



TECHPULSE

THE NEWSLETTER OF THE DEPARTMENT OF
COMPUTER SCIENCE AND ENGINEERING

ISSUE 8

2025-26



INNOVATE



CODE



ENGINEER



INSPIRE

AI

Fr. Conceicao Rodrigues
College of Engineering

FRCRCE

LEARN. INNOVATE. EXCEL.
TOGETHER, WE BUILD THE FUTURE.





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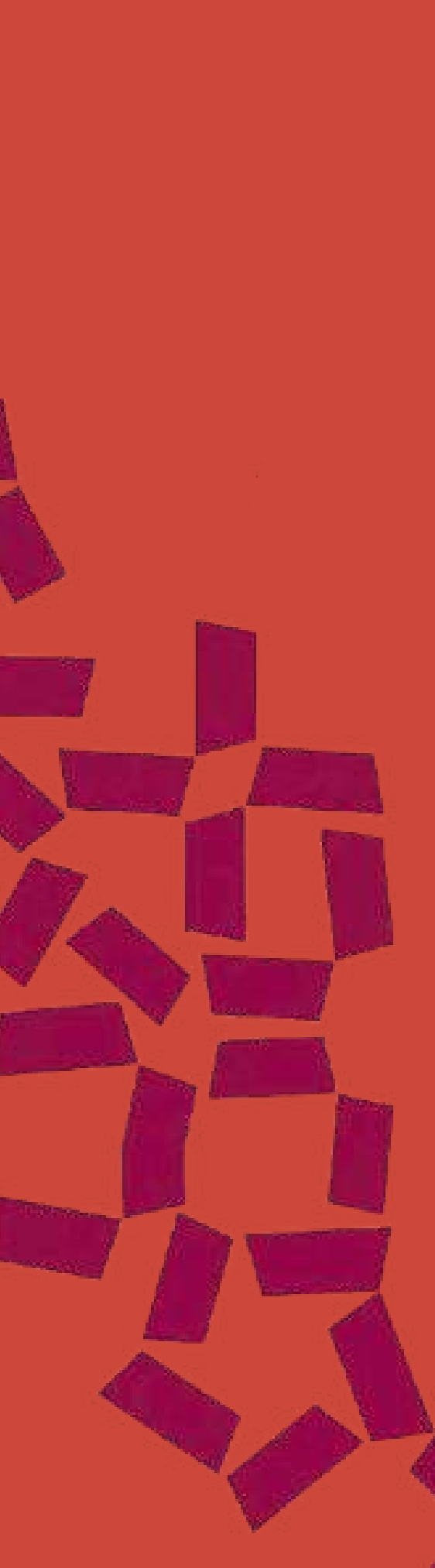
FOREWORD

FROM OUR HOD

Artificial Intelligence has moved rapidly from theory to practice. What students once encountered only in textbooks or research discussions now is already embedded in our everyday lives—powering smartphones, search engines, streaming platforms, navigation systems, healthcare diagnostics, financial systems, and even creative tools. As a result, Industry today demands more than degrees.

Employers increasingly prioritize skills, adaptability, and hands-on experience over formal qualifications. For students of Computer domain, this moment presents both an extraordinary opportunity and an intensely competitive challenge.

The role of engineers is not disappearing; it is evolving. Engineers who understand how to integrate AI tools into problem-solving, evaluate outcomes critically, and apply technology responsibly will define the next generation of innovation. Career paths in areas such as machine learning, data science, computer vision, and AI-enabled product development are already expanding across industries.



Preparing for this shift requires a focus on core competencies such as AI awareness, data understanding, ethical responsibility, analytical thinking, and lifelong learning. Beyond classroom learning, hands-on projects, internships, online courses, and participation in technical communities are essential. Even a few focused hours of learning each week can make a significant difference over time.

As a department, we are committed to supporting skill-based, future-oriented learning. At the same time, personal initiative remains the most important factor in professional success. You are entering the profession at a defining moment in history. The same technology that increases competition also democratizes opportunity. Students from any background, and any starting point can build successful careers—provided they are willing to learn, adapt, and evolve.

Do not view Artificial Intelligence with hesitation. Learn to use it thoughtfully. Work alongside it effectively. Apply it responsibly.

The future will not be shaped by machines alone, but by engineers who are prepared to guide and govern their use.

Dr. Jagruti Save

“The illiterate of the 21st century will not be those who cannot read and write, but those who cannot learn, unlearn, and relearn.”

- Alvin Toffler

EDITORIAL NOTE

विद्या ददाति विनयं विनयाद् याति पात्रताम् ।
पात्रत्वाद्धनमाप्नोति धनाद्धर्मं ततः सुखम् ॥



“Knowledge bestows humility; humility leads to worthiness; worthiness brings prosperity; prosperity enables righteous living, and righteousness ultimately leads to happiness.”

This timeless Sanskrit verse beautifully captures the essence of education and lifelong learning. It reminds us that true knowledge is not merely the accumulation of information but a journey of continuous growth, humility, and service. It is in this spirit that I take immense pleasure in presenting this edition of our department newsletter.

As we continue this journey of documenting and celebrating the achievements, innovations, and memorable moments of our department, I am reminded of how far we have come since the inception of the newsletter in 2019.

What began as a modest initiative to capture the vibrant academic, cultural, and extracurricular activities of our department has gradually evolved into a meaningful platform for communication, creativity, and community engagement.

Serving as the Faculty Editor throughout these years has been a truly enriching experience. It has provided me with the opportunity to interact with students, faculty members, alumni, and other stakeholders, each contributing unique stories that reflect the values, aspirations, and collective spirit of our department.

I extend my heartfelt gratitude to the entire editorial team for their unwavering support, dedication, and hard work. As we move forward, I hope this newsletter continues to inspire, inform, and strengthen the bonds within our academic community.

Faculty Editor
Prof. Garima Tripathi



PROGRAM SPECIFIC OUTCOMES (PSO)

Students will be able to

1. Apply computational thinking, algorithmic design and software development principles to build efficient computing solutions.
2. Develop scalable and intelligent computing solutions using emerging technologies such as Artificial Intelligence, Data Science and Distributed Systems to solve complex problems.

PROGRAM EDUCATIONAL OBJECTIVES (PEO)

Graduates will be able to

1. Design, develop and implement innovative computing solutions that promote sustainable development and socio-economic growth.
2. Pursue lifelong learning and advanced education by adapting to evolving technologies and diverse career opportunities.

❖ VISION ❖

To achieve excellence in Computer Science education by nurturing technically competent and socially responsible professionals who solve real-world problems.

❖ MISSION ❖

- To Facilitate an excellent scholastic environment for students and faculty to promote research, innovation and interdisciplinary learning.
- Foster a culture of experiential learning and sustainable practices through projects, internships and industry engagement.
- Promote participation in co-curricular and extra-curricular activities to build integrity, communication, teamwork and leadership.

ALUMNI

SPOTLIGHT

Looking back, my college years were some of the most memorable and important years of my life. Beyond academics, they taught me how to think critically, work with people, and keep learning even when things got challenging. The support and guidance from my professors, along with the friendships I built, played a huge role in shaping who I am today.



After graduation, I started my journey in cybersecurity and now work in the AI and Machine Learning domain, building intelligent solutions to solve real-world security challenges. Many of the concepts and problem-solving skills I use today have their roots in what I learned during my time in college.

I will always be grateful to the department and my teachers for believing in me and encouraging me to grow. I hope the current students make the most of every opportunity, stay curious, and never stop learning. College is just the beginning of an exciting journey.

Rishabh Pathak
2025 Graduate



VOICES OF CAMPUS

Choosing Artificial Intelligence and Data Science at Fr. Conceicao Rodrigues College of Engineering was one of the best decisions I've ever made. What began as a fascination with AI turned into an incredible four-year journey of growth, learning, and unforgettable memories.

With the constant support of my faculty and classmates, I became the branch topper, participated in multiple hackathons, and secured my dream job along with one of the college's best placements.

Beyond academics, we celebrated countless victories together, including winning every major college trophy. This department didn't just help me build a career - it helped me build the person I am today.

Aditya Rathod
BE AI&DS



TE was a year of learning, adapting, and growing in many ways. The academic workload was definitely more challenging, but it helped me become more disciplined and confident. Along with regular lectures, practicals, and projects, the introduction of the Campus Credentials course gave us an opportunity to improve our communication, aptitude, and interview skills, making us better prepared for placements.

Beyond academics, the year was filled with teamwork, new friendships, and memorable moments with classmates and faculty. Every experience, whether easy or challenging, taught me something valuable. Looking back, I'm grateful for everything this year has given me and excited for the journey ahead.

Aarya Nawar
TE AI&DS



I was fortunate to learn under supportive faculty and study alongside a highly cooperative and genuine group of friends. Year 2 also helped me become more disciplined academically and improve my daily routine, which strengthened my focus.

Serving as the Class Representative in SE was a valuable and memorable experience. The role helped me develop leadership, accountability,

and the ability to make considerate decisions for the class. Participation in hackathons, StuCo events, and the ACM Student Chapter's Shark Tank event added to my learning. Euphoria 26 further strengthened our class spirit overall.

Aaradhya Raut
SE CSE



My experience as a first-year student in the CSE department at FRCRCE has been nothing short of transformative. It has been a constant journey of learning, growth and self-discovery, both from within and beyond the classroom. From being a part of workshops and hackathons to professional clubs like GDSC and experiencing our fest Euphoria, every opportunity has pushed me to develop in all aspects, be it academics, technical, or social.

The department has broadened my perspective, introduced me to diverse career paths, and sparked interests I never knew I had. Looking back, I feel grateful for the guidance and exposure I've received and am excited for everything the next three years at CSE department have to offer.

Tanisha Suresh Chary
FE CSE-C

FACES OF THE CAMPUS



FE CSE-A



FE CSE-B



FE CSE-C



SE CSE

TE AI&DS



BE AI&DS

FACULTY ACHIEVEMENTS



Dr. Jagruti Save received the Most Influential Professor Award (Nov 2025).

Dr. Jagruti Save also delivered a guest lecture in a webinar on 4th Oct 2025 on the topic “ANOVA” for students of A. P. Shah Institute of Technology.

Parshwanath Education Trust
A. P. Shah Institute of Technology
Affiliated to University of Mumbai, Approved by AICTE Delhi & DTE

Department of Computer Science and Engineering
(Artificial Intelligence and Machine Learning)

A webinar on
ANOVA

Content :

- Introduction
- Types of ANOVA
- F test
- Kruskal-Wallis test
- Friedman's test

Co-ordinator :
Prof. Sumeet Shingl
Assistant Professor,
Dept. of CSE (AIML), APSIT

Date : October 4th, 2025
Time : 11.00 AM
Mode : Online

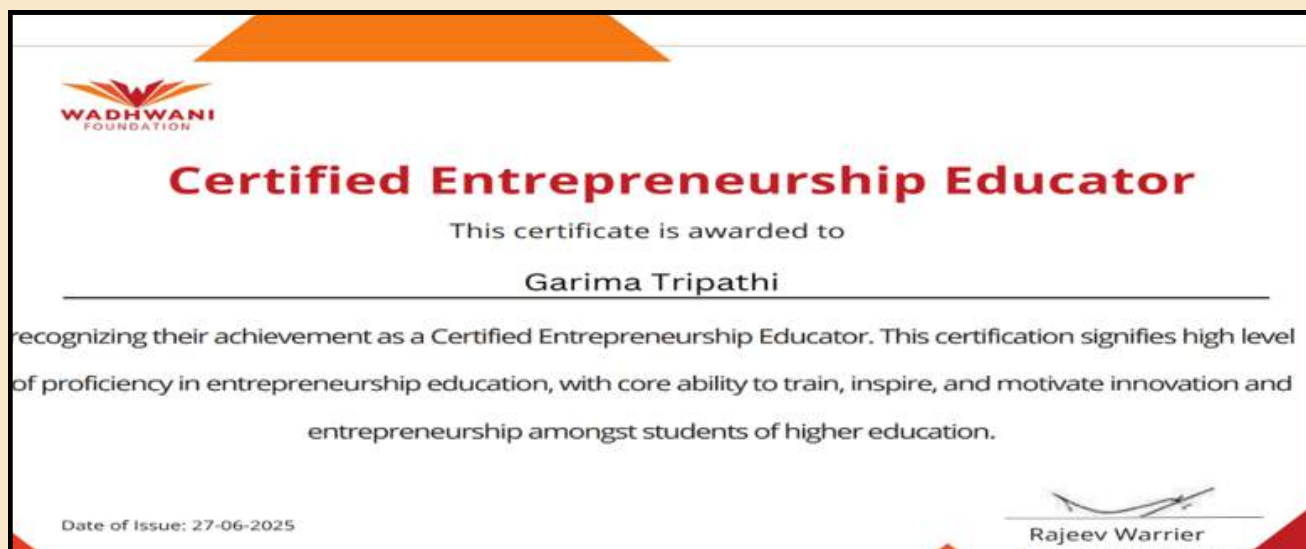
Dr. Jagruti Save
Guest Speaker



Dr. Jagruti Save served as a resource person and delivered a lecture on the topic “Upskilling Ourselves to Deal with the New Reality Posed by AI.”



St. Paul's Communication Centre, Bandra
9th August 2025



**Mrs. Garima Tripathi – Certified Entrepreneurship Educator
(Wadhvani Foundation, July 2025).**



- ✧ Dr. Dipali Koshti served as a Resource Person for one week ISTE approved STTP on **“Emerging significance of AI across key technological domains”** organized by VPM’s Maharshi Parshuram College of Engineering, Velneswar from 1st July 2025 to 5th July 2025. Took session on 4th July 2025 (topic: AI in Big Data Analytics)
- ✧ Dr. Dipali Koshti served as a Session Chair for the 8th IEEE International conference of **“Emerging Smart Computing and Informatics (ESCI-2026)”** held on 11th to 13th March 2026.
- ✧ Dr. Dipali Koshti served as a Resource person for one week ISTE approved STTP on **“Agentic AI”**
Topic - Building AI agents with Zapier and n8n for Multiple domains
organized by Fr. CRCE from 1st December 2025 to 6th December 2025

Dr. Dipali Koshti

was granted a patent on 17/03/2026 for the project titled

“EDU-VQA - A Multimodal Multi-Knowledge Open-Domain Visual Question Answering Model For Education.”

This remarkable achievement marks a significant milestone, and we extend our heartfelt congratulations to Dr. Koshti for this accomplishment and contribution to innovation.



Dr. Sarika Davare

was granted a patent on 03/10/2025 for the project titled

“Doc Assist: AI Doctor's Assistant.”

This achievement highlights her commitment to advancing innovative ideas and creating impactful solutions. We congratulate Dr. Davare on this proud moment and wish her continued growth and success ahead.



FACULTY CERTIFICATIONS



Elite NPTEL ONLINE CERTIFICATION

(Funded by the MoE, Govt. of India)

This certificate is awarded to
SAURABH KESHAV KULKARNI
for successfully completing the course
Yoga and Positive Psychology for Managing Career and Life

with a consolidated score of **82** %

Online Assignments	23.13/25	Proctored Exam	59.01/75
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Total number of candidates certified in this course: **1158**

Aug-Oct 2025
(8 week course)


Prof. Sridhar Iyer
Head CDEEP & NPTEL Coordinator
IIT Bombay

**Indian Institute of Technology Bombay**

Roll No:NPTEL25MG104S463703143 To verify the certificate  No. of credits recommended: 2 or 3



Elite NPTEL ONLINE CERTIFICATION

(Funded by the MoE, Govt. of India)

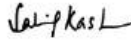
This certificate is awarded to
SAVITA BHAGAWAN BOROLE
for successfully completing the course
Neural Networks for Computer Vision and Natural Language Processing

with a consolidated score of **94** %

Online Assignments	25/25	Proctored Exam	69/75
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Total number of candidates certified in this course: **1323**

Jan-Apr 2026
(12 week course)


Dr. Salil Kashyap
Coordinator, Centre for Educational Technology,
IIT Guwahati

**Indian Institute of Technology Guwahati**

Roll No:NPTEL26CS04S961300574 To verify the certificate  No. of credits recommended: 4



Elite NPTEL ONLINE CERTIFICATION

(Funded by the MoE, Govt. of India)

This certificate is awarded to
DIPALI KOSHTI
for successfully completing the course
Foundations of Deep Learning: Concepts and Applications

with a consolidated score of **81** %

Online Assignments	25/25	Proctored Exam	55.5/75
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Total number of candidates certified in this course: **3739**

Jan-Apr 2026
(12 week course)


Prof. L. Umanand
NPTEL Coordinator & Chair, Centre for Continuing Education, IISc Bangalore

**Indian Institute of Science Bangalore**

Roll No:NPTEL26CS01S1061301231 To verify the certificate  No. of credits recommended: 4



Elite NPTEL ONLINE CERTIFICATION

(Funded by the MoE, Govt. of India)

This certificate is awarded to
SARIKA DAVARE
for successfully completing the course
Fundamentals of Object Oriented Programming

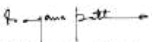
with a consolidated score of **85** %

Online Assignments	20.56/25	Proctored Exam	64.5/75
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Total number of candidates certified in this course: **4549**

Jan-Apr 2026
(12 week course)


Prof. Kaushik Ghosh,
Professor (Chemistry)
Coordinator CEC


Prof. Ranjana Pathania,
Professor (BSBE)
Coordinator (NPTEL)

**Indian Institute of Technology Roorkee**

Roll No:NPTEL26CS87S1261301516 To verify the certificate  No. of credits recommended: 4



Elite NPTEL ONLINE CERTIFICATION

(Funded by the MoE, Govt. of India)

This certificate is awarded to
JAGRUTI SAVE
for successfully completing the course
Data Analytics with Python

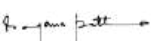
with a consolidated score of **94** %

Online Assignments	25/25	Proctored Exam	68.75/75
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Total number of candidates certified in this course: **15086**

Jan-Apr 2026
(12 week course)


Prof. Kaushik Ghosh,
Professor (Chemistry)
Coordinator CEC


Prof. Ranjana Pathania,
Professor (BSBE)
Coordinator (NPTEL)

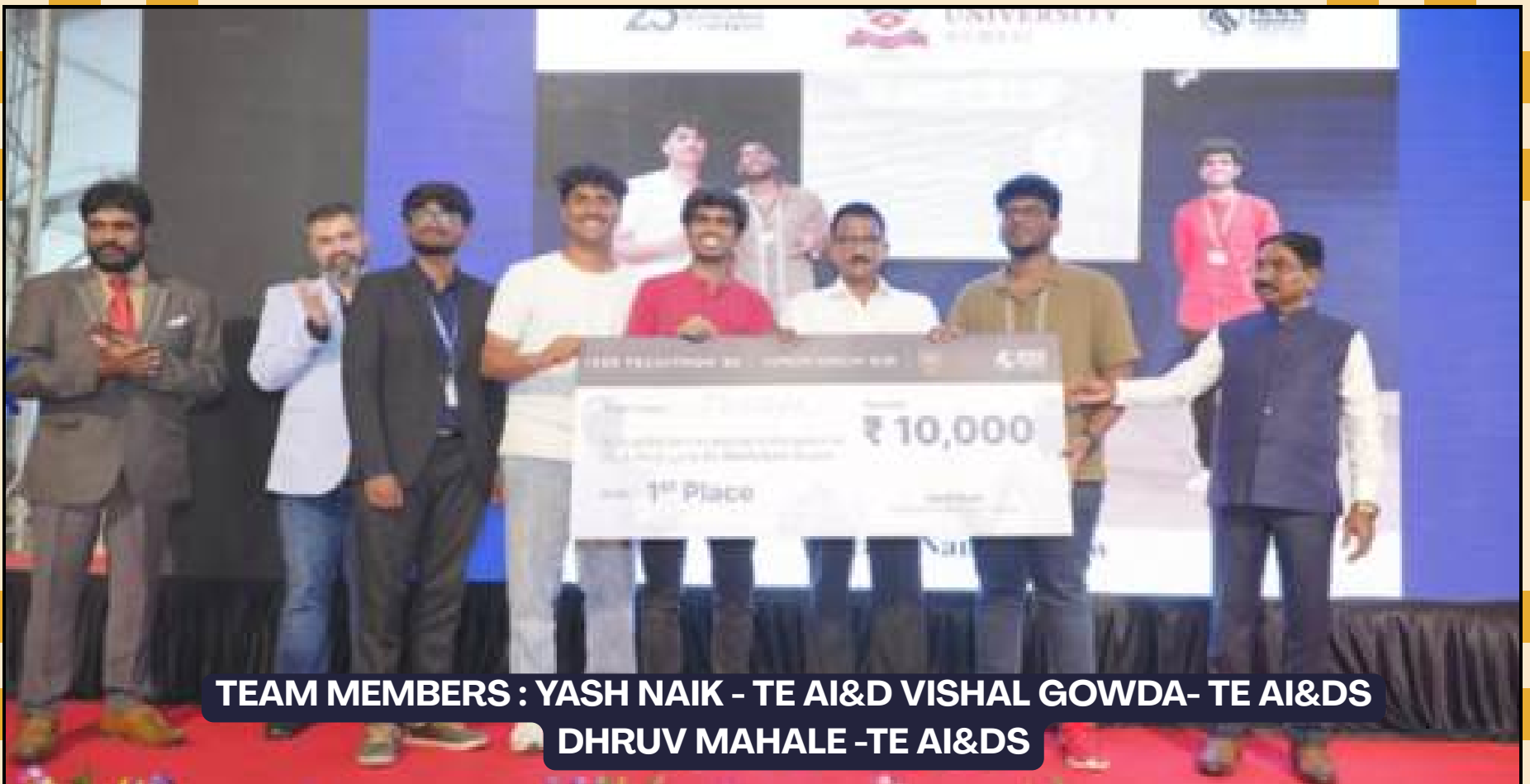
**Indian Institute of Technology Roorkee**

Roll No:NPTEL26CS86S661301296 To verify the certificate  No. of credits recommended: 4

STUDENT ACHIEVEMENTS



Carol Lobo (BE AI&DS) and Keith Dsouza (BE AI&DS) secured a Gold Medal at the 20th Avishkar Competition held at Mumbai University in the Pharmacy category in December 2025.



**TEAM MEMBERS : YASH NAIK - TE AI&D VISHAL GOWDA- TE AI&DS
DHRUV MAHALE -TE AI&DS**

Team Meow won the IEEE Techathon at Atharva University in Blockchain Domain



**Happy to share “Team Meow” from TE AI&DS
won best solution for the given problem statement**
Organized by Innovate You at AISSMS College, Pune at Techathon 3.0



**Team Shazam Shines with Best
Project in Web Development**

Devhacks by CS at Atharva College of Engineering, Mumbai



Team Members:
Royce Antony - SE CSE
Maria Joanna - SE COMPS C

**“Team Coco” won the Samadhan
 2026 Ideathon**

held at St. Francis Institute of Technology



Team Members:
Joshua D’Souza
Kabir Sharma

**The Team secured 2nd Place at ADAPPT
 4.0 Hackathon 2025**

*organized by MPSTME (NMIMS) in
 AI Domain- Smart Crop Tech*



TEAM MEMBERS: JONAH QUADROS, YASH TATTU, SOHAM NAVATHE, JEET RUIA

**Team Cognify achieved 2nd Runner-Up
 at VIT in Sustain-A-Thon**



Secured 1st Runner-Up at Horizon'26 Hackathon hosted by Shri Bhagubai Mafatlal Polytechnic and College of Engineering

Awarded the Best Approach and Special Consolation Prize at M.H Saboo Siddik College at their 12 hour IDEATHON.

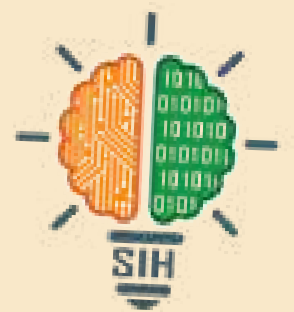




**Won 1st at International
Agentic AI Hackathon
“SUNHACKS” 2026 At
Sandip University, Nashik
In April 2026**

**Gideon Mire, Vishal Gowda,
Pranav Shirke, and
Deepkumar Das secured 2nd
Place in CODE-A-THON 2.0**





Elish Mark and Rachel Soares were a part of Team ARKA, Winners of Smart India Hackathon (SIH) 2025, showcased innovation and excellence on a national platform.



Team Raskhapath proudly represented Fr. CRCE at GTU, Ahmedabad for the SIH 2025 Finale



Department received Best BE Class Award, Sports trophy, Technical trophy, Cultural trophy, Director's cut trophy at the college cultural event Euphoria 2026

EXTRACURRICULAR

**Juvana Dsouza
Crowned Miss
CRCE 2026!**



**Shalom Mendes placed
3rd in Shot Put and 4th in
Discus Throw at Mumbai
University Athletics
championship 2025**



**TE AI&DS Girls won 1st
Place in Tug of War**



**TE AI&DS take
home the TE Sports
Trophy**





SE CSE lift the SE Sports Trophy



SE CSE claim the SE Technical Trophy



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**BE AI&DS secure the
Director's Cut Trophy**





**A Podium Finish:
SE CSE secure 3rd
Place at Director's
Cut**

**FARHANITRATE
PRERAJULISATION**



EVENTS IN THE DEPARTMENT



Expert Session by Bombay Stock Exchange

Date: 06 February 2026

Time: 1:00 PM – 2:00 PM



Sustainable Development Goals (SDGs) and ESG Awareness

Number of students: 65

Session mapped to PO: 7,8,9,10,11



The session was conducted by **Ms. Prerana Tirodkar**, an alumna of our college (Batch of 2017), who is currently working in the domain of Energy Management and Sustainability Reporting. She shared practical insights from her professional experience and introduced students to emerging career opportunities in sustainability and ESG (Environmental, Social, and Governance).

Mental Health Awareness & Adapting Healthy Coping Strategies

Submitted by: Ms. Manasi Hindlekar
Designation: Professional Counselor-
Clinical Psychologist



Industrial Visit to JIO Institute, Ulwe



An Autonomous Institution under the University of Mumbai | Awarded Grade 'A' by NAAC

ACM CRCE and Dept. of CSE Organizes a Visit to Jio INSTITUTE

What to Expect ?

- Discover the innovative technologies driving India's tech future
- Tour Jio's advanced AI & VR Labs
- Get hands-on with real-world AI/ML applications
- Attend an exclusive AI & ML session led by an international expert

Who Can Attend ?

This visit is exclusively for SE Computer Science & Engineering and TE AI&DS students only...
Seats are limited, so registration will be on a first-come, first-served basis.

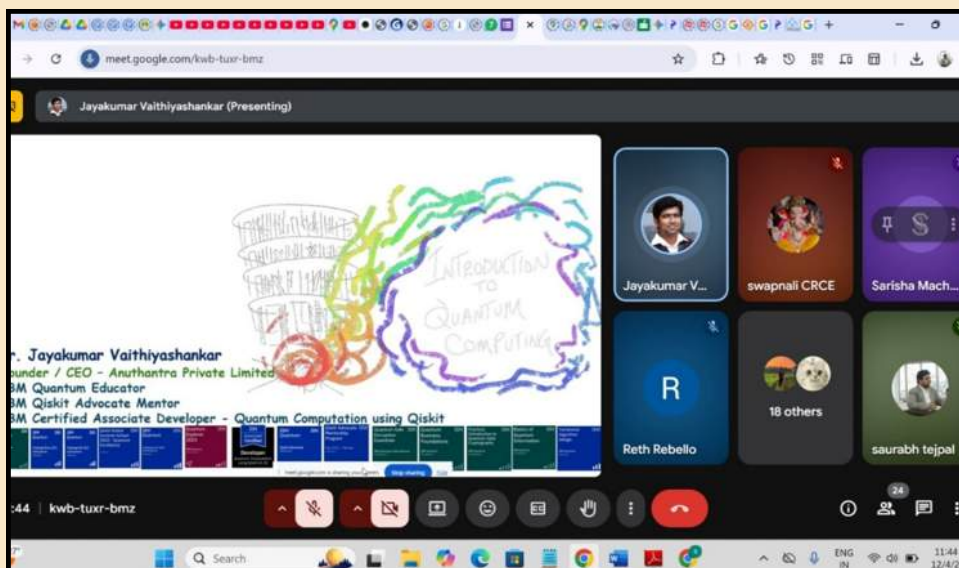
Register Now

Contact Info

Andre Dsouza (VCP)
+91 9372878772
Faraz Kazi (Secretary)
+91 91676 71223

Date: 14th August 2025

Time: 10:30 AM – 4:00 PM
Venue: Jio Institute Ulwe



SDP on Quantum Computing

by Jayakumar Vaithiyashankar,
Founder/CEO – Anuthantra, IBM
quantum educator

Date: 4/11/25 , Duration: 1 day

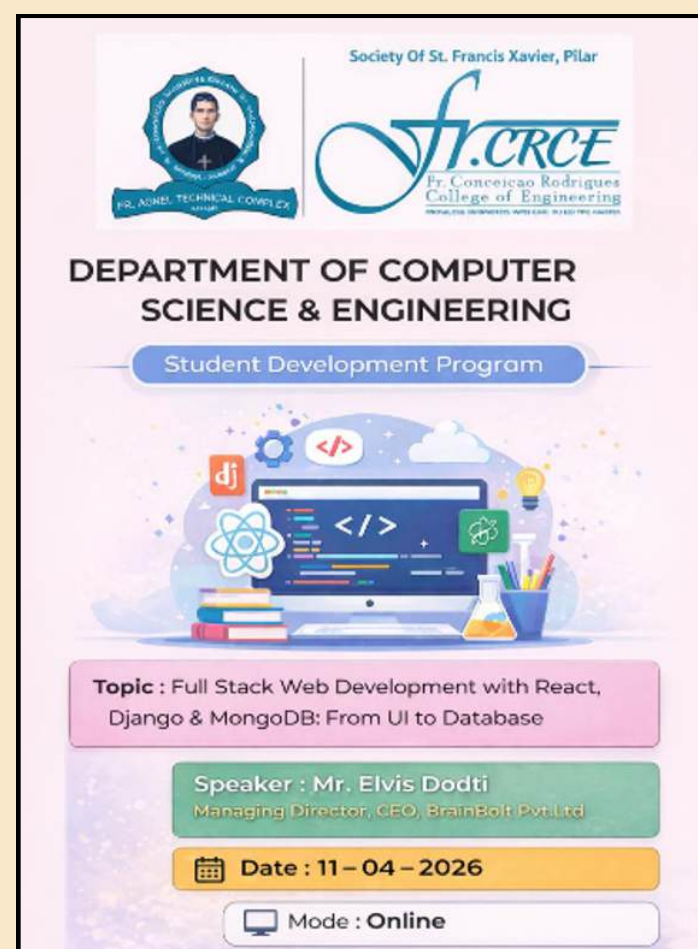
No. of Participants: 27

Mode of Conduct: Online

The Department of CSE organized an insightful session on Full Stack Web Development for students.

Three guest lectures conducted by domain experts.

Students were encouraged to undertake online certification courses. During the academic year 2025-26, a total of 135 certifications were completed by SE, TE, and BE students.



“From Code to Career: Interview Preparation in Data Structures and Algorithmic Thinking”

Industry expert talk for TE students

by Mr. Rishabh Pathak,
Software Engineer-AI & ML,
Astra Cybertech Pvt. Ltd in Nov 2025



Seminar on Technology Readiness and Commercialization

Date: 18/2/2026, Time: 3:30pm - 4:30pm

Speaker: Bilal Ahmed, Data Analyst at Yes bank

The **ACM Student Chapter** organized a seminar on Technology Readiness and Commercialization by alumnus **Mr. Bilal Ahmed**. The session covered TRL, MRL, IRL, technology transfer, and commercialization using real-world case studies.

It focused on bridging the gap between research, product development, and market readiness. Students gained insights into technology maturity frameworks and strategies for scaling research into products.

Expert Talk: AI in Microcontrollers

Date: 25/2/2026, Time: 3:30pm - 4:30pm

Speaker: Naimish Purohit, Caleb Lewis,

RND hardware development interns at Acevin solutions

IEEE-CRCE and ACM CRCE organized an expert talk on AI-powered embedded systems and IoT by **Acevin Solutions**. The session covered embedded AI, intelligent hardware, and real-world industry applications.

Students gained insights into Edge AI and IoT-based automation systems. The interactive talk enhanced understanding of AI in resource-constrained devices and encouraged active participation.



Shark Tank CRCE

Fostering Innovation and Entrepreneurship

ACM Student Chapter and Rotaract Club organized “Shark Tank CRCE,” a three-day Mumbai-level pitching competition. Students from various colleges presented startup ideas through screening, pitching, and investment simulation rounds. A panel of entrepreneurs, investors, alumni, and professionals evaluated the ideas. The event boosted entrepreneurship, presentation skills, and offered real-world exposure to pitching and negotiation

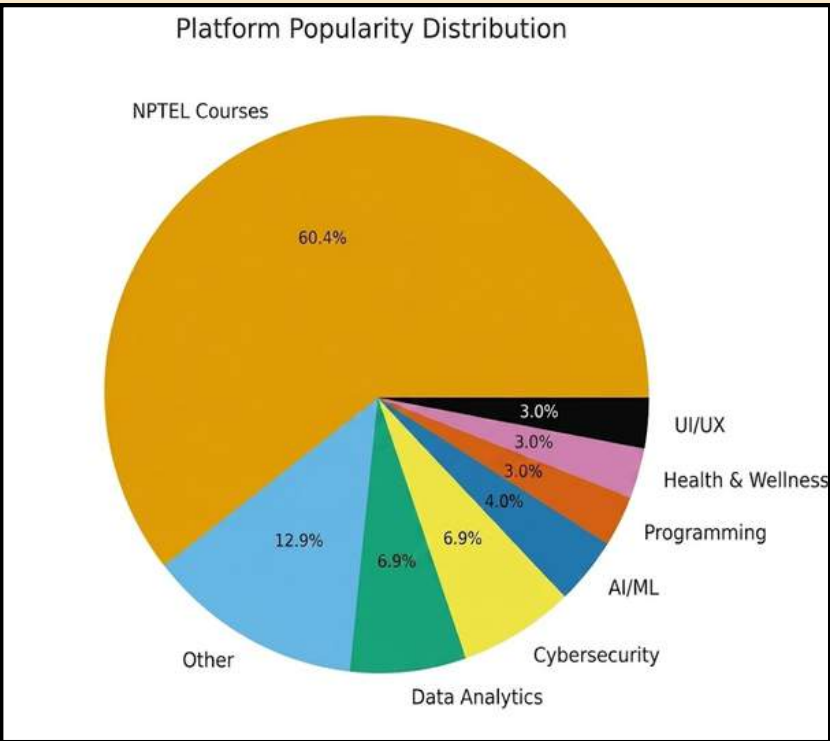


ONLINE COURSES DONE BY STUDENTS

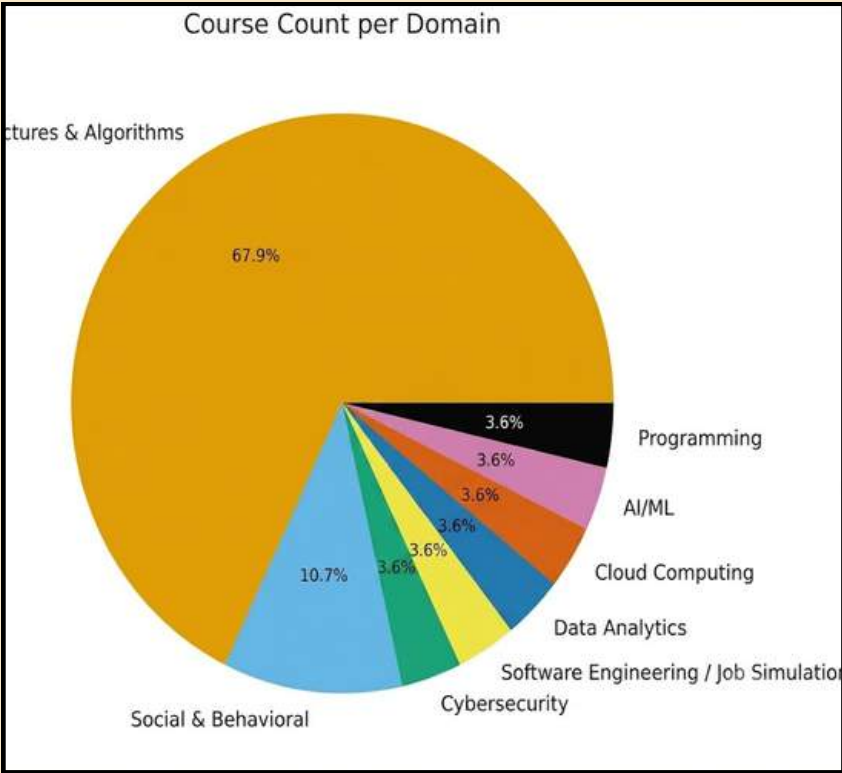
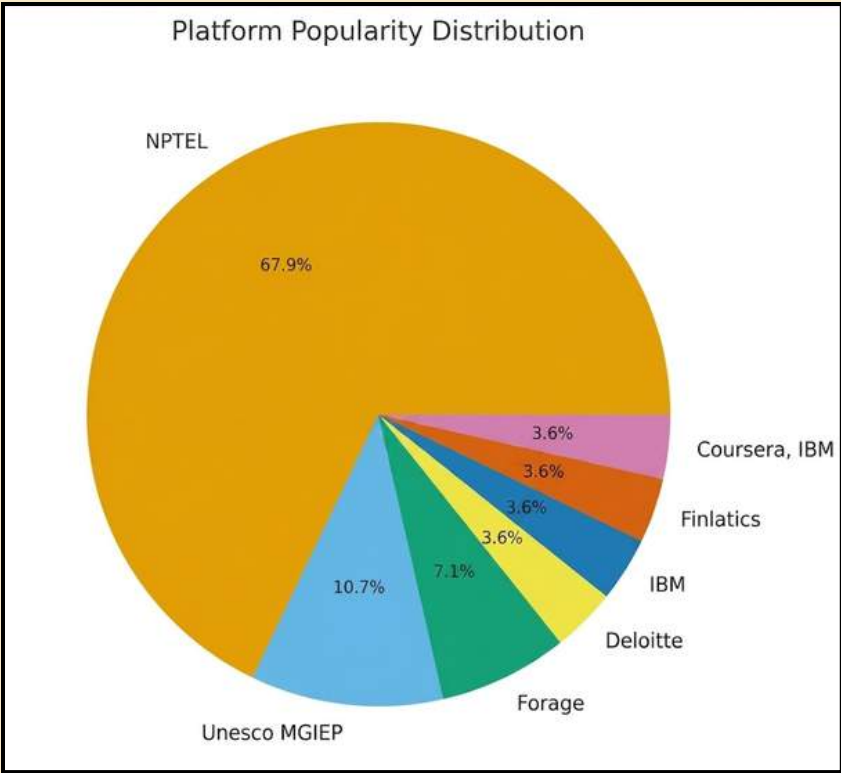
TE AI&DS (101 Students)

Committed to continuous learning:

135 online certifications completed by SE, TE, and BE students in 2025-26.



SE CSE (28 Students)



INTERNSHIPS

Selected for an internship at the

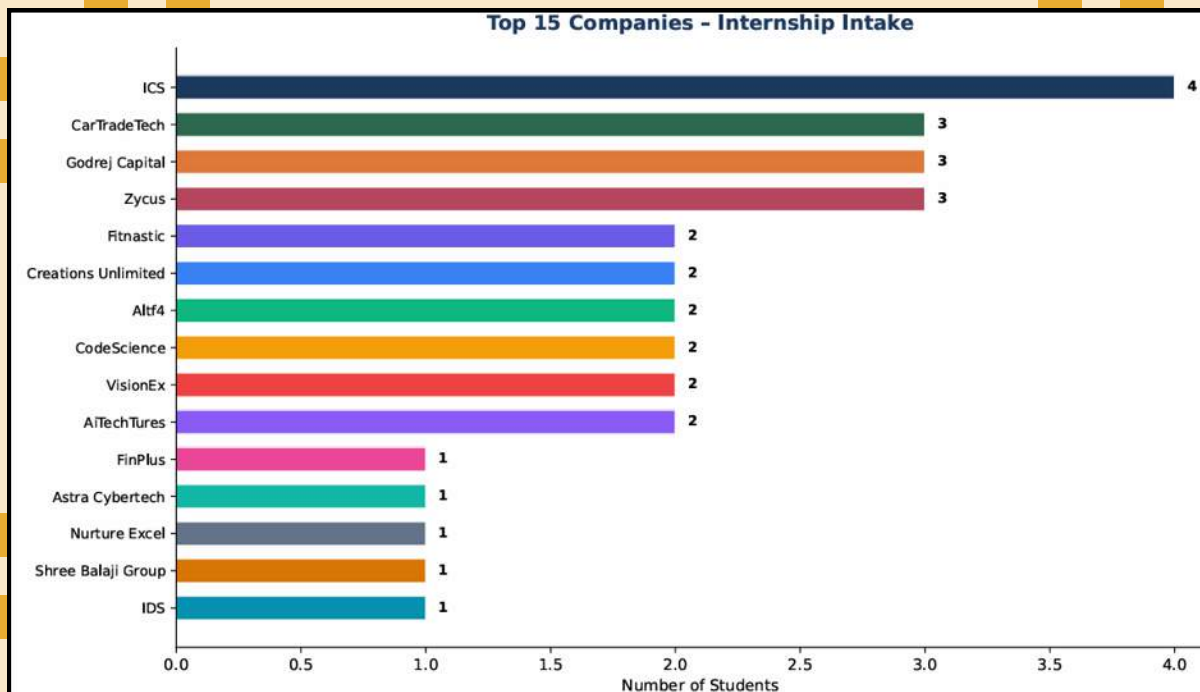
North Eastern Space Applications Centre (NESAC), ISRO from 1st January 2026 to 15th February 2026.



Mohammed Anus Abdul Aziz Khatri
(TE AI&DS)

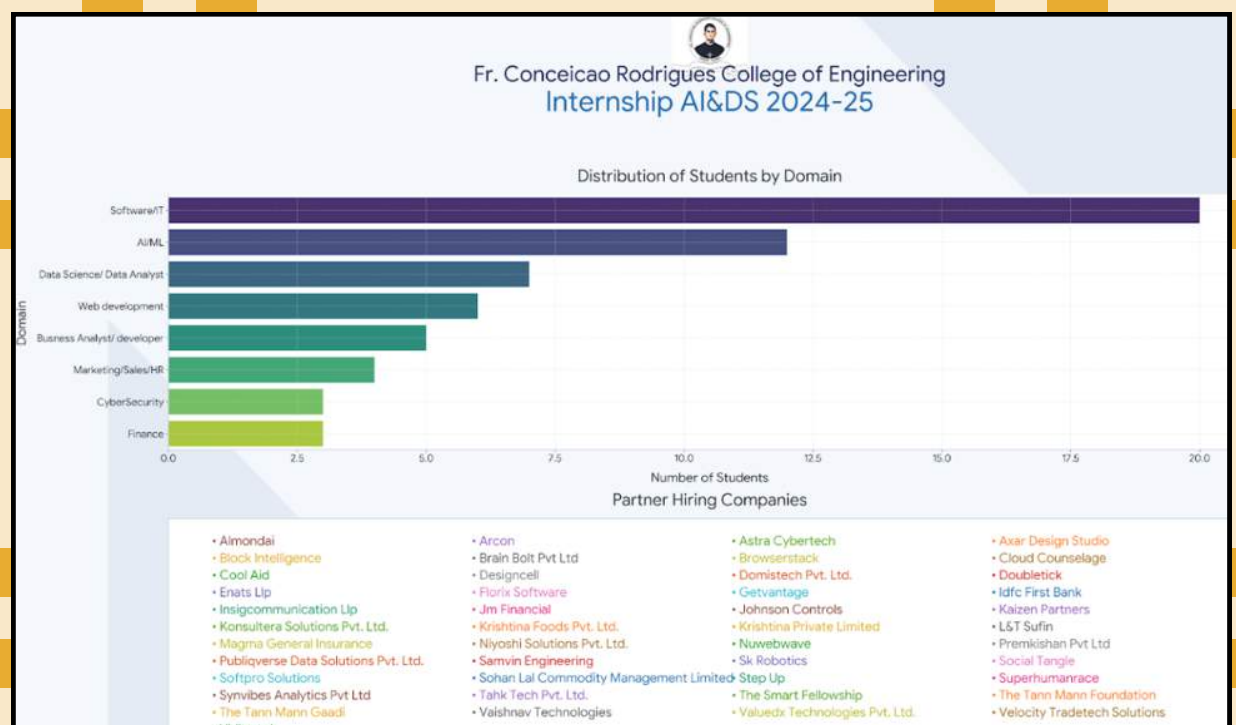


Earned this opportunity after his team secured a top 9 position out of 8,744 teams across India in 30 hours hackathon organized by NRSC ISRO at Hyderabad!



ICS emerged as the top internship recruiter this year, closely followed by industry leaders like CarTradeTech, Godrej Capital, and Zycus.

Software/IT continues to be the dominant sector for internships, while specialized roles in AI/ML and Data Analytics are experiencing rapid growth.



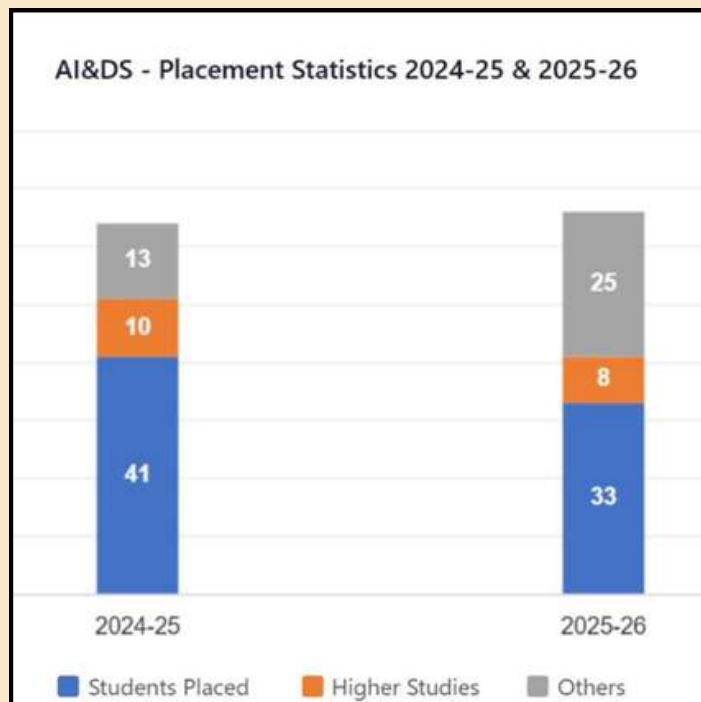
STEPPING INTO THE WORLD

The infographic is titled "Our Students" in a cursive font, followed by a graduation cap icon and the main heading "PURSUING HIGHER EDUCATION" in bold, dark blue capital letters. Below this is the tagline "Empowering minds for global academic excellence" with a small star icon. The infographic features five student profiles, each with a portrait photo, a name, a degree program, the university name, and a flag indicating the location.

Student Name	Program	University	Location
Sharvin Govad	MS in Computer Engineering	New York University	USA
Sachi Shah	MS in Computer Science	University of California Irvine	USA
Nicole Mascarenhas	MSc in Data Science	The University of Manchester	UK
Nerice Rodrigues	MS in Data Science	Indiana University	USA
Jaden Menezes	MSc in Data Science	University of Edinburgh	UK

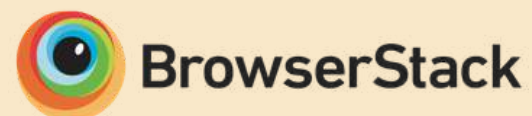
The Department proudly celebrates the achievements of its students as they embark on their journey towards higher education at prestigious international universities. With students pursuing advanced programs in Computer Engineering, Computer Science, and Data Science **across the USA and UK**, they continue to represent the institution's commitment to academic excellence and global opportunities.

PLACEMENTS AND STATISTICS

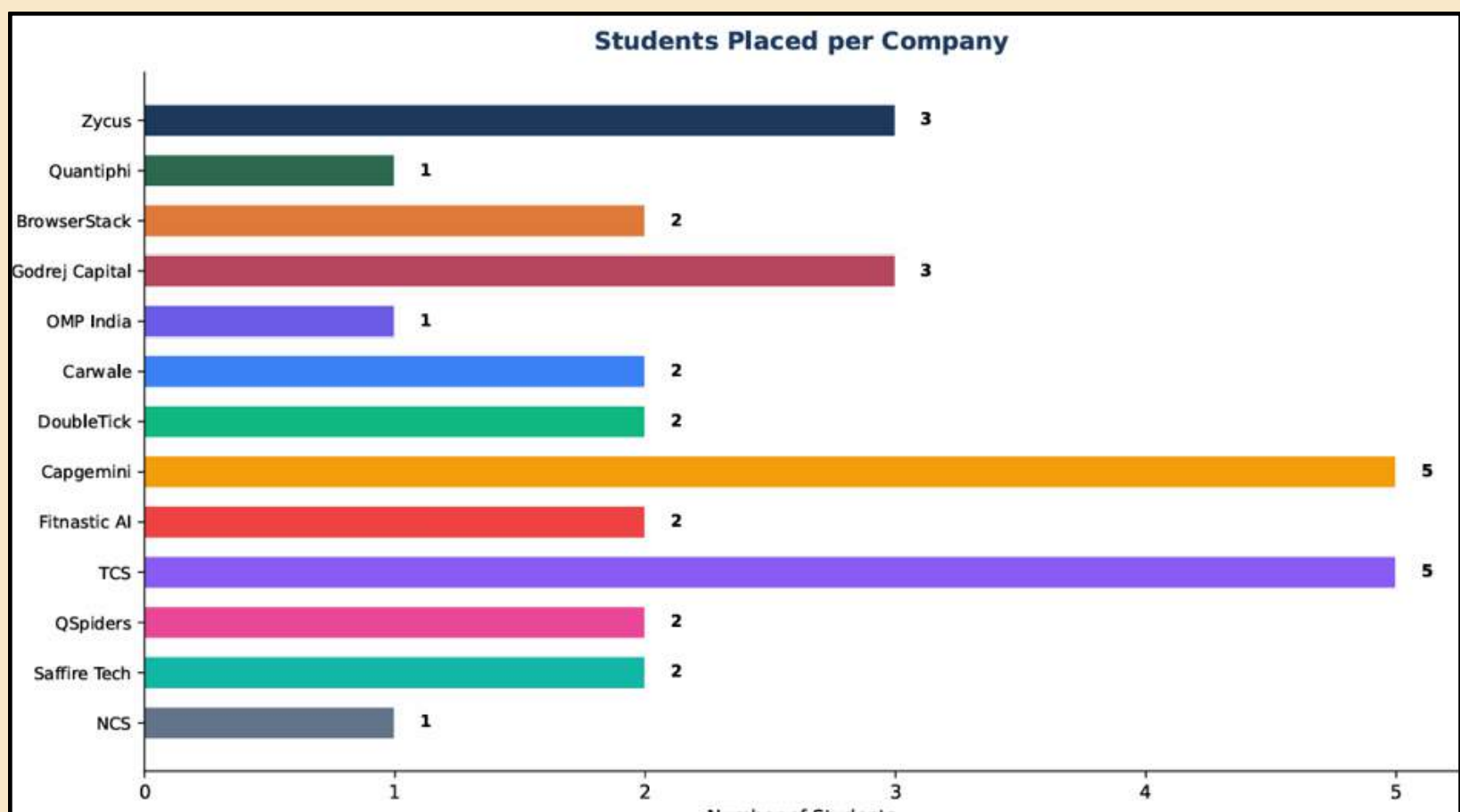


₹22 LPA

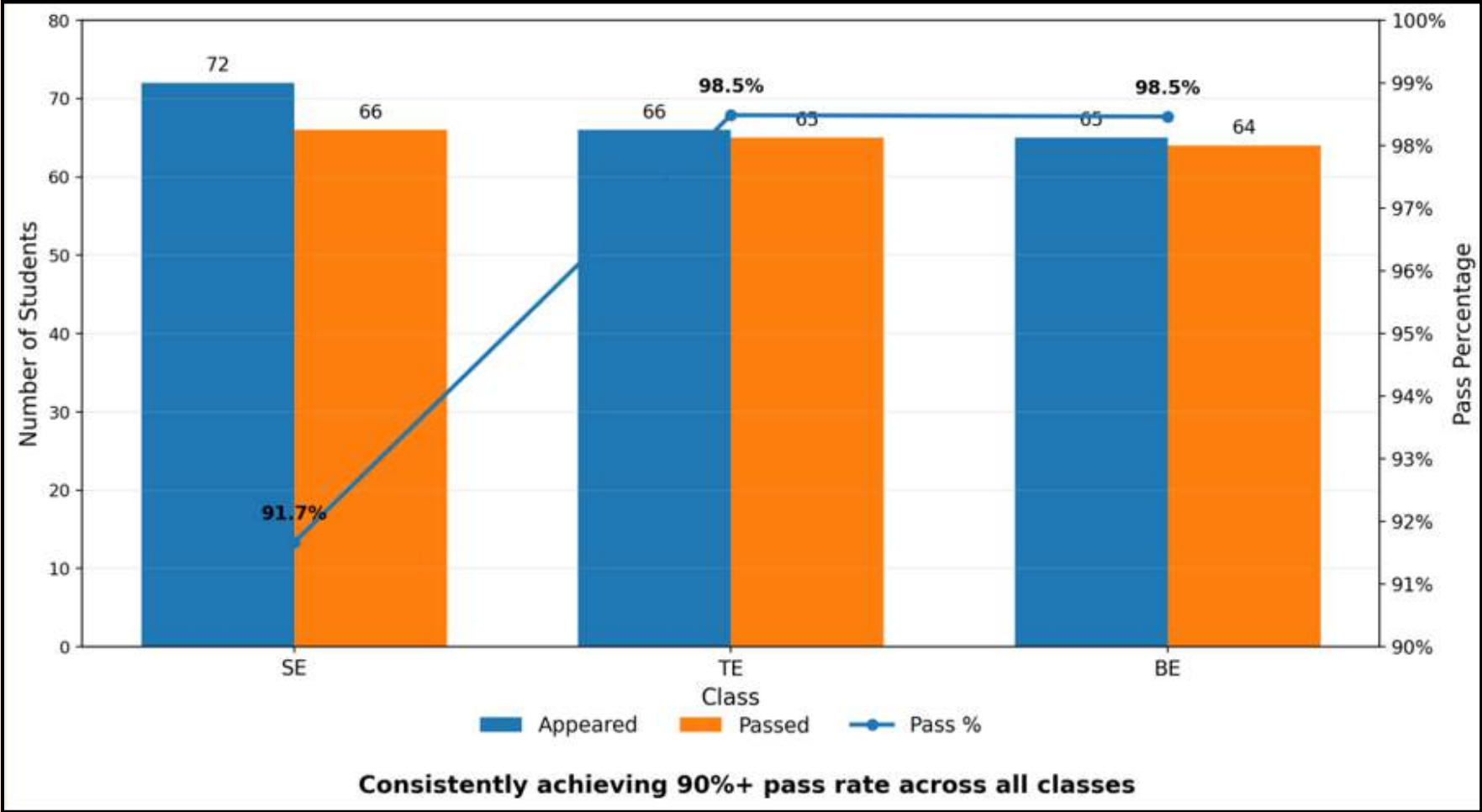
Highest Package Secured by
Aditya Rathod (BE AI&DS) at



Capgemini and TCS lead recruitment with 5 hires each, followed closely by Zycus and Godrej Capital at 3 apiece. Overall, 13 diverse companies successfully recruited from our campus.



RESULT STATISTICS



Academic Performance

CLASS	PASS RATE
SE CSE	91.7%
TE AI DS	98.5%
BE AI DS	98.5%

Key Highlight

90%+ Result
Across All Years!

ARTICLES

PREPARING TODAY'S CRYPTOGRAPHY FOR TOMORROW'S MACHINES

Article by:

Anushree Prasanna Worlikar - SE CSE

“The computers that protect our digital world today may one day become the very machines capable of breaking it.”

From online banking and digital payments to confidential government records and private messages, encryption silently protects billions of digital interactions every day. Quantum computing, one of the most promising technologies of this century, has the potential to revolutionize medicine, materials science, and artificial intelligence. At the same time, it poses a serious challenge to the cryptographic systems that secure the internet. Understanding this balance is becoming increasingly important for every computer science student.

Bits, Qubits, and Quantum Advantage

Classical computers process information using bits, each representing either 0 or 1. Quantum computers use qubits, which exploit superposition to exist in multiple states simultaneously. Combined with entanglement, qubits can perform certain computations far more efficiently than classical machines. However, quantum computers are not simply faster versions of today's computers. Their advantage applies only to specific problems, one of which is cryptography.

Why Modern Encryption Is at Risk

Most internet security, including HTTPS, digital signatures, and secure financial transactions, relies on RSA and Elliptic Curve Cryptography (ECC). These systems are considered secure because factoring large numbers or solving discrete logarithms is practically impossible for classical computers.



In 1994, mathematician Peter Shor introduced Shor's Algorithm, demonstrating that a sufficiently powerful, fault tolerant quantum computer could solve these problems efficiently. Although current quantum computers are still too small and error prone to threaten practical encryption, experts agree that preparing for this future cannot wait.

“Harvest Now, Decrypt Later”

A major concern is the Harvest Now, Decrypt Later strategy. Attackers can collect encrypted information today and store it until quantum computers become capable of decrypting it. This is particularly dangerous for data requiring long term confidentiality, such as healthcare records, government communications, intellectual property, and critical infrastructure. The quantum threat, therefore, has already begun, even before practical quantum computers exist.

Post Quantum Cryptography

To address this challenge, researchers have developed Post Quantum Cryptography (PQC), cryptographic algorithms designed to resist attacks from both classical and quantum computers while running on existing hardware.

In August 2024, the National Institute of Standards and Technology (NIST) finalized its first PQC standards: ML KEM for secure key exchange and ML DSA and SLH DSA for digital signatures. In 2025, NIST selected HQC as an additional backup algorithm to strengthen cryptographic diversity. Governments, technology companies, and standards organizations are now actively integrating these algorithms into practical systems. Although replacing cryptography across global infrastructure will take years, the transition from research to implementation is already underway.



Beyond Cybersecurity

Quantum computing is not only about breaking encryption. It also promises breakthroughs in molecular simulation, drug discovery, climate modelling, logistics optimization, financial analysis, and machine learning. Like the internet or classical computing before it, quantum computing represents a transformative technology whose benefits depend on responsible innovation and secure implementation.

Opportunities for Future Engineers

For today's computer science students, the shift toward quantum safe security presents exciting career opportunities. Industries such as banking, healthcare, cloud computing, and government are investing heavily in cryptographic migration, security audits, and quantum resistant system design. Developing knowledge of cryptography, quantum algorithms, and secure communication protocols will become an increasingly valuable skill in the coming decade.

Conclusion

The race between quantum computing and cybersecurity is no longer a distant possibility. It is already shaping the future of technology. While quantum computers capable of breaking today's encryption have not yet arrived, the need to protect data for decades makes preparation essential. The standards for quantum safe cryptography are already in place, and organizations worldwide have begun adopting them. For the next generation of engineers, the challenge is not to fear quantum computing but to build secure systems that allow classical and quantum technologies to coexist safely.

References: NIST Post-Quantum Cryptography Project; NIST FIPS 203, 204 & 205 (2024); NIST HQC Announcement (2025).

CODE FOR A COOLER PLANET

*A Sustainability Article by:
Shalom Judith Mendes - SE CSE*

“This world is a ticking time bomb, an environmental disaster just waiting to explode- with no planet B, we must have a plan B.”

For the generation entering classrooms, laboratories and workplaces today, climate change is not a distant threat. It is visible in rising temperatures, unpredictable rainfall, water scarcity, polluted air and increasingly fragile ecosystems. Technology has helped shape modern life, but it has also created a growing demand for energy, computation and electronic resources. The responsibility of young technologists is therefore clear: build systems that are not only intelligent and scalable, but sustainable by design.

Across the world, students, researchers and young founders are using Artificial Intelligence, Internet of Things networks, edge computing and data analytics to address environmental challenges. This is instilled into us students in our curriculum first from Year one and furthermore in the Sustainability Double Minor.

IoT-based soil-moisture sensors and precision agriculture platforms can reduce water and fertiliser consumption by delivering resources only when required. Computer vision models are being deployed for waste segregation, allowing systems to identify recyclable materials more efficiently. AI-powered forecasting can improve renewable-energy integration by predicting solar and wind availability, while smart grids can balance electricity demand in real time. Digital twins- virtual models of physical systems- are also being used to simulate traffic, buildings and energy networks before resources are spent in the real world.



However, the technology sector must also confront its own environmental footprint. Cloud computing, video streaming, blockchain systems and large-scale AI models depend on data centres that consume substantial electricity and water for cooling. A 2026 research paper on carbon-aware compute-power scheduling for AI data centres proposes a significant solution: instead of running workloads solely based on demand, data centres can schedule flexible AI training and inference tasks when renewable energy is abundant. By combining microgrids, battery energy storage systems, workload migration and carbon-intensity forecasting, data centres can reduce dependence on fossil-fuel-heavy electricity. This transforms computing infrastructure from a passive energy consumer into an active participant in a cleaner power ecosystem.

For Computer Science students, sustainable innovation extends far beyond environmental apps. It includes designing energy-efficient algorithms, reducing model parameters through pruning and quantisation, using edge AI to minimise cloud communication, optimising database queries and building carbon-aware software architectures. Efficient code is not merely faster- it can also reduce computational overhead, server utilisation and energy consumption.

Personal responsibility matters as well. We can audit our digital habits by reducing unnecessary cloud backups, deleting duplicate files, extending device lifecycles through repair and reuse, and disposing of e-waste through authorised recyclers. We can choose lower streaming resolutions when high definition is unnecessary, avoid idle devices and question whether every AI request, download or always-on service is genuinely needed.

The climate crisis is immense, but so is the potential of a generation that understands both technology and responsibility. Every efficient algorithm, sustainable prototype and conscious digital choice can contribute to a more resilient future. Hope lies in the fact that the youth are not waiting for tomorrow to act- they are already coding, building and innovating for a planet worth inheriting.



AGENTIC AI: THE NEXT PARADIGM IN INTELLIGENT SYSTEMS

Article by:

Aditya Vakadia - SE CSE

"From answering questions to accomplishing goals, AI is entering a new era."

Artificial Intelligence (AI) has advanced rapidly over the past decade, evolving from image recognition systems to Large Language Models (LLMs) capable of writing code, summarizing research, and engaging in human-like conversations. The latest milestone in this evolution is Agentic AI.

Unlike traditional AI, which follows a prompt-response model, Agentic AI is goal-driven. It can understand objectives, plan tasks, use external tools, and autonomously execute multi-step workflows with minimal human intervention. Rather than functioning as a chatbot, an AI agent acts as a digital collaborator capable of solving complex problems.

For example, given the task, "Research the latest advancements in electric vehicles, prepare a presentation, and email it to my team," a conventional chatbot may only generate a summary. An AI agent can gather information, organize findings, create presentation slides, and draft the email by determining the sequence of actions required. This ability to reason, plan, act, and adapt distinguishes Agentic AI from traditional conversational AI.

Modern AI agents combine several core components:

- Reasoning Engine: Interprets objectives and determines the next action.
- Planning Module: Breaks complex goals into manageable subtasks.
- Tool Integration: Connects with web browsers, databases, APIs, code interpreters, and other software.

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- Memory: Stores previous interactions and intermediate results for long-running tasks.
 - Feedback Mechanism: Evaluates outcomes and corrects mistakes during execution.

Together, these components enable AI agents to execute complete workflows instead of simply generating text.

The potential applications of Agentic AI span multiple industries:

- Software Engineering: Assists with code generation, debugging, testing, documentation, and deployment, allowing developers to focus on innovation.
- Healthcare: Supports clinical workflows by organizing medical records, summarizing patient histories, and reducing administrative tasks under human supervision.
- Scientific Research: Accelerates discovery by reviewing literature, summarizing findings, and identifying research trends.
- Business Operations: Automates report generation, scheduling, document processing, and customer support to improve efficiency.

Unlike traditional automation, which relies on predefined rules, Agentic AI can independently coordinate multiple activities to achieve broader objectives. This capability enables organizations to reduce manual effort, improve productivity, and allow professionals to focus on higher-value work.

Despite its promise, Agentic AI is still evolving and faces important challenges:

- Hallucinations: AI agents may generate inaccurate information or faulty assumptions.
- Reliability: Errors can accumulate across multi-step workflows, reducing overall accuracy.
- Security: Access to emails, databases, and cloud services raises concerns about privacy and cybersecurity.
- Computational Cost: Reasoning, planning, memory management, and tool execution require significantly greater computing resources than conventional AI systems.



The future of Agentic AI lies in multi-agent systems, where specialized agents collaborate on complex tasks. For example, a software project could involve separate agents for planning, coding, testing, documentation, and deployment, working together under human supervision. Such systems could automate entire engineering workflows while improving efficiency and maintaining quality.

In conclusion, Agentic AI marks a major advancement in intelligent systems by moving beyond simple responses to reasoning, planning, and autonomous task execution. By combining language models with memory and real-world tools, AI agents are transforming how people interact with technology. Although challenges related to reliability, security, and ethics remain, their potential to reshape industries is undeniable. Tomorrow's engineers will not simply build AI-powered software—they will design systems that collaborate with intelligent agents to solve increasingly complex real-world problems. The next wave of innovation will emerge from the partnership between human ingenuity and intelligent AI systems.

AI-POWERED DIGITAL TWINS: THE FUTURE OF SPORTS SCIENCE

Jeet Ruia - SE CSE

What if a computer could create a virtual version of an athlete that predicts performance, simulates training, and even warns of injuries before they happen?

As a Computer Science student, I'm fascinated by how technology can solve real-world problems. One of the most exciting examples is AI-powered digital twins in sports, where artificial intelligence, biomechanics, and data science are transforming the way athletes train, recover, and compete. A digital twin is a dynamic virtual replica of an athlete that continuously updates itself using data from wearable sensors, cameras, biomechanics, medical records, and even genetic information. Powered by AI, it can simulate how an athlete's body responds to training, fatigue, and recovery, helping coaches and sports scientists make informed decisions before they are applied in the real world.



This technology is already making its way into elite sports. FC Barcelona is developing AI-driven digital twins by integrating biomechanics, genomics, physiology, psychology, and performance data to predict injuries, personalize training, optimize recovery, and extend athletes' careers. Similar initiatives, such as the SMART REHABI II project, are using digital twins and artificial intelligence to improve rehabilitation through personalized treatment strategies.

Behind these innovations lies the power of computer science. Machine learning predicts injury risks, computer vision enables markerless motion capture, data engineering integrates data from multiple sources, cloud and edge computing provide real-time feedback, and GPU-accelerated simulations make complex biomechanical models practical and efficient.

For Computer Science students, this is an exciting interdisciplinary field where AI meets healthcare and sports. The software we build in the future may not just power applications—it could help athletes stay healthier, perform better, and extend their careers. To me, that's one of the most inspiring examples of how computer science can make a real difference in people's lives.



UI/UX DESIGNS BEFORE AI

Article by:

Suzan Cardoz - SE CSE

Before algorithms started creating layouts in seconds designers had to rely on their instinct, patience and a lot of trial and error. They would watch people struggle with a screen and ask themselves “why is this not working?” Designers like this would make every decision about button placement and color choice.

Then design was not about making something look pretty. It was about making something that worked well. Design was often limited by the things that were possible at the time. Designers would draw on paper, build models by hand and test their ideas before they had software to help them. When designers tested their ideas they would sit with someone, watch how they used the screen. They would notice where the person's eyes moved and where their finger would hover before they clicked something.

As the internet grew in the 90s and 2000s the things you could see on the internet got more interesting but the way designers worked did not change much. Teams of designers would look at what people thought, run surveys and test versions of pages by hand. There was no computer program making decisions behind the scenes. It was people talking, arguing and sometimes just going with what they thought was right.

That is what made design special. Every interface felt like it was made by a person because it was. Every decision was made by a designer. That is what gave it personality.



Some design tools that use intelligence are really good today. They can make functional designs quickly, find problems and even suggest colors that work well. These tools are very good at what they do, even the best ones are missing something. There is no person behind the decisions, no designer who saw a problem and fixed it in a way that nobody thought of. The designs are polished. They do not have a story.

If you compare these designs to a lot of designs made by artificial intelligence you can see that they are missing something. They are made quickly. They often feel empty. Everything starts to look the same with the shapes, colors and layouts. There is no risk of trying something, no designer saying “lets just try this”. AI is good at making things that are expected, not things that feel real. It is efficient, but being efficient is not the same as being meaningful.

And this is a trade-off that nobody talks about enough. The old way of designing was slow and messy. It gave us interfaces that were made by real people with all their creativity and frustrations. The artificial intelligence tools we have today are fast and polished. They are losing the things that made designs feel human, the imperfections that made them special. Designers like this are what made designs special. That is what is being lost.

EDITORIAL TEAM

This newsletter has been a revelation for the team that built it. More than a publication, it became an opportunity to witness the passion, creativity, and dedication that make the Department of Computer Science & Engineering an integral part of CRCE.

It is easy to overlook the countless hours behind every page, every photograph, every article, and every achievement. Creation demands far more than observation it requires conviction, collaboration, and the courage to bring an idea into existence. This newsletter stands as a testament to that spirit.

The Department of Computer Science & Engineering is not defined by a single identity. It is a vibrant collection of diverse minds, united by a shared pursuit of learning and innovation. Together, these individuals shape a generation ready to embrace an ever-evolving India.

With the unwavering guidance of our mentor and the dedication of our editorial team, we have curated a newsletter that reflects not only our vision but also the character of our department and, in turn, the institution we are proud to call home.

We hope these pages celebrate not just accomplishments, but also the people whose willingness to create, participate, and strive makes every achievement possible.

– The Editorial Team



Percival Trinidad



Shalom Mendes



Om Suryavanshi



Arya Dixit



*"Excellence is a continuous
process and not an accident."*

- DR. A.P.J ABDUL KALAM

