POWER VISION

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

MAGAZINE

Harnessing Electrons, Empowering Ideas!

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Discovering New Horizons: A Glimpse into Power Vision

Preface

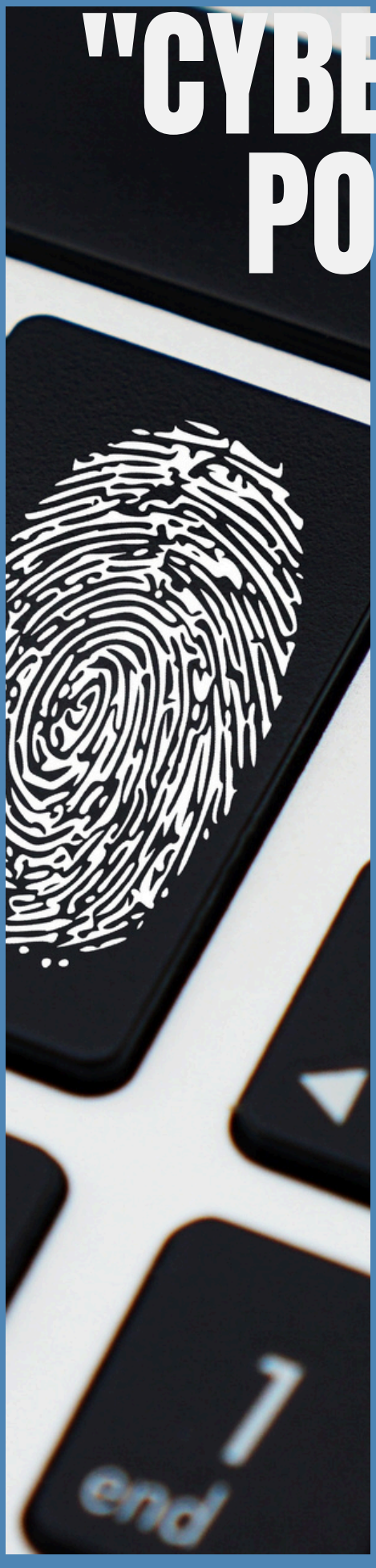
Welcome to Power Vision – Your Gateway to the Dynamic World of Power Engineering! In this premier edition, we invite you to embark on a captivating journey through the electrifying landscapes of innovation, sustainability, and excellence within the realm of power engineering.

Power Vision is not just a magazine; it's a testament to the transformative power of electricity in shaping our world. From cutting-edge technologies to visionary projects, each page is meticulously crafted to inspire and inform, showcasing the latest advancements and trends in the field.

Join us as we explore the forefront of power engineering, uncovering the groundbreaking research, impactful initiatives, and remarkable achievements that are driving progress and shaping the future of energy. Whether you're a seasoned professional, an aspiring engineer, or simply a curious mind eager to learn, Power Vision promises to enlighten and empower.

So, immerse yourself in the illuminating world of power engineering with Power Vision as your guide. Let us ignite your curiosity, spark your imagination, and empower you to make a difference in the electrifying journey ahead. Welcome to Power Vision – where the future of power awaits!

"CYBERSECURITY IN POWER GRIDS



The digitalization of power grids has expanded the potential for cyber threats, necessitating robust cybersecurity measures. As operators enhance communication networks for real-time monitoring, they inadvertently broaden their attack surface, making them vulnerable to malicious actors. Past cyber attacks have caused significant blackouts, underscoring the urgency of addressing these vulnerabilities.

Key challenges include the critical need for high availability; any outage can have severe consequences. The balance between power generation and consumption poses risks, as disruptions can lead to frequency instability. Additionally, the rise of decentralized energy sources, like household solar panels, complicates security.

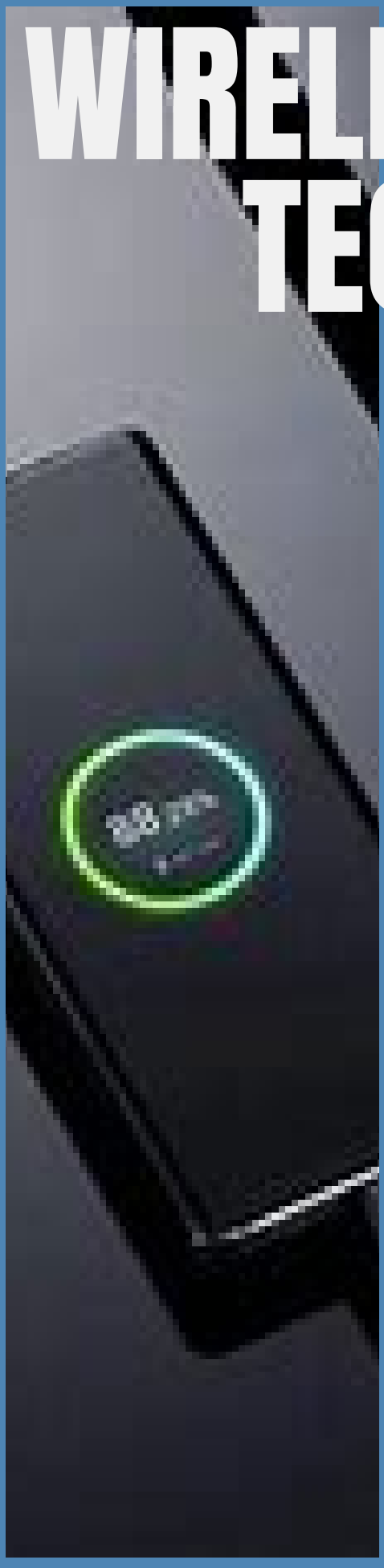
Outdated protocols, such as DNP3 and IEC 60870-5-104, designed without modern security considerations, worsen these issues. Insufficient separation between office networks and process control networks allows attackers to move laterally.

To address these challenges, the authors propose a defense-in-depth strategy that includes device, network, and physical security, along with comprehensive policies. By adopting these approaches, power grid operators can enhance their cybersecurity posture and safeguard critical infrastructure.

T. Shomesh
II YEAR

https://www.softwebsolutions.com/resources/AI-enabled-electronics-manufacturing.html

WIRELESS CHARGING TECHNOLOGY



Wireless charging technology is revolutionizing how we power our devices, moving us away from cumbersome cables. Rooted in Tesla's magnetic resonant coupling, this innovative method allows energy transfer via a transmitter and receiver, making it increasingly popular for smartphones, wearables, laptops, and electric vehicles. The global wireless charging market, valued at $4.5 billion in 2021, is projected to reach $13.4 billion by 2026, growing at a CAGR of 24.6%.

Key technologies include radio charging, inductive charging, and resonance charging, each serving distinct applications. Standards like Qi, Ki Cordless Kitchen, and SAE ensure compatibility across devices, fostering a cohesive ecosystem. The advantages are significant: convenience, improved safety, and universal compatibility enhance user experience while minimizing clutter.

Emerging trends such as faster charging, extended range capabilities, and integration into everyday environments are shaping the future. As wireless charging continues to evolve, it promises to offer even more efficient and sustainable power solutions, ultimately enhancing our daily lives. With the potential for widespread adoption in public spaces and homes, the future of wireless charging looks bright and transformative.

M. Keerthana
III YEAR

sites.tufts.edu/eeseniordesignhandbook/2015/wearable-electronics

THE ROLE OF AI IN NEXT-GEN ROBOTICS

Next-generation robotics is revolutionizing industries and reshaping daily life through advanced technologies like artificial intelligence and machine learning. Unlike traditional robots, these next-gen systems can learn from their environments, make autonomous decisions, and collaborate with humans in real-time.

In manufacturing, smart robots enhance production lines by performing complex assembly tasks and predictive maintenance, leading to reduced downtime and higher efficiency. In healthcare, robotics aids in surgical assistance and patient care, improving outcomes with precision.

The logistics sector is also transformed, as autonomous vehicles and drones streamline deliveries, reducing costs and enhancing service speed. Additionally, agriculture benefits from robotics through automated planting and harvesting, promoting sustainable practices.

As these technologies evolve, they raise critical questions about workforce dynamics and ethics, redefining the interaction between humans and machines. Next-gen robotics promises to enhance productivity while shaping a new era of automation in our everyday lives.

M. Thirisha
IV YEAR

https://www.trvst.world/renewable-energy/electricity-facts/

CONCENTRATED SOLAR POWER.

Concentrated Solar Power (CSP) is an innovative technology that captures and utilizes solar energy through mirrors or lenses that concentrate sunlight onto a receiver. This concentrated thermal energy is then converted into heat, which drives turbines to generate electricity. CSP is distinct from solar photovoltaics (PV), which directly convert sunlight into electricity, making CSP more suited for large-scale utility applications rather than residential installations.

CSP systems fall into four main categories: parabolic dishes, solar power towers, parabolic troughs, and linear Fresnel systems. Each type has its unique advantages, such as land use efficiency and energy capture capabilities. One of the key benefits of CSP is its ability to store thermal energy, allowing it to provide electricity even when solar irradiance is low, such as at night or on cloudy days.

A. Rishanth
IV YEAR

https://www.livescience.com/facts-about-electricity

DIY SMART WASTE MANAGEMENT SYSTEM

To design and build a smart waste management system that monitors the fill levels of waste bins and sends alerts for collection, improving efficiency in waste disposal.

Materials Needed:

1. Microcontroller (e.g., Arduino or ESP8266/ESP32)
2. Ultrasonic Sensor (to measure the fill level of the bin)
3. Wi-Fi Module (if not using ESP8266/ESP32)
4. Power Supply (battery or USB)
5. Breadboard and Jumper Wires
6. LED Indicator (optional, for visual status)
7. Mobile App (e.g., Blynk or a custom web interface)
8. Resistors (as needed)

Steps to Build:

Step 1: Design the System

Plan the layout of components: the ultrasonic sensor at the top of the bin, the microcontroller nearby, and the power source.

Step 2: Set Up the Ultrasonic Sensor

Connect the ultrasonic sensor to the microcontroller. This typically involves connecting power (VCC), ground (GND), and the trigger and echo pins to digital pins on the microcontroller.

Step 3: Write the Code

Program the microcontroller to read distance measurements from the ultrasonic sensor. Calculate the fill level based on the distance to the top of the bin.

Set a threshold for when the bin is considered full (e.g., 80% full) and program it to send an alert via Wi-Fi to a mobile app or web interface.

Step 4: Power the System

Connect the power supply to the microcontroller and ensure all components are powered correctly.

Step 5: Test the System

Place the ultrasonic sensor in the waste bin. Power on the system and check the readings.

Simulate different fill levels (e.g., by placing objects in the bin) to ensure the alerts are sent correctly when the threshold is met.

Step 6: Adjust and Optimize

Fine-tune the fill level threshold based on bin size and waste types.

Refine the code for reliability and add features such as timestamped alerts or fill level data logging.

Flow chart :

Future Enhancements:

- Multiple Bins: Expand the system to monitor multiple bins, sending aggregated data to a central dashboard.
- Solar Power: Integrate solar panels for sustainable power supply in outdoor settings.
- Mobile Notifications: Implement real-time notifications to waste management teams when bins are nearing capacity.

Conclusion:

This project introduces key concepts in IoT, sensor integration, and data communication. The smart waste management system can help municipalities and businesses improve waste collection efficiency, reducing costs and environmental impact.

The Intersection of AI and Quantum Computing

source: IBM

Quantum computing is a revolutionary field that harnesses the principles of quantum mechanics to solve complex problems beyond the capabilities of classical computers. Unlike traditional computers, which use binary bits (0s and 1s), quantum computers utilize qubits that can exist in superposition, allowing them to represent multiple states simultaneously. This capability enables quantum computers to process vast amounts of information in parallel, significantly speeding up computations for specific tasks.

Key principles of quantum mechanics underpin this technology: superposition allows qubits to hold multiple possibilities, entanglement links qubits so that the state of one informs the state of another, decoherence describes how quantum systems can lose their properties due to environmental factors, and interference enables the selection of the most probable outcomes by amplifying certain probabilities while canceling others.

As major tech companies invest heavily in quantum research, the potential applications of quantum computing are vast, from molecular simulations to advanced cryptography. While quantum computers won't replace classical ones for all tasks, they promise to unlock new possibilities and transform various fields in the coming years.

SOULFUL LINES

“குழந்தை சிரிப்பு”

என் குட்டி குத்து, இளம்பெண்
பொழுது,
பேசிக்கிறான், "என் நண்பர்
நட்டு!"
பேசும் போது, குரல் கிட்டேன்,
என் மாமா சொன்னான், "கூழ்
உண்டே!"
சோறு வைத்தால்,
நென்னிக்குப் பண்ணே,
அவன் நாற்காலியில்,
குதிக்கிறான், "கண்ணே!"
பொங்கலுக்கு உள்ளே, நான்
குழிக்கிறேன்,
அவன் பல்லைக்கு மேல்,
எப்போது கிளிக்கிறேன்!
என்னை நெஞ்சில் அழுதாலும்,
அவன் யோசிக்கிறான், "என்ன
பயம்!"
இந்த நாடகத்தில் நாங்கள்
இருவரும்,
சிரிக்க, சிரிக்க, உலகம்
மூழ்கும்!

B. Balaji
III YEAR

“காலை சிரிப்பு”

காலை நேரம், மணி ஏழு,
படுக்கையில் நான், “ஏன் நான்
தூங்க?”
வெள்ளை கிளி, சிரிக்கிறதா,
பைசா காட்டி, “சேய், நான்
வந்தேன்!”
சொல்லி விட்டேன், "இன்னும்
வராது,"
ஆனால் நண்பர் வந்தால்,
"சாப்பாடு!"
சாம்பார், சாதம், எனக்கெல்லாம்
ஆராய்ச்சி,
பத்து கோப்பை கூட, நான் ஒரு
ஸ்மார்ட் பண்ணி!
குடிக்குது காபி, பனிருச்சி,
பார்க்கும் போது எல்லாம், என்
கண்ணில் நிழல்.
இன்றும் நாளை, சிரிக்கிறேன்
நான்,
இந்த அன்றாடம், என் வாழ்க்கை
மழலை!

R. Dhanush
II YEAR

SOULFUL LINES

“ Everyday Adventures”

Morning breaks, the sun is high,
I stretch and yawn, let out a sigh.
My dog’s at my feet, ready to play,
“Come on, human! Let’s start the day!”
Coffee’s brewing, oh what a smell,
But first, a battle with my laundry spell.
Socks are missing, where did they go?
A sock thief lurks, putting on a show!
Out to the store for a little snack,
Got my list, but where’s my track?
Chocolate calls me, “Just one more bite!”
Who needs a plan when it feels so right?
Back home, I flop on the couch with glee,
These little moments are the best for me.
Laughing and living, with friends by my side,
Everyday adventures, a joyful ride!

M. Shankar
IV YEAR

“The Joy of Snacks”

In the kitchen, what do I see?
A cupboard full of goodies, just for me!
Cookies and chips, popcorn galore,
Every snack whispers, “Eat just one more!”
I grab a cookie, it crumbles with cheer,
“Who needs a diet? It’s snack time, my dear!”
Chocolate melts, sweet on my tongue,
With every bite, I feel so young.
A friend walks in, eyes wide with delight,
I smile and say, “Just a little taste!
In the world of snacks, there’s no time to waste!”
Finding happiness in the simplest way!

S. Pooja
III YEAR

ELEGANT STROKES

Subhashini

II YEAR

Gayathri

II YEAR

Srikanth

II YEAR

ELEGANT STROKES

Parthib Ram

II YEAR

Abisheik

II YEAR

Shomesh

II YEAR

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College Vision & Mission

VISION

"To become an Internationally Renowned Institution in Technical Education, Research, and Development by Transforming the Students into Competent Professionals with Leadership Skills and Ethical Values."

MISSION

- **Providing the Best Resources and Infrastructure.**
- **Creating a Learner-Centric Environment and Continuous -Learning.**
- **Promoting Effective Links with Intellectuals and Industries.**
- **Enriching Employability and Entrepreneurial Skills.**
- **Adapting to Changes for Sustainable Development.**

Department Vision & Mission

VISION

"To be a pioneer in Electrical and Electronics Engineering and to create electrical engineering experts with social responsibilities, for global industry needs."

MISSION

- **To facilitate the student's continuous learning with the best infrastructure and environment.**
- **To provide the students with skills, knowledge, and opportunities to function as members of multi-disciplinary teams.**
- **To Empower the students towards popular needs of industry, research, and development**
- **To enable the students to learn ethics, values and contribution to the society.**

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