ELECTRO CHRONICLES

ELECTRONICS & COMMUNICATION DEPT.

Friday, March 17, 2023

About
our Institution

LBS Institute of Technology for Women stands as a premier institution committed to empowering women in engineering and technology. Committed to excellence, the institution continually nurtures talent and inspires students to reach new heights in engineering and technology.

VISION AND MISSION OF THE INSTITUTION

Vision of the Institution

To be a centre of academic Excellence empowering women in the technical domain.

Mission of the Institution

Imparting value based technical education to young women transforming them to professionals excelling globally in academics, research and development and industry meeting social challenges

Vision of the Department

To become the centre of electronics communication and instrumentation and computer engineering to facilitate professional education and research keeping higher level of value systems

Mission of the Department

M1:To transform young women engineers, entrepreneurs and researchers with ethical values.

M2:To contribute creative engineering solutions to industry by keeping pace with latest technological advancements

M3: To provide intellectual services to the society by application of electronics communication and instrumentation and computer engineering

Robotics Club Triumphs at Prisma '24!

Keerthana D S of our class, along with Adithya Hemand, Bhadra R, and Aarathy Variar from the Robotics Club LBSITW, secured First Place in the Roborace at Prisma '24, hosted by Christ Engineering College.
The team also showcased their skills in Robosoccer, making their mark in both events. Congratulations to the team on this fantastic achievement!

Astro Summit: Celebrating India's Space Saga

- On National Space Day (August 23), the Space Club of LBSITW hosted the Astro Summit, a seminar competition themed "Touching Lives while Touching the Moon: India's Space Saga." The event celebrated Chandrayaan-3's milestone and highlighted the impact of India's space achievements on everyday life.
- Students delivered insightful presentations on India's space journey, with Bhadra D Nair taking the spotlight as the first prize winner. Her seminar stood out for its depth, clarity, and innovative perspective, capturing the spirit of India's space saga.
- Congratulations to Bhadra for this well-deserved honor! Her achievement is sure to inspire more students to explore the vast horizons of space science.

Bhadra D Nair presenting her seminar at the Astro Summit, celebrating India's space legacy.

Mu Carnival: A Celebration of Technology and Innovation

Mu Carnival, a Mulearn technical carnival, was a grand success, drawing tech enthusiasts, students, and professionals alike. Featuring five dynamic stalls—IoT, UI/UX, AI, Web Development, and Startups—the event offered hands-on learning experiences and sparked innovation.

- Startup Stall: Participants collaborated on brainstorming innovative ideas, fostering an entrepreneurial mindset and practical skills to bring concepts to life.
- UI/UX Stall: A quick dive into tools like Canva taught attendees how to design with purpose, balancing creativity and functionality under time constraints.
- Web Development Stall: Students explored the basics of HTML, experiencing the joy of creating functional web pages—a crucial skill in today's digital age.
- AI Stall: Engaging discussions on real-world applications of AI inspired participants to think about its transformative potential and career opportunities.
- IoT Stall: An interactive buzzer game introduced students to circuit design and block programming, sparking curiosity and enthusiasm for the world of IoT.
- Mu Carnival was more than an event; it was a catalyst for skill-building and inspiration. By introducing emerging technologies in an engaging way, it empowered students to embrace the future of innovation and set the stage for a tech-savvy generation.

Raspberry Pi

The Raspberry Pi is a tiny, affordable computer originally created to teach students programming, but it has grown into one of the best-selling computers in the world. Despite its small size, it can run full operating systems, power robots, smart home devices, and even industrial machines. It's energy-efficient, can host servers, run retro games, and has even been sent to the International Space Station for student experiments. Its GPIO pins make it perfect for electronics projects, and clusters of Raspberry Pis are used to create mini supercomputers.

TechX '24: A Fusion of Innovation, Learning, and Fun!

TechX '24, held on December 14th and 15th, 2024, was an incredible two-day event organized by IEEE CS SYP and IEEE CS SBC LBSITW. It featured engaging workshops on IoT by Muhammed Rems Iqubal Oyalott, Cloud Computing by Hiba Shabu, DevOps by Govind S R, and a Buildathon by Dhanwand S, focusing on real-world challenges with Machine Learning. The event also included a captivating talk on Gene Editing by Austin P and fun cultural activities, making it a perfect mix of learning and enjoyment.
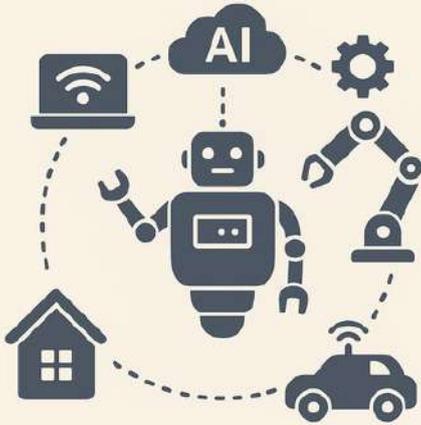

Tiny facts, Big Geek Energy

1. Modern chips contain billions of transistors, each smaller than a virus.

2. Your smartphone has more computing power than NASA had during the first Moon landing.

3. LEDs can glow for over 50,000 hours without burning out.

4. Fiber optic cables send data using pulses of light, not electricity.

5. The first computer bug was a real moth stuck inside a relay.

Internet of Robotic Things (IoRT): Connected, Intelligent, and Everywhere

1. IoRT is basically IoT + Robotics + AI

It's like giving robots Wi-Fi, brains, and superpowers. They sense, think, and act without waiting for humans to push buttons.

2. IoRT devices talk to each other automatically

A robot can detect something, send data to the cloud, another device reacts...

Teamwork level: Avengers, but with circuits.

3. They learn and adapt in real time

IoRT systems don't just follow commands. They observe patterns and improve — like a robot that notices when energy spikes and shuts down appliances before trouble hits. Smart kid.

Codecraft - Arduino Edition: A Success for LBSITW Students!

The Codecraft - Arduino Edition internship, held from July 17 to August 17, was a fantastic experience for LBSITW students, including Keerthana D S, Jyothika Padmakumar, Nandana AM, Pavithra KV, and Gourynanda from our class. Organized by the Robotics Club in collaboration with Higbec Private Ltd, the program allowed students to work on five innovative Arduino-based projects, which they completed after gaining valuable hands-on experience in embedded systems.

The mentorship from Vishnu Thampi, CEO of Higbec Private Ltd, was instrumental in helping the students enhance their creativity and technical skills. This program has opened new opportunities for exploring robotics and technology in the future!

Smart Pet Care Made Easy: Automatic Dog Feeder Using NodeMCU ESP8266

This innovative project features an automatic dog feeder powered by the NodeMCU ESP8266, designed to keep your pet fed and hydrated, even when you're not around. Key features include:

- Programmable Feeding Schedules for customized meal times.
- Mobile Integration with notifications for food dispensing and feeding status.
- Real-Time Monitoring via a mobile app connected to ThingSpeak.
- Smart Adjustments based on remaining food.
- Water Feeder for optimal hydration.
- Low Food Alerts for timely refills.

This system provides peace of mind for pet owners, ensuring consistent care for your dog.

Revolutionizing Firefighting: Wi-Fi Controlled Firefighting Car

This innovative Wi-Fi Controlled Firefighting Car merges robotics with advanced features to improve firefighting in challenging environments.

Key highlights include:

- Voice Control for hands-free operation in hazardous areas.
- Obstacle Avoidance using ultrasonic or infrared sensors for safe navigation.
- Fire Detection & Extinguishing with integrated sensors and firefighting mechanisms.
- Autonomous Navigation enabled by GPS for independent movement in complex terrains.

Applications include:

- Urban Firefighting in congested areas.
- Industrial Safety in hazardous material zones.
- Forestry for wildfire control in natural environments.

This project demonstrates how robotics can enhance safety and efficiency in firefighting operations.
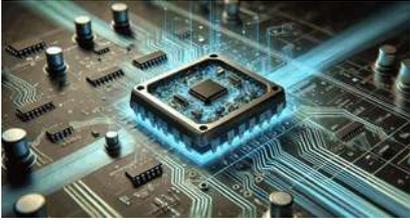
MAHAPATRA RELIABILITY MODEL

The Mahapatra Reliability Model, is a mathematical model used in the field of reliability engineering to evaluate the reliability of systems, especially for complex systems involving multiple components. Developed by Prof.Souvik Mahapatra of IIT Bombay, it specifically addresses the issues of Bias Temperature Instability (BTI) and Hot Carrier Degradation (HCD) in MOSFETs. This model is particularly useful in the context of multi-state systems, where components do not simply work or fail, but instead can operate in several states (e.g., operational, degraded, or failed).

KEY FEATURES:
- Multi-State Systems: The model extends beyond the simple binary state (working or failed) and accounts for systems where components may have varying levels of performance.
- State Transitions: The model tracks the transitions between different states over time, allowing for more accurate assessments of system reliability under real-world conditions where components degrade rather than fail abruptly.
- Time Dependence: The reliability of the system may change over time as components experience wear, aging, or maintenance. This model incorporates time-dependent behaviors into its analysis.
- Mathematical Framework: It typically uses stochastic processes to describe the system's behaviour over time.
- Application to Complex Systems: It's particularly helpful in industries where the system's components are interdependent, and their failure modes aren't easily categorized into just two states (working or not working).

KEY ASPECTS:
- BTI Modeling : The model accurately predicts Bias Temperature Instability (BTI) effects on MOSFETs, considering factors like temperature, voltage, and oxide thickness.
- HCD Modeling : It provides a comprehensive framework for modeling Hot Carrier Degradation (HCD) in MOSFETs, accounting for parameters such as substrate bias, drain voltage, and channel length.
- Reliability Prediction : The model enables accurate prediction of device reliability under various operating conditions, including temperature, voltage, and frequency.

MAHAPATRA RELIABILITY MODEL

APPLICATIONS:

- **Automotive Industry Application:** In automobiles, especially modern electric vehicles (EVs) or autonomous vehicles, many components such as batteries, sensors, and control systems degrade over time. Use of the Model: The model can assess the multi-state reliability of various components, like the battery life and charging system, considering performance degradation over time. It also helps in evaluating how the interaction of components affects overall vehicle reliability. Benefit: Automakers can use the model to optimize warranty policies, plan maintenance schedules, and design vehicles with greater reliability, which leads to increased customer satisfaction and reduced downtime.

- **Telecommunications Application:** Telecommunication networks, including mobile, satellite, and broadband systems, rely on a wide variety of components such as routers, servers, and transmission lines. Use of the Model: The Mahapatra model can help assess the reliability of these components in terms of service degradation, network availability, and failure rates over time. Benefit: It enables more efficient network management by predicting potential downtimes and planning for redundancy or replacement of aging equipment, thus ensuring more consistent service for end users.

- **Healthcare and Medical Devices Application:** Medical devices, especially complex ones like MRI machines, pacemakers, or infusion pumps, can degrade over time or exhibit partial failures, affecting their reliability and performance. Use of the Model: The model can assess the reliability of medical devices based on time-dependent factors like usage cycles and wear-and-tear, which is crucial for preventive maintenance and ensuring patient safety. Benefit: It helps in predicting the failure likelihood of critical devices, optimizing maintenance schedules, and extending the life of medical equipment, which is essential for cost management and quality patient care.

- **IT Infrastructure and Cloud Computing Application:** Data centers and cloud computing platforms rely on a vast number of physical and virtual components, such as servers, storage systems, and network devices, which can degrade over time. Use of the Model: The Mahapatra model can help predict the failure probability of individual components based on their age, load, and usage patterns. It can also assess the overall system's performance in terms of uptime and service quality. Benefit: By accurately predicting when components will degrade, companies can implement proactive maintenance strategies, reducing unexpected outages and improving service reliability.

MAHAPATRA RELIABILITY MODEL

- **Oil and Gas Industry Application:** Offshore platforms, drilling rigs, and pipelines face significant challenges related to equipment reliability due to harsh environmental conditions and long operational lifetimes. Use of the Model: The Mahapatra model helps in evaluating the multi-state reliability of critical systems, including pumps, valves, and safety equipment, which may experience gradual degradation over time. Benefit: It allows oil and gas companies to predict the optimal time for maintenance or part replacement, minimizing the risk of system failure and reducing operational costs. Other applications include Transportation and Logistics, Aerospace Engineering, Power Systems, Manufacturing, Railway Systems, etc

THE SECRET LIFE OF CAPACITORS

Ever wondered why capacitors act like the moody teenagers of the electronics world? One moment they're storing energy like responsible adults, and the next moment—zoom!—they release everything in a single dramatic burst.

A capacitor's job is basically to hold tiny packets of electrical energy and let them go at the perfect moment. Think of it as a tiny power bank inside your circuit, but with zero patience. When voltage rises, it quietly charges up. When the circuit needs a quick boost, it steps in, releases its stored charge, and pretends nothing happened.

That's why your power supplies don't scream when the load suddenly increases—capacitors are there calming everything down, smoothing out voltage, and keeping your circuit from throwing tantrums.

They're small, cheap, and everywhere—from your phone to your washing machine. And even though they look simple, they're the reason your electronics don't behave like a roller coaster on Monday mornings.

In short:
Capacitors are the unsung heroes keeping your devices steady, responsive, and way less chaotic than real life.