

AI&DS INSIGHTS



AI Growth & Education Trends

The global AI market is worth \$391B and is expected to reach \$1.8T by 2030. Around 50% of businesses use AI for big-data insights, and 97 million professionals work in AI roles. In Maharashtra, AI & Data Science courses now surpass Computer Engineering in popularity, with seats rising from 9,030 to 11,940.



**HOW MAHARASHTRA
POLICE'S MARVEL IS USING
AI TO FIGHT CRIME LIKE
NEVER BEFORE >>**

The MARVEL Initiative

In 2025, Maharashtra Police launched MARVEL, India's first state-level AI system for predictive policing, with a ₹23 crore investment. The central government set up the IndiaAI Safety Institute to develop ethical AI standards in partnership with global tech and academic leaders. Rajasthan is also set to unveil its AI Policy 2025, focusing on ethical AI, infrastructure, and ₹1,000 crore for innovation.



*"Excellence is not a skill,
it's an attitude."
– Ralph Marston*

Expert Talk on "Getting Ready for the Corporate World"

An insightful session on bridging academics with industry expectations, essential skills, and career preparedness. For detailed highlights and takeaways, refer to Page 4.

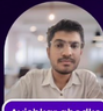
Achievement Spotlight

We are proud to share that **Hardik Vasant Rokde**, a student of Third Year, has brought laurels to our institution by securing the 3rd Prize in the Tutedude Buildathon, a prestigious National-Level Online Technical Competition.



Congratulations

To the **Winners Of Tutedude Buildathon**
72 hours Online Hackathon



Avishkar ghodke



Jineshwari Bagul



Anuj Gosavi



Hardik Rokde

Team VITEens

His outstanding performance stood out among numerous talented participants from across the country, earning him a cash prize of ₹10,000. This commendable achievement is a testament to Hardik's innovation, technical acumen, and unwavering dedication.

We extend our heartfelt congratulations and wish him continued success in all future endeavors.

We are thrilled to announce that **Hardik Vasant Rokde** from Third Year, Division A (Roll No. 57), has secured 3rd Prize in the Tutedude Buildathon – a prestigious National Level Online Technical Event.

His remarkable performance earned him a cash prize of ₹10,000.

A fantastic achievement that reflects innovation, dedication, and technical brilliance.

Five Days of Innovation: AI Bootcamp 2025 at VIT Pune

The Department of CSE-AI and AI & DS, VIT Pune, in collaboration with C-DAC Pune, hosted an immersive Five-Day Bootcamp on Artificial Intelligence, drawing participation from 160 second-year students eager to explore the ever-expanding horizons of AI.

Opening Ceremony

The inaugural session began with Saraswati Pujan, symbolizing the pursuit of knowledge, followed by insightful speeches from faculty leaders and industry experts. Dr. Nilesh Sable and other dignitaries outlined the objectives — blending theory, hands-on training, and industry-ready skills.

Impact

This bootcamp wasn't just about coding — it was about bridging classroom learning with real-world AI applications. Students left inspired, confident, and ready to take their AI journey to the next level.

"This was a game-changer for us. I now see AI not just as a subject, but as a tool to solve real problems," said one enthusiastic participant.



Day-by-Day Highlights

- Day 1: Foundation in AI concepts, trends, and history. Students got hands-on with Python basics, data preprocessing, and Git.
- Day 2: Mastery in Data Visualization using Matplotlib, Seaborn, Pandas, and NumPy, followed by an introduction to Machine Learning models and evaluation metrics.
- Day 3: Applied Linear Regression in ML, explored Deep Learning concepts like CNNs, RNNs, and GANs, and practiced building models in TensorFlow/Keras.
- Day 4: Deep dive into Computer Vision and OpenCV, from image processing to edge detection and video basics.
- Day 5: Introduction to Generative AI and NLP tasks like sentiment analysis, capped with sessions on Ethical & Responsible AI before the final MCQ assessment.



The session was well planned and organized by Dr. Renu Kachhoria and Mrs. Surbhi Kakde.



“Getting Ready for the Corporate World”

The Department of Artificial Intelligence and Data Science organized an expert session on “Getting Ready for the Corporate World” on 22nd July 2025. The session was conducted by Dr. Atul Kulkarni, Director of Corporate Relations, and Dr. Radhika Kulkarni, Associate Dean of Corporate Relations, both from VIT Pune. The speakers shared how important it is to connect what we learn in college with the real needs of the industry. They encouraged students to take up internships, work on practical projects, and keep learning new skills. They also spoke about what companies look for in new graduates, such as good communication, teamwork, adaptability. The session was very helpful for students preparing for their future careers.



Guidance for Higher Education Abroad

The Department of Artificial Intelligence and Data Science organized a division-wise career counselling session focused on higher education abroad. Held on the 23rd and 25th of July 2025, the sessions were conducted in various classrooms for Second Year (SY) and Third Year (TY) students. Each division followed a dedicated time slot, with venues including classrooms 2205, 1002, and the Sharad Arena. The event saw enthusiastic participation from over 150 students.

The sessions were led by expert representatives from Jamboree Institute – Ms. Rutuja Kulkarni and Ms. Satmita Banerji – who bring significant experience in overseas education counselling and standardized test preparation. The resource persons delivered comprehensive insights on various aspects of studying abroad, covering topics such as university applications, admission timelines, eligibility criteria, and the importance of tests like GRE, GMAT, TOEFL, and IELTS.

The key objectives of the event included building student awareness about global academic opportunities, demystifying international admission procedures, and providing financial planning guidance. The session also highlighted education systems and student life in popular destinations such as the USA, UK, Germany, Australia, and Canada. Importantly, it enabled direct interaction with experts and alumni who shared real-life experiences and practical tips for aspiring international students.

Session highlights included a deep dive into globally ranked universities and trending programs like MS in AI/ML, MIM, MIS, and PhDs. The speakers presented a step-by-step breakdown of application procedures, visa protocols, and scholarship opportunities. Students also learned about the importance of SOPs, letters of recommendation, and early preparation to secure admissions and funding.

“Capacity Building for Faculty and Students”

Dr. Shubham Joshi delivered an expert session on “Capacity Building for Faculty and Students” on 30-07-2025 during the Five Days Online Faculty Development Programme (FDP) on “Fostering Innovation & Start-Up Culture in Academic Institutions” organized by MBA Department of Pune Vidyarthi Griha’s College of Engineering, Technology & Management, Pune.

Student Article



OMAR KHAN
SY AI&DS-D



Technology of the Month

IOT AND CLOUD COMPUTING

The Internet of Things (IoT) is a transformative technology paradigm that involves the interconnection of everyday physical objects to the internet, allowing them to collect, send, and receive data. These objects—often called "smart" devices—can range from consumer gadgets like smartwatches, home assistants, and connected refrigerators to industrial equipment such as automated machinery, smart meters, and agricultural sensors. What makes IoT revolutionary is its ability to bridge the physical and digital worlds, enabling devices to monitor real-world conditions and respond intelligently. For instance, a smart thermostat can detect room temperature and adjust settings automatically based on user behavior or external weather conditions. In industries, IoT improves operational efficiency by enabling real-time tracking, condition-based maintenance, and automation, which reduces downtime and increases productivity.

However, the vast potential of IoT can only be realized with the help of cloud computing, which provides the backbone infrastructure needed to support this massive network of devices. Since IoT devices generate continuous streams of data, managing, storing, and processing that data locally would be highly inefficient and limited in scale. Cloud platforms like Amazon Web Services (AWS), Microsoft Azure, and Google Cloud offer on-demand, scalable resources that can handle large volumes of data with high availability. These platforms allow for centralized data storage, powerful computing for analytics or artificial intelligence, and remote management of IoT devices. They also support real-time updates, software patching, and scalability, which are crucial for businesses deploying thousands or even millions of connected devices. Additionally, cloud services ensure data redundancy and backup, which enhances security and reliability in critical applications like healthcare, finance, or autonomous systems.

The integration of IoT with cloud computing is a key driver of digital transformation across industries. In smart cities, IoT sensors track traffic, pollution, and energy use, with cloud platforms optimizing services and urban planning. In healthcare, wearable devices monitor patient vitals and upload data to the cloud for real-time alerts, enabling remote care. In agriculture, IoT sensors connected to the cloud help optimize irrigation and fertilization for better crop yields. Consumer tech, like smart homes and fitness apps, also relies on cloud-IoT synergy for automation and personalization. This combination empowers data-driven decisions, enhances operations, and creates scalable, adaptable systems for the future. Ultimately, the future of IoT hinges on its integration with intelligent cloud infrastructure.

Architecture of IoT and Cloud Integration

- **Device Layer:** Sensors and actuators collect data (e.g., temperature, motion) using protocols like MQTT or CoAP.
- **Network Layer:** Data travels via Wi-Fi, Zigbee, or 5G, with gateways handling preprocessing.
- **Cloud Layer:** Platforms like AWS, Azure, or Google Cloud manage devices, data, and updates.
- **Data Intelligence:** Cloud analyzes real-time data, enabling automation and smart responses.

Real-World Applications

- **Smart Homes:** Devices like lights and thermostats use cloud control for automation and personalized settings.
- **Healthcare:** Wearables track vitals, enabling remote monitoring and early diagnosis via cloud platforms.
- **Agriculture:** Sensors monitor soil and weather; cloud analytics optimize irrigation and boost crop yield.
- **Smart Cities:** Sensors track traffic and pollution; cloud data improves services and urban planning.

Challenges and Security in IoT-Cloud Ecosystems

- **Security & Privacy:** Sensitive data requires encryption, secure logins, and protected APIs to prevent breaches.
- **Latency Issues:** Cloud delays affect real-time tasks; edge computing ensures faster local responses.
- **Scalability:** Managing many devices needs strong cloud support for updates, data flow, and control.
- **Compatibility:** Diverse protocols hinder integration; standards and unified platforms ease connectivity.

The Internet of Things (IoT) is transforming industries by enabling smarter homes, healthcare, agriculture, and cities through real-time data and automation. However, to fully harness its potential, challenges like security, latency, scalability, and device compatibility must be addressed. With advancements in edge computing, cloud infrastructure, and standardization, IoT continues to evolve as a key driver of digital transformation and intelligent systems.



Suggested Models for Federated Learning in Cybersecurity

Use Case	Recommended Model	Why?
IoT Intrusion Detection	FedProx + LSTM	Handles non-IID data and time-based threats
Mobile Malware Detection	FedPer + CNN	Learns general + device-specific patterns
Cross-organization IDS	FedAvg+ Transformer	Simple, scalable, works on mixed logs
Personalized Phishing Detection	FedPer	Local adaptation for user-specific behavior
Real-time Network Anomaly Detection	FedDyn+ Autoencoder	Robust and adaptive to network changes

“Future Directions”

- 1 Integration with Blockchain: Combining FL with blockchain can offer tamper-proof logging of model updates and improve trust among participating nodes.
- 2 Adaptive Federated Learning: Dynamic selection of participating clients based on trustworthiness, data relevance, or system performance to enhance model robustness.
- 3 Privacy Enhancing Technologies: Adoption of techniques like Differential Privacy and Homomorphic Encryption.
- 4 Cross-Silo and Cross-Device FL: Future FL systems may blend both paradigms across organizations (silos) and individual devices for holistic cybersecurity.
- 5 Explainable Federated Learning: Ensuring FL models are interpretable and auditable is essential for cybersecurity analysts to trust and verify outcomes.

In conclusion, the future of Federated Learning (FL) in cybersecurity lies in its integration with advanced technologies and trust-building mechanisms. Incorporating blockchain ensures tamper-proof records and transparency in model updates, while adaptive FL allows intelligent client selection to enhance model performance and reliability. The adoption of privacy-enhancing techniques like Differential Privacy and Homomorphic Encryption further strengthens data protection. Moreover, combining cross-silo and cross-device FL enables a unified and scalable approach across organizations and individual users. Finally, the emphasis on explainable FL ensures that models remain interpretable and trustworthy for cybersecurity analysts, paving the way for more secure and accountable AI systems.

Faculty Publication

Faculty Member	Paper Title	Summary
Prof. Ratna Patil	NUTRILENS: An AI Powered Nutritional Analysis Paper ID: 1462	Presented at ICCCNT 2025, this paper proposes an AI-based system to analyze nutritional intake, promoting better health habits.
Prof. Ratna Patil	Multi-Language Email Generator Using Streamlit, Gemini AI, and NLP Paper ID: 4096	Introduces a smart tool leveraging AI and NLP to generate multilingual emails via Streamlit, enhancing global communication.

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For feedback and Query Scan this.

