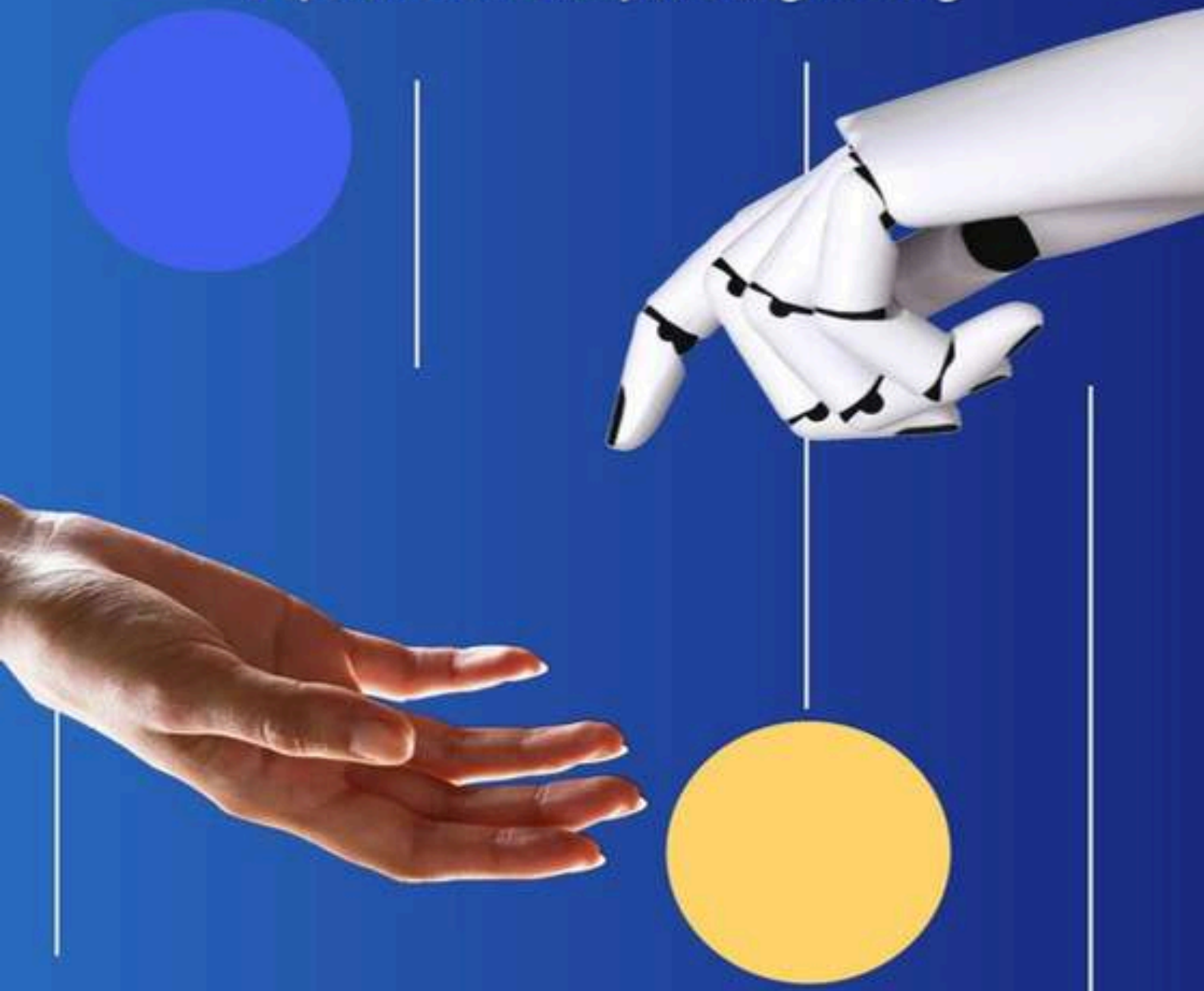
R. C. PATEL
INSTITUTE OF TECHNOLOGY

An Autonomous Institute

Department of Computer Engineering



The TechnoVerse

Technical Magazine for A.Y. July 2024- June 2025

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DEPARTMENT OF COMPUTER ENGINEERING

R. C. PATEL
INSTITUTE OF TECHNOLOGY
An Autonomous Institute

Department of Computer Engineering

Vision of the Institute

To become a leading Institute in Technical education fostering innovation, research, ethical values, and sustainable development for the betterment of society.

Mission of the Institute

To impart high quality Technical Education through:

M1. Innovative and Interactive learning process and high quality, globally recognized instructional programs.

M2. Fostering a collaborative scientific temper among students with ethical responsibility towards the society.

M3. Preparing students from diverse backgrounds to have aptitude for employment, entrepreneurship and research with a spirit of Professionalism.

M4. To contribute to nation's sustainable development.

Vision of the Department

To provide high quality Computer Engineering education with socio-moral values.

Mission of the Department

M1 To provide state-of-the-art ICT based teaching-learning process.

M2 To groom the students to become professionally sound computer engineers to meet emerging needs of industry and society.

M3 To make the students employable professionals by inculcating ethical values.

Program Educational Objectives (PEOS) of the Department

PEO1 Graduates will have technical proficiency, lifelong learning skills to become a professional, entrepreneur and leader.

PEO2 Graduates will function effectively in diverse cultural and professional environments, respecting societal perspectives and inclusive practices.

PEO To foster ethical and social values to be socially responsible human being.

Program Specific Outcomes (PSOs)

PSO 1 Apply programming principles, algorithms, and data structures to design efficient software solutions and intelligent systems using structured, object-oriented, and emerging technologies.

PSO 2 Design, develop, and deploy responsive web and mobile applications integrated with databases and cloud platforms, leveraging modern frameworks and tools for digital transformation.

DEPARTMENT OF COMPUTER ENGINEERING

ABOUT THE DEPARTMENT



Established in 2001, the Department of Computer Engineering at R. C. Patel Institute of Technology (RCPIT), Shirpur, offers a dynamic and industry-aligned education that promotes innovation, research excellence, and professional growth. The department offers a B.Tech. undergraduate program, a postgraduate M.E. program since 2010, and a Ph.D. research program recognised by Dr. Babasaheb Ambedkar Technological University, Lonere. Supported by a team of qualified and experienced faculty members, including doctoral degree holders and faculty actively engaged in research, the department fosters a strong academic and research-oriented culture. With a wide alumni base placed in reputed industries and academic institutions worldwide, the department maintains strong professional and industry connections and has consistently demonstrated excellence through quality publications, patents, copyrights, and outstanding academic results. A robust learning environment with modern laboratories, ICT-enabled classrooms, high-speed internet connectivity, and advanced computing infrastructure supports effective teaching and learning. Innovative practices such as blended learning through LMS platforms, project-based learning, add-on certification courses, mentoring systems, active student technical communities, industry collaborations, and entrepreneurship initiatives enhance students' technical competence, communication skills, and lifelong learning abilities. Through outcome-based education and continuous improvement practices, the department is committed to developing skilled engineers, innovative problem solvers, and responsible global citizens capable of meeting global technological challenges.

DEPARTMENT OF COMPUTER ENGINEERING

FROM Director'S DESK



Prof. Dr. Jayantrao Bhaurao Patil
Director, RCPIT, Shirpur

Dear Students, Faculty Members, Staff, Parents, and Esteemed Stakeholders,

I am pleased to reflect on the Academic Year 2022–2023, which marked steady academic progress and continued commitment to quality education at R. C. Patel Institute of Technology, Shirpur.

Throughout the year, the institute remained focused on promoting academic excellence, innovation, and professional ethics. Our dedicated faculty members played a key role in delivering effective teaching and mentoring, while continuously enhancing their academic and professional competencies.

Students actively participated in academic and co-curricular activities, which encouraged skill development, teamwork, and leadership. These experiences complemented classroom learning and helped prepare them for future professional challenges.

We also continued efforts to strengthen industry interaction and promote skill-oriented learning, ensuring our students are Well-prepared for a dynamic and competitive environment. I sincerely appreciate the efforts of our faculty, staff, students, and the continued support of parents and stakeholders. Let us move forward with confidence and determination to achieve greater milestones in the years ahead.

DEPARTMENT OF COMPUTER ENGINEERING

FROM HOD'S DESK



Prof. Dr.Rajnikant B.Wagh
HOD (Computer Engineering)

It fills me with immense joy and a deep sense of privilege to share a few words as you explore the pages of the magazine, **"TechnoVerse"**. The Computer Department strives to empower students to harness the best from their surroundings, transforming the knowledge they gain into a ladder for achieving greater heights. It is often through collective efforts that aspirations are discovered and realized.

I take pride in being part of the journey that shapes and nurtures students. In the Computer Department, we aim to develop every facet of a student's personality. I would like to take this opportunity to extend my heartfelt gratitude to all the faculty members and auxiliary staff for their dedicated contributions to making this edition a success.

DEPARTMENT OF COMPUTER ENGINEERING

MESSAGE BY EDITORIAL BOARD MEMBERS

I am pleased to present the Department Magazine of Computer Engineering for the academic year 2023–24, which showcases the department's sustained commitment to developing students' technical proficiency, creativity, collaborative skills, and effective communication.

Throughout the academic year, students actively participated in academic pursuits, project work, technical documentation, and various skill-development initiatives. The contributions featured in this edition highlight student engagement with emerging technologies, innovation-driven thinking, and professional growth, in line with the objectives of outcome-based education.

I sincerely thank the student editorial team, contributors, and faculty members for their dedication and coordinated efforts in bringing out this publication. I trust that this magazine will encourage students to strive for excellence, embrace lifelong learning, and uphold ethical standards in their professional journey.

CHEIF EDITOR

Dr. Vipul D. Punjabi
Associate Professor

FACULTY COORDINATOR

Mr. M. L. Mali | **Dr. S. S. Sonawane** | **Ms. G. B. Patil**

STUDENT COORDINATOR

Lokesh Chaudhari | Ojaswini Borse | Hemal Parikh | Siddhesh More

DEPARTMENT OF COMPUTER ENGINEERING

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DEPARTMENT OF COMPUTER ENGINEERING

FACULTY ARTICLES

ROLE OF AI IN ENVIRONMENTAL CONSERVATION



Dr. Saiyyad Mohmmadali Muzffarali
Associate Professor-CSE

Artificial Intelligence (AI) has emerged as a powerful and transformative tool in addressing contemporary environmental challenges. From climate variability to biodiversity loss, AI is increasingly being leveraged to analyze complex datasets, optimize resource utilization, and develop innovative, sustainable solutions. Its ability to process and interpret large volumes of data has positioned AI as a key enabler in modern environmental conservation efforts.



AI algorithms are capable of analyzing vast amounts of environmental data, including satellite imagery, meteorological records, and pollution indices. Such analysis supports continuous monitoring of AI algorithms are capable of analyzing vast amounts of environmental data,

.including satellite imagery, meteorological records, and pollution indices Such analysis supports continuous monitoring of ecosystems, enabling early detection of deforestation, glacier and ice-sheet melting, land-use changes, and air and water pollution. These insights allow policymakers and environmental agencies to implement timely interventions and make informed policy decisions to mitigate environmental damage.Furthermore, AI systems can predict future environmental trends by learning from historical data and identifying existing patterns. Predictive models assist in forecasting climate-related events such as extreme weather conditions, sea-level rise, and prolonged droughts. These forecasts enable governments and communities to enhance preparedness, minimize risks, and optimize the use of natural resources across sectors including energy, agriculture, and transportation.

Beyond climate prediction, AI plays a significant role in wildlife conservation. Machine learning techniques are employed to study animal behavior, track endangered species, and monitor illegal activities such as poaching. AI-based analytics help identify poaching-prone regions, enabling enforcement agencies to take focused and proactive measures to protect vulnerable wildlife and preserve biodiversity.

AI is also contributing to sustainable waste management practices. Intelligent waste management systems use robotics and computer vision technologies for automated waste segregation, recycling, and waste-to-energy conversion. These systems enhance operational efficiency, reduce landfill dependency, and minimize environmental pollution.

In conclusion, the role of Artificial Intelligence in environmental conservation and sustainability is rapidly expanding. As AI technologies continue to evolve, their integration into environmental monitoring, prediction, and management systems holds significant potential for building a sustainable and resilient future. The responsible adoption of AI can strengthen global efforts toward environmental protection and long-term ecological balance.

DEPARTMENT OF COMPUTER ENGINEERING

Explainable Artificial Intelligence: Building Trust in Intelligent Systems



Ms. Jayshri Suresh Sonawane

Assistant Professor
Computer Department

Artificial Intelligence (AI) has rapidly evolved from a research-driven concept to a foundational technology influencing decision-making across diverse sectors such as healthcare, finance, transportation, education, and governance. Intelligent systems now assist in medical diagnosis, credit approval, recruitment, predictive policing, and autonomous driving. While these advancements offer significant benefits, they also raise critical concerns regarding transparency, fairness, accountability, and trust.



Many modern AI systems, particularly those based on deep learning, operate as "black-box" models, producing accurate outputs without providing clear explanations of how decisions are made.This lack of interpretability poses serious challenges, especially in high-stakes applications where human lives, rights, and safety are involved. In this context, Explainable Artificial Intelligence (XAI) has emerged as a crucial paradigm aimed at making AI systems transparent, interpretable, and trustworthy.

1.Need for Explainable Artificial Intelligence

The growing dependence on AI-driven decision systems has highlighted the importance of understanding why a system produces a particular output. In traditional software systems, logic and rules are explicitly programmed and easily traceable. In contrast, AI models learn complex patterns from data, making their internal reasoning difficult to interpret.

2. **The absence of explain ability can lead to several issues:**

- **Lack of user trust:** Users may hesitate to rely on AI systems if decisions cannot be justified.
- **Ethical and legal concerns:** Unexplainable decisions may result in discrimination, bias, or unfair outcomes.
- **Regulatory challenges:** Compliance with data protection and accountability regulations requires transparent decision-making.
- **Difficulty in debugging and improvement:** Without explanations, identifying errors or biases in models becomes challenging.

  Explainable AI addresses these concerns by enabling humans to understand, interpret, and validate AI decisions, thereby fostering trust and acceptance.
- **Principles of Explainable Artificial Intelligence**

  Explainable AI is guided by several fundamental principles that ensure transparency and reliability: Interpretability: The ability to understand how input features influence the output of an AI model. Simple models like decision trees are inherently interpretable, while complex models require additional explanation techniques.
- **Transparency:**

  Transparency refers to openness in model design, training data, and decision processes. Transparent systems allow stakeholders to examine how models function and make decisions.
- **Accountability:**

  AI systems must be designed such that responsibility for decisions can be assigned. Explainability supports accountability by enabling auditability and traceability.
- **Fairness:**

  Explainable models help identify and mitigate biases related to gender, race, or socio- economic factors, ensuring ethical decision-making.
- **Techniques for Explainable AI**

  Several techniques have been developed to explain AI models without significantly compromising their performance:
- **Model-Intrinsic Explainability:**

  Some models, such as linear regression, rule-based systems, and decision trees, are inherently interpretable due to their simple structure.
- **Post-Hoc Explanation Methods:**

  These techniques explain complex black-box models after training. Popular methods include:
- **LIME (Local Interpretable Model-Agnostic Explanations):**

  Explains individual predictions by approximating the model locally.

  SHAP (SHapley Additive exPlanations): Uses game theory to measure the contribution of each feature to the final prediction.

  Saliency Maps: Commonly used in image-based AI systems to highlight influential regions.

  These methods allow engineers and users to gain insights into complex AI models without redesigning them entirely.

- **Explainable AI in Critical Applications**
  Explainable AI plays a vital role in domains where transparency and trust are non-negotiable:
- **Healthcare:**
  AI systems assist in disease diagnosis and treatment recommendations. Doctors must understand AI-generated suggestions to make informed clinical decisions and ensure patient safety.
- **Finance:**
  In loan approval and credit scoring systems, explainability is essential to justify decisions and comply with financial regulations.
- **Autonomous Systems:**
  In autonomous vehicles and robotics, explainable decision-making is crucial for safety validation and system reliability.
- **Governance and Public Systems:**
  AI-based decision systems used in public services must be transparent to maintain public trust and democratic accountability.
- **Challenges in Implementing Explainable AI**
  Despite its importance, implementing explainable AI presents several challenges. There is often a trade-off between model accuracy and interpretability, as highly complex models tend to achieve better performance but lower transparency. Additionally, explanations must be meaningful not only to technical experts but also to non-technical users, which requires careful design.
  Another challenge lies in standardizing explain ability metrics and integrating XAI into existing development pipelines. Continuous research and interdisciplinary collaboration are essential to address these limitations.
- **Role of Engineering Education and Research**
  As educators and researchers in computer engineering, it is our responsibility to prepare students to design AI systems that are not only intelligent but also ethical and trustworthy. Engineering curricula must incorporate topics such as explainable AI, responsible AI, data ethics, and regulatory compliance.

Encouraging research in interpretable models, fairness-aware algorithms, and human-centered AI will contribute to the development of sustainable and socially responsible intelligent systems.

DEPARTMENT OF COMPUTER ENGINEERING

Code Review Techniques for Improving Software Quality



Dr. Pankaj Rambhau Patil

Associate Professor
Computer Department

In modern software development, writing code is only one part of building reliable systems. Ensuring correctness, maintainability, security, and performance requires systematic evaluation of code before it reaches production. Code review is a proven software engineering practice that involves examining source code to identify defects, improve design, and promote best practices. This article discusses the importance of code reviews, various review techniques, tools, challenges, and their role in enhancing overall software quality in academic and industrial environments.



Software systems today are becoming increasingly complex, distributed, and mission-critical. Errors in software can lead to financial loss, security breaches, and safety hazards.While testing detects defects after code execution, code review helps prevent defects at an early stage, making it one of the most cost-effective quality assurance .

practices. Code review refers to the systematic examination of source code by peers or automated tools to ensure that it meets defined standards of correctness, readability, security, and performance. In engineering education and professional practice, code reviews play a vital role in improving both software quality and developer skills.

Objectives of Code Review

The primary objectives of code review include:

- Identifying logical errors and bugs early
- Ensuring adherence to coding standards and guidelines
- Improving code readability and maintainability
- Detecting security vulnerabilities
- Encouraging knowledge sharing and team collaboration
- Enhancing overall software design and architecture
- By achieving these objectives, code review significantly contributes to long-term project sustainability.

Types of Code Review Techniques

3.1 Informal Code Review

This is a lightweight review method where developers casually review each other's code through discussions, emails, or pair programming. It is commonly used in small teams and academic projects. Though informal, it encourages collaboration and quick feedback.

Advantages:

- Low overhead
- Fast feedback
- Improves team communication

Limitations:

- May miss critical defects
- Lack of documentation
- Formal Code Review (Inspections)
- Formal reviews follow a structured process involving roles such as moderator, reviewer, and author. Checklists are used to evaluate correctness, logic, and standards.

Advantages:

- High defect detection rate
- Well-documented process
- Suitable for safety-critical systems

Limitations:

- Time-consuming
- Requires trained reviewers
- Tool-Based Code Review

Modern development environments rely heavily on tools such as GitHub, GitLab, Bitbucket, Gerrit, and Crucible. These tools allow reviewers to comment directly on code, track changes, and maintain review history.

Advantages:

- Easy collaboration in distributed teams
- Version control integration
- Audit trails for quality assurance
- Automated Code Review
- Automated tools analyze code without human intervention to detect syntax errors, code smells, security flaws, and performance issues.

1. Common tools include:
2. SonarQube
3. ESLint
4. PMD
5. Checkstyle
6. Coverity

Advantages:

- Consistent analysis
- Saves human effort
- Early detection of vulnerabilities
- Limitations:
- Cannot judge design intent
- False positives possible
- Best Practices for Effective Code Review

To maximize the benefits of code review, the following best practices should be followed:

- Review small chunks of code to improve focus
- Use standardized coding guidelines
- Combine automated tools with manual reviews
- Focus on logic, readability, and security—not just syntax
- Provide constructive and respectful feedback
- Maintain documentation of review comments
- In an academic setting, incorporating code reviews into lab sessions and projects helps students develop professional programming habits.

Challenges in Code Review

- Despite its benefits, code review faces certain challenges:
- Time constraints in fast-paced development
- Lack of reviewer expertise
- Resistance to criticism
- Over-reliance on tools
- These challenges can be addressed through training, clear review policies, and fostering a positive review culture.

Role of Code Review in Engineering Education

For engineering students, code review enhances:

- Critical thinking and analytical skills
- Understanding of real-world software practices
- Exposure to collaborative development
- Awareness of security and maintainability issues
- Introducing peer code review in academic curricula bridges the gap between theoretical learning and industry expectations.

Code review is a cornerstone of high-quality software development. By detecting defects early, improving design, and promoting best practices, it significantly enhances software reliability and maintainability. The combination of manual reviews and automated tools provides an effective approach to quality assurance. For engineering faculty and students alike, adopting systematic code review practices prepares future engineers to meet professional and industrial standards.

TECHNOLOGY IN CINEMA



Aditi Joshi

B. Tech CE II-Year

Technology and Cinema go hand in hand, as technology advances, so is the ability of filmmaking. We have advanced from Black and White to Color, from shooting on matte paintings or curtains to green screens, and the set design is setting new heights now and then. I have found myself obsessing over filmmaking or behind-the-scenes videos recently, the sheer creativity of making a movie amazes me, how every scene included has some story behind how it was shot, why those particular colors are used and how have they been achieved.



How many of you have come out of the theatre and said," the storyline was bland but the songs were amazing or the lightning or the colors", well, we all have said it, haven't we? Filmmaking is not just about the storyline but it is a collective effort of the screenplay, background score, sound quality, lighting and colors, makeup, and much more. We have found ourselves leaning toward K-dramas more and more recently, why? the reason is the same as explained above, we love the aesthetics. Why we can't stop listening to some songs even if their lyrics make no sense, the reason is their amazing sound quality. Even the academy has accolades for the best background score, best makeup, and best soundtrack, they are not just value addition but an important part of the movie itself.

Well, who doesn't like Sanjay Leela Bhansali's grand, royal, extravagant films, it will not be wrong to say that he makes all the actors look like walking portraits in his films, well some of you might think it is due to the exquisite costumes and eminent direction but you will be surprised to know that the cinematography has an upper hand here. For filming Bhansali collaborated with NY VFXWAALA, a leading Indian VFX corporation that delivered this film over eight months in terms of CGI creation and visual effects with a team of 50 to 60 artists working on it.

Talking about it Prasad Sutar, Founder and Managing Director says that he and his team were involved with the film from the scripting stage. Throughout the shooting process, they would discuss and analyze whether a particular shot was possible to shoot live or with CGI or VFX, and arrangements were made accordingly.

He further adds that he likes to shoot live and further adds effect to make it as realistic as possible. Talking about scenes he says," The opening war wherein the entire army was created using CGI, was shot in broad daylight and then converted into the night. The close-ups were shot indoor therefore we had to match and blend all the shots. This sequence itself had around 300 VFX shots with minute detailing as this was the introductory sequence. The climax sequence had live water shot on a camera with CGI horses, arrows, and fireballs. Bhansali sir had visualized the climax but our team enhanced the scene with our thoughts and ideas. The climax took around 15 to 20 days to be completed with perfection. Bajirao Mastani went on to win several awards for the CGI and VFX used in it including Asian Film Award (AFA) for Bajirao Mastani, becoming the only Indian VFX house to have won the AFA award to date. Bajirao Mastani, a grand Period Drama was brought to life by the enhanced VFX work.

Let's talk about something recent, Gehraiyaan although not a very appealing movie due to its storyline but had been criticized positively regarding its Cinematography. Kaushal Shah, the Cinematographer of Gehraiyaan revealed that the shots have been taken in a way to make the viewer read between the lines, to feel things being unsaid, the music and background score has been set in such a way that it gives us a sense of therapy but with a tint of hopelessness in it too. If one observes the lighting and the filters keep on changing following each phase of the film.

Talking about everyone's favorite Harry Potter, Framestore a British animation, and visual effects company worked side by side with directors of all 8 films of the Harry Potter series crafting key characters, otherworldly environments, and of course magical effects. Dobby, Buckbeak, and the watery underworld created during Triwizard Tournament, etc. are all visual effects creations.

Technology had, has, and will continue to influence filmmaking. Thanks to it we all have experienced fantastical worlds that could never exist on our earthly plane, recently successful Marvel films and Squid Games are proof that people indeed are ready to witness technology on their screens which also is an incentive for making such films. This also has opened wide doors for new career opportunities and creativity. Just brace yourself to witness a technological revolution in Filmmaking.

DEPARTMENT OF COMPUTER ENGINEERING

TECHNOLOGY: BOON OR BANE



Pratik Patil

B. Tech CE II-Year

Technology is said to be one of the greatest inventions of mankind. It has made our lives easier by leaps and bounds. You need to pay money to someone, use online transactions; you want to learn from educators miles away from you, use distance learning programs: you want ice cream but don't want to visit a store, use online shopping applications and much more. Technology advances every second, take a simple example of Whatsapp, you can delete messages for both sender and viewer, can use on multiple devices at a time and the group limit exceeds every now and then. Technology undergoes evolution continuously to equip it with new features



and for making it more user friendly. In short, everything has increased: speed, accuracy, endurance to work with technology. Technology has opened wide doors for new career opportunities. It is been used in fields like Medical, Education, Transportation, Defence, Filmmaking etc.

Well, it will not be wrong to say that technology has made an important spot in everybody's lives. It has several advantages but it does have certain disadvantages which should be talked about, one such case is the recent Bulli Bai Case which has exposed a different side of technology which most people are still unaware about.

The amount of hazardous content being served on Internet has influenced youngsters to take malevolence steps, today we can access thousands of videos, audiobooks and images on internet according to our need but some of these elements are being used to share hateful content. An engineering student from Jorhat, Assam named Niraj Bishnoi was arrested in the Bulli Bai Case. The case is related to hundreds of Muslims women being listed for auction on the Bulli Bai app on Github Platform.

What does this tell us? technology could be harmful in some ways too. What about the dark web? It contains harmful content like videos for promoting terrorism, violence, etc. Cyber-attacks are threats for individuals as well as nations' security. The recent incidents like use of spyware Pegasus have caused distrust on usage of technology. Frauds are actively working online, how can we keep a check on all these liberties on online platforms, the sheer ease of accessing internet has resulted in all these crimes.

Technology has taken a toll on our health as well, the excessive screen time we devote streaming videos has made our eyes vulnerable of straining. A 5- year study in the journal Applied Ergonomics found an association between texting on a mobile phone and neck or upper back pain in adults. Using technology too close to bedtime may cause issue with sleep. It has reduced physical activity in our lives and increased chances of diseases like Diabetes and Obesity in adults. One less talked reason but an important one is that technology has resulted in Isolation of individuals. A 2017 study, in young adults aged 19-32 years found that people with higher social media use were more than three times as likely to feel socially isolated than those who did not use social media as often. Social media often causes insecurities among people.

What may be concluded is that technology has several disadvantages too and it is always beneficial to know about it, the picture is not that rosy.

DEPARTMENT OF COMPUTER ENGINEERING

VIRTUAL REALITY



Dhananjay Marathe

B. Tech CE II-Year

When we talk about virtual reality we tend to feel it's something like we see in movies like 'minority report' or the 'labyrinthus' however we can find virtual reality around us these days while playing video games, education, medicine etc. and it is here to stay. Virtual Reality is a computer-generated environment with scenes and graphics that appear to be real making the user feel immersed in it. This environment is perceived through a virtual reality headset or helmet. It makes us feel as if we are the main protagonist in the video game or the story or as if we are playing the sport in reality like Golf. It helps us to perform surgeries or improve the quality of the sports training to maximise the performance.



This may seem futuristic but it isn't a new concept. In fact the first virtual reality device was called Sensorama, a machine with a built-in seat that played 3D movies, gave off odours and generated sensations and vibrations to make the experience wholesome and real. It was invented back in the 1950s.

There are many sectors today in which virtual reality is applied like medicine, culture, education, and architecture. From guided museum visits to the dissection of a muscle, VR now allows us to cross boundaries that would otherwise be unimaginable. It helps us to transcend into a new world leaving behind our real surroundings. It has been used and studied in Primary education, anatomy teaching, military, astronaut training, fight simulators, miner training, medical education etc. There have been a few very famous concerts during the covid pandemic which were possible only because of Virtual reality like Billie Ellish performed on Oculus Venues on October 24, 2021 and the Pop group Imagine Dragons will perform on June 15,2022.

Though Virtual Reality is good and technologically a right fit for today's World however it has lead to a variety of problems as well like Concerns related to health problems in both Children and adults. Also, threat to privacy is a main concern as the persistent tracking required by all VR systems makes the technology particularly useful for, and vulnerable to, mass surveillance.

All this means that Virtual Reality is no longer science fiction. It is integrated into our present World and is emerging in the coming years. It will lead to advances that will shape the future and will turn the World into the Tomorrow land we all aspire to have.

DEPARTMENT OF COMPUTER ENGINEERING

BEST PROJECT ABSTRACT

Approaches for Identifying Suicide Ideation in Social Media Texts: Comprehensive Review

Ms.Jayashri.S.Sonawane, Prof.Dinesh
Jain Computer Engine

In contemporary society, Suicide has become a notable concern within the realm of public health. Suicidal ideation (SI) encompasses thoughts about ending one's life. Factors contributing to suicidal thoughts and actions are diverse, ranging from personal life events to enduring emotional distress. We investigate the issue of identifying such ideation on Twitter, emphasising the usefulness of a collection of characteristics taken from the literature as well as the function of discussion context in this process. Numerous machine learning algorithms have been put forth to identify SI from internet channels, but because feature engineering and classification techniques are still lacking, the accuracy of these algorithms is still low. Therefore, by using novel deep learning and natural language processing-based feature engineering technique accuracy can be increased.

DEPARTMENT OF COMPUTER ENGINEERING

Suggestion Mining for Mobile APP Quality Improvement

Mr. Makarand Lotan Mali, Prof.Dr. Nitin N. Patil
Computer Engineering

User feedback is essential for mobile apps to continuously improve. However, obtaining insightful suggestions from user reviews still poses a major challenge. In order to address this issue, this study suggests a brand-new rule-based method for suggestion mining that focuses on the action verbs' capacity to provide information. To detect user evaluations with suggestions, our approach makes use of verb semantics and pre-established criteria based on action verbs. We undertake a comprehensive performance evaluation on an actual dataset of mobile app evaluations to determine its efficacy. The outcomes demonstrate the substantial potential of our rule-based methodology, attaining superior memory and precision in identifying suggestions in reviews. Through the utilisation of action verbs' rich information, our approach provides a useful and effective way to automatically derive actionable suggestions from user reviews. We obtained above 89% accuracy for the enhanced proposed method. In the end, this helps to improve the quality of mobile apps by enabling data-driven adjustments based on user reviews.

DEPARTMENT OF COMPUTER ENGINEERING

Towards Precision in Skin Cancer Diagnosis: A Deep Learning Framework for Segmentation and Severity Analysis

Ms.Punam R. Patil, Dr. Ritu Tandon
Computer Engineering

The most common and fatal type of cancer that poses a serious risk to Cutaneous malignancy is one of the most common and fatal cancers, with melanoma being particularly deadly. Early detection is crucial for effective treatment, but traditional diagnostic methods face challenges due to poor image quality and the complexity of visual differentiation. This study proposes an advanced deep learning approach for optimal skin cancer segmentation and classification, with a focus on severity analysis. The proposed method utilizes advanced image pre-processing techniques to reduce noise while preserving critical features, ensuring high-quality images for precise diagnosis. By leveraging state-of-the-art feature extraction techniques, the model identifies intricate patterns and correlations within the data. To enhance accuracy, multiple advanced classification methods are integrated, addressing computational challenges often associated with deep learning models. The approach is designed to be efficient and effective, even in resource-limited settings. Additionally, the study includes a comprehensive severity assessment, analyzing various clinical parameters to provide a detailed understanding of the cancer's progression and impact on the patient. This holistic approach, from early detection to severity evaluation, enhances diagnostic accuracy and patient outcomes. Overall, this research highlights the transformative potential of deep learning in skin cancer diagnosis. By improving early detection, classification precision, and severity assessment, the proposed method offers a robust and reliable solution that advances patient care and treatment strategies.

DEPARTMENT OF COMPUTER ENGINEERING

Performance Evaluation of Modified YOLOv5 Object Detectors for Crop-Weed Classification and Detection in Agriculture Images

Dr.Sandip Sonawane, Prof.Dr. Nitin N. Patil

Computer Engineering

Crop-weed classification and detection are essential tasks in precision agriculture for effective weed management. In this study, we employed the most popular YOLO (You Only Look Once) object detection algorithm to address this challenge. A Weed1000 dataset comprising 1228 annotated images was used for training and evaluation. Various versions of the YOLOv5 algorithm, namely YOLOv5n, YOLOv5s, YOLOv5m, YOLOv5l, and YOLOv5X, were implemented and evaluated with reference to performance evaluation metrics including precision, recall, F1 score and mean Average Precision (mAP) at different Intersection over Union (IoU) thresholds. Our experimental results revealed that YOLOv5X, the largest and most complex variant, achieved superior performance compared to other model versions, demonstrating higher precision, recall rates, and mAP scores. Furthermore, we developed a web application using Flask to deploy the YOLOv5 model, enabling real-time crop-weed detection accessible via a user-friendly interface. This research contributes to advancing automated cropweed classification methodologies using Deep Learning (DL) and highlights the practical deployment of such models for agricultural applications. The findings underscore the importance of model selection and deployment strategies in achieving accurate and efficient crop-weed detection systems.

DEPARTMENT OF COMPUTER ENGINEERING

Dr. Vipul Punjabi Associate Professor in the Computer Engineering Department at R. C. Patel Autonomous Institute of Technology, Shirpur, Awarded Ph.D. for Research on Fake News Detection System



Dr. Vipul Devendra Punjabi

Associate professor

In today's digital era, the spread of fake news is increasing rapidly. It is being misused for purposes such as extortion, blackmail, defamation, and more. This has a profound impact on society and democracy. To address this serious challenge, Dr. Vipul Punjabi conducted research on the topic "Design and Development of Fake News Detection System Using Machine Learning Techniques." and has been awarded a Ph.D. His research aims to improve the accuracy and efficiency of detecting fake news, thereby promoting truth and fact-based information in society. Dr. Punjabi's research was guided by Prof. Dr. Rajesh Kumar Shukla, Director of Oriental Institute of Science and Technology, Bhopal, a renowned academician in the fields of machine learning and data science. The system developed by Dr. Punjabi uses machine learning-based algorithms and various feature engineering techniques to analyse the authenticity of news. False and misleading news often incites hatred and unrest in society. Since traditional methods struggle to identify fake news effectively, an automated machine learning-based system has become necessary. The system incorporates logistic regression, random forest, and deep learning models, which enhance its accuracy and performance. It is also capable of integrating with multimodal data (text, image, video), making fake news detection more effective. His research paper entitled "Sarcasm Detection in Breaking News: Evaluating Official and Satirical Headlines", published by Springer, was awarded the "Best Research Paper" title along with a prize of 200 Euros. The management and faculty of Shirpur Education Society, including Hon. Shri. Amrishbhai Patel and other dignitaries, extend their congratulations on this significant achievement



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PH.D ACHIEVEMENT 2024-2025

Prof. Pankaj Rambhau Patil, a faculty member in the Computer Engineering Department at R. C. Patel Institute of Technology, Shirpur, has been conferred with a Doctorate degree (Ph.D.) from Amity University, Mumbai, Maharashtra.



Dr. Pankaj Rambhau Patil

Associate professor

His research focused on "Design and Development of an Effective Framework for Accurate Stock Market Prediction Using Machine Learning Techniques." Throughout his research journey, he received valuable guidance from Dr. Deepa Parasar, Computer Engineering Department, Amity University, Mumbai. Prof. Patil's research papers have been published in internationally recognized journals, including Scopus and SCI-indexed journals. Additionally, he has actively participated in various conferences and seminars, presenting his findings on stock market prediction using cutting-edge machine learning algorithms. His research aims to enhance the accuracy of stock market price forecasting by developing advanced machine learning models, which could significantly benefit investors and traders in making informed decisions. During his research, Prof. Patil received strong support from his department head, Dr. R. B. Wagh, and fellow faculty members, whose encouragement played a crucial role in his achievement. Prof. Patil's remarkable achievement has brought immense pride to R. C. Patel Institute of Technology, Shirpur, reinforcing its commitment to academic excellence and research innovation



DEPARTMENT OF COMPUTER ENGINEERING

The Shirpur Education Society's R. C. Patel Institute of Technology (Autonomous) proudly announces that Prof. Shailendra MadanSingh Pardeshi of the Computer Engineering Department has been awarded a Doctorate degree in Computer Engineering from Oriental University, Indore, Madhya Pradesh.



Dr. Shailendra MadanSingh Pardeshi
Associate professor

His doctoral research, conducted under the guidance of Prof. Dr. Dinesh Jain, focused on "Sentiment Analysis Using Machine Learning for Emotion Detection." Dr. Pardeshi's work explores the application of machine learning techniques to identify human emotions, aiming to address future challenges in sentiment analysis. Dr. Pardeshi has a strong research profile, including publications in internationally recognized, Scopus indexed journals and active participation in numerous conferences and symposiums. He received significant support from his Head of Department, Dr. R. B. Wagh, and colleagues throughout his research journey. The institute congratulates Dr. Pardeshi on this significant academic achievement. On this remarkable achievement, congratulations were extended to Dr. Shailendra Pardeshi by the President of Shirpur Education Society, Mr. Amrishbhai Patel, Former Mayor and Director, Ms. Jayashreeben Patel, Executive President, Mr. Bhupeshbhai Patel, Vice President, Mr. Rajgopal Bhandari, Director, Mr. Chintanbhai Patel, Secretary, Ms. Resha Patel, Director, Mr. Atul Bhandari, along with the Director of the institute, Dr. J. B. Patil, Deputy Director, Dr. P. J. Deore, Controller of Examination, all Heads of Departments, Training and Placement Officers, Public Relations Officers, faculty members, and administrative staff of the institute



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Dr. Sandip Ravindra Sonawane, Assistant Professor in the Computer Engineering Department at R. C. Patel Autonomous Institute of Technology, Shirpur, has been awarded a Ph.D. in Computer Engineering from Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon .



Dr. Sandip Ravindra Sonawane

Associate professor

His doctoral research focused on the "Design and Development of a System for Weed Detection and Control," leveraging AI, IoT, and Robotics for efficient and environmentally conscious weed management. Guided by Dr. Nitin Namdev Patil, Dr. Sonawane's work holds potential for broader applications in smart agriculture. His research has been published in Scopus and Web of Science indexed journals, and presented at international conferences. Dr. Sonawane acknowledges the support of his department head, Dr. R. B. Wagh, and colleagues. The management and faculty of Shirpur Education Society, including Hon. Shri. Amrishbhai Patel and other dignitaries, extend their congratulations on this significant achievement.





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Dr. Saiyyad Mohmmadali Muzffarali, Associate Professor in the Computer Engineering Department at R. C. Patel Autonomous Institute of Technology, Shirpur, has been awarded a Ph.D. in Computer Engineering from Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon.



Dr. Saiyyad Mohmmadali Muzffarali
Associate Professor

Dr.Saiyyad Mohmmadali Muzffarali, Associate Professor in the Computer Engineering Department at R. C. Patel Institute of Technology, Shirpur has made notable academic contributions in Natural Language Processing with recent research focused on advanced text summarization using machine learning techniques.

His research focuses on "On the Text Summarization using Machine Learning Technique", exploring novel algorithmic frameworks, feature extraction pipelines, and machine learning models to effectively compress long-form text while preserving core semantic intent.Guided by Prof.Dr. Nitin Namdev Patil, Dr. Saiyyad's work holds potential for broader applications in natural language processing.His research has been published in Scopus Journals and presented at international conferences.

Dr. Saiyyad acknowledges the support of his department head,Prof. Dr. R. B. Wagh, and colleagues. The management and faculty of Shirpur Education Society, including Hon. Shri. Amrishbhai Patel and other dignitaries, extend their congratulations on this significant achievement.



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Faculty Certifications 2024-2025

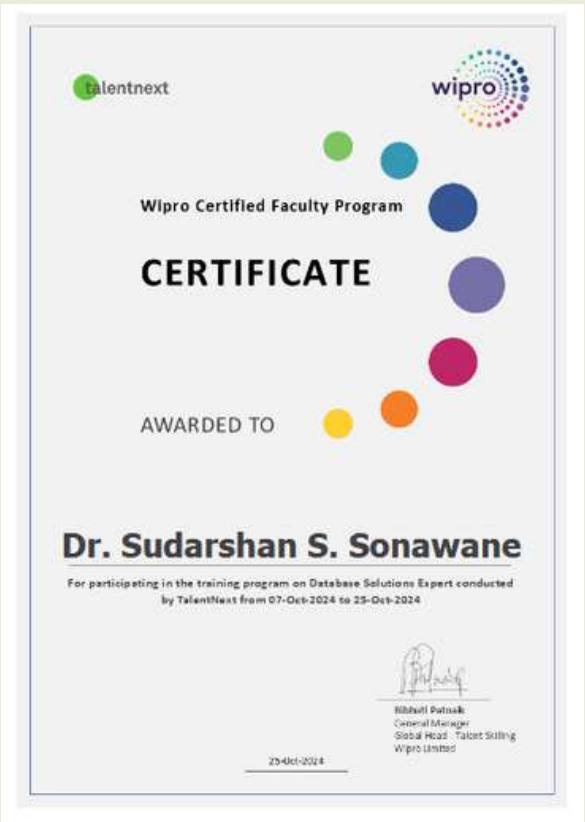


Dr. Sudarshan S. Sonawane
Associate professor

Dr. Sudarshan S. Sonawane, faculty of Computer Engineering, R. C. Patel Institute of Technology, Shirpur, successfully completed a Wipro Certified Faculty Development Program (Oct 2024) and earned the **Wipro "Database Solutions Expert" certification.**

The achievement strengthens industry-oriented teaching and academic excellence at the institute.







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HACKTHON GLIMPSE

Internal Smart India Hackathon 2024 Glimpse



The Department of Computer Engineering successfully organized the Internal Smart India Hackathon 2024 at R. C. Patel Institute of Technology, Shirpur, on 2nd and 5th September 2024. The event aimed to encourage innovation, problem-solving abilities, and teamwork among students by providing a platform to present impactful ideas and working prototypes.

The competition was conducted in two rounds. Round I, held on 2nd September 2024, focused on idea presentation, where teams pitched their innovative concepts.



Round II, organized on 5th September 2024, involved prototype development and evaluation. After comprehensive assessment based on novelty, feasibility, usability, and scalability, 30 teams were shortlisted to represent the institute at the National Level Smart India Hackathon 2024.

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A total of 43 teams with 258 students participated in the event, demonstrating collaborative effort from all branches with mandatory inclusion of girl participants. The hackathon provided students valuable exposure to real-world problem statements, teamwork culture, and hands-on learning with mentoring support. The event was efficiently coordinated under the guidance of Mr. Sagar U. More and Mr. Harshal S. Patil (Internal Hackathon Faculty In-charge), ensuring smooth and successful execution





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TECH ACTIVITY GLIMPSE

Cyber Dhamaka Quiz and Challenge Fest Glimpse



The Cyber Dhamaka Quiz and Challenge Fest was organized by the Cyber Security Cell and the Department of Computer Engineering. As per AICTE guidelines, the main objective of the Cyber Security Cell is to raise awareness about cyber security among students.



The event was conducted in two rounds. The first round of the quiz was conducted on 20th September 2024, and the second round was a CTF (Capture The Flag) challenge that was conducted on 27th September 2024. In the first round, 48 teams participated, from which 10 teams were shortlisted for the final round.

In the final round, 10 CTF challenges were given to each team. The team that solved the maximum number of challenges quickly was considered the winner. The prize distribution of the event was held on 10th October 2024.



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Nodevember 2.0 Glimpse

The Department of Computer Engineering, under the Akatsuki Coding Club, organized a hands-on workshop titled “Nodevember 2.0” from 11th to 14th November 2024 for third-year Computer Engineering students at R. C. Patel Institute of Technology, Shirpur. The workshop aimed to enhance students’ backend development skills through industry-focused training on JavaScript, Node.js, Express.js, and MongoDB. Students learned to build scalable server-side applications, develop secure RESTful APIs, integrate cloud databases, and deploy practical software solutions.

The event followed a blended learning approach with concept sessions, live demonstrations, and guided hands-on practice, helping participants gain both theoretical and practical expertise. Daily Menti quizzes reinforced concepts, increased engagement, and encouraged healthy competition.

A total of 120 students actively participated, showing strong curiosity and teamwork. The workshop significantly strengthened their backend development skills and prepared them for advanced projects, internships, and future career opportunities in the software industry.



Day-wise Highlights

Day 1 – Client-Server Technology & JavaScript BasicsThe workshop began with core concepts of client-server architecture and RESTful APIs, explaining how web systems communicate. Students revised JavaScript fundamentals such as variables, data types, loops, and decision-making. Hands-on coding helped apply concepts in real time. A Menti quiz boosted engagement and tested understanding.



Day 2 – Advanced JavaScript, Node.js & Express.js:

Day 2 covered advanced JavaScript topics, including functions, callbacks, promises, and async/await. Students were introduced to Node.js for server-side programming and Express.js for building APIs. Through live demos, they learned routing, middleware, and request/response handling. Practical exercises strengthened their ability to create scalable backend applications.



Day 3 – MongoDB, MongoDB Atlas & Mongoose Integration:
Students explored MongoDB fundamentals, data modeling, and connecting Node.js applications to databases. They learned to use MongoDB Atlas for cloud deployment. With Mongoose, they implemented schemas and CRUD operations. By the end, every student integrated a working database into their project.

Day 4 – Backend Project Development:
The final day centered on practical backend development. Students began building the Company Review System project using the MVC structure, creating schemas and APIs, and testing endpoints through Postman. This hands-on development helped them apply all concepts learned throughout the workshop, resulting in a working backend prototype and boosting their project-building confidence.



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The React Cohort Glimpse

The Department of Computer Engineering, under the Akatsuki Coding Club, successfully organized a 4-day technical workshop titled “The React Cohort” from 2nd to 5th April 2025. Designed exclusively for second-year students, the workshop provided hands-on training in React.js and Tailwind CSS, focusing on modern frontend development, component-based design, and real-time deployment.

A total of 98 students actively participated, developing an “Online Project Selling Platform” through a project-based learning approach in the department’s computer center.



Highlights:

Day 1: Front-End, JavaScript & TypeScript Basics

The workshop opened with an overview of modern front-end development and the role of React in today’s ecosystem. Students learned core JavaScript concepts—variables, loops, functions, and asynchronous programming—along with an introduction to TypeScript, building a strong foundation for dynamic web applications.



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CONVERGES 2025 GLIMPSE

Muggles Mystery

The Department of Computer Engineering, under E-Builders, successfully organized an engaging and dynamic event titled “Muggles Mystery” as part of Converges 2025 on 27th and 28th February 2025. The event combined physical challenges, technical skills, and deduction-based strategy, providing participants with a thrilling and competitive experience.

The primary objective of the event was to enhance students’ **teamwork, communication**, and **problem-solving abilities** while integrating entertainment with technical learning.

A total of multiple teams participated, each consisting of **4 members**, competing across **four uniquely designed rounds**.



Round 1 – Trust the Trail

Part 1: One team member, blindfolded, navigated an obstacle path solely through verbal instructions from teammates. Teams with the slowest completion time or repeated errors were eliminated.

Part 2: Teams competed in a target-based task by tossing balls into designated buckets—Hogwarts (10 points), Gryffindor (5 points), and Harry (15 points). Scores earned at this stage provided an initial technical advantage for subsequent rounds.



Round 2 – Technical Evaluation Round

This round measured participants' core technical abilities through a three-stage assessment:

- Debugging: Identifying and resolving errors in faulty code snippets.
- Problem Solving: Completing logic-based and puzzle-oriented PDF tasks involving patterns and riddles.
- Web Development: Designing a responsive webpage using Bootstrap within a strict 20-minute timeframe.



Round 3 – Who is the Spy?

Designed to test analytical thinking and strategic reasoning, this round assigned one hidden "spy" within each team. Participants evaluated clues, monitored interactions, and attempted to identify the spy with only two allowable guesses. Points were awarded based on the correctness and timing of the identification.



Round 4 – Mystery Round

The final round introduced unexpected tasks through on-the-spot instructions, adding an element of suspense and unpredictability. This decisive stage ultimately determined the champions of Muggles Mystery.



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The Animeverse

The Department of Computer Engineering, under the Akatsuki Coding Club, successfully organized an exciting and intellectually stimulating event titled “The Animeverse” as a part of Converges 2025, the international tech fest of R. C. Patel Institute of Technology, Shirpur. Conducted on 27th and 28th February 2025, the event witnessed a massive participation of 66 teams, each comprising 3 to 4 members, who showcased their technical expertise, creativity, and problem-solving skills.

The core objective of the event was to enhance students’ coding proficiency, logical reasoning, teamwork, and strategic thinking, while blending fun and innovation with a competitive spirit inspired by anime themes.



Round 1 – Matrix Showdown (Fun Round)

The opening round included two engaging activities testing teamwork and quick thinking.

X-O Blitz: A life-size Tic-Tac-Toe race requiring speed and coordination, becoming a major highlight of Converges 2025.

Binary Unlocked: A memory-based binary conversion task powered by a custom digital system created by the Akatsuki Coding Club.

All teams advanced to the next round.

Round 2 – CodeSprint 50

A 50-minute HackerRank challenge with 50 questions:

- 20 Easy (50 pts)
- 20 Medium (100 pts)
- 10 Hard (200 pts)

This round tested coding accuracy and time management. Only the top 28 teams qualified for the final stage.

Round 3 – Chamber of Secrets (Final Round)

The finale featured 15 progressive coding and logic levels, each unlocked using passwords generated from solved challenges. Teams could use digital currency earned in earlier rounds to buy hints or answers. A live leaderboard tracked progress, creating a highly competitive finish.



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COMPUTER DEPARTMENT PLACEMENT 2024-2025













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