College Insider

academics

Achievements

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Xavier Institute of Engineering

2025

Department of Information Technology

Departmental Vision

To nurture the joy of excellence in the world of Information Technology

Departmental Mission

M1: To develop the critical thinking ability of students by promoting interactive learning.

M2: To bridge the gap between industry and institute and give students the kind of exposure to the industrial requirements in current trends of developing technology.

M3: To promote learning and research methods and make them excel in the field of their study by becoming responsible while dealing with social concerns.

M4: To encourage students to pursue higher studies and provide them awareness on various career opportunities that are available.

Program Educational Objectives (PEOs)

PEO1: Information Technology Engineering Graduates shall be employed as IT Professionals, and shall engage themselves in learning, understanding and applying newly developed ideas and technologies as their field of study evolves.

PEO2: information Technology Engineering graduates shall be competent to use the learnt knowledge successfully in the diversified sectors of Industry, academia, research and work effectively in a multi-disciplinary environment.

PEO3: Information Technology Engineering Graduates shall be aware of professional ethics and create a social responsibility in the building the nation/society.

Program Specific Outcomes (PSOs)

Student will be able to :

PSO1: Demonstrate the ability to analyze and visualize the business domain and formulate appropriate information technology solutions.

PSO2: Apply various technologies like intelligent systes, Data mining, IOT, Cloud and Analytics,Computer and Network Security etc. for innovative solution to real time problems.

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THE DARK WEB EXPLAINED: HOW IT WORKS AND WHY IT STILL MATTERS

HARSH PATIL
FE-IT

Introduction

The dark web is one of the most mysterious and controversial corners of the internet. Often linked with illegal activities and cybercrime, it is a hidden network that prioritizes privacy and anonymity. But beyond its notorious reputation, the dark web plays a crucial role in protecting free speech, enabling secure communication, and safeguarding privacy in an age of growing digital surveillance.

Understanding the Dark Web

The dark web is a part of the internet that isn't indexed by traditional search engines like Google or Bing. It requires special software, such as Tor (The Onion Router), to access. Tor routes internet traffic through multiple encrypted layers, making it extremely difficult to trace users' identities or locations. This high level of anonymity makes the dark web a refuge for those seeking privacy but also a hotspot for illegal activities.

Key Developments & Applications

- **Privacy Protection:** The dark web provides a platform for journalists, activists, and whistleblowers to communicate safely without fear of government surveillance or corporate tracking.

- **Anonymous Marketplaces:** Though often associated with illegal goods, these markets reveal the need for stronger regulation and cybersecurity practices on the surface web as well.

- **Secure Communication Tools:** Many encrypted email services, chat platforms, and forums operate within the dark web to ensure the confidentiality of sensitive conversations.

Future Implications

- Freedom of Speech: In countries with strict censorship, the dark web can provide citizens with a platform to speak freely and share information.
- Evolving Cybersecurity: As cyber threats grow, law enforcement and cybersecurity professionals are investing more resources into monitoring and understanding dark web activities.
- Data Privacy: With increasing global concerns over personal data leaks, more everyday users may turn to dark web technologies to protect their online identities.

Challenges & Ethical Concerns

- Illegal Activities: The dark web hosts black markets for drugs, weapons, and stolen data, posing serious law enforcement challenges.
- Balancing Privacy and Security: Governments face ethical dilemmas in monitoring dark web activities without infringing on personal freedoms and rights to privacy.
- Misinformation and Harmful Content: Without regulation, the dark web can become a breeding ground for dangerous conspiracies, extremist propaganda, and malicious communities.

Conclusion

The dark web is a double-edged sword: it offers unmatched privacy and freedom but also harbors criminal activity and ethical risks. As the digital world continues to evolve, understanding the dark web's function and impact is essential for creating balanced strategies that protect privacy while ensuring online safety.

DATA POISONING: THE SILENT THREAT TO AI MODELS

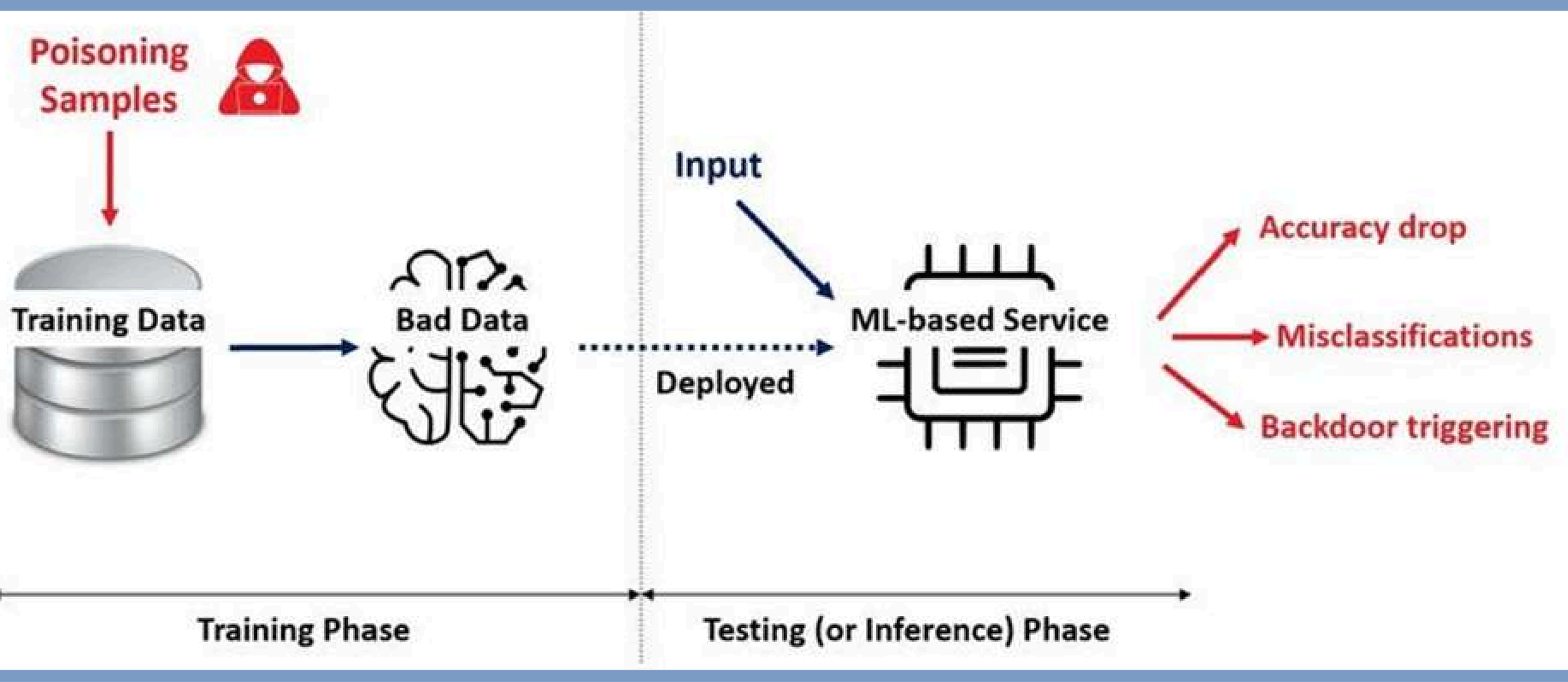
BHUMIKA D BHOIR
SE-IT

Artificial Intelligence (AI) is rapidly transforming industries, from healthcare and finance to autonomous systems and cybersecurity. However, as AI becomes more powerful, it also becomes more vulnerable to Data Poisoning attacks - a subtle yet highly effective method of corrupting machine learning (ML) models. Unlike traditional cyberattacks that target software or networks, data poisoning manipulates the very foundation of AI: the training data. By injecting false or misleading data into AI datasets, attackers can alter the behavior of an AI model, leading to biased, inaccurate, or even dangerous outcomes.

What is Data Poisoning?

Data poisoning is a type of adversarial attack where malicious data is deliberately introduced into an AI model's training set, influencing how the model learns and makes decisions. Since AI systems rely heavily on data-driven learning, even a small percentage of poisoned data can significantly impact their performance.

These attacks are particularly dangerous because they do not exploit software vulnerabilities or weak passwords; instead, they take advantage of the fundamental way AI models learn. This makes data poisoning much harder to detect compared to traditional cyber threats. Once an AI model is trained on corrupted data, it carries those flaws into real-world applications, where the consequences can be severe.



Types of Data Poisoning Attacks

1. **Availability Attacks**

In an availability attack, the goal is to degrade the overall performance of the AI model, making it unreliable or unusable. Attackers inject irrelevant or incorrect data into the training set, causing the model to produce random or erroneous predictions.

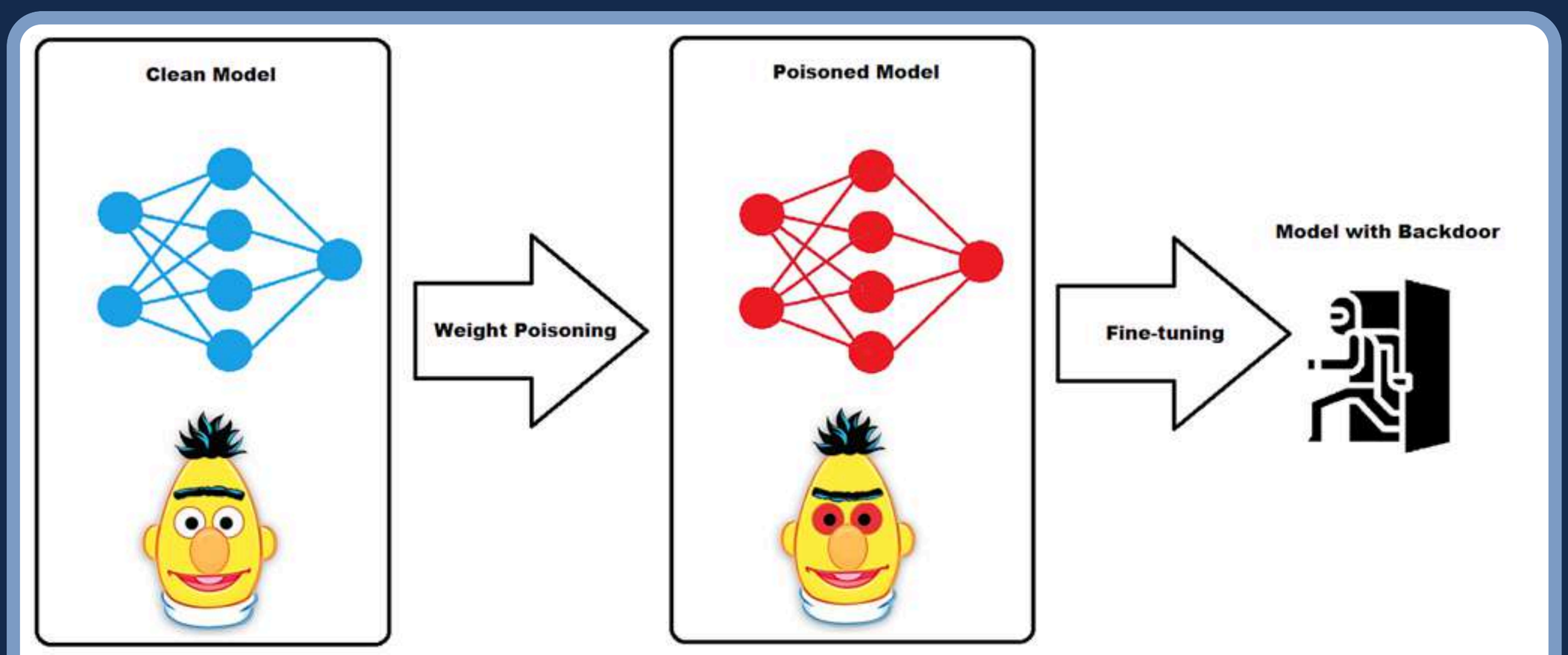
This type of attack is often used to sabotage AI-driven applications in fields such as cybersecurity, fraud detection, and recommendation systems.

2. Integrity Attacks

Integrity attacks are more targeted, focusing on specific aspects of an AI model to manipulate its predictions. For example, an attacker could poison a facial recognition system so that it misclassified certain individuals or allows unauthorized users to gain access. These attacks are particularly dangerous in security-sensitive applications like biometric authentication, banking systems, and surveillance.

3. Backdoor Attacks

A backdoor attack involves embedding hidden patterns or "triggers" in the training data. When the AI model encounters these triggers in real-world scenarios, it behaves in a pre-programmed way that benefits the attacker. For instance, an AI-powered spam filter trained on poisoned data may allow specific types of malicious emails to bypass security measures when a particular keyword is present.



Conclusion

Data poisoning represents a silent yet powerful threat to AI models, capable of disrupting industries and endangering lives. Unlike traditional cyber threats that attack software vulnerabilities, data poisoning exploits the learning process itself, making it particularly difficult to detect and mitigate.

As AI continues to shape the future, ensuring the integrity of training data is paramount. Organizations, researchers, and policymakers must collaborate to develop stronger defenses against data poisoning attacks. By implementing robust security measures and improving AI resilience, we can safeguard AI-driven systems from this hidden but dangerous threat.

In the battle between cybersecurity and adversaries, protecting AI from data poisoning will be one of the key challenges in the coming years. The question is: **Are we prepared?**

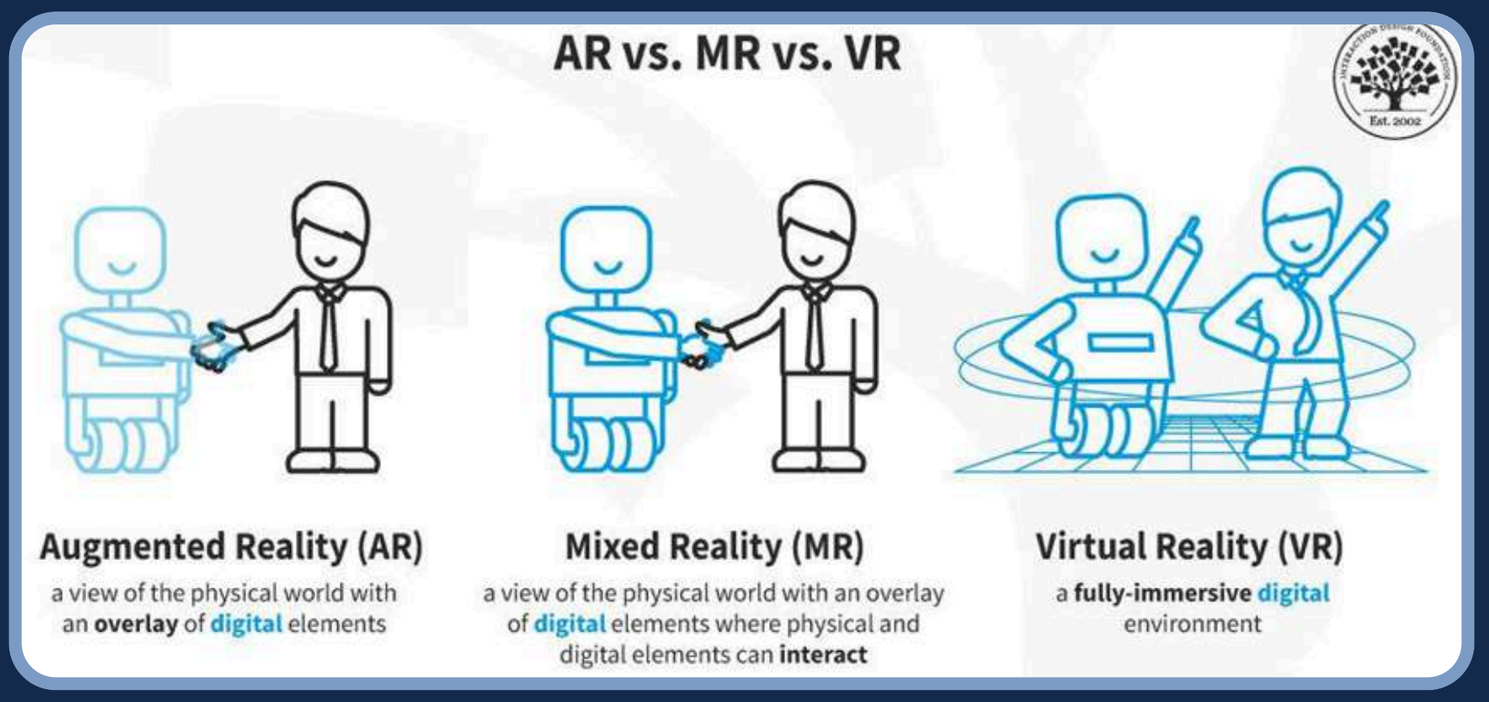
5G BEYOND CREATIVITY

ARYA SAWANT
SE-IT

The 5th generation of cellular wireless technology (5G) is a big step forward for mobile broadband as it will significantly **increase internet speeds, improve latency, and provide higher bandwidths**. It is an enormous economic opportunity that will unlock the potential of the internet of things (IoT), connecting a barrage of smart devices to the internet.

5G is expected to make **autonomous vehicles** possible, and enable virtual reality (VR) and augmented reality (AR) to perform critical tasks such as **remote surgery and telemedicine**. Real-time data processing using **artificial intelligence** (AI) will also receive a boost as 5G makes edge computing feasible. There are countless other applications still in the works.

Additionally, 5G will also be used to control water and electric supplies, integrating 5G with **critical infrastructures** of a country. **Intelligence and military applications** of 5G have received a lot of attention as well.

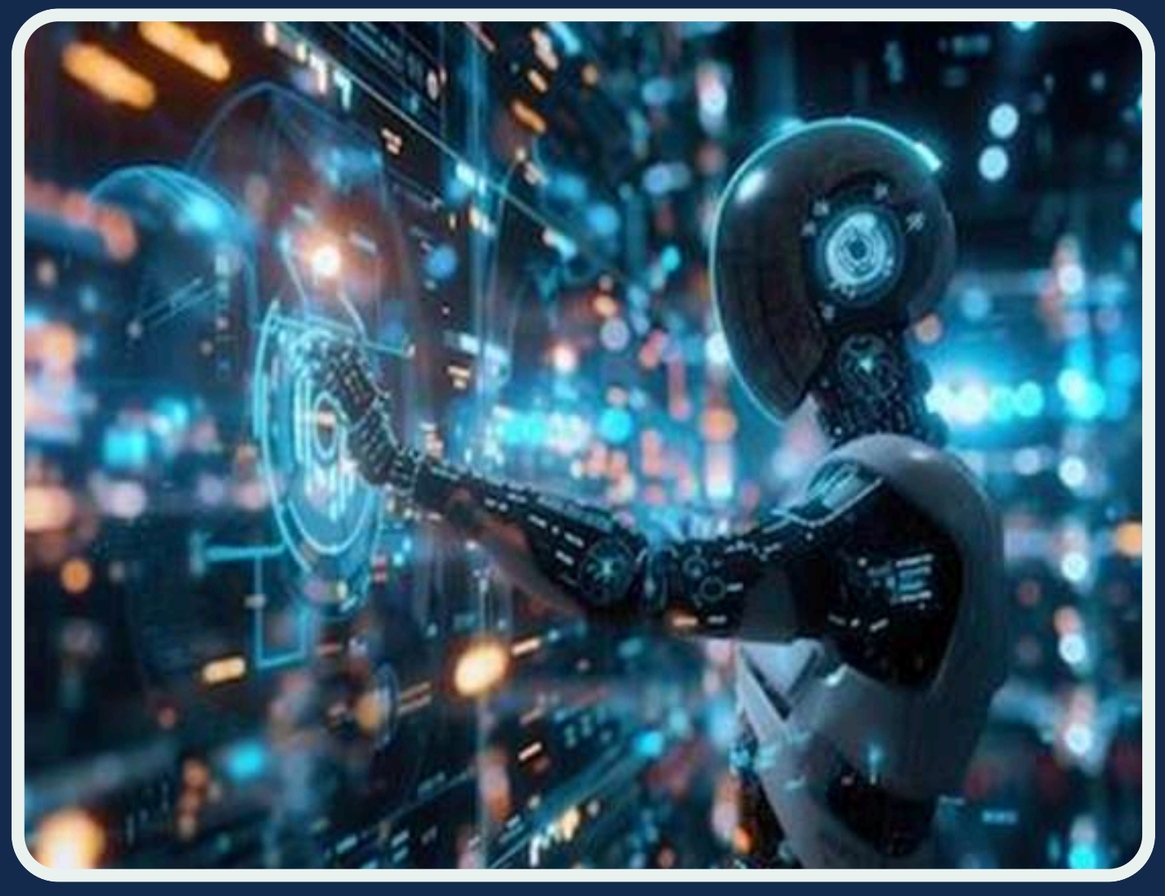


Immersive Experiences (AR/VR and XR)

- 5G allows for ultra-low latency and high data speeds, making augmented reality (AR), virtual reality (VR), and extended reality (XR) more seamless. Creative industries, including gaming, entertainment, and education, can now offer experiences that were once unimaginable. These technologies can be used for interactive storytelling, immersive training, virtual tourism, and remote collaboration.
- Beyond 5G (with 6G), ultra-realistic holograms and highly detailed simulations could be standard, creating new forms of interaction and content creation, from holographic concerts to fully immersive metaverses.

Autonomous Creativity (AI + 5G)

- 5G opens up possibilities for real-time communication between devices, machines to engage in creative tasks. In fields like photography, film production, and design, drones or robots could autonomously capture content, edit it, or even generate visual art on their own.
- As we look beyond 5G, AI will likely become even more capable, allowing for the real-time generation of creative content, from AI-generated music to dynamically crafted films, all aided by faster connectivity



Next-Generation Manufacturing

- 5G allows manufacturers to implement faster, smarter, and more connected supply chains, enabling the creation of more customizable, unique products. This includes advancements in the creation of personalized consumer products (like clothing, shoes, and tech gadgets), where consumer preferences can influence real-time design and production decisions.
- Beyond 5G could allow for true on-demand, hyper-customized manufacturing, where consumers influence product design in real-time through augmented reality and AI.

Conclusion:

5G and beyond will not just empower faster, more efficient communication; they will unlock completely new frontiers of creativity. From entertainment and healthcare to space exploration and sustainability, the potential for creative solutions will expand exponentially. As these technologies evolve, we can expect entirely new ways for humans to express themselves, collaborate, and create across a wide range of industries.

NEUROMORPHIC COMPUTING: THE FUTURE OF INTELLIGENT MACHINES

ABHISHEK KONGE
TE-IT

In the ever-evolving landscape of technology, one emerging field stands out for its potential to revolutionize the way we think about computing: Neuromorphic Computing. But what exactly is Neuromorphic Computing, and why should we care about it?

What is Neuromorphic Computing?

Neuromorphic Computing, also known as neuromorphic engineering, is an innovative approach to computing that mimics the structure and function of the human brain. Unlike traditional computers that rely on binary logic and sequential processing, neuromorphic systems are designed to emulate the neural networks found in biological brains. This means they can process information in a more parallel, efficient, and adaptive manner.

How Does It Work?

At the heart of Neuromorphic Computing are spiking neural networks (SNNs). These networks consist of artificial neurons and synapses that communicate through electrical spikes, much like the neurons in our brains. Each neuron in an SNN has its own charge, delay, and threshold values, allowing it to store and process data in a way that closely resembles biological neurons.

Real-World Applications

Neuromorphic Computing is not just a theoretical concept; it is already being applied in various domains. Here are a few examples:

- Autonomous Vehicles: Neuromorphic chips can process sensory data from cameras, radar, and lidar in real-time, enabling faster and more efficient decision-making for self-driving cars.
- Healthcare: Neuromorphic systems can be used to develop advanced prosthetics that mimic natural limb movements, improving the quality of life for amputees.
- Robotics: Robots equipped with neuromorphic processors can perform complex tasks with greater precision and efficiency, from industrial automation to space exploration.

The Road Ahead

While Neuromorphic Computing is still in its early stages, the potential it holds for the future is immense. As research and development continue to advance, we can expect to see even more innovative applications and breakthroughs in this exciting field.

In conclusion, Neuromorphic Computing represents a paradigm shift in the world of technology. By drawing inspiration from the human brain, it offers a new way to approach computing that is more efficient, adaptable, and scalable. As we continue to explore the possibilities of this emerging technology, one thing is clear: the future of intelligent machines is bright.

IT’S ROLE IN SPACE EXPLORATION: POWERING HUMANITY’S FINAL FRONTIER

MAYURESH BALSARAF
BE-IT

Space exploration has always been a testament to human ingenuity and curiosity. From the first moon landing to the exploration of Mars, technology has been the backbone of these remarkable achievements. At the heart of this technological revolution lies Information Technology (IT), which has transformed how we study and explore the cosmos.

Applications of IT in Space Exploration

1. Satellite Technology Satellites are the eyes and ears of modern space exploration. IT plays a critical role in designing, launching, and operating satellites that facilitate communication, Earth monitoring, and deep-space exploration. Advanced software systems enable satellites to collect and transmit data across vast distances with incredible precision.

2. Mission Control Systems Mission control centers rely heavily on IT infrastructure to monitor spacecraft in real time. These systems process massive amounts of data, ensuring seamless communication between Earth and space missions. They also support decision-making during critical moments, such as spacecraft landing or orbit adjustments.

3. Simulation and Training IT advancements in Virtual Reality (VR) and Augmented Reality (AR) have revolutionized astronaut training. These tools simulate the challenges of space missions, providing astronauts with hands-on experience in a risk-free environment.

Autonomous Systems and Robotics

Autonomous systems and robotics are crucial for exploring environments that are inhospitable to humans. IT enables the development and operation of autonomous rovers like NASA's Perseverance and drones like Ingenuity on Mars. These technologies gather data, conduct experiments, and even navigate challenging terrains without direct human intervention.

Future Innovations

The future of space exploration is intertwined with IT advancements:

- **Quantum Computing:** Quantum systems could revolutionize space simulations, enabling faster and more accurate calculations.
- **Space Internet:** Projects like Starlink aim to establish high-speed internet connectivity for space missions.
- **IoT in Spacecraft:** Internet of Things (IoT) devices could enhance spacecraft monitoring and maintenance.

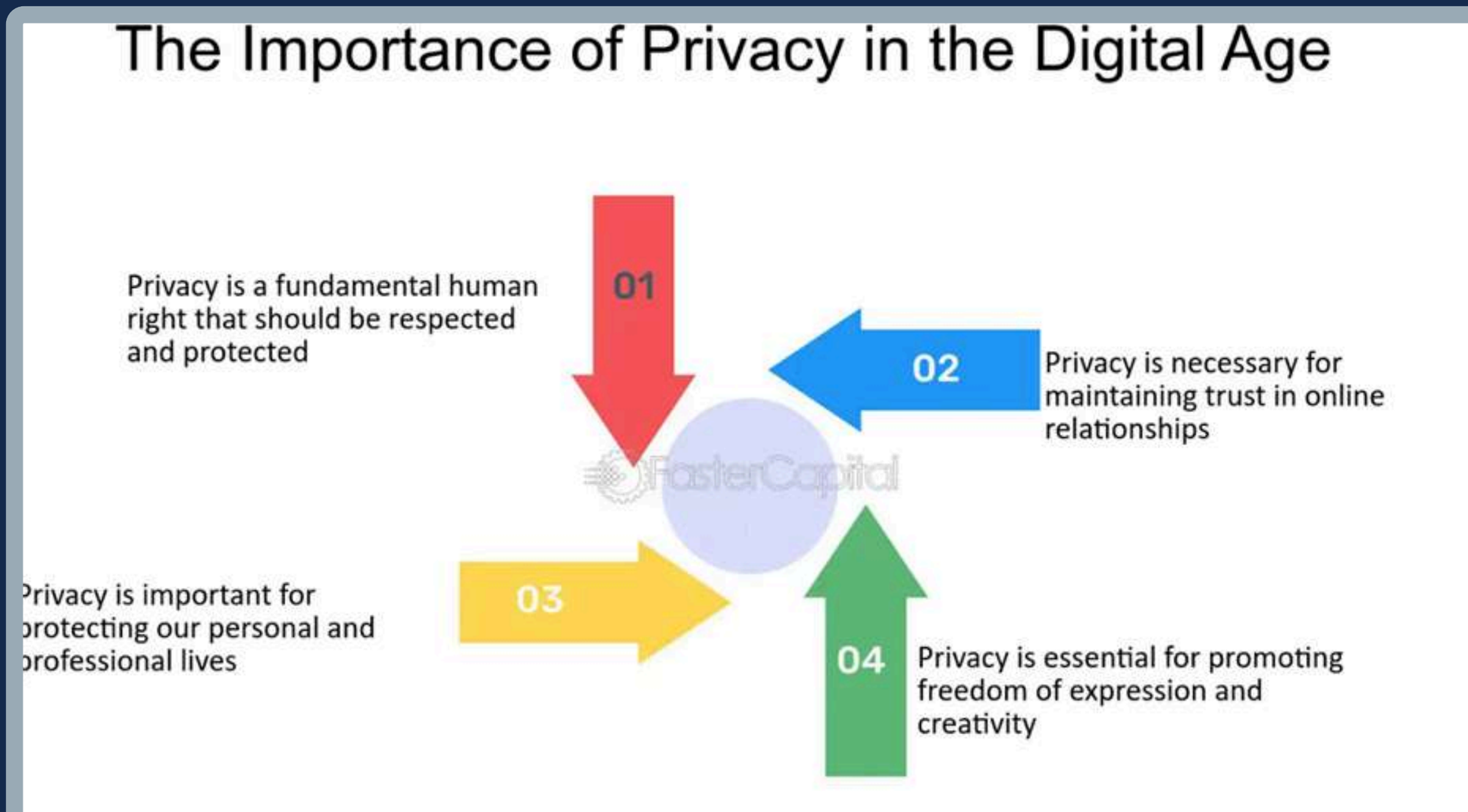
Challenges and Ethical Considerations

Despite its potential, IT in space exploration faces challenges such as managing space debris and ensuring ethical AI usage. IT solutions are being developed to track and mitigate debris, while policymakers discuss frameworks for ethical decision-making in AI-driven missions.

Conclusion

From managing satellites to enabling autonomous rovers, IT is at the core of modern space exploration. As humanity sets its sights on ambitious goals like colonizing Mars and exploring beyond our solar system, IT will continue to power these endeavors, pushing the boundaries of what's possible in the final frontier.

In today's connected world, data is a precious asset. From social media profiles to financial records, our lives are digitized. But with convenience comes risk, making data privacy a top priority.



What is Data Privacy?

Data privacy means protecting personal information from misuse. It ensures individuals control their data, prevents unauthorized use, and complies with laws like GDPR and CCPA.

Why Does It Matter?

- Protecting Identity: Shields against identity theft and fraud.
- Ensuring Freedom: Prevents unwarranted surveillance.
- Building Trust: Businesses gain customer confidence by safeguarding data.
- Legal Compliance: Avoids hefty fines and legal issues.

Key Challenges

- Data Breaches: Hackers target sensitive information.
- Tech Advances: AI and IoT raise privacy concerns.
- Lack of Awareness: Many users don’t know the risks.

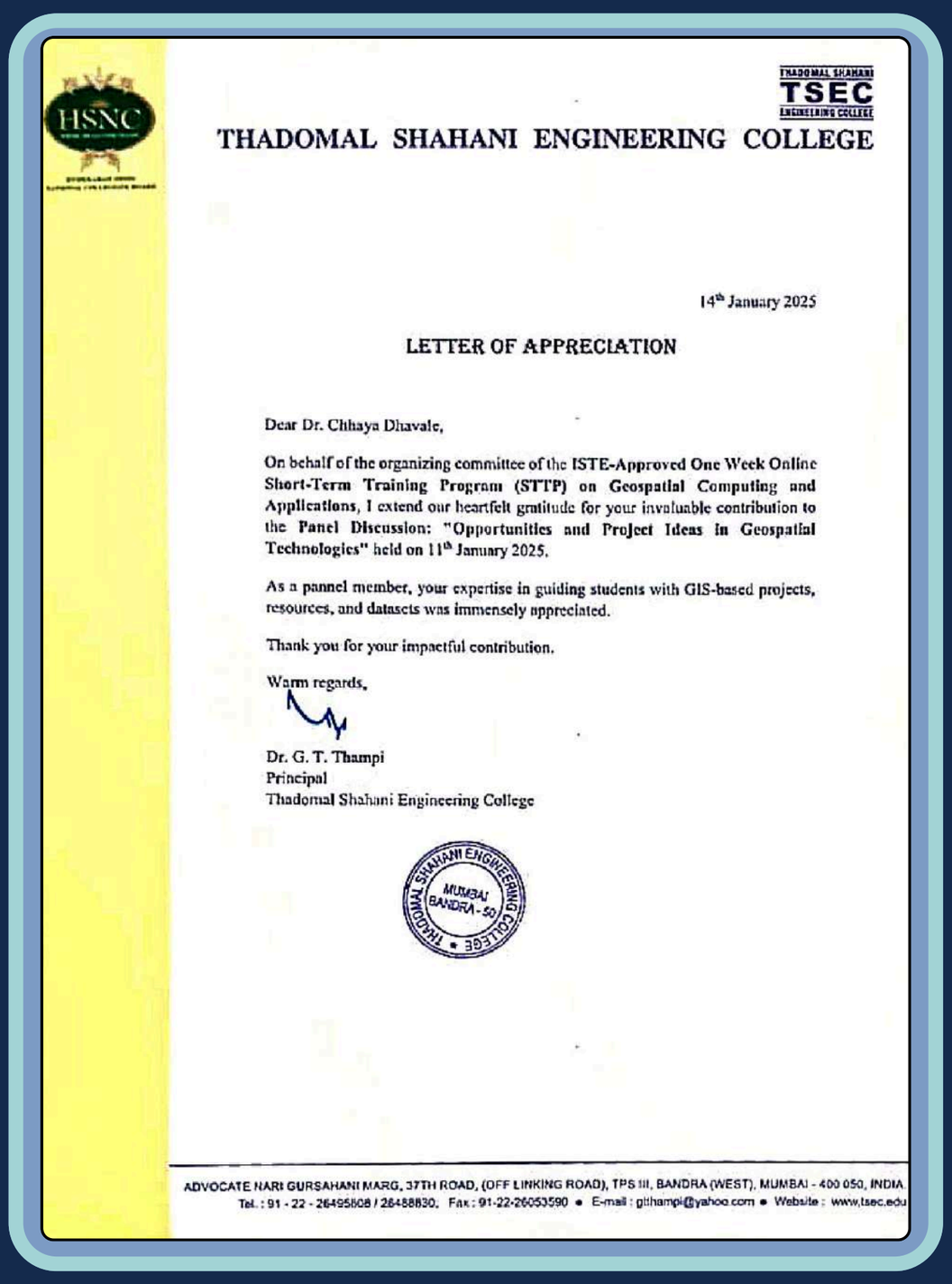
Looking Ahead

As technology evolves, privacy must remain a priority. Innovations like blockchain and stricter laws can shape a secure digital future.

Conclusion

Data privacy isn’t just a tech issue—it’s a basic right. By protecting data, we create a safer and more trustworthy digital world.

Achievements



THADOMAL SHAHANI ENGINEERING COLLEGE

14th January 2025

LETTER OF APPRECIATION

Dear Dr. Chhaya Dhavale,

On behalf of the organizing committee of the ISTE-Approved One Week Online Short-Term Training Program (STTP) on Geospatial Computing and Applications, I extend our heartfelt gratitude for your invaluable contribution to the Panel Discussion: "Opportunities and Project Ideas in Geospatial Technologies" held on 11th January 2025.

As a pannel member, your expertise in guiding students with GIS-based projects, resources, and datasets was immensely appreciated.

Thank you for your impactful contribution.

Warm regards,

Dr. G. T. Thampi
Principal
Thadomal Shahani Engineering College

THADOMAL SHAHANI ENGINEERING COLLEGE MUMBAI BANDRA - 50

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Prof. Chayya Dhavale received a LOA from Thadomal Shahani Engineering College, for her valuable contribution as a panel member in the ISTE-Approved One Week Online Short-Term Training Program (STTP) on **Geospatial Computing and Applications**. The appreciation was extended for her expertise in guiding students with GIS-based projects, resources, and datasets, significantly impacting the panel discussion on "Opportunities and Project Ideas in Geospatial Technologies," held on January 11, 2025.

Prof. Chhaya Dhavale

Assistant Professor of IT Department

Saket Jha, Vedang Nijap, Rohan Jaiswal, and Fardeen Shaikh, under the guidance of Prof. Stella J, presented their paper titled "Experimental Study and Analysis of Drone Flight Anomalies Using Motion Capture" at the International Conference on Innovation in Computing and Communication '25 held from 04/03/2025 to 05/03/2025 and were awarded the Best Paper Award.

Prof. Stella J.

Assistant Professor of IT Department

Prof. Martina D’souza, Assistant Professor in the IT Department, has successfully completed the AICTE Training and Learning (ATAL) Academy Faculty Development Program on “AI-Driven Growth: Shaping India’s Economy and Global Leadership.” The program was held at MCT’s Rajiv Gandhi Institute of Technology, Mumbai, from February 24, 2025, to March 1, 2025.

This intensive training provided valuable insights into the transformative role of artificial intelligence in driving economic growth and enhancing India’s global leadership. Prof. D’souza’s participation in this program reflects her commitment to staying at the forefront of technological advancements and integrating AI-driven strategies into academia and research.

Prof. Martina D’souza

Assistant Professor of IT Department

ATAL/2025/1738552757

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ATAL

ALL INDIA COUNCIL FOR TECHNICAL EDUCATION

Nelson Mandela Marg, Vasant Kunj, New Delhi -110070

AICTE Training and Learning (ATAL) Academy

Certificate

It is certified that ***Mrs. sulochana devi, Assistant Professor*** *of* ***Xavier institute of engineering*** *has successfully participated & completed AICTE Training And Learning (ATAL) Academy Faculty Development Program on* ***Leveraging Artificial Intelligence for Climate and Sustainability*** *at* ***K. J. Somaiya Institute of Technology*** *from* ***03/02/2025*** *to* ***08/02/2025.***

Radhika Kotecha
Professor Level (AICTE Institute), Coordinator
K. J. Somaiya Institute of Technology

Dr. Sunil Luthra
Director & Bureau Head
Training and Learning Bureau, AICTE

Prof. Sulochana Devi, received a certificate from the All India Council for Technical Education (AICTE) for successfully participating in and completing the AICTE Training and Learning (ATAL) Academy Faculty Development Program on "Leveraging Artificial Intelligence for Climate and Sustainability." The program was conducted at K. J. Somaiya Institute of Technology from February 3, 2025, to February 8, 2025.

Prof. Sulochana Devi

Assistant Professor of IT Department

Prof. Stella and Mr. Dharmaraj Stalin conducted an insightful seminar on "Robotics and Artificial Intelligence" for the students of St. Mary's School. The session provided an engaging overview of cutting-edge advancements in robotics and AI, highlighting their real-world applications and future potential. Through interactive discussions and demonstrations, the speakers inspired participants to explore the fascinating intersection of technology and innovation.

Prof. Stella J.

Assistant Professor of IT Department

Prof. Martina D’souza successfully completed a one-day Faculty Development Program (FDP) on “AI Tools for Academics”, organized by Xavier Institute of Engineering (XIE) in collaboration with JHEASA-West Zone on 18th January 2025.

The FDP aimed to enhance educators' understanding and application of artificial intelligence tools in academic settings, covering topics such as AI-assisted research, automated grading systems, and AI-driven content generation. Experts from the field shared insights on integrating AI into teaching methodologies to improve student engagement and learning outcomes.

Prof. Martina D’souza

Assistant Professor of IT Department

Nelson Kolas has successfully completed the AWS Cloud Practitioner Essentials course, demonstrating a strong foundational understanding of AWS cloud concepts, services, security, pricing, and best practices.

Nelson Kolas

BE - IT

OUR AMAZING CREW

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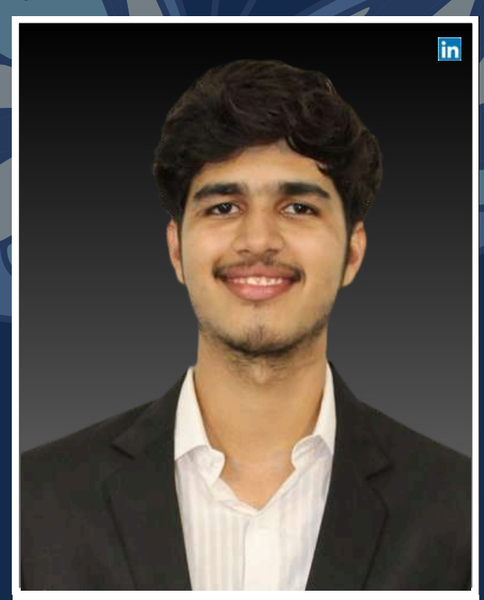

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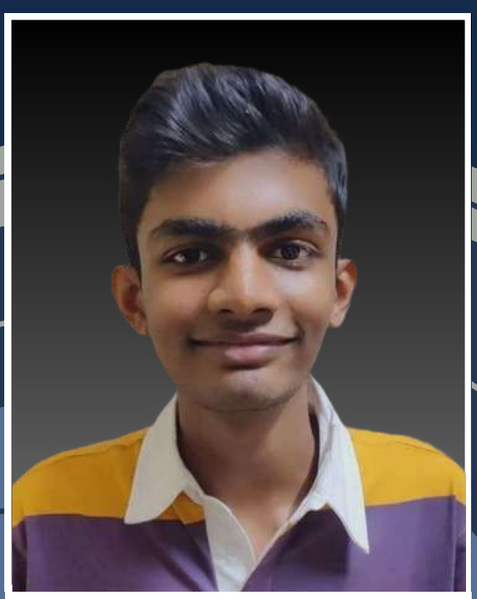

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