

# THE SPARK

Igniting Innovations

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

JAN 2025



UNIVERSITY COLLEGE OF ENGINEERING KAKINADA (A)
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA





01 MESSAGES AND OPINIONS

04 EVENTS

02 ACHIEVEMENTS

05 ARTS & CULTURALS

#### 03 ARTICLES



# **ACHIEVEMENTS**

# Congratulations!

We are delighted to acknowledge your remarkable journey.



Dr. Venkat Reddy Kota, HOD and Professor of EEE, acknowledged and appreciated for his contributions as a reviewer in IEEE INDICON 2024 at IIT Kharagpur.

Ms. Killana Kavya of II B.Tech (24025A0256) participated in Viksit Bharat Essay Competition, a national level competition by Government of India. She also secured 1st position in essay writing competition by National Social Service of UCEK, JNTUK.





Ms. Kavitha T (23021D3410) - II M.Tech (AEPS)

has been selected for the position of "Post Graduate Engineer Trainee" with Larsen & Toubro Limited with a CTC of ₹ 6,80,000/- per annum.



#### Ms. Ravada Anita (23021D5207) - II M.Tech (PED)

has been selected for the position of "Post Graduate Engineer Trainee" with Aarvee Associates Architects Engineers & Consultants Pvt. Ltd. with a salary upto ₹ 40,000/- per month.

# Congratulations!

For securing internship at **Apollo Tyres Ltd.** with a stipend of



Ms. Vanumu Lakshmi Prasanna 21021A0203 IV B.Tech



Mr. Upadrasta V S Satya Sai Srivasta 21021A0238 IV B.Tech



Mr. Kanchumarthi Vara Prasad 21021A0242 IV B.Tech

# A GLIMPSE ON LIGHT POLLUTION

In truly dark skies, our Milky way is visible with the naked eye, a gift unique to Earth due to its atmosphere and shape without needing fancy telescopes or going beyond our planet. Even if we were to leave Earth to view the galaxy, we wouldn't experience this beauty in the same way. Earth's unique shape and atmosphere naturally focus the light of the galaxy into a clear band, giving us a wonderful picture of the Milky Way. But we still couldn't experience this beauty in these times. And that's because of light pollution, it is the kind of pollution that exploits the resource "light".



https://www.njconservation.org/light-pollution-erasing-views-of-the-stars-and-planets/

#### **Understanding Light Pollution:**

Light pollution occurs when artificial light overwhelms natural light. Let's explain it through

scenarios:

- The Brighter Light Wins: Imagine pointing a dim flashlight from an old phone and a bright flashlight from a smartphone in the same direction. The brighter light dominates making the dim one invisible. Similarly, bright city lights overpower-the faint:light of stars.
- Skyglow Effects Directing light toward a shadow makes it unclear, just like artificial light creates skyglow, reducing the contrast and clarity of celestial objects.
- Daylight Analogy: During the day, the sun's light hides stars. Similarly, artificial lights mimic this effect at night, making it hard to observe the stars.

#### **Environmental impact:**

Plants during the day, through photosynthesis, they produce oxygen, while at night, they respire, releasing CO2. Artificial lighting can disrupt these cycles.

Species like fish and zooplankton, which depend on these algae for food, also face difficulties, impacting the entire aquatic food chain.

Many pollinating insects are attracted to artificial lights, reducing their ability to pollinate plants effectively.

Animals that rely on plants for food or oxygen may face challenges if the plants' growth and life cycles are disturbed.

Light pollution confuses nocturnal animals like bats, reducing their ability to hunt insects, which are drawn to artificial lights.

Written by A. MEGHANA 22021A0236 III B. Tech

#### How dark sky reserves mitigate light pollution?

Dark sky reserves use specific lighting systems designed to reduce light pollution, such as:

- Fully Shielded Lights that direct light downward to avoid skyglow.
- Low-Intensity, Warm-Colored LEDs to minimize blue light emissions.
- Motion-Sensor or Timed Lighting to ensure lights are only used when necessary.
- Strict Lighting Regulations that Enforce rules on outdoor lighting, such as shielding and brightness limits.
- Public awareness to educate communities about the importance of reducing light pollution.
- Collaboration Work with engineers, planners, and policymakers to design eco-friendly lighting solutions.
- Use advanced lighting technologies, like adaptive lighting and renewable energy-powered fixtures.



View from the Hanle Dark-Sky Preserve, India

source: https://www.indiatoday.in/science/story/indias-first-dark-sky-reserve-in-hanle-conducts-star-party-under-the-milky-way-2450663-2023-10-18

Astronomers strongly oppose light pollution because it makes studying the night sky very difficult.

#### Here's why:

- Light pollution brightens the sky and hides faint stars and other objects in space.
- Telescopes study light from stars and galaxies at specific wavelengths.
- To avoid light pollution, astronomers have to build observatories in remote locations, like Mauna Kea in Hawaii or the Dark Sky Reserve in New Zealand. While these locations have clearer skies, building and maintaining observatories there is expensive and limits access for many researchers.

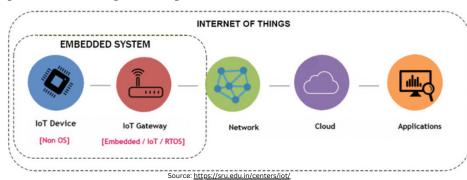
#### Some preventing methods to know:

- Develop lighting systems that can automatically adjust their brightness and spread based on the surrounding darkness levels.
- Install shields on light fixtures to direct light where it is needed and prevent it from spreading to unnecessary areas, such as the sky or neighbouring properties.
- Slowly, we must shift to light fixtures powered by renewable energy sources, such as solar or wind, to create a more sustainable and ecofriendly future.
- Additionally, opt for warm-colored LEDs instead of blue-rich lights, as warm light minimizes glare, reduces skyglow, and is less harmful to humans and wildlife.
- Establish dark sky reserves across the world at a low cost, focusing on preserving natural nightscapes. These reserves promote responsible lighting and protect areas from the impacts of light pollution.

All the awe we feel for artificial lighting today could leave future generations in awe of something as simple as experiencing the difference between night and day, a natural gift we've taken for granted and are now exploiting carelessly. Shouldn't sustainability be at the core of everything we do?"

#### EMBEDDED SYSTEMS: THE FOUNDATION OF IOT

Industry 4.0, also known as the fourth industrial revolution, merges the digital and physical worlds through the use of sensors, the Industrial Internet of Things (IIoT), and advanced technologies like artificial intelligence and machine learning. These innovations are integrated throughout research and development, manufacturing, supply chain, logistics, and other business sectors to gather and analyze real-time data. This transformation alters the processes of how parts and products are created, stored, utilized and maintained.



• IoT + Big Data = IIoT
The Internet of Things (IoT) is revolutionizing the world we live in. From smart homes to connected vehicles, IoT is changing the way we interact with technology. At the heart of IoT are embedded systems, which are responsible for collecting, processing, and transmitting data from sensors and other devices.

#### **BASIC UNDERSTANDING OF HOW IT WORKS**

An embedded system is a compact functional component within a larger device, designed to carry out a specific task. The heart of embedded systems is an integrated circuit engineered to facilitate computation processes and operations in real-time. Some examples of embedded systems include the controllers in washing machines, the engine management systems in cars, and the flight control systems in aircraft. They may feature no UI or have a fully developed graphical UI. (UI- User Interfacing)

In addition to the microcontroller, an IoT embedded system will typically include a range of sensors and other input devices. These sensors can include temperature sensors, humidity sensors, pressure sensors, and motion sensors. Other input devices can include cameras, microphones, and GPS receivers.

#### Why IoT and IoT Devices Needed Embedded Software?

To make IoT work seamlessly, it needs embedded software.

In the world of technology, the Internet of Things (IoT) has emerged as a revolutionary force. IoT refers to a network of interconnected devices that can communicate with one another via the internet without human involvement.

Well there are over 16 billion connected IoT devices across the globe. IoT devices are growing extremely fast because of their popularity, comfort, and huge demand.

#### Some advanced technologies include:

- Edge Computing
- Cybersecurity Layers
- DevOps in Embedded Engineering with CI/CD Pipelines
- System on Chip (SoC) Integration
- Sensor Fusion
- Real-Time Operating Systems (RTOS)
- Advanced communication protocols like 5G and LoRaWAN

#### Future prospective:

- The potential for embedded systems in the IoT landscape is immense, with billions of connected devices expected in the years ahead, highlighting the need for enhanced intelligence, efficiency, and security.
- Artificial intelligence (AI) and machine learning (ML) are revolutionizing embedded systems, facilitating data-driven decision-making processes.
- The integration of AI and ML within embedded systems supports applications such as predictive maintenance, computer vision, real-time data analytics, and intelligent automation.
- Edge computing is an emerging trend that is becoming increasingly significant in embedded systems, particularly with the growth of IoT.
- The deployment of 5G and advancements in communication technologies will offer faster, more reliable, and lower-latency connectivity for IoT devices.

AI's integration into IoT underscores the necessity of low-latency, high-bandwidth connectivity solutions such as 5G. The symbiotic relationship between IoT and AI amplifies the requirement for networks capable of supporting complex data ecosystems.

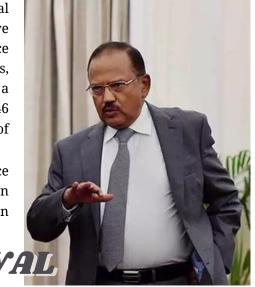
Written by

BORRA THULASI 22021A0248 III B.Tech

## THE INDIAN JAMES BOND

Ajit Kumar Doval, India's National Security Advisor since 2014, the real game changer who is renowned for his strategic acumen and decisive actions in safeguarding national security. A former Indian Police Service (IPS) officer, he served in the Intelligence Bureau (IB) for decades, specializing in counterterrorism and intelligence. He had played a crucial role in Operation Black Thunder in 1988, the extrication of 46 Indian nationals in Iraq, Operation Hot Pursuit in 2015, the sabotage of the PFI and many more.

Ajit Doval spent a major part of his career as an active field Intelligence officer with the Intelligence Bureau (IB). With a plethora of well-known awards, honours, and records to his credit, Doval has built a reputation for taking a strict stance against militancy and terrorism.



source: https://economictimes.indiatimes.com/people/meet-ajit-doval-indias-real-life-james-bond/indias-james-bond/slideshow/54405117.cms?from=mdr

Ajit Doval's combination of operational expertise, strategic

vision, and diplomatic skills make him a unique and influential figure in India's governance and security landscape.

Doval is also credited with the successful rescue of hostages during the IC-814 hijacking in Kandahar in 1999, where his negotiation skills were critical. Post-retirement, his strategies have shaped India's bold foreign policy. In 2016, he masterminded the surgical strikes in Pakistan-occupied Kashmir (PoK) following the Uri attack, showcasing India's offensive defense approach. Similarly, in 2019, his leadership was key during the Balakot airstrikes, retaliating against Pulwama's terrorist attack.

HERE ARE THE KEY ASPECTS THAT MAKE DOVAL TO STAND OUT BEYOND WELL DOCUMENTED OPERATIONS:

- Architect of India's Modern Security Doctrine.
- Diplomatic Negotiator.
- Vision for Counterterrorism.
- Pioneer of Intelligence Modernization.
- Influence on Foreign Policy.
- Focus on Internal Security and Social Harmony.
- Intellectual Contributions.
- Strategic Independence Advocate
- Administrator of India's Defense Modernization.

#### SECRETARY KERRY MEETS DOVAL



https://commons.wikimedia.org/wiki/File:Secretary\_Kerry\_Meets\_With\_Indian\_National\_Security\_Adviser\_Doval\_Amid\_Munich\_Security\_Conference.jpg

Secretary John Kerry's meeting with the National Security Advisor (NSA) likely focuses on integrating climate action into national security strategy. Climate change, a recognized global threat multiplier, impacts geopolitical stability, resource availability, and disaster resilience. As the U.S. Special Presidential Envoy for Climate, Kerry's discussions may involve aligning international climate commitments, such as those under COP agreements, with U.S. security objectives. Topics like energy security, transitioning to renewables, and mitigating climate-driven conflicts could be key. The meeting underscores the administration's view of climate change as a critical component of both foreign policy and national security planning.

Ajit Doval's strategic expertise and impactful career have also earned him immense respect globally, though his awards and honors are primarily from Indian institutions.

Written By CHALLA VENKATESH 23021A0205 II B.Tech

# **ARTS AND PHOTOGRAPHY**

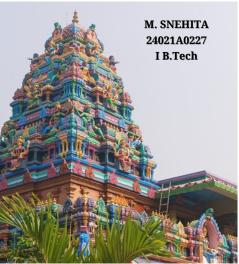


R.K. YASASWINI SATYA SREE 22021A0218 III B.Tech



K.S.N. SOWMYA 22021A0213 III B.Tech











# "WHISPERS OF THE FORGOTTEN"

## Episode 2:

## The exploration of the Forgotten



It was past midnight when Jai first noticed it—a soft, sweet fragrance drifting through the air, unlike anything he had smelled before. It wasn't the scent of flowers from the college gardens, nor was it the usual damp, musty odor that lingered around old hostel buildings. Especially not from this creepy place.

Jai and his three friends—Priya, Kumar, and arjun—stood at the entrance of the abandoned boys' hostel, which had been shut down for ten years. The doors were locked, and apart from some eerie-looking plants growing wildly along the walls, the place seemed completely lifeless.

Priya, always prepared for such adventures, took out a bottle containing a yellow liquid and poured it over the rusty lock. Within seconds, the lock melted away, and the door creaked open. A wave of darkness greeted them.

The night was moonless, and the air inside was thick and heavy. Their torches were the only source of light as they cautiously stepped in, the floorboards groaning under their weight. The scent that had led them here was stronger now—intoxicatingly sweet yet unsettling.

As they explored, Jai couldn't shake the feeling that something was off about the plants creeping along the walls and floors. The leaves were thick and waxy, the flowers disturbingly vibrant in the dim torchlight.

They got separated.

Somehow, in the span of moments, all four of them had wandered off in different directions. The corridors twisted unnaturally, making it impossible to tell which way they had come.

Kumar, the most superstitious of the group, was already trembling. His mind raced with tales of spirits and curses. Desperate, he started chanting prayers under his breath, his voice barely above a whisper.

And then—a bloodcurdling scream.

"KUMAR!"

Jai, Priya, and arjun sprinted toward the sound. Their torches flickered wildly as they ran, their breaths heavy with panic. They turned a corner, expecting to find their friend—

But everything went black.

---

"Jai, wake up! It's already nine."

Jai's eyes flew open. He was in his hostel room. The morning sun streamed through the windows,he then woke up and attended the class and the usual chatter of students filled the air.

His heart pounded as he looked around. Across the room, Priya, Kumar, and arjun were casually talking, laughing, acting as if nothing had happened.

Jai rubbed his temples. He remembered everything. The hostel. The fragrance. The plants. Kumar's scream.

But... why was he here?

What happened after they heard Kumar scream?

And why were his friends pretending like last night never even occurred?

...To Be Continued

# The Spark Igniting Innovations

## Our Team,

#### **Editor in Chief**

Dr. K.Venkata Reddy Head & Professor

#### **Issue Editor**

Dr. T. Murali Mohan Professor

#### **Associate Editors**

Smt.K.Vijaya Bhanu Assistant Professor(C)

Smt.J.Jyothsna Assistant Professor (C)

Dr.C.Naga Kota Reddy Assistant Professor (C)

#### **Student Members**

#### III B.Tech

Mr. T. Sai Govinda Krishna

Ms. B. Thulasi

Mr. R.D. Pavan Kumar

Mr. M. Jai Surya Mr. G. Naveen Sai

#### II B.Tech

Mr. G.Gnanendra Ms. G.Bhavitha

#### I B.Tech

Mr. J.Mist Ms. M.Snehita

### **Contact Details:**

Editor in Chief

Department of Electrical & Electronics Engineering. University College of Engineering Kakinada. Kakinada-533003,Andhra Pradesh. Mail.Id: thespark@jntucek.ac.in