TECHNOLOGY NOW

ACADEMIC YEAR 22-23

MAGIC CIRCUITS

Department of Electronics and Communication Engineering

SRI SAIRAM COLLEGE OF ENGINEERING

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SPACE ODYSSEY OF TOMORROW: AN INTERSTELLAR MOSAIC OF REVOLUTIONARY TECHNOLOGIES

1. Space Elevators: Imagine a future where instead of fiery rocket launches, we ascend to space inside an elevator. Space elevators are colossal structures that promise to revolutionize space access. They consist of a cable anchored to Earth and a counterweight in space. By climbing this cable, payloads can be transported to orbit without the need for traditional rocket propulsion, making space travel more affordable and sustainable.

2. Solar Sails: Conventional rocket propulsion requires vast amounts of fuel, limiting how far we can explore the cosmos. Solar sails offer an ingenious solution. These spacecraft deploy immense, ultra-thin sails that capture the pressure of sunlight. By harnessing this natural force, they can glide through space indefinitely, opening up the possibility of longer, more efficient journeys.

3. Space-Based Solar Power: Imagine if we could solve our planet's energy crisis from space. Space-based solar power is an audacious concept that involves capturing sunlight in orbit and then transmitting it to Earth using advanced technologies like microwaves or lasers. This could provide a constant, clean, and abundant source of energy, potentially transforming the way we power our world.

4. Astrobiology and Life Detection: Robotic explorers equipped with sophisticated sensors and analytical instruments are venturing to distant planets and moons in search of extraterrestrial life. They examine geological features, analyze samples, and detect molecules that hint at the existence of life. These missions are pushing the boundaries of our understanding of life beyond Earth.

5. Space Mining: As Earth's resources become scarcer; companies are looking to the heavens for solutions. Space mining involves developing the technology to extract valuable resources like rare metals and water from asteroids and other celestial bodies. It's a bold step towards resource sustainability and opening up new frontiers of industry.

6. Hypersonic Space Planes: Traditional space travel involves rocket launches with incredible forces and noise. Hypersonic space planes promise a quieter, faster, and more comfortable journey to space. These aircraft can travel at speeds exceeding Mach 5, drastically reducing the time it takes to reach orbit.

7. Quantum Communication: The realm of space communication is evolving with quantum entanglement, a bizarre yet powerful phenomenon. It allows for ultra-secure and instantaneous data transmission between spacecraft and Earth. This technology promises to safeguard sensit.

Content:Jeevitha.M | 1SB20EC022

ROBOT'S FOR LIFE

HOW ARE ROBOTS USED IN MEDICINE?

Robots have a lot of potential in operating rooms and may be able to perform surgeries precisely. While many human loyalists still have qualms about the skills of such robots, a new report highlights how such tech may be used in extreme situations to help people. The Da Vinci surgical robot recently operated on a man's inoperable tumour that no doctor wanted to touch, a CBC report said. The patient, Glenn Deir, explained how he almost lost his life to this inoperable tumour until the robot stepped in. Deir had contracted cancer in the left tonsil due to the human papillomavirus, the same virus that causes cervical cancer. Unfortunately, no doctor wanted to operate on Deir. That's when one of his doctors suggested the Da Vinci robot, which was also no easy feat. The surgery took 2.5 hours and was more complicated than the doctors thought. As Deir explained, the "the previous radiation had made the tonsil stiff; it didn't pull away easily. The tumor on my tongue was the size of a large cherry." However, the surgery turned out to be successful. Now, he is recovering and learning to speak and swallow again. Without Da Vinci, Deir had no surgical options. "In the good old days, we would have cut your jaw in two," his doctor told him. Owing to radiation treatment, many regular treatments including a tooth extraction are not viable for Deir. This incident is testimony to how smart robots may be used to save multiple lives as such technology becomes more intelligent.

CONTENT : SOMAGUTTA SWATHI , ISB22EC109

THE CONVERGENCE OF CLOUD AND NETWORK

Cloud computing has become synonyms with agility and scalability. It provides businesses with the ability to access, store, and manage data and reducing the need for on-premises infrastructure. The cloud's full potential can only be realized when paired with robust network capabilities. Network convergence refers to the integration of various communication channels into a single, unified network. It involves the amalgamation of data, voice, and video traffic onto a common infrastructure. It is reduced latency. It ensures that data transmitted to & from the cloud travels efficiently. Converged networks offer improved security through centralized management & monitoring. Real-time applications like video conferencing, IOT, and online gaming. The Convergence of cloud and network is far from reaching its zenith. Future developments promise even more profound impacts: Edge Computing, 5G Connectivity, Artificial Intelligence and Automation. Combining network and cloud services streamlines operations, reduces maintenance costs, & simplifies management. This cost- efficiency encourages businesses to adopt cloud-based solutions more readily.

Content: MONIKA LAKSHMI.S | 1SB21EC057

Gi-Fi

- Gi-Fi will helps to push wireless communication to faster drive.For many years cables ruled the world .Optical fibre played a dominant role fot its higher bit rates and faster transmission. Gigabit Wireless is a wireless communication at a data rate of more than one billion bits (gigabit) per second.
- It will allow wireless transfer of audio and video data at up to 5gigabits per second, ten times the current maximum wireless transfer rate, at one- tenth the cost.
- The core component of Gi-Fi system is the subscriber station which available to several access points. It supports standard of IEEE 802.15.3C. The wireless span is computer network used for communication among computer devices close to one person. An 802.15.3C based system often uses small antenna at the subscriber station. The antenna is mounted on the roof. It support line of sight operation.
- This technology can be successfully used in wireless pan network, inter-vehicle communication system, AD hoc information distribution with point to point network extension media access control (MAC),imaging & other application.
- GIFI technology also can be used in broadband video signal transaction system in sport stadium & multimedia wave video signal transaction system. The technology could also be used for beaming full HD video in real time & could be used by notebooks.

CONTENT : SREENIDHI.R | ISB21EC090

THE EVOLUTION OF CONNECTIVITY: UNLEASHING THE POWER OF 5G

In a world where information travels at the speed of thought, the evolution of technology is a constant force shaping our lives. The latest stride in this journey is the revolutionary advent of 5G, the fifth generation of wireless technology. Promising to be a game-changer, 5G is much more than just an incremental upgrade; it's a transformative leap that holds the potential to reshape industries, enhance communication, and fuel innovation on an unprecedented scale.

Speed and Bandwidth: At the core of 5G's allure is its remarkable speed. With data transfer rates up to 100 times faster than its predecessor, 4G, 5G is set to usher in an era of seamless, real-time connectivity. Downloading entire HD movies in seconds and streaming 4K content without buffering will soon become the norm. This incredible bandwidth isn't just about convenience; it underpins advancements across sectors, from healthcare and transportation to entertainment and education.

Internet of Things (IoT): 5G is set to be the bedrock of the IoT revolution, where everyday objects are interconnected and communicate without human intervention. From smart homes that adapt to residents' needs in real-time to smart cities managing resources more efficiently, 5G's capacity to handle a massive number of connected devices will pave the way for unprecedented levels of automation and data-driven decision-making.

Industries Transformed: Beyond personal convenience, 5G holds immense promise for industries. Manufacturing, for instance, can embrace ultra-responsive, connected factories powered by real-time data analytics and remote control. Healthcare can extend its reach to remote areas through telemedicine, while augmented reality (AR) and virtual reality (VR) applications will gain new dimensions, transforming entertainment, training, and design.

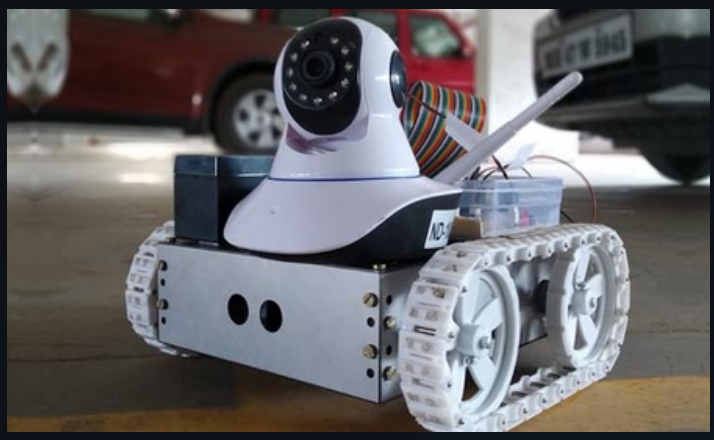
Is future depends on 5G?

CONTENT: SRIKANTH.S , 1SB21EC091

TOP PROJECTS IN ECE

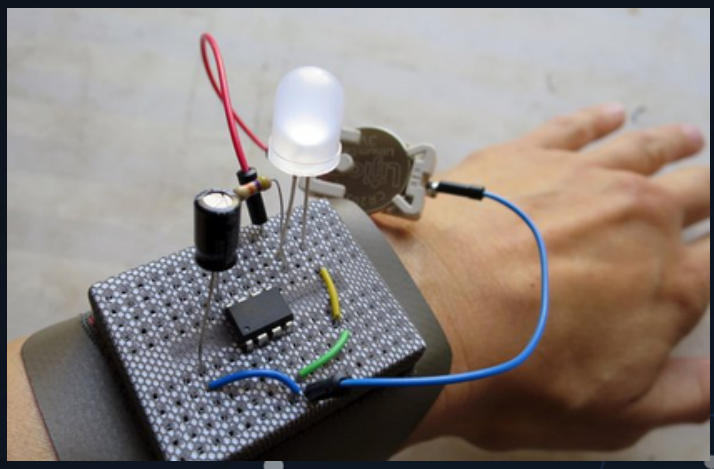
- Raspberry Pi-based ECE Projects:

1.X-Ray-Based Quick COVID-19 Detection With Raspberry Pi.
2. Face Tracking and Movement Following Drone.
3.Make Video streaming with Raspberry Pi.
4.Multi-Language Voice Control IOT Home Automation.
5. IoT Face Recognition AI Robot.
6. New Facial Recognition Smart Glasses For Visually Challenged Persons.
7.Raspberry Pi Real-Time Face Recognition Doorbell.



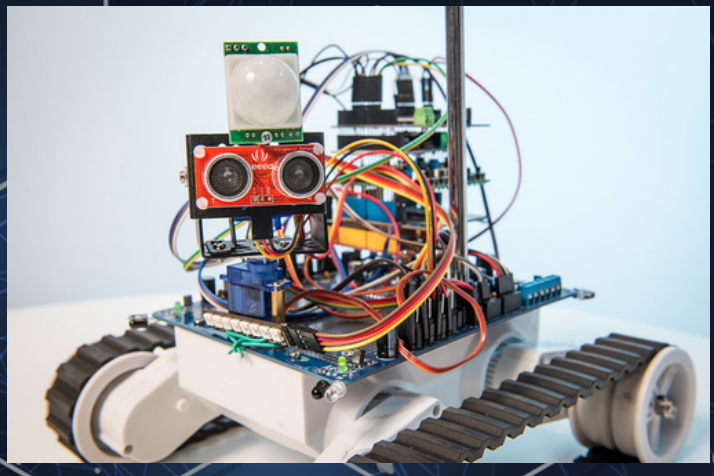
- Communication-based ECE Projects:

1. PC-Based GPS Receiver.
2. ESP32 (Non-Standard) GPS Receiver.
3. Designing FM Receiver Using GNU Radio and RTL-SDR Dongle.
4. Aircraft Signal Receiver Using RTL-SDR and DUMP1090.
5. RF-Based 12-Bit Signal Transmitter. And Receiver.
6. Noise Muting FM Receiver



- Robotics-based ECE Projects:

1.IoT-based Face Recognition AI Robot.
2. Object Finder Robot.
3. Hospital Sanitizing Robot.
4. Make This Joystick-Controlled Robot.
5. Colour Sensing Robot with MATLAB.
6. Arduino based Smartphone Controlled Robot Car.
7. Make Your Own Remote-Controlled Robot.
8. Soccer Robot.
9. Make Joystick RF-Controlled Robot.



CONTENT: SREENIDHI.R | ISB21EC090

THE BRAIN BEHIND MOTION SENSING (ACCELEROMETERS AND GYROSCOPES)

Introduction: In today's world of rapidly advancing technology, the terms "accelerometer" and "gyroscope" have become commonplace, powering everything from smartphones to drones, virtual reality headsets, and even self-driving cars. These devices play a crucial role in measuring and understanding motion, orientation, and acceleration. In this article, we'll explore the fascinating world of accelerometers and gyroscopes, their principles of operation, applications, and the ways they have revolutionized various industries.

Accelerometers: Measuring Linear Acceleration: An accelerometer is a sensor that measures linear acceleration, or the rate of change of velocity with respect to time. The fundamental principle behind accelerometers is Newton's second law of motion, which states that "the force acting on an object is equal to its mass multiplied by its acceleration" (F = ma). Accelerometers consist of a mass attached to a spring, which is, in turn, attached to a casing. When the sensor experiences acceleration, the mass moves relative to the casing, and the displacement is measured. This displacement is then converted into an electrical signal that can be processed and used to determine the object's acceleration.

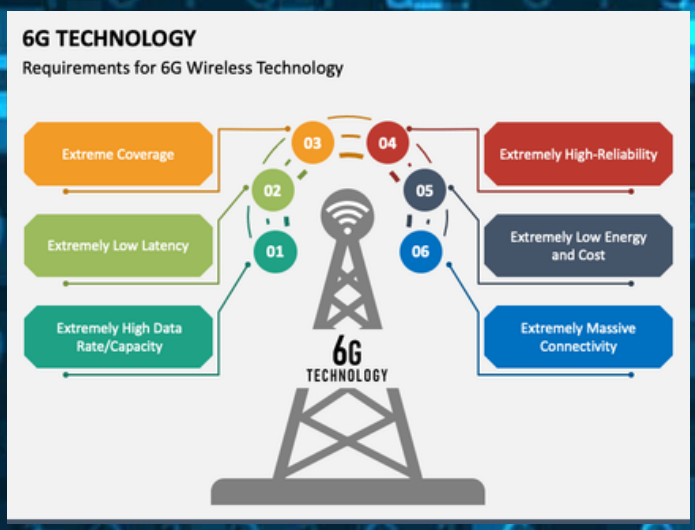
Applications of Accelerometers: Accelerometers are the reason your smartphone can automatically adjust the screen orientation when you rotate it. In vehicles, accelerometers are used in airbag deployment systems and electronic stability control. In aircraft and spacecraft, accelerometers help monitor acceleration and vibrations.

Gyroscopes: Measuring Angular Velocity: A gyroscope, measures angular velocity. Gyroscopes are based on the principle of angular momentum, "which states that a rotating object will maintain its orientation unless acted upon by an external torque". The most common type of gyroscope is the MEMS (Micro-Electro-Mechanical Systems) gyroscope, which utilizes the Coriolis effect. In a MEMS gyroscope, a small vibrating mass is set into motion, and when the device is rotated, the Coriolis effect causes the mass to move perpendicular

CONTENT: YOGESHWARAN.K | ISB22EC103

Article on 6G Antennas

The sixth-generation (6G) wireless communications require substantial research and development in antennas, Radio-Frequency (RF) front-ends, and wave propagation characterization intended for frequencies ranging from 100 GHz to 1 THz. Sub-THz communications utilize new innovations in air interfaces and RF front-ends, such as massive antenna arrays, lens antennas, filter design, ultra-massive Multiple-Input Multiple-Output (MIMO), metasurface-based antennas, and reconfigurable intelligent surface technologies. In addition, antenna technologies will need to be tightly integrated, e.g., by using Antenna-in-Package (AiP) and on-chip antenna technologies, and the required signal integrity will necessitate high-performance vertical and horizontal interconnections and feed networks. Transmissions in the sub-THz band require low loss, low permittivity propagation, and high manufacturing tolerances for relevant antenna packages, whereas semiconductor substrates have typically higher permittivity and higher RC-delays in the package.



CONTENT: VENUGOPAL,PROF. ECE

SUSTAINABLE DEVELOPMENT GOAL

Sustainable Development Goal 3 : "ensure healthy lives and promote well-being for all at all ages", according to the United Nations.

- **Over the last few years, life expectancy has declined globally, with the pandemic causing untold damage to health systems and populations, especially for the poorest and for women and children. The World is committed to restoring essential health services to pre-pandemic levels by the end of 2025, by strengthening health systems and investing in health workers, as an essential step toward achieving universal health coverage and renewing progress on the SDGs.**
- **The Goal addresses all major health priorities, including reproductive, maternal and child health; communicable, non-communicable and environmental diseases.**
- **universal health coverage and access for all to safe, effective, quality and affordable medicines and vaccines. It also calls for more research and development, increased health financing, and strengthened capacity of all countries in health risk reduction and management.**

CONTENT: RAGHUL.R | ISB21EC074

TIME

TIME IS WHAT EVERYONE WANTS THE MOST BUT ITS USE HAS DEFINITELY BEEN THE WORST HOW INSANE IS IT THAT WE KILL TIME INSTEAD OF WORSHIPPING IT LIKE A SHRINE??

OFCOURSE WE CAN'T OWN TIME, TIME IS NOT A POSSESSION BUT WE MUST USE TIME WISELY OR ELSE WE MAY FALL INTO DEPRESSION!!

TIME IS THE EQUIVALENT OF MONEY BUT CAN'T BE BOUGHT, WHAT AN IRONY!! TIME GIFTS US A BUNCH OF MEMORIES THAT WE REWIND OVER CENTURIES BUT IT'S HARDWORK WHICH MAKES ONE A BRAND JUST REMEMBER, DON'T COMMIT A CRIME ..

PATIENCE AND TIME COME HAND IN HAND BY NOT MAKING THE MOST OF TIME!!

CONTENT: MOHANTHI K | ASSISTANT PROFESSOR,ECE

RAIN

ITS A PRECIOUS "THING"
WHICH GIVES FARMER'S A
"WING"
RAIN FALLS AS A DROP
WHICH GIVES LIFE TO A CROP
WHEN ITS GRACE FILLED THE
GROUND
ITS SOUL WITHIN THE FLOWER IS
FOUND
SOMETIMES RAIN ACTS AS A
SHADOW
WHICH IS SEEN THROUGH THE
WINDOW &
SOMETIMES IT MAKES A
CONTINUOUS CHAIN
AS SAME AS A MOVING TRAIN.

CONTENT: HEMA SHUBRAJA, AP,ECE

SKETCHES OF ECE

Art by : RANJITHA B, 1SB20EC078

Art by : MONIKA K, 1SB21EC056

Art by : RAKSHITHA G, 1SB22EC089

Art by :SUSHMITHA R, 1SB21EC403

SKETCHES OF ECE

Art by : MOHANTHI K, A P, ECE

Art by : HEMA SHUBRAJ, A P, ECE