which detects light)
- The lens (the component in which light comes through)
- The image processor

PCB:

The PCB of a mobile phone consists of the following,

Antenna switch-It searches network and passes forward after tuning, mostly antennas in mobile phones are omnidirectional or horn antenna.

PBP(Power amplifier, Band, Pass filter)- It filters and amplifies network frequency and selects the home network.

RF IC-It works as transmitter and receiver of audio and radio waves according to the instruction from the CPU.

Crystal oscillator(24 MHz)- It creates frequency during outgoing calls.

VCO-It sends time, date and voltage to the RF IC and the CPU. It also creates frequency after taking command from the CPU.

RX Filter|TX Filter-It filters frequency during incoming calls.| It filters frequency during outgoing calls.

Flash IC| Power IC| Charging IC-Software and IMEI Number of the mobile phone is installed in the Flash IC.| It takes power from the battery and supplies to all other parts of a mobile phone. | It takes current from the charger and charges the battery.

RTC- It helps to run the date and time in a mobile phone.

Login IC | Audio IC- It controls Ringer, Vibrator and LED of a mobile phone.

It controls Speaker and Microphone of a mobile phone.

SENSORS:

- **Accelerometer**: Used by apps to detect the orientation of the device and its movements, as well as allow features like shaking the phone to change music.
- **Gyroscope**: Works with the Accelerometer to detect the rotation of your phone, for features like tilting phone to play racing games or to watch a movie.
- **Digital Compass**: Helps the phone to find the North direction, for map/navigation purposes.
- **Ambient Light Sensor**: This sensor is automatically able to set the screen brightness based on the surrounding light, and helps conserve battery life. This would also explain why your smartphone's brightness is reduced in low-light environments, so it helps to reduce the strain on your eyes.

Proximity Sensor: During a call, if the device is brought near your ears, it automatically locks the screen to prevent unwanted touch commands.

AN OVERVIEW OF TECHNICAL INTERVIEW QUESTIONS

EDWARD ANANDS IV

YEAR ECE

Most hiring managers know that they have to look beyond a job candidate's technical qualifications when staffing an IT role. Soft skills and initiative, for example, are equally important factors to consider. And to get that kind of insight, you'll need to put aside the resumes and come up with a thoughtful set of interview questions to ask your top candidates.

Predictable interview questions like "Where do you see yourself in five years?" probably won't tell you much. Neither will a series of "yes-or-no" questions. To determine whether someone is a good fit for the job, you want to draw them out, ask a mix of technical and situational questions, and listen closely to not only what they have to say but how they say it.

You want to know if this person has the technical skills and drive to succeed at the job — and the interpersonal skills to thrive on your team? Here are 1 7 tech interview questions to help you reach a decision:

1. ***What online resources do you use to help you do your job?***

Most IT workers turn to websites such as Stack Exchange or Github when they need help with something. Serious professionals will have their own selection of websites, online communities, social media feeds and other resources specific to their interests. The answer to this question will give you an indication of how engaged the candidate is with the broader IT world.

2. ***How do you keep your technology skills current?***

Tech professionals work hard to keep their knowledge base current by reading blogs and forums, taking online courses, joining hackathons and plugging away at personal IT projects. This tech interview question can help you gauge the candidate's enthusiasm for the profession, as well as open up a conversation about professional development.

3. ***Pretend I'm not a tech person. Can you explain [a relevant technology] in simpleTerms?***

IT plays a crucial role in almost every company, so the ability to communicate with non- technical people is a must. You can assess candidates' communication skills with this IT interview question. Do they avoid obscure acronyms and jargon? How well can they break down a complicated process? Try asking a few "dumb" follow-up questions to get a sense of how they'd interact with non-tech colleagues.

4. What strengths do you think are most important in a developer [or another relevant IT position]?

A question like this can reveal how the interviewee feels about the position and what they think they would bring to it. Some candidates may focus on technical abilities and IT certifications, while others may talk more about problem solving, attention to detail, communication and other general job skills. Look for IT candidates who give a balanced answer.

5. What three words would your colleagues use to describe you?

The answer can clue you in to a candidate's personality trait that may not be readily apparent through their resume or traditional interview questions. It also gives insight into how the individual perceives themselves and the role they're applying for. For example, if their answer focuses on their creative side but the position is very analytical in nature, the job may not be a good fit.

6. Can you tell me about a time when things didn't go the way you wanted at work, such as a project that failed or being passed over for a promotion?

Everyone deals with professional setbacks at some point in their career. What you want to know is how people handled — and what they learned from — those situations. The best employees are resilient, using setbacks as a springboard toward positive changes. So listen to not only the problem they mention, but also what they did after the disappointment.

7. What are your favourite and least favourite technology products, and why?

In addition to learning whether prospective employees like the hardware, operating system and software your company uses, this tech interview question helps you evaluate enthusiasm and knowledge. Do candidates become animated when discussing the advantages and disadvantages of certain tools? Do they admire solid engineering, sleek design, intuitive user experience or another aspect of good technology?

8. What are the benefits and the drawbacks of working in an Agile environment?

Most IT teams have adopted some form of Agile — currently the favoured SDLC methodology — which means lots of quick meetings and a steady stream of feedback from fellow team members. A candidate's answer to this IT question can tell you not only their level of understanding of this popular environment, but also their attitudes toward collaboration and communication.

9.How do you think further technology advances will impact your job?

Advances in technologies continue to change most IT roles. How aware of that is the candidate you're interviewing? Do they know, for example, that automated testing is a major part of DevOps, which allows for faster development cycles and quicker deployment? A candidate may talk about the automation tools they use or the challenges of working with machine learning and big data. They may also discuss Al proiects they hope to work on. This question is a good way to start a conversation about trends and advancements in the field, and it will also give you insight into how the candidate perceives their role over the long term.

9. ***Tell me about a tech project you've worked on in your spare time.***

You want to hire an IT professional who devotes their personal time to side proiects. Why? These are people who are driven and curious, which, in turn, keeps their skill set fresh. Ask how they stay motivated, what interests them about the project and what their ultimate goal is. If they can demo a website or app they've built, all the better.

10. ***What was the last presentation you gave?***

Today's tech workers can't be lone wolves. They have to discuss changes with teammates, coordinate with other departments, advocate for platforms they prefer and much more. While not everyone has to love public speaking, your new hire should be able to conduct research, put together a solid presentation and persuade stakeholders why X is better than Y.

11. ***What are the qualities of a Successful team or project leader?***

Always be on the lookout for leaders, even when you're not hiring for a management position. The nature of IT work means individuals will frequently have to take responsibility for delivering proiects, and this requires leadership skills such as organization, motivation, positivity, delegation and communication.

12. ***What skills or characteristics make someone an effective remote worker?***

This is an important question to ask given the ongoing impact of the COVID-19 pandemic. Remote workers must be self-starters who are able to work with little supervision. They need excellent communication abilities as well as self-discipline and stellar time-management skills. Not everyone has those qualities, and not everyone thrives working outside an office. You want to be sure your new hire will be both productive and comfortable if working off- site.

13. ***What would you hope to achieve in the first six months after being hired****?*

The answer to this tech interview question depends on the role. A developer, for example, may hope to have developed a small project during that time, while a tech manager may want to have analysed internal processes. A candidate's response will give you insights into their overall understanding of the position. If their goals and ambitions don't match the job description, this may not be the right position for tem.

14. How do you handle tight deadlines?

IT teams often face daunting time constraints. You need someone who can work efficiently and accurately when under pressure. Ask this interview question of a potential employee and you'll at least get a sense of how they deal with stress and whether they can keep up with the pace of proiects at your company. You could also follow up by asking if they've ever missed a deadline and, if so, how they dealt with the situation.

15. How do you manage your work-life balance?

With on-call duties and multiple pressing deadlines, some tech workers struggle with the always-on, workaholic culture of this field. While you want dedicated team members, you should also seek employees who know how to relax and take care of themselves. Burnout is a very real problem in IT, and top performers have good strategies in place to prevent that. As a follow up to their answer, you could talk about how your company supports a healthy work-life balance — something that can be very tempting for candidates with multiple offers.

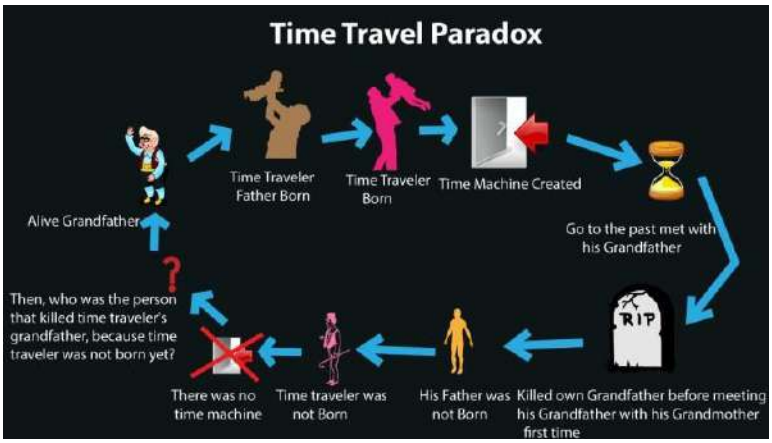
16. Why do you want to work for us?

Individuals who truly want the job will have done their research and be able to talk about your company's values, products and services, and approach to technology. If they can't articulate at least a few reasons your company would be a good match for their skills and ambitions, then they haven't done their due diligence to properly prepare for the interview. Remember to allow time at the end of the interview for candidates to ask you questions. This is not only beneficial to applicants — it also clues you in to what matters to them. For instance, you may reconsider your interest in a prospect if they seem overly concerned about salary and vacation accrual during the first interview. Or you may be impressed when someone asks questions that demonstrate their business acumen and thorough understanding of your company's strengths and weaknesses.

HOW THANOS WAS DEFEATED USING TIME DILATION

NAVANEETHA KRISHNAN C

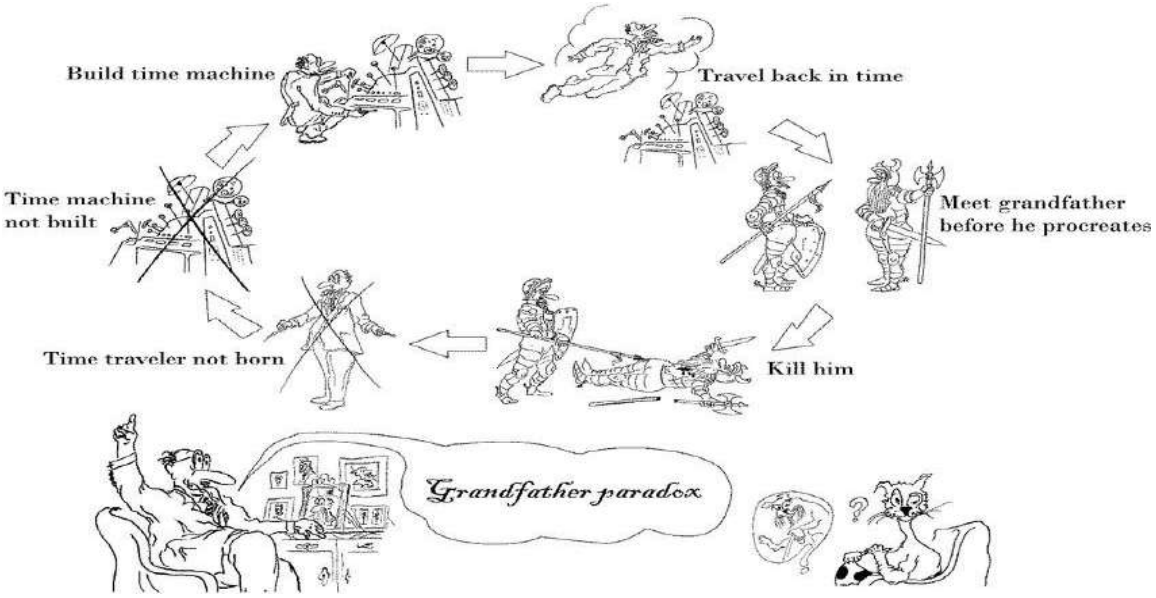
II YEAR ECE



Special relativity indicates that, for an observer in an inertial frame of reference, a clock that is moving relative to him will be measured to tick slower than a clock that is at rest in his frame of reference. This case is sometimes called special relativistic time dilation. The faster the relative velocity, the greater the time dilation between one another, with the rate of time reaching zero as one approaches the speed of light (299,792,458 m/s). This causes massless particles that travel at the speed of light to be unaffected by the passage of time.

Theoretically, time dilation would make it possible for passengers in a fast-moving vehicle to advance further into the future in a short period of their own time. For sufficiently high speeds, the effect is dramatic. For example, one year of travel might correspond to ten years on Earth. Indeed, a constant 1 g acceleration would permit humans to travel through the entire known Universe in one human lifetime.

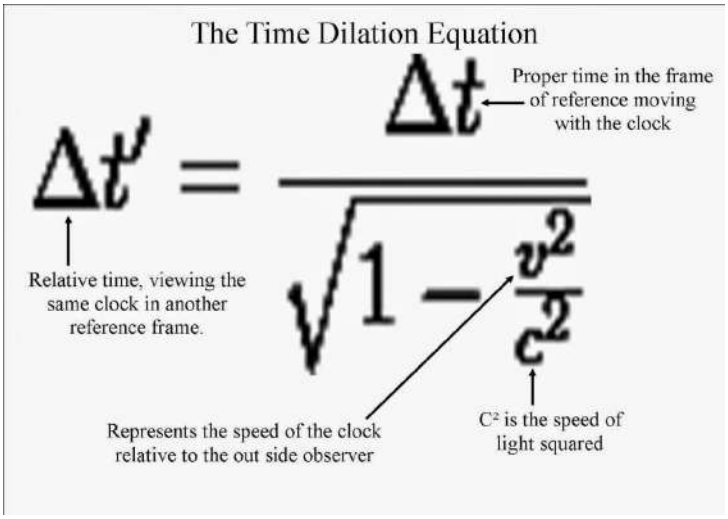
With current technology severely limiting the velocity of space travel, however, the differences experienced in practice are minuscule: after 6 months on the International Space Station (ISS) (which orbits Earth at a speed of about 7,700 m/s) an astronaut would have aged about 0.007 seconds less than those on Earth. The cosmonauts Sergei Krikalev and Sergei Avdeyev both experienced time dilation of about 20 milliseconds compared to time that passed on Earth.



This constancy of the speed of light means that, counter to intuition, speeds of material objects and light are not additive. It is not possible to make the speed of light appear greater by moving towards or away from the light source.

Consider then, a simple clock consisting of two mirrors A and B, between which a light pulse is bouncing. The separation of the mirrors is L and the clock ticks once each time the light pulse hits either of the mirrors.In the frame in which the clock is at rest (diagram on the left), the light pulse traces out a path of length $2L$ and the period of the clock is $2L$ divided by the speed of light:

From the frame of reference of a moving observer traveling at the speed v relative to the resting frame of the clock (diagram at right), the light pulse is seen as tracing out a longer, angled path. Keeping the speed of light constant for all inertial observers, requires a lengthening of the period of this clock from the moving observer's perspective. That is to say, in a frame moving relative to the local clock, this clock will appear to be running more slowly. Straightforward application of the Pythagorean theorem leads to the well-known prediction of special relativity.


The Time Dilation Equation
$\Delta t' = \frac{\Delta t}{\sqrt{1 - \frac{v^2}{c^2}}}$
Proper time in the frame of reference moving with the clock
Relative time, viewing the same clock in another reference frame.
Represents the speed of the clock relative to the out side observer
C² is the speed of light squared

LPG GAS DETECTOR

K.UDAY

III YEAR ECE

ABSTRACT

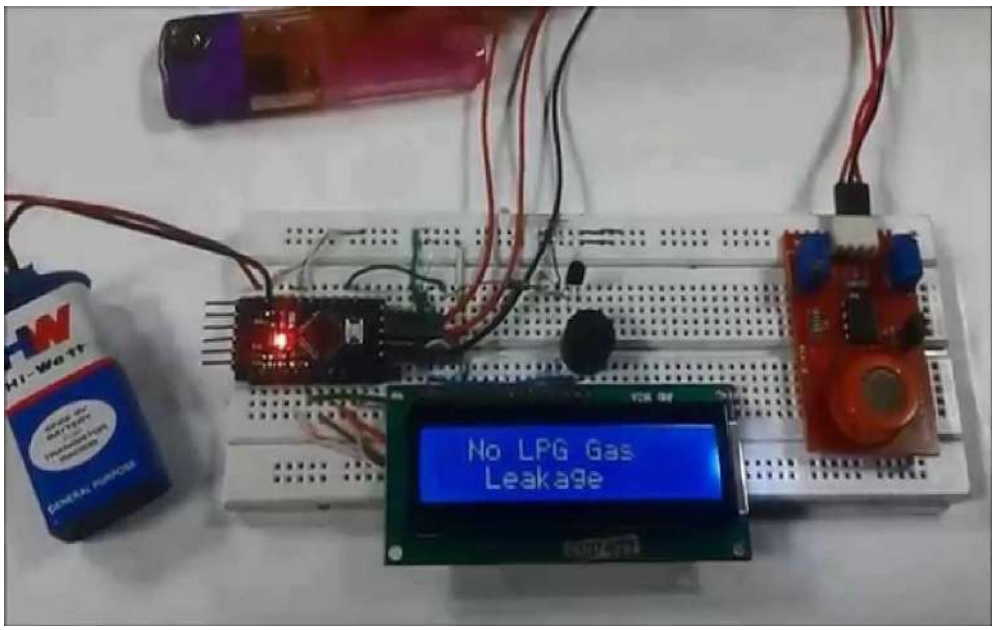
LPG leakages are a mutual hindrance in household and manufacturing nowadays. It is very life threatening if you will not distinguish and modified right away. The idea behind our project is to give a solution by power cut the gas provision as soon as a gas leakage is perceived apart from activating the sounding alarm. In addition to this, the authorized person will receive a message informing him about the leakage.

DISCRIPTION OF PROJECT:

The project entitled "**LPG Leakage Detector"** using Arduino with SMS Alert and Sound Alarm will be a great help in terms of preventing any danger caused by gas leakage. The purpose of this project is to detect the presence of LPG leakage as a part of a safety system. An SMS alert will inform the authorized person and the solenoid valve will be triggered to shut down the gas supply to prevent any harmful effects due to gas leakage. Descriptively, we use a gas sensor to monitor the LPG if the gas leak reaches beyond the normal level.This proposed project will trigger the sound alarm. In addition, the authorized person will be informed about the leakage via SMS alert and the gas supply will be automatically shut down. The people can be saved from a potential explosion caused by gas leakage.project will perceive gas outflow like Methane leak, Butane leak, and LPG leak, Methane outflow or any such petroleum centered on gaseous substance that can be discovered using MQ9 device to layout and set up an SMS centered Alert method send SMS alert missives to restrict mobile number enter inside the Arduino program to layout and acquire a project that will fabricate a sound alarm during gas outflow and rest the alarm once gas outflow is regulated show status by using a 16×2 LCD screen and LCD module to test the gas.

The MQ9 gas sensor consists of four pins.The (+5v)pin of the gas sensor is given to the analog (A0)pin of arudino.To make connection between the sensor and arduino the analog pin of the arduino is considered.TheGnd pin of the sensor is given to the Gnd of the arduino and to the LCD screen.TheVcc of the sensor is given to the (+5v)of arduino and to the LCD screen.

The GSM module is also connected to the arduino. The Gnd pin of the module is given to Gnd in the digital pin of the arduino.To make connection between GSM module and arduino the digital pin of the arduino is considered.TheTx pin of the module is given to the (~9)pin of the arduino.The Rx pin of the module is given (~10)pin of the arduino.



The Gas Sensor(MQ9) module is useful for gas leakage detection (in home and industry). It is suitable for detecting LPG, CO, CH4. Due to its high sensitivity and fast response time, measurements can be taken as soon as possible. The sensitivity of the sensor can be adjusted by using the potentiometer.

A **gas detector** is a device that detects the presence of gases in an area, often as part of a safety system. This type of equipment is used to detect a gas leak or other emissions and can interface with a control system so a process can be automatically shut down. A gas detector can sound an alarm to operators in the area where the leak is occurring, giving them the opportunity to leave. This type of device is important because there are many gases that can be harmful to organic life, such as humans or animals.combustible, flammable and toxic gases, and oxygen depletion. This type of device is used widely in industry and can be found in locations, such as on oil rigs, to monitor manufacture processes and emerging technologies such as photovoltaic. They may be used in fire fighting.

Gas leak detection is the process of identifying potentially hazardous gas leaks by sensors. Additionally a visual identification can be done using a thermal camera These sensors usually employ an audible alarm to alert people when a dangerous gas has been detected. Exposure to toxic gases can also occur in operations such as painting, fumigation, fuel filling, construction, excavation of contaminated soils, landfill operations, entering confined spaces, etc. Common sensors include combustible gas sensors, photoionization detectors, infrared point sensors, ultrasonic sensors, electrochemical gas sensors, and metal-oxide- semiconductor sensors (MOS sensors). More recently, infrared imaging sensors have come into use. All of these sensors are used for a wide range of applications and can be found in industrial plants, refineries, pharmaceutical manufacturing, fumigation facilities, paper pulp mills, aircraft and shipbuilding facilities, hazmat operations, waste-water treatment facilities, vehicles, indoor air quality testing and homes.

Gas detectors can be classified according to the operation mechanism (semiconductors, oxidation, catalytic, photoionization, infrared, etc.). Gas detectors come packaged into two main form factors: portable devices and fixed gas detectors.

AUTOMATICAIRFILLING AND PRESSURE MONITORING OF TYRES IN BIKE

PURUSHOTHAMAN.R

III YEAR ECE

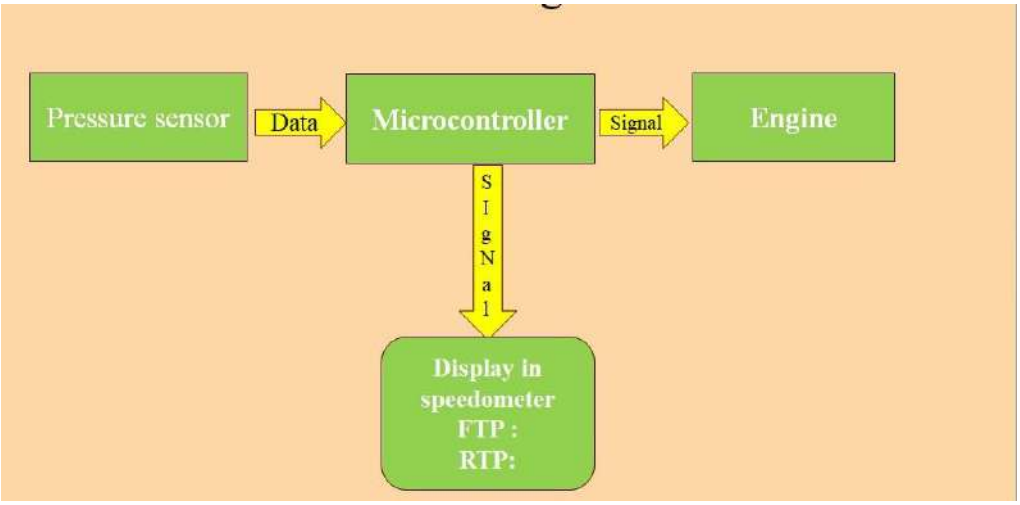
Introduction:

In genral , the pressure inside the tyre makes any vehicle move smoothly. Thus the monitoring of pressure inside a tyre plays a vital role.In this project , we fix a pressure sensor inside the valve of the tyre to measure the pressure periodically.A pressure indicator is fixed in the speedometer .The pressure sensor detects the pressure value and forwards it to the microcontroller.

The microcontroller then does two operations

- First the sensor value is displayed in the speedometer .
- Secondly the microcontroller turns of the bike engine .

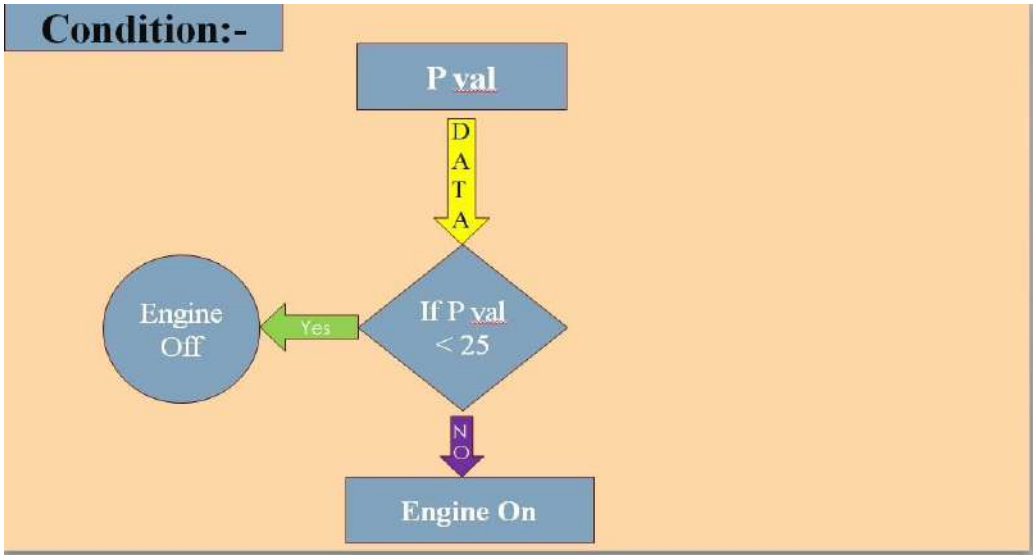
Block Diagram:-



Working:

The pressure sensor monitors the pressure in the tyre .The sensed value is given as input to the Microcontroller.A display is connected to the microcontroller and the pressure value is displayed on the speedo meter.The engine which is also connected to the microcontroller receives control from it.

Condition:



The above conditions works only when the vehicle is started using self start the self start option is deactivated in the bike . In case of emergencies kick starter can be used.Eg:- When bike is punctured.The microcontroller checks the pressure in the tyre once again .If again the condition is satisfied self start option is activated and the engine can be . Start using self start.The gas can be filled in the tire using a gas generator fixed along side of the engine .

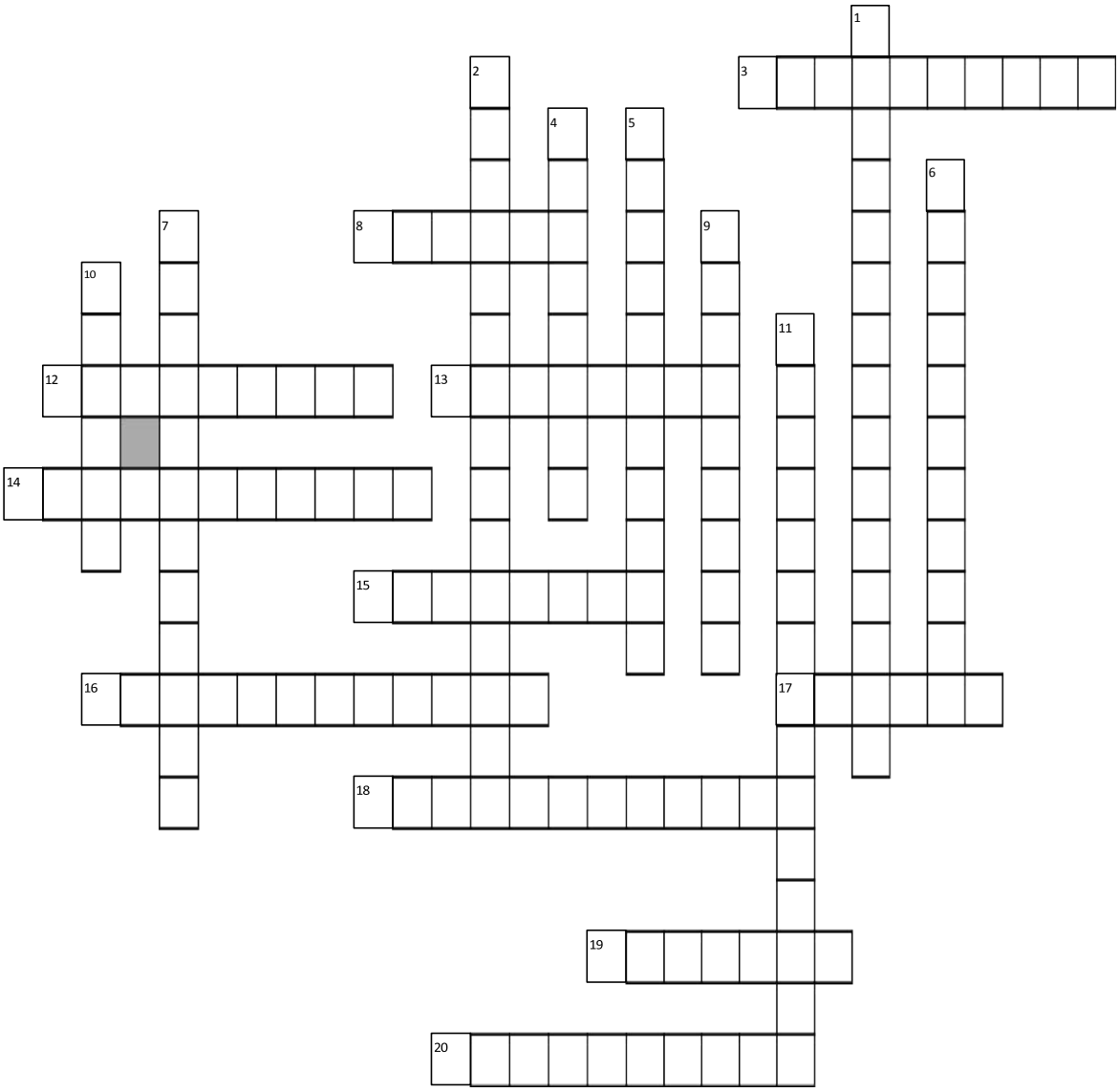
Disadvantanges:

- The microcontroller takes the supply from bikes's battery So the battery life of bike reduces.
- Frequent change of pressure sensor in valves is difficult.
- As of now the air filling is manual , we try to implement it to be automatic Features to be added:
- Fingerprint lock for bike.

CROSS WORD

EDWARD ANAND S

V YEAR ECE



Across

3. The amount of data that is transferred under real life conditions.

8. In a client server network, a computer or other device that requests and uses network resources.

12. A networking standard for very short-range wireless connections

13. To retrieve files from a server

14. A network that uses a central device connected directly to several other devices

15. a private network that is set up similarly to the internet and is accesses via a Web browser

16. A method of transmitting data in which data is sent out to all nodes on a network and is retrieved only by the intended recipient.

17. In a client-server network, a computer that is dedicated to processing client requests.

18. The use of networking technology to provide medical information and services

19. A location that provides wireless Internet access.

20. A network that uses a central cable to which all network devices connect

Down

1. What is it called when computers and other devices that are connected to share hardware, software, and data?

2. A real time, face to face meeting between individuals not in the physically in the same place is called?

4.An intranet that is at least partially accessible to authorized outsiders.

5. The act of working from a remote location bu using computers and networking technology.

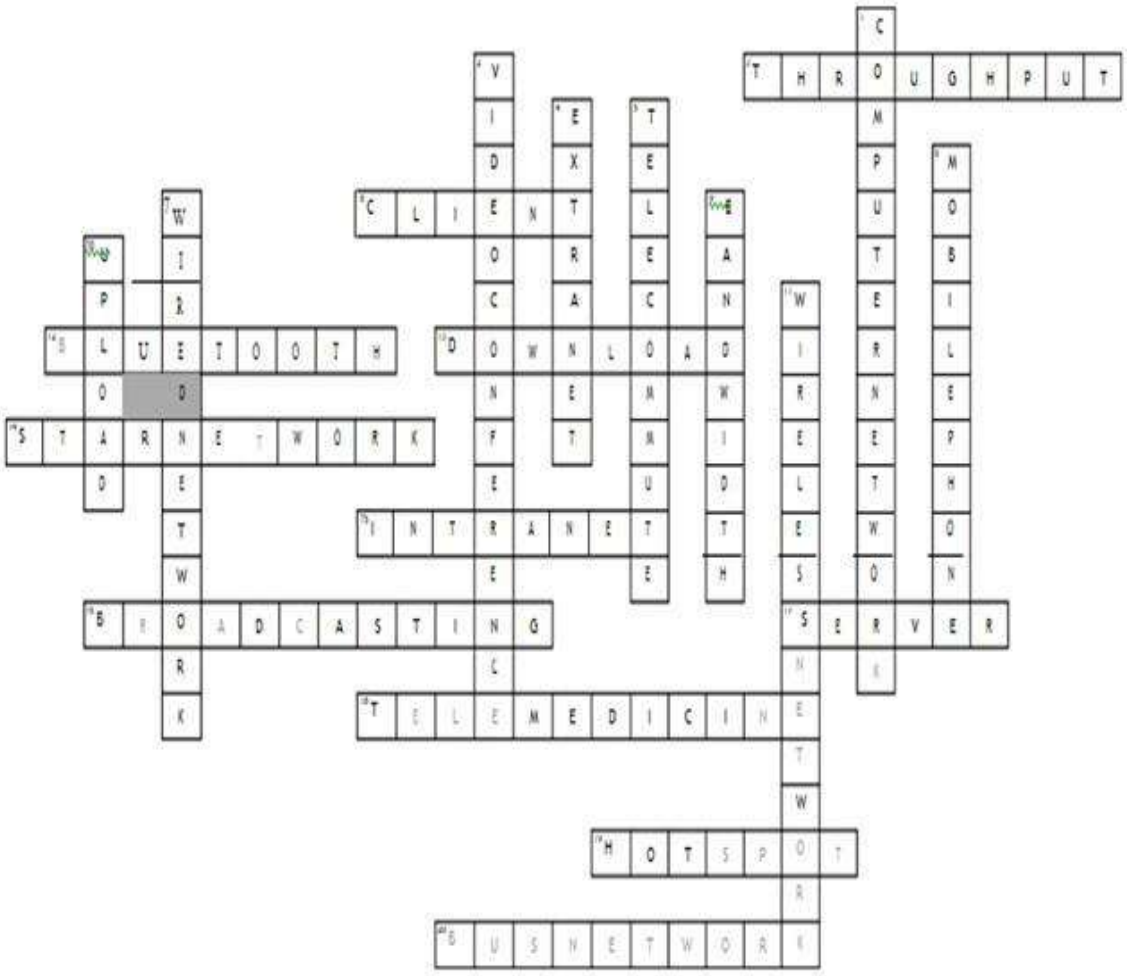
6.A phone, such as a cellular or satellite phone, that uses a wireless network.

7. A network in which computers and other devices are connected to the network via physical cables

9.The amount of data that can be transferred, such as via a bus or over a networking medium, in a given time period.

10.To transfer files to server

11. A network in which computers and other devices are connected without physical cables



GALLERY

Guest Lecture Topic: Communication Networks

Guest Speaker: Mr.J.Tyson Immanuel, End Point Security Specialist, IBM, Chennai.

Date of Guest Lecture: 14-6-19

Guest Lecture Topic: Control Systems and its Applications

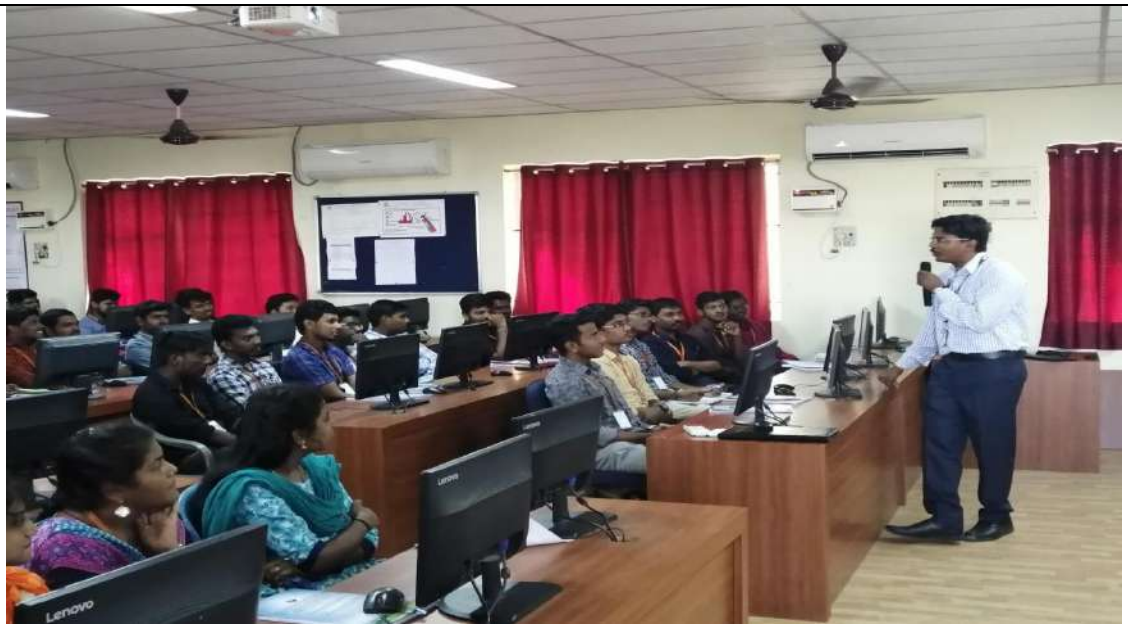
Guest Speaker: Dr.Mathiazhaghan,Scientist D,Gun Control System Division,CVRDE,Avadi.Date of Guest Lecture: 17-6-19

Guest Lecture Topic: Understanding Python Programming.

Guest Speaker: Mr. Vinoth Subramanian, Software Trainer, Silicon Software Services, Chennai.Date of Guest Lecture: 19-7-19

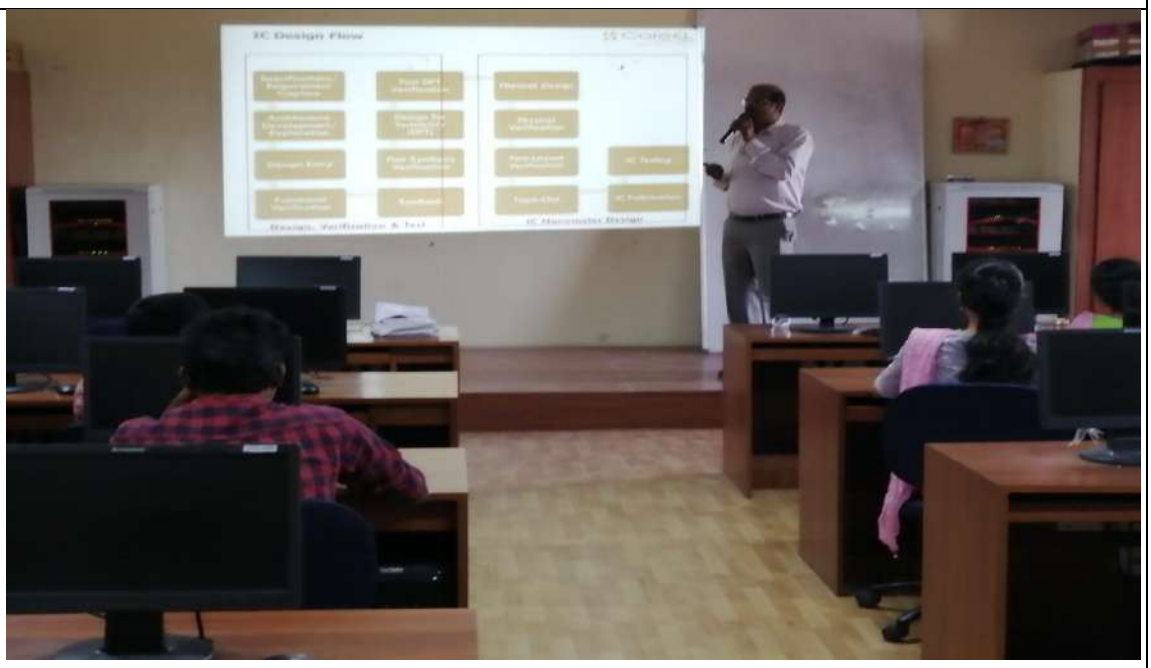
Guest Lecture Topic: RECENT TRENDS IN MARKETING MANAGEMENT AD ITS OPERATIONS

Guest Speaker: Mr.Mukesh.H,Solution Architect TCS,Chennai.Date: 8.1.2020



Guest Lecture Topic: RECENT TRENDS IN WIRELESS COMMUNICATIONS

Guest Speaker: Mr.Rohit K , Senior Hardware Design Engineer, Mobiveil Technologies India Pvt Ltd.Date of Guest Lecture: 25.1.2020



Guest Lecture Topic: Advanced VLSI Design and its Scope

Guest Speaker: Mr.Prakash, Application Engineer, CoreEL Technologies

Date of Guest Lecture: 04.02.2020

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