

**REPORT ON INDUSTRY INTERACTION ACTIVITIES CONDUCTED UNDER
IEEE-CIS (Bangalore Section)**



**IEEE Computational Intelligence Chapter Bangalore
Section (R-10), Bangalore**

INDUSTRY INTERACTION ACTIVITIES 2024-25

1	Activity 1 – Partial Delivery of courses	60000
2	Activity 2 – Hackathon (Amritha University)	10000
3	Activity 3 - AI Conclave "NirvAI"	25000
4	Activity 4- Industry Interaction (Nishant)	50000
5	Activity 5- Hackathon (MSRIT)	34370
6	Activity 6- FDP (MSRIT)	45000

Activity 1 : (Partial Delivery of Courses)

End-to-End Machine Learning Workflow using MLOps: From Experimentation to Deployment

1. Introduction

1.1 Objective

The two-day workshop aimed to provide participants with practical skills in machine learning (ML) experimentation, artifact management, and deployment strategies using various tools and platforms. The focus was on hands-on experience with MLflow for tracking experiments, deploying models locally and as APIs, and implementing CI/CD automation using GitHub Actions, Docker, and related technologies.

1.2 Overview

The workshop was conducted over two days with the following focus:

- **Day 1 (August 3rd):** Machine Learning Lifecycle, including classification problems, data processing, model building, and local deployment.
- **Day 2 (August 10th):** CI/CD pipeline setup, version control, and running ML applications in Docker, with a focus on CI/CD automation and deployment strategies.




End-to-End Machine Learning Workflow using MLOps: From Experimentation to Deployment

Date: 3rd to 10th August 2024

Mr. Sachin Shivakalimath
AI / ML Professional, Genpact

About Speaker
[QR code](#)

Timings: 10:00 AM to 4:30 PM
Venue: Data Engineering Lab

Convenor Dr Anita Kanavalli Prof and Head, Dept.of ISE RIT, Bangalore	Advisor Dr Vijaya Kumar B P Advisor & Past Chair, IEEE-CIS Prof, Dept.of ISE, RIT	Coordinator Dr Sumana M Chair, IEEE-CIS Prof, Dept. of ISE, RIT
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Note: This event is conducted under the IEEE-CIS chapter and attached to the MTech (Data Sciences) course on Current Trends in Industry (MDSMC).

Organized by
Department of Information Science & Engineering

2. Day 1: Machine Learning Lifecycle and Local Deployment

2.1 Classification Problems

The workshop began with an introduction to classification problems:

- **Binary Classification:** Problems with binary outputs, such as spam detection.
- **Multi-class Classification:** Scenarios involving multiple classes, such as fruit classification.

2.2 Data Processing Pipeline

Participants learned about the data processing pipeline essential for preparing data:

- **Data Collection:** Gathering data from various sources.
- **Feature Extraction:** Selecting and engineering relevant features.
- **Data Normalization:** Scaling features for consistency.

2.3 Model Building

The model-building process was covered in detail:

- **Data Splitting:** Dividing data into training and testing sets.
- **Model Training:** Using algorithms to learn patterns from training data.
- **Model Validation:** Evaluating performance on unseen data.
- **Model Deployment:** Integrating models into production.

2.4 ML Experimentation with MLflow

Participants were introduced to MLflow:

- **Tracking:** Logging parameters, metrics, and results.

- **Artifacts:** Managing models, datasets, and files.

2.5 Local Deployment

Deployment methods were covered:

- **Streamlit:** Building and sharing data apps.
- **Flask:** Deploying models as web services.
- **.EXE Deployment:** Converting Python scripts into executable files for Windows systems.

2.6 Exposing the ML Model as an API

The process of exposing ML models as APIs was discussed:

- **API Development:** Creating RESTful APIs using Flask.
- **Integration:** Integrating APIs into software systems.

2.7 Logging and Exception Handling

Participants learned about logging and handling exceptions:

- **Logging:** Implementing logging for monitoring and debugging.
- **Exception Handling:** Strategies for error management in production.

2.8 Unit Testing and Precommit

Instructions were given on:

- **Unit Testing:** Writing tests to validate model correctness.
- **Precommit Hooks:** Setting up hooks to ensure code quality before commits.

3. Day 2: CI/CD Pipeline, Version Control, and Docker

3.1 CI/CD Pipeline Overview

Day 2 focused on CI/CD pipelines:

- **Source Code Management:** Using Git for version control.
- **Continuous Integration:** Automating code integration and testing.
- **Continuous Deployment:** Automating code deployment to production.

3.2 Setting Up Version Control with Git

Participants learned essential Git operations:

- **Initializing Repositories:** Creating and linking repositories.
- **Basic Commands:** Adding, committing, and pushing changes.
- **Branching and Merging:** Best practices for managing branches.

3.3 Configuring the CI/CD Pipeline

The CI/CD pipeline configuration was covered:

- **Build and Test Automation:** Writing scripts for builds and tests.
- **Deployment Automation:** Setting up deployment scripts and managing secrets.
- **Monitoring and Logging:** Implementing mechanisms for performance and issue tracking.

3.4 Working with Virtual Environments

Participants learned to manage virtual environments:

- **Creating Environments:** Using Python's venv module.
- **Managing Dependencies:** Installing and managing dependencies.

3.5 GitHub Actions for CI/CD

GitHub Actions for CI/CD automation were introduced:

- **YAML Configuration:** Writing YAML files for defining workflows.
- **Pipeline Setup:** Automating tests, builds, and deployments.

3.6 Docker for ML Deployment

Docker was covered for containerization:

- **Docker Desktop:** Installation and local development.
- **Docker Hub:** Pushing Docker images for distribution.

3.7 Running the ML App in Docker

Participants learned to containerize and deploy ML applications:

- **Containerization:** Creating Docker containers for ML apps.
- **Deployment:** Running containers in different environments.

4. Best Practices and Conclusion

4.1 Best Practices

Key best practices emphasized included:

- **Commit Messages:** Writing clear, descriptive commit messages.
- **Repository Management:** Regularly merging changes to avoid conflicts.
- **CI/CD Pipeline Maintenance:** Keeping pipelines updated and monitored.
- **Experiment Tracking:** Logging experiments for reproducibility.
- **Dockerization:** Containerizing applications for consistency.
- **Version Control:** Maintaining clean version control practices.

4.2 Conclusion

The workshop successfully equipped participants with comprehensive skills in managing the ML lifecycle, from experimentation to deployment. Attendees gained practical experience in deploying models locally and using containers, automating CI/CD pipelines, and ensuring robust development practices. The importance of continuous learning and staying updated with evolving tools and technologies in ML and DevOps was emphasized, concluding with discussions on the value of these skills in professional roles.

Links to photos and videos :

https://drive.google.com/drive/folders/1yxJ0kKK0Z3G1UFNhXuz7IySl2aKR_g6?usp=drive_link

https://drive.google.com/drive/folders/1y3GMwHzOsHgtDBmERswsRnsihp9JuGRe?usp=drive_link

Link to the materials: https://drive.google.com/drive/folders/1fY1-VwZIWV_-vCPvcYWrv3xi48wah2q?usp=drive_link

Session 3 : 27/08/2024

MLOps Workshop - Class 3 Summary Report

Overview

This report summarizes the key points and steps covered in the MLOps workshop, focusing on building and managing machine learning pipelines using Docker, Streamlit, FastAPI, and Evidently. The workshop emphasizes best practices in model deployment, data drift detection, and continuous integration/continuous deployment (CI/CD).

1. Docker Image Creation and Continuous Integration

- **Docker Image:**
 - A Docker image is built as part of the workflow.
 - This image encapsulates the model and its dependencies, ensuring consistency across environments.
- **CI/CD Process:**
 - A Continuous Integration (CI) pipeline is configured to automate the building and deployment of the Docker image.
 - The process includes steps to validate and score the model, followed by manual approval before deployment.
- **Approval Workflow:**
 - After generating predictions ($y_{\hat{}}$ values), the results are subject to an approval process.
 - Monitoring for data drift is a key part of this process to ensure model accuracy over time.

2. Data Preprocessing and Machine Learning Workflow

- **Data Handling:**
 - Preprocessing steps include standardization for numeric data and dummy variable creation for categorical data.
 - Response variables are label-encoded, and the best model from experiments is saved as a .pkl file.
- **Model Training:**

- Models are trained with validation splits, and the best performing model is identified and serialized for use in production.
- **Drift Monitoring:**
 - An Evidently report is generated to monitor data drift, comparing new data against reference data.
 - The appearance of new categories in categorical columns is discussed, with clarification that this should not always be classified as drift.

3. Evidently Report Generation

- **Generating Evidently Report:**
 - Steps to generate the report include installing the evidently package and running a Python script (generate_evidently_report.py) from the appropriate directory.
 - The report highlights how much the data has drifted from the reference set.
- **Decision on Drift:**
 - The report creation is followed by a manual review to determine if any drift detected requires approval or further action.
- **Software Dependencies:**
 - Evidently version 0.4.36 is used, and it should be listed in the requirements.txt.
 - Integration with FastAPI and Docker is set up, where Streamlit also depends on FastAPI for handling user requests.

4. Local and Batch Execution

- **Local Execution:**
 - For running the app locally, the command streamlit run app.py is used.
 - Batch predictions can be run using unicorn batch_api_app --host.
- **Version Control and CI/CD:**
 - git status and git commit commands are used for version control.
 - Changes are made in the CI/CD pipeline configuration (ci.yml) to ensure smooth deployment.
- **Docker Hub Integration:**
 - A personal access token (PAT) is generated in Docker Hub for secure access, which is added to repository secrets for automation.
- **Drift Testing:**
 - The workshop encourages intentionally creating data drift scenarios to test the system's ability to detect and respond to such changes.
- **Container Management:**
 - Instructions are provided for managing Docker images and containers, including stopping, deleting, and reviewing logs.

5. Key Takeaways

- **Comprehensive MLOps Pipeline:** The workshop guides through the setup of a full MLOps pipeline, emphasizing automation, monitoring, and security.
- **Data Drift Management:** Continuous monitoring for data drift is critical to maintain model accuracy over time.

- **Integration with Docker and CI/CD:** The use of Docker, FastAPI, and Streamlit, combined with CI/CD practices, ensures that models are deployed consistently and efficiently.

This report encapsulates the workshop's key lessons and steps, providing a practical guide for setting up and managing MLOps pipelines in real-world scenarios.

Link to videos and photos:

https://drive.google.com/drive/folders/16HAfTA8BU75j6yGkZugkHIYurjZOwwpj?usp=drive_link

Activity 2 – Hackathon (Amritha University)

Botcraft – Building Conversational AI

Introduction:

Botcraft, a two-day Workshop and Ideathon organized by IEEE-CIS, was held at Amrita Vishwa Vidyapeetham on October 26th and 27th, 2024. Designed to enhance skills in conversational AI, this event focused on building foundational knowledge of Large Language Models (LLMs) and guiding participants on career paths in AI. Attendees could participate individually or form teams of up to four members. The program offered a blend of lectures, hands-on sessions, and an ideathon, enabling participants to explore both the technical aspects of AI and practical implementation strategies.



Agenda:

Day 1: October 26th, Saturday

1. 9:30 AM - 10:00 AM: Introduction and Welcome Remarks
 2. 10:00 AM - 1:00 PM: Workshop on Large Language Models (LLMs) – From Basics to Advanced Chatbot Building (primarily for 2nd and 3rd-year students, but 1st-year students are welcome to join)
 3. 2:30 PM - 3:30 PM: Tech Talk and career doubts.
 4. 3:30 PM - 4:00 PM: Release of Ideathon problem statements for students.
- Day 2: October, Sunday :
1. 9:00 AM - 12:00 PM: Ideathon presentations by the participants.
 2. 12:30 PM: Announcement of winners.

The first day of the event, held on Saturday, October 26th, commenced with a warm welcome to the speakers and participants. The proceedings began with a traditional lamp-lighting ceremony, symbolizing the auspicious start of the program. Ishvary G, the Webmaster of the club, introduced the event and set the tone with an insightful overview, followed by heartfelt welcome remarks delivered by Amara Pranav, the Co-

Membership Development Chair of the club. At 9:30 AM, once all the participants had settled, the workshop on Large Language Models (LLMs) began. The session started with an overview of LLMs, including their general concepts and the challenges they face in real-world applications. Gradually, the discussion transitioned to highlight the need for Retrieval-Augmented Generation (RAG) models, setting the stage for an in-depth exploration of their architecture, functionalities, and the problems they are designed to solve. A lunch break from 1:00 PM to 2:00 PM offered participants an opportunity to network and relax before the afternoon sessions. The event resumed at 2:00 PM with a hands-on session on RAG models. Under the guidance of the speakers, participants engaged in practical exercises, following step-by-step instructions to apply their newfound knowledge. The interactive session fostered a collaborative learning environment. At 3:00 PM, a tech talk was conducted, during which speakers shared valuable career guidance, followed by an engaging Q&A session. This allowed participants to seek clarity on career-related queries and gain insights into navigating the tech industry.

The day concluded with a vote of thanks delivered by Yasasree Lasya, the Vice President of the club, expressing gratitude to the speakers, organizers, and participants for their contributions to the event's success. Mementos were presented to the speakers as a token of appreciation, marking the end of an enriching and productive first day. In the evening, the problem statements for the Ideathon were released, giving participants a challenging task to work on and present their solutions during the following day's session.



Day 2: October 27th, Sunday

1. 9:30 AM - 3:00 PM: Ideathon Presentations by Participants
2. 3:30 PM: Announcement of Winners

On the second day of the Ideathon, participants arrived with their teams, ready to showcase their innovative solutions. The presentations commenced promptly at 9:30 AM, creating an atmosphere of enthusiasm and anticipation.

The panel of esteemed judges for the event included Dr. Manju Khanna, a mentor, Ms. Pooja Gowda, and Mr. Imran Khan, the speaker from the previous day. Each team was allotted approximately 10 minutes to present their ideas, followed by a round of insightful and thought-provoking questions from the judges.

After all the presentations were completed, the judges deliberated on the results. The decision was notably challenging, given the high quality and creativity demonstrated by the teams. Finally, at 3:30 PM, the winners of the Ideathon were announced, receiving well-deserved applause for their exceptional work. With this, the event came to a successful conclusion, leaving participants and organizers with a sense of accomplishment and inspiration.

Key Takeaways:

The event featured insightful talks by two experienced machine learning engineers: Mr. Imran Khan, Senior ML Engineer at Mercedes, and Mr. Varundatt Tiwari, ML Engineer at CORK, Ireland. Their presentations covered key topics, including the challenges and potential of LLMs, Retrieval Augmented Generation (RAG) models, and their model architecture and functionality. A hands-on session on the RAG model provided participants with direct experience in its practical applications.

Teams pitched their ideas based on the given problem statements, receiving valuable feedback and guidance from the judges on refining their projects.

Participants:

The event attracted a diverse group of 70 participants, organized into 23 teams, who showcased their enthusiasm and innovative ideas in the field of conversational AI.

Conclusion

Botcraft concluded successfully, with certificates awarded to all participants in recognition of their dedication and contributions. The top-performing teams were honored with prizes.

Two teams were awarded first place: Praneel N and team, and Ummadi Vennela Sai and team, each receiving a cash prize of ₹1500 along with Amazon gift vouchers.

Two teams were awarded second place: Gorantla Samhitha and team, and Aryan Gera and team, each receiving ₹1000 in cash prizes along with Amazon gift vouchers.

The event fostered an engaging learning environment and encouraged collaboration among participants, leaving them with practical knowledge and valuable connections in the AI community. It was an inspiring experience that highlighted the power of teamwork and the potential of AI in shaping future careers.





Budget Report

Funding Allocation for BOTCRAFT Event

Event Name: BOTCRAFT

Date: 26th and 27th October 2024

The BOTCRAFT event was held on 26th and 27th October 2024. Industry professionals were invited to explain various fundamental concepts of LLMs to students. Additionally, an Ideathon was conducted during the event with a prize pool sponsored by IEEE. The funding from IEEE facilitated the distribution of prizes as follows:

Budget Breakdown

Description	Amount (Rs)
Total IEEE Funding	5000
First Prize	3000
Second Prize	2000

The allocated funds were used efficiently to reward the winners of the Ideathon as part of the BOTCRAFT event. This initiative successfully engaged students and showcased the support of IEEE for fostering innovation and learning.

Activity 3 - AI Conclave "NirvAI"

IEEE CIS NIRV AI 2024

The banner features a white humanoid robot's head and upper torso on the right side. The robot has blue eyes and a neutral expression. The background is divided into two main sections: a light grey area on the left with a red and black diagonal striped pattern, and a white area on the right where the robot is positioned. In the bottom left corner of the grey section, there are three circular icons with symbols: a person, a gear, and a flag. At the bottom of the banner, there is event information: a calendar icon followed by "28th November 2024", a clock icon followed by "Starts at 9:00 AM", and a location pin icon followed by "NITTE Campus, Bengaluru".

SPEAKERS:



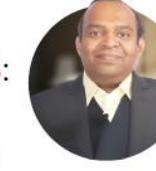
Dr. Gajendra Deshpande

Gajendra Deshpande, an accomplished professional, holds an M.Tech. in Computer Science and Engineering from VTU, Belagavi, and a PG Diploma in Cyber Law and Cyber Forensics from NLSIU, Bengaluru. He is the founder and director of Theta Dynamics Private Limited in Belagavi.

Deshpande has delivered over 100 talks and conducted 25+ workshops at esteemed international conferences, including JuliaCon at MIT, EuroPython, PyCon APAC, and PyData Global, among others. He has also guided teams to win the Smart India Hackathon and National Security Hackathon five times.

An active member of the tech community, he has led the PyCon India Program Committee (2021) and Mentorship (2023), and organized FOSSCon India and Belfy conferences. Currently, he serves as Vice Chair of the IEEE Young Professionals Bangalore Section and is an Excom Member of IEEE NKSS. Additionally, he is a Fellow of the Royal Statistical Society, UK, and a member of OWASP, BCS, and ACM, contributing extensively to Python, Julia, and FOSS initiatives.

SPEAKERS:



Giridharan S

Giridharan S is a highly experienced professional with over 30 years of expertise in embedded systems, specializing in the complete software development lifecycle, from design and implementation to testing and deployment. He has a strong focus on AUTOSAR architecture and ISO 26262 standards, ensuring safety, reliability, and compliance in automotive systems.

Giridharan's career includes significant global exposure, with over a year spent in Germany leading key AUTOSAR integration projects, showcasing his technical proficiency and ability to collaborate in multicultural environments. His hands-on expertise in integrating complex frameworks highlights his ability to deliver innovative solutions aligned with international safety and performance standards.

In addition to his technical strengths, Giridharan is skilled in managing large-scale programs that drive innovation, improve processes, and align technology with organizational objectives. His leadership and strategic approach have consistently delivered impactful results, establishing him as a trusted expert in the field of embedded systems.

IEEE CIS NIRV AI 2024

Report on AI Conclave "NirvAI"

Date: November 28, 2024 **Venue:** NMIT, Bangalore

The NirvAI Conclave at NMIT, Bangalore, provided a unique platform to explore the intersection of academia and industry in Artificial Intelligence (AI). The event featured speeches by industry leaders, a panel discussion on AI's potential and challenges, and a hands-on session on AI tools. It fostered learning, networking, and inspiration for students and professionals alike.

Inaugural Session

The NirvAI AI Conclave commenced with a traditional lamp-lighting ceremony, symbolizing the beginning of a significant event dedicated to exploring the frontiers of Artificial Intelligence. The ceremony was followed by a warm welcome address from Nitte Meenakshi Institute of Technology (NMIT) representatives, setting a positive tone for the day's proceedings and emphasizing the importance of AI in the modern academic and industry landscape.

Dr. **Sumana M** the Guest of Honour, took the stage next to inaugurate the conclave. She highlighted the importance of the **IEEE Computer Society (IEEE CIS)**, In her inaugural address, Dr. Sumana also emphasized how the event would serve as a bridge between academia and the AI industry. She underscored the significance of such events for students and professionals, noting that they provide opportunities to not only learn about AI's real-world applications but also to engage with industry experts. Dr. Sumana's speech set a clear tone for the event, emphasizing the immense value that the NirvAI AI Conclave would bring to all attendees by fostering both academic growth and professional development in the field of Artificial Intelligence.

The event was further enriched by the presence of several prominent figures, including:

- **MD Ramaswamy**, the Chief Guest, who shared his entrepreneurial journey and insights into AI's role in solving real-world problems.
- **Yashwanth** and **Dr. Gajendra**, who were panelists and speakers for the hands-on session, providing practical knowledge and discussing AI tools.
- **Dr. Sudheer Reddy** and **Dr. Sudhakar K**, **Dr. Parameshachari B D**

Keynote Speech by MD Ramaswamy

10:32 AM: MD Ramaswamy, an entrepreneur and mentor, shared his journey from engineering to leadership.

Key highlights included:

- The significance of solving real-world problems through AI.
- Transitioning from technical roles to entrepreneurial and sales-focused roles.
- Encouragement for students to build resilience and adaptability.

Q&A Session: MD Ramaswamy and Students

Q: "How should students pursue a career in AI, and where should they start?" A: MD Ramaswamy: "AI is a vast field, but the foundation lies in data structures and algorithms. Start by mastering these basics. Explore practical projects and platforms that teach you how to work with datasets. Experiment with tools like Python, TensorFlow, or AWS. What truly sets you apart is the ability to understand and solve specific business problems using AI. So, while technical skills are crucial, don't forget to focus on the application side."

Q: "What can we do as students to stand out in the industry as engineers?" A: MD Ramaswamy: "The industry is always looking for engineers who can not only code but also think critically about problems. Communication is a key skill. Many brilliant engineers fail to explain their ideas. Practice articulating your solutions clearly. Also, try to align your learning with industry trends. AI and cloud computing are here to stay. Attend events like this, network, and showcase your ability to adapt to new challenges."

Q: "What is the biggest opportunity for startups in the AI domain?" *A:* MD Ramaswamy: "AI startups have a wide array of opportunities, especially in healthcare, logistics, and education. The challenge, however, is to focus on solving problems that matter. It's tempting to chase trends, but the real value lies in meaningful, impactful solutions. I would also encourage startups to consider collaborations with academia and larger companies to gain access to resources and guidance."

Q: "You mentioned transitioning from technical roles to sales. How did you manage that, and what advice would you give?" *A:* MD Ramaswamy: "The transition wasn't immediate; it was gradual and intentional. I realized early on that understanding technology is an asset in sales, as it helps you address customer pain points effectively. My advice is simple: never stop learning. Whether it's technical or non-technical roles, curiosity and willingness to adapt are key. And if you're considering entrepreneurship, understanding the market and customer perspective is non-negotiable."

Panel Discussion: AI—Opportunities, Challenges, and the Road Ahead

Time: 12:35 PM - 1:15 PM **Panel Members:**

- Dr. Gajendra
- Yashwanth
- MD Ramaswamy
- Abhishek Sarangi

Moderator: Subhajith Sir

The panel discussion centered around the future of AI in India, with a particular focus on AI startups, the challenges they face, and the strategies they can adopt to succeed in a competitive landscape.

Subhajith Sir (Moderator): The panel began with an introduction to India's growing AI startup ecosystem. Dr. Gajendra and MD Ramaswamy highlighted some of the key challenges faced by AI startups, including the lack of patient capital, limited access to computing power, and the shortage of skilled AI professionals. MD Ramaswamy mentioned that India currently has around 6,200 AI startups, but many face significant hurdles.

MD Ramaswamy: "India's AI ecosystem is growing, but we face a few significant challenges. One of the biggest is patient capital—investors are looking for quick returns. Additionally, we have a gap in AI talent, which limits innovation."

He emphasized that the growing hype around AI often leads to a misunderstanding of the technology's true potential. "AI is not just about algorithms. As an entrepreneur, I can tell you that it's about solving real-world problems and creating sustainable solutions."

Subhajith Sir (Moderator): "How can AI startups overcome these challenges and gain momentum in the ecosystem?"

MD Ramaswamy: "Startups need to focus on building deep domain knowledge. AI should be a tool to solve specific, real-world problems, not just a buzzword. Investors are looking for long-term vision, and it's important to be patient with growth."

Subhajith Sir (Moderator): "What are the key obstacles AI startups face when scaling up, and how can they address these?"

Yashwanth: "Recruitment is a significant challenge. Startups struggle to find people who not only have the technical expertise but also understand the specific industry they are working in. Upskilling talent is time-consuming but crucial for scaling."

MD Ramaswamy: "Building a team is one of the most critical aspects. It's not just about hiring people with the right skills; it's about creating a team that shares the same vision and passion. Without alignment, even the most talented individuals can struggle to deliver results."

Subhajith Sir (Moderator): "What about the computational challenges? How can AI startups navigate them?"

Dr. Gajendra: "Computational power is crucial for AI, but the problem often lies in the quality of data and how we process it. Even with the best hardware, without the right algorithms or clean data, models will fail."

MD Ramaswamy: "Absolutely. The real challenge is not just having the computational power but also having access to quality data. If the data is flawed, the model will be inaccurate, no matter how advanced the algorithm is. Therefore, clean and structured data pipelines are essential for success."

Subhajith Sir (Moderator): "What are the regulatory challenges AI startups face, and how can they navigate these issues?"

Dr. Gajendra: "Regulation in AI is still in a grey area. However, startups need to stay ahead of the curve and be prepared for the increasing focus on transparency, fairness, and ethical AI. Building trust with consumers and regulators is vital, and startups must focus on these aspects."

Abhishek Sarangi: "AI regulation is something we need to think about very carefully. The biggest issue is the opacity of AI systems, which raises ethical concerns. Ensuring transparency and fairness in AI development is essential, and startups should be proactive in adhering to these principles."

Subhajith Sir (Moderator): "How can AI startups benefit from partnerships with larger tech companies?"

MD Ramaswamy: "Partnerships can be very beneficial, especially if startups are looking to scale quickly. Larger companies often provide resources, expertise, and networks that startups may not have access to. However, startups need to be cautious about losing their identity or getting trapped in non-compete clauses."

Abhishek Sarangi: "Startups should look for accelerator programs or industry-specific collaborations to gain access to resources and mentorship. Networking is essential, and you need to leverage these partnerships to further your ideas and gain traction."

Yashwanth: "Building the right partnerships can provide not just funding but also strategic guidance. It's also important to align yourself with partners who share your vision and understand your domain."

Subhajith Sir (Moderator): "What advice would you give to students aspiring to start their own AI startups?"

MD Ramaswamy: "Focus on understanding the domain you want to work in. AI is just a tool; the real challenge is solving pain points in specific industries. Build a good team where each member complements the other's strengths."

Abhishek Sarangi: "Don't just chase the latest trends. Understand the problem deeply and ensure your solution addresses a real market need. Your startup should solve a problem that people are willing to pay for."

Yashwanth: "Firm up your basics. Learn as much as you can and don't rush into anything. The learning process is continuous, and you need a solid foundation before diving into the startup world."

Networking Lunch

The lunch break was an engaging networking session where students interacted with dignitaries, discussing career prospects, industry expectations, and academic applications in AI.

Hands-On Lab Session

Time: 2:00 PM – 3:20 PM **Focus:** Practical Application of AI Tools

The **hands-on lab session** was a major highlight of the conclave, designed to bridge the gap between theoretical concepts and real-world implementation of AI. Participants were introduced to two state-of-the-art tools for AI and machine learning: *Orange* and *AWS (Amazon Web Services)*. This session provided a structured and interactive learning environment, helping attendees explore AI workflows from data preprocessing to model deployment.

Part 1: Orange – Visualizing and Building Machine Learning Workflows

Orange is an open-source data analysis and machine learning tool that simplifies complex processes with an intuitive drag-and-drop interface. It is especially useful for students and beginners who want to experiment with AI and machine learning concepts without deep programming expertise.

Data Import and Preprocessing: Participants started by importing datasets in formats such as CSV and Excel. They explored key preprocessing steps, including:

Handling Missing Values: Filling or dropping incomplete data points.

Data Normalization: Standardizing data ranges to prepare it for algorithms.

Feature Selection: Identifying relevant features to improve model accuracy.

Orange offers a variety of visualization widgets, which attendees used to uncover insights from the datasets:

Scatter Plots: For identifying correlations between variables.

Bar Charts and Histograms: To analyze distribution and frequency of data points.

Box Plots: To understand data variability and detect outliers.

Attendees created machine learning workflows for predictive tasks, such as: **Classification** using decision trees and k-nearest neighbors (KNN).

Regression for predicting numerical values.

Clustering for grouping similar data points.

Models were evaluated using metrics like: **Confusion Matrices** to measure classification accuracy.

ROC Curves to assess the trade-off between sensitivity and specificity.

Advanced users extended Orange's functionality by integrating Python scripts, enabling customized data processing and analysis.

1. **Data Visualization:**

2. Model Building and Evaluation:

3. Integration with Python:

By the end of this session, students gained a clear understanding of how to preprocess, visualize, and build machine learning models efficiently with Orange.

Part 2: AWS – Cloud-Based AI and Machine Learning

AWS is one of the most widely used cloud platforms for deploying scalable AI solutions. The session highlighted AWS's ability to manage the entire AI lifecycle, from data ingestion to model deployment.

Introduction to AWS Services: Participants were introduced to key AWS services, focusing on their roles in machine learning and AI workflows:

Amazon SageMaker: A fully managed machine learning service.

Amazon Polly: Converts text into lifelike speech.

Amazon Rekognition: Offers advanced image and video analysis capabilities.

- Amazon SageMaker: **Data Upload and Preparation:** Students learned how to upload datasets to SageMaker and prepare them for training.
- **Model Training:** Using built-in algorithms, participants trained models such as linear regression and classification models.
- **Deployment:** After training, models were deployed as endpoints to make real-time predictions.

- Amazon Polly: Attendees experimented with text-to-speech features, converting various text inputs into natural-sounding audio.
- They explored Polly's multilingual capabilities and customization options like speech tone and speed.
- Amazon Rekognition: The session demonstrated how to use Rekognition for image and video analysis: Detecting objects and scenes in images.
- Facial recognition to identify individuals or emotions.
- Text detection within images for document processing.
- Use Case Integration: Participants combined AWS services to create a small application, such as:
 - Speech-to-Text with Image Recognition:** Using Polly to transcribe audio and Rekognition to analyze associated images.
 - End-to-End Workflow:** Loading data into SageMaker, training a predictive model, and deploying it on the cloud.

Key Takeaways from the Lab Session

1. **Practical Exposure:** Participants got hands-on experience with tools used by AI professionals, helping them understand industry-standard workflows.
2. **Problem-Solving:** Students tackled real-world scenarios, such as predicting outcomes, analyzing visual data, and deploying scalable AI solutions in the cloud.

Tool Mastery: With *Orange*, they learned to create quick prototypes of AI models without coding extensively. With *AWS*, they explored the power of cloud computing for building robust, scalable AI solutions.

Team Collaboration: Working in groups, attendees exchanged ideas and strategies, fostering a collaborative environment and enhancing their problem-solving skills.

Parallel Session: Talk on Microcontrollers in Automotive by Giridharan Sir

Giridharan S, a distinguished professional from Harman International, delivered an insightful talk on Microcontrollers and Automotives during the NirvAI forum. With his extensive expertise in electronics and automotive systems, he shed light on the pivotal role of microcontrollers in transforming the automotive industry. The session offered a deep dive into the technological advancements driving modern vehicles and the challenges associated with integrating cutting-edge solutions.

He began by explaining the fundamental architecture of microcontrollers and their evolution from basic control units to highly sophisticated embedded systems. Giridharan highlighted how these compact yet powerful processors serve as the backbone of automotive electronics, enabling functionalities like engine control, infotainment systems, and advanced driver-assistance systems (ADAS). He emphasized that modern vehicles house dozens of microcontrollers, working seamlessly to ensure efficiency, safety, and user experience.

One of the critical themes of his talk was the role of microcontrollers in advancing autonomous driving technologies. Giridharan discussed how these systems process real-time data from sensors and cameras to make intelligent decisions, ensuring safe and efficient navigation. He also touched upon the integration of Internet of Things (IoT) in vehicles, where microcontrollers facilitate connectivity and communication between various components, paving the way for smarter and more connected cars.

Another fascinating aspect of the talk was the emphasis on power efficiency and durability. Giridharan explained how automotive-grade microcontrollers are designed to operate under extreme environmental conditions, such as high temperatures and vibrations, ensuring reliability. He also discussed the industry's

shift towards electric and hybrid vehicles, where microcontrollers play a crucial role in managing battery systems and optimizing energy consumption.

The session concluded with an engaging Q&A, where Giridharan addressed queries about emerging trends, cybersecurity challenges in automotive electronics, and the future of fully autonomous vehicles. His talk not only highlighted the transformative potential of microcontrollers in the automotive domain but also inspired students and professionals to explore innovative applications in this rapidly evolving field.

Conclusion

The NirvAI AI Conclave served as an invaluable platform for fostering meaningful discussions and providing rich insights into the rapidly evolving AI landscape. It brought together students, industry professionals, and thought leaders to share their knowledge, experiences, and visions for the future of AI, creating a unique opportunity for both learning and networking.

One of the most significant outcomes of the event was the **hands-on lab session**. This practical component allowed students to actively engage with AI tools like **Orange** and **AWS**, both of which are widely used in the industry for machine learning and data processing. Through these labs, students were able to not only learn how to implement AI algorithms but also gain firsthand experience in deploying machine learning models and working with cloud-based platforms. The real-world application of AI concepts, such as data preprocessing, model evaluation, and deployment, helped bridge the gap between theoretical knowledge and practical application. This session, in particular, equipped attendees with a solid foundation of technical skills that are essential for building and scaling AI solutions, making the event a highly enriching experience for all participants.

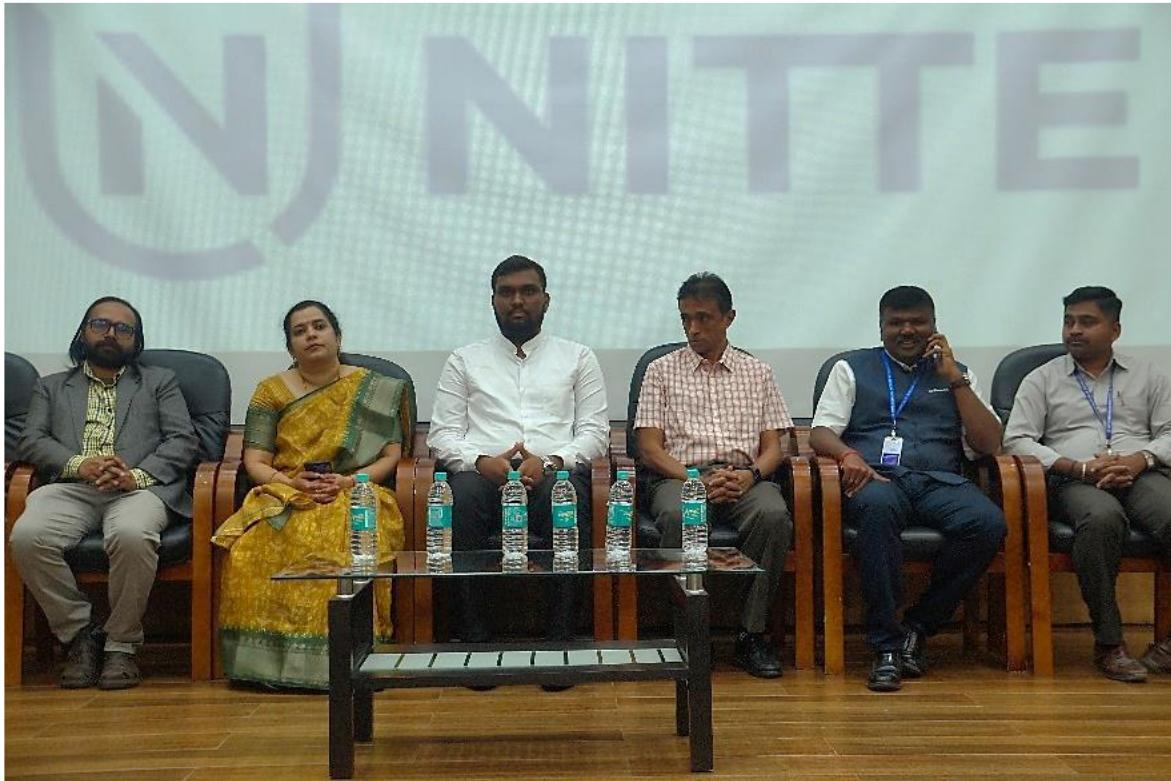
Furthermore, the **panel discussion** added another layer of depth to the event. The expert panelists, including seasoned entrepreneurs, academics, and professionals, discussed various facets of AI, ranging from the challenges faced by AI startups to the strategic insights required to succeed in the AI domain. Topics such as **AI's potential to solve real-world problems**, **the importance of domain-specific knowledge**, and **the need for long-term vision in AI ventures** were thoroughly explored. The discussions also highlighted the growing importance of AI in various sectors such as healthcare, logistics, and education, underscoring the broad scope of opportunities available to AI startups. By addressing the hurdles faced by AI startups, such as access to funding, talent acquisition, and computational resources, the panel provided a realistic view of the AI landscape, helping students better understand the intricacies of building successful AI-driven businesses.

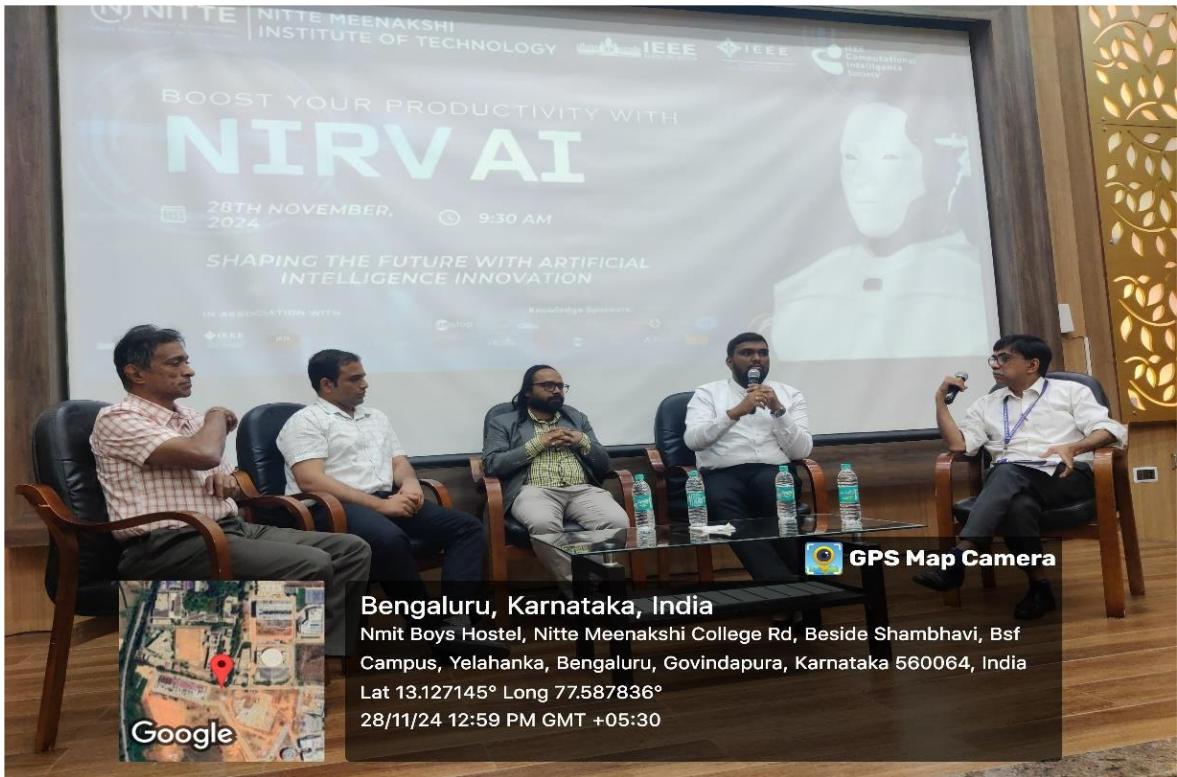
The event also highlighted the **role of collaboration** in fostering innovation. Industry collaborations with academic institutions, large tech companies, and startup ecosystems were emphasized as key drivers of success in AI ventures. The panelists discussed how AI startups can benefit from mentorship, resource-sharing, and strategic partnerships, which are often crucial for scaling up operations and achieving sustainable growth. Students learned the value of these collaborations and the importance of networking, which will serve them well as they embark on their careers in AI.

Moreover, the event's holistic approach to AI education—blending **theoretical insights**, **practical experience**, and **industry perspectives**—contributed significantly to the academic and professional growth of all attendees. The diverse sessions at the conclave not only focused on the technical aspects of AI but also provided insights into the **business and entrepreneurial side** of AI, encouraging students to think beyond code and algorithms and consider AI as a tool for innovation and business transformation.

In conclusion, the NirvAI AI Conclave was a highly successful event that provided participants with a comprehensive understanding of the AI domain. It equipped students with practical tools, deepened their understanding of the challenges and opportunities in the AI industry, and fostered connections with professionals in the field. By offering an interdisciplinary approach that combined technical skills with

entrepreneurial insights, the event contributed to both the academic and professional development of attendees, helping them better prepare for the future of AI and its transformative impact on the world





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	Delivery Note :	Terms of Payment :
	Buyer's Order No.:	Dated :
	E-Way Bill No.:	Vehicle No. :
Phone :	Despatched Through :	Destination :
GSTIN Number :		
PAN/IT No. :		
State : Karnataka	Code : 29	Remarks :

S.N.	Description	HSN/SAC	Qty	Rate	Dis %	Tax%	Amount
1	Water Bottle	90000090	191 Nos	111.02	-	18	21204.24

E & O.E.	Total	191	Basic Total	21204.24
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Amount in Word	CGST @ 9%	21204.24	1908.36
Rs. Twenty Five Thousand Twenty One Only	SGST @ 9%	21204.24	1908.36

Terms & Conditions :	Grand Total	25,021.00
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ACTIVITY 4

Hack4Humanity Hackathon

13th and 14th December

(24 hour Hybrid Hackathon)

The Hack4Humanity hackathon, organized by the ISE Department in collaboration with the CSE and MCA Departments at MSRIT, provided a platform for innovative problem-solving to address real-world challenges. The event was conducted in a hybrid format, with the online phase hosted on the Unstop platform and offline project submissions taking place on campus.

Event Details

- Dates:
 - Online Phase: 13th December
 - Offline Phase: 14th December
- Initial Registrations: 79 teams
- Qualified for Offline Submission: 52 teams

Hackathon Structure

1. Online Phase:

- Conducted on the Unstop website.
- Participants were given specific milestones with submission deadlines.
- Teams that failed to meet deadlines were eliminated.

2. Offline Phase:

- Offline evaluations occurred simultaneously across 4 labs.
- Timing: 9:00 AM to 1:00 PM.
- A total of 4 judges evaluated the projects.

Problem Statement

Digital platforms often exclude people with disabilities, and low-income groups lack access to education and jobs. Participants were tasked with developing solutions to make platforms more inclusive and connect these underserved groups to economic opportunities.

Evaluation Criteria

Projects were assessed based on:

1. **Innovation/Creativity:** Uniqueness and originality of the solution.
2. **Functionality:** Practicality and reliability of the proposed solution.
3. **User Experience:** Ease of use and design accessibility for target users.

4. Impact: Potential to create meaningful change for the target demographic.

5. Presentation: Clarity and effectiveness in communicating the solution.

Prizes

- First Prize: ₹10,000
- Second Prize: ₹7,000
- Third Prize: ₹5,000



1. Executive summary

The Hack4Humanity Hackathon, organized by the ISE Department in collaboration with the CSE and MCA Departments of MSRIT, was an impactful event aimed at fostering innovative solutions to societal challenges. This hackathon focused on addressing the pressing issues of digital accessibility for people with disabilities and connecting low-income groups to educational and economic opportunities. By emphasizing inclusivity and accessibility, the event encouraged participants to develop solutions that could create tangible, positive impacts.

Objective

The primary objective of Hack4Humanity was to inspire participants to leverage technology and creativity to design solutions that bridge gaps in digital accessibility and economic inclusion. The hackathon problem

statement revolved around making digital platforms more inclusive for underserved communities, thereby providing them with better access to education and employment.

2. Introduction

The Hack4Humanity Hackathon, organized collaboratively by the ISE, CSE, and MCA Departments of MSRIT, was designed to inspire innovation and address critical social challenges. With a focus on inclusivity, the event emphasized the need for technological solutions to bridge gaps in digital accessibility and economic opportunities for marginalized communities.

Purpose and Theme of the Hackathon

1. Addressing Accessibility Challenges for People with Disabilities:

Digital platforms play a central role in education, employment, and daily life, but they often remain inaccessible to individuals with disabilities. This hackathon aimed to motivate participants to create user-friendly, accessible solutions that cater to the diverse needs of differently-abled individuals. By addressing these challenges, the hackathon sought to empower this community and enhance their participation in society.

2. Bridging Gaps in Education and Employment for Low-Income Groups:

Economic inequality restricts access to quality education and stable jobs for underprivileged groups. Hack4Humanity encouraged participants to build tools and platforms that connect these individuals to opportunities and resources. Solutions targeting affordability, scalability, and usability were a key focus, ensuring impact for underserved communities.

3. Fostering Innovation and Inclusivity in Technology:

Innovation thrives when diverse perspectives are embraced. Hack4Humanity provided a platform to showcase how technology can address systemic inequities and foster inclusion. By integrating empathy into the problem-solving process, participants were challenged to think beyond technical feasibility and consider broader societal impact.

Importance of the Event

This hackathon underscored the role of technology as a force for social good. It provided a space for students and professionals to develop practical solutions to real-world problems, enhancing their technical, creative, and collaborative skills. By engaging with complex issues and proposing innovative solutions, participants were encouraged to view themselves as change-makers in a rapidly evolving digital landscape.

Hack4Humanity was not just a competition but a movement to align technological innovation with empathy and inclusivity. The event set a precedent for how academia, industry, and young talent can work together to address societal challenges, paving the way for a more equitable future.

3. Event details

3.1 Event Timeline

The Hack4Humanity Hackathon was conducted in two distinct phases to ensure a thorough and engaging evaluation process:

1. Online Phase:

The online phase of the hackathon was hosted on the Unstop platform on December 13th, 2024. Participants were tasked with completing specific milestones within designated timeframes. These milestones were

designed to assess the feasibility, creativity, and preliminary execution of their proposed solutions. Teams that failed to submit their progress by the given deadlines were disqualified, ensuring that only disciplined and proactive teams advanced to the next phase.

2. Offline Phase:

The offline phase took place on December 14th, 2024, at MSRIT. It was a live, in-person evaluation held across four labs, with simultaneous assessments conducted by the judges. This phase ran from 9:00 AM to 1:00 PM and provided an opportunity for teams to present their final solutions through demonstrations and detailed discussions. The offline phase enabled judges to evaluate the functionality, user experience, and overall impact of the projects in a hands-on setting.

3.2 Participation Statistics

The hackathon witnessed a robust level of participation, reflecting the enthusiasm and commitment of the MSRIT community and beyond:

Total Registrations: The event initially attracted 79 teams, comprising students and professionals eager to tackle the given problem statement.

Qualified for Offline Submission: Out of the initial registrations, 52 teams successfully cleared the online phase by meeting all the milestone requirements. These teams advanced to the offline phase to showcase their solutions in person.

3.3 Judging Process

The evaluation of projects during the hackathon was meticulously planned to ensure fairness and rigor:

Number of Judges: A panel of four judges with expertise in technology, design, and social impact presided over the evaluations.

Evaluation Labs: To streamline the assessment process, the offline phase was conducted in four separate labs, allowing simultaneous evaluations. This setup minimized delays and ensured that each team received adequate attention and feedback.

Evaluation Criteria: Judges assessed the projects based on five key criteria:

Innovation/Creativity: The uniqueness and originality of the solution.

Functionality: The practicality and technical execution of the solution.

User Experience: The ease of use and accessibility of the platform or tool.

Impact: The potential of the solution to address the problem effectively and create meaningful change.

Presentation: The clarity, structure, and persuasiveness of the team's pitch.

3.4 Problem Statement

The central theme of the hackathon revolved around inclusivity and accessibility, encapsulated in the following problem statement:

"Digital platforms are often inaccessible to people with disabilities, and low-income groups lack access to education and jobs. A solution is needed to make platforms inclusive and connect these groups to economic opportunities."

This statement challenged participants to think deeply about the systemic barriers faced by these underserved communities. Teams were encouraged to design solutions that:

Improve digital accessibility for individuals with disabilities, enabling them to navigate and utilize platforms with ease.

Bridge the gap for low-income groups by providing affordable and scalable solutions that connect them to educational resources and job opportunities.

Leverage technology as a tool for empowerment and inclusion, ensuring that the benefits of innovation are accessible to all.

The problem statement underscored the hackathon's commitment to addressing real-world issues and inspiring participants to create impactful, empathetic solutions.

4. Hackathon structure

4.1 Online Phase

Platform: The hackathon was hosted on Unstop, an online platform that facilitated all the submissions, communication, and tracking of progress throughout the event.

Milestones:

Participants were given specific milestones to complete and submit within predefined deadlines. These milestones could range from initial ideation and concept submission to functional prototypes, and eventually the final solution.

The milestones were set in a way to ensure consistent progress across all teams, encouraging them to develop their ideas step by step.

Each milestone submission was reviewed and assessed by the organizers, with feedback provided to help guide teams through the process.

Elimination Criteria:

Elimination took place for teams that failed to meet the set deadlines or did not submit the required milestones on time.

Teams that missed submissions were disqualified from further participation, ensuring that only those teams who maintained a consistent work ethic and met the deadlines continued on to the next phase.

4.2 Offline Phase

Venue: The offline phase of the hackathon was held at MSRIT (M S Ramaiah Institute of Technology), utilizing four separate labs for the teams to present their final solutions. These labs were equipped with all the necessary resources for teams to prepare their final presentations.

Team Presentations:

Each participating team presented their final solution to a panel of judges.

The presentations usually included demonstrations of the product or solution developed during the hackathon, as well as an explanation of the design process, problem-solving strategies, and any challenges faced.

Judging Criteria:

Teams were evaluated based on predefined judging criteria, which typically included:

Innovation: How creative and novel the solution was.

Technical Complexity: The technical depth and sophistication of the solution.

Implementation: How well the idea was executed in terms of functionality and usability.

Presentation: The clarity and impact of the final presentation, including how well the team communicated their ideas and solutions.

Team Collaboration: How effectively the team worked together to complete the project.

Outcome: Based on the evaluation, teams were either awarded prizes, given honorable mentions, or provided feedback for further improvement.

5. Evaluation criteria

The projects in the hackathon were evaluated based on several key parameters that helped judges assess the quality and potential of each solution. These parameters ensured a holistic view of the projects, considering everything from the initial idea to its real-world applicability and presentation. Below is a detailed explanation of each evaluation criterion:

1. Innovation/Creativity: Originality and Uniqueness of the Idea

Innovation and creativity are central to the success of any hackathon project. Judges assess how original and unique the idea is compared to existing solutions. This criterion examines:

Novelty: Does the project introduce a new concept or approach, or is it based on existing technologies and ideas? A truly innovative project brings something fresh to the table, whether in its core concept, technology stack, or problem-solving approach.

Out-of-the-box Thinking: Does the project break conventional boundaries? Creative solutions often involve unconventional ideas, fresh perspectives, or unique applications of existing technologies to address problems in new ways.

Differentiation: How different is the solution from what is already available? A creative idea should offer an alternative or better way of doing things, providing distinct value to the target audience or market.

2. Functionality: Feasibility and Reliability of the Solution

Functionality evaluates whether the project works as intended and its practical viability in the real world. A project can be innovative, but if it lacks functionality, its impact will be limited. The key aspects of functionality include:

Feasibility: Is the solution achievable with the current technology and resources? Judges will look at how well the team was able to implement their solution within the given timeframe and the technical constraints.

Reliability: Does the solution perform consistently and without errors? A functional product must be stable and robust, ensuring it operates as expected across different environments and use cases.

Scalability: Can the solution handle increased usage or larger datasets in the future? A well-implemented solution should have the capacity to scale with growth, ensuring it remains useful in the long term.

3. User Experience: Ease of Use, Accessibility, and Design

User experience (UX) is one of the most critical aspects of evaluating any project, as it directly impacts how end-users interact with the solution. This parameter evaluates:

Ease of Use: Is the solution intuitive and easy to navigate? A user-friendly interface and a smooth user journey are essential to ensuring that users can interact with the product without confusion or frustration.

Accessibility: Does the solution cater to users with diverse needs and abilities? Accessibility is key to ensuring that the product is usable by everyone, including people with disabilities. Features like screen readers, voice commands, or adaptive layouts can enhance accessibility.

Design: How visually appealing and consistent is the design? Aesthetic considerations, like colors, typography, and layout, contribute to the overall user experience. Good design makes the product not only pleasant to use but also enhances its functionality.

Responsiveness: Does the solution adapt to various devices and screen sizes? In today's digital age, ensuring that a project works seamlessly across different platforms, such as mobile devices, tablets, and desktops, is essential for a successful UX.

4. Impact: Potential of the Solution to Create Meaningful Change

The ultimate goal of most hackathons is to create solutions that can lead to significant improvements or changes in the world. This criterion assesses the potential impact of the project:

Social Impact: Does the solution address an important societal issue? Projects that tackle problems like climate change, social inequality, or health disparities are highly valued for their potential to make a difference.

Scalability of Impact: Can the solution have a broad and long-lasting impact? A solution with scalable potential can expand and reach a wider audience, thus multiplying its positive effects.

Sustainability: Is the solution sustainable over time? Impactful solutions are not only short-term fixes but also have enduring value that can contribute to long-term change. This can include sustainability in terms of resources, economic viability, and continued support or updates.

Real-World Applicability: How applicable is the solution in the real world? A solution with high impact should solve an existing, tangible problem or address an unmet need in the market or community.

5. Presentation: Clarity, Organization, and Delivery of the Project

The way a project is presented can significantly influence how its value is perceived. Effective communication of the project's concept, implementation, and potential is crucial for convincing the judges and audience of its worth. Key elements include:

Clarity: Is the project easy to understand? The presentation should clearly outline the problem being solved, the approach taken, and how the solution works. This is especially important for complex or technical solutions, as clarity ensures that the judges can easily grasp the concept.

Organization: Is the presentation logically structured? A well-organized presentation flows smoothly, covering all important aspects, from the problem statement to the solution's features and the results achieved. A logical progression helps keep the audience engaged and makes the information digestible.

Delivery: How confident and engaging is the presentation? Effective delivery involves not only explaining the solution well but also showcasing the team's enthusiasm, passion, and commitment to the project. A strong delivery can leave a lasting impression on the judges.

Visual Aids: Are there visual aids, such as slides or demos, to enhance the presentation? Good visuals help explain the concept and make the presentation more engaging. Demos or prototypes can showcase the solution in action, providing concrete evidence of its functionality and effectiveness.

6. Awards and prizes

The hackathon concluded with a grand ceremony where the top-performing teams were rewarded for their hard work, innovation, and problem-solving skills. The awards were designed to recognize and celebrate the excellence and achievements of the participants. The winners were given cash prizes, and all participants received certificates acknowledging their participation in this competitive event.

Prize Breakdown:

First Prize: ₹10,000

This prestigious award was presented to the team that demonstrated exceptional creativity, technical proficiency, and overall execution. Their solution not only met the challenge requirements but also went above and beyond in terms of impact, innovation, and functionality.

Second Prize: ₹7,000

The second-place winners showcased impressive solutions that were both functional and innovative, though they slightly lagged behind the first prize winners in terms of overall execution. Nevertheless, their hard work and ingenuity were acknowledged with a substantial cash prize.

Third Prize: ₹5,000

The third-place team's solution was highly functional, practical, and well-received. Though they may have been slightly outperformed by the top two teams, their project still demonstrated great potential and skill, earning them recognition and a cash reward.

Winners of the Hackathon:

Error 404

Tanish Mehta

Moazam Showkat

Siddharth Kannan

This team emerged as the First Prize winners. Their solution was highly praised for its originality, functionality, and impact, making them stand out from the other teams. They effectively solved a challenging problem with a creative and well-executed solution, showcasing impressive technical skills and innovation.

Millibytes

Urvi Umesh

Pranav MK

This team secured the Second Prize. Their project was both technically sound and creative, demonstrating excellent collaboration and problem-solving capabilities. The judges were particularly impressed with the

way they implemented their solution, as well as their ability to explain the process and impact clearly during their presentation.

Strivers

Aarib Anwar

Vaishnavi Ravi Kumar

Ayush Prabhat

The Third Prize was awarded to Strivers. Their project was well-executed, and although it may not have had the same level of innovation as the top two teams, it still presented a strong and practical solution that had clear real-world applications.

Certificates for Participants:

All participants, regardless of their ranking, were awarded certificates of participation. These certificates acknowledged their dedication, hard work, and contribution to the hackathon. Participating in such an event, especially with the challenges posed by tight deadlines and high expectations, was an achievement in itself. The certificates served as a reminder of their effort and experience gained during the event.

These awards and certificates helped foster a sense of accomplishment and recognition among all participants, motivating them to continue pursuing their passion for technology and innovation. The prizes not only rewarded the winning teams for their outstanding performance but also encouraged other participants to keep pushing the boundaries of their potential in future hackathons and projects.

7. Key highlights

The hackathon featured several standout elements that contributed to its overall success. These highlights ensured that the event was not only competitive but also educational and enriching for all participants. Here's a detailed look at the key aspects of the hackathon that made it unique and impactful:

1. Milestone-Based Elimination Ensured Consistent Effort

One of the key features of this hackathon was the milestone-based elimination process. Instead of simply judging teams at the end of the event, the hackathon included several intermediate milestones that participants had to meet within specified deadlines. This structure was beneficial for several reasons:

- **Consistent Progress:** The milestone approach helped maintain a steady pace throughout the event. Participants were required to show incremental progress at each stage, ensuring that teams didn't wait until the last minute to complete their projects.
- **Focus on Execution:** By breaking the competition into smaller milestones, teams were forced to focus on execution, testing, and refining their solutions progressively. This not only ensured that participants worked efficiently but also prevented the overwhelming task of finishing everything at once.
- **Early Identification of Issues:** Teams that struggled to meet milestones early on could identify issues with their approach, technology stack, or workflow. This early intervention allowed them to pivot and improve, thereby reducing the likelihood of failure towards the end.
- **Fair Evaluation:** The milestone system provided a more balanced evaluation, considering not just the final result but the journey and process undertaken by each team. This kept participants on track and encouraged them to maintain a high standard of work throughout the event.

2. Multidisciplinary Collaboration Between Departments Enriched the Event

The hackathon encouraged multidisciplinary collaboration between various departments, which proved to be an enriching experience for everyone involved:

- Diverse Skill Sets: Teams were composed of participants from different academic backgrounds, bringing together a rich variety of skills, such as coding, design, business analysis, and marketing. This mix fostered creative problem-solving and innovative solutions as each team member brought a different perspective and expertise to the table.
- Cross-Departmental Learning: Participants from various departments had the opportunity to learn from each other. For example, engineers could gain insights into user experience design, while designers could understand the technical challenges involved in implementation. This interaction helped in broadening participants' knowledge and enhancing their understanding of how different domains contribute to the development of a solution.
- Networking and Collaboration: The hackathon provided a platform for students and professionals from different disciplines to network and collaborate on solving real-world problems. This collaboration not only enriched the quality of solutions but also created a space for participants to build connections that could prove valuable in their future careers.
- Innovation Through Diverse Perspectives: The multidisciplinary nature of the event promoted innovation by encouraging participants to think beyond their individual areas of expertise. The fusion of technology, design, and business ideas often resulted in solutions that were more holistic, user-centric, and feasible in real-world applications.

3. Direct Interaction with Judges During Offline Evaluation Helped Participants Refine Their Solutions

The offline evaluation phase of the hackathon played a crucial role in helping teams refine their solutions. One of the standout aspects was the direct interaction with judges, which allowed teams to receive real-time feedback and guidance:

- Immediate Feedback: During the offline evaluation, teams had the opportunity to present their solutions directly to the panel of judges. This direct communication allowed the judges to ask clarifying questions and provide valuable feedback on areas that could be improved.
- Refinement of Solutions: With immediate insights from the judges, teams could refine their solutions on the spot, addressing any gaps or concerns raised during the presentation. This allowed teams to enhance the final product before submitting it for final evaluation.
- Constructive Criticism: Judges provided constructive criticism, focusing on both strengths and areas for improvement. This helped participants understand where their solutions excelled and where they could push for better functionality, user experience, or scalability.
- Personalized Guidance: Teams received personalized guidance based on their specific projects. This one-on-one interaction allowed the judges to focus on the individual needs of each team, providing feedback tailored to their unique challenges.
- Enhanced Learning Experience: For many participants, this phase was an invaluable learning opportunity. Direct interaction with industry professionals and experts gave participants the chance to gain insights into real-world problem-solving and receive advice that would be useful beyond the hackathon.

8. Challenges faced

While the hackathon was a great success, several challenges arose during its planning, execution, and evaluation phases. These challenges were part of the learning experience and helped in refining the overall structure for future events. Below is a detailed look at some of the main obstacles faced during the hackathon:

1. Maintaining Strict Adherence to Milestone Deadlines

One of the biggest challenges in organizing the hackathon was ensuring that all teams adhered to the milestone deadlines. While the milestone-based approach helped maintain consistent progress, it also presented several logistical difficulties:

- Time Management for Teams: Hackathons often attract participants who are eager to work on their ideas, but balancing a hackathon with academic schedules, personal commitments, and other projects can make meeting deadlines challenging. Some teams struggled with time management, resulting in missed milestones.
- Managing Delays: When teams missed milestone deadlines, it created a ripple effect, potentially causing delays in the entire event. Organizers had to stay on top of these delays and manage rescheduling or adjustments to ensure that the competition continued smoothly without disrupting the overall timeline.
- Strict Milestone Requirements: The need to submit progress reports and updates at each milestone required participants to focus not only on development but also on documentation and tracking their progress. For some teams, this added layer of complexity proved to be difficult to manage, especially when unexpected technical hurdles arose.
- Communication: Keeping all teams informed about upcoming deadlines, and ensuring they understood the importance of meeting those deadlines, was a challenge. Some teams faced issues with understanding or remembering the time constraints, leading to confusion or frustration.
- Ensuring Fairness: For teams that did meet their deadlines, ensuring that their efforts were recognized appropriately in the evaluation process became a challenge. Organizers had to make sure that teams who followed the timeline were not unfairly overshadowed by others who missed deadlines.
- Despite these challenges, the milestone system ultimately helped ensure that the teams stayed focused and worked steadily toward their final solution. The organizers learned a great deal from managing the deadlines and were able to fine-tune their approach for future events.

2. Coordinating Multiple Labs and Judges Simultaneously

Another significant challenge faced was the coordination of multiple labs and judges simultaneously during the offline phase of the event. With the event spanning over several labs at MSRIT and multiple judges evaluating the teams, the logistics became complex:

- Managing Multiple Venues: The offline phase required effective coordination between four different labs, each hosting different teams. Organizers had to ensure that the labs were equipped with the necessary infrastructure, such as power supplies, internet access, and proper seating arrangements for both teams and judges. This meant that organizers had to manage physical space efficiently and make sure there was no overlap or conflict between teams using the labs.
- Judges' Availability and Coordination: With several judges involved, managing their schedules and ensuring that each judge was assigned the right teams to evaluate required careful planning. Judges had to be given clear guidelines on how to assess the projects and what criteria they should focus on during their evaluations. Aligning all the judges' schedules, ensuring they were available at the right times, and facilitating smooth transitions between teams were logistical challenges.

- Real-time Updates and Communication: During the offline evaluation phase, real-time communication between the event organizers and judges was critical. If any issues or delays arose, organizers needed to quickly communicate updates to judges and teams. This required a reliable system of communication, as well as a proactive approach to managing any on-the-ground disruptions that occurred.

- Judging Process Consistency: Ensuring that all judges followed the same evaluation criteria and provided consistent feedback across the different labs was essential to maintain fairness. Organizers had to be diligent in reminding judges of the evaluation parameters and ensuring they applied the same standards to each team's presentation.

Despite these challenges, the organizers were able to manage the coordination of multiple labs and judges efficiently. They relied on a well-organized system and clear communication to ensure smooth proceedings and minimal disruption during the offline evaluation.

3. Ensuring Participants Understood the Problem Statement Clearly

A third major challenge was ensuring that all participants clearly understood the problem statement and the specific requirements of the hackathon:

- Complexity of Problem Statements: The problem statements provided to the participants were sometimes multifaceted, requiring them to address both technical and functional aspects. Some participants struggled to fully grasp the scope of the challenge, leading to confusion about what was expected of them. It was crucial for the problem statement to be clear, concise, and easy to interpret.

- Misalignment of Expectations: At times, teams misunderstood certain aspects of the problem statement, leading to misalignment between what they delivered and what was expected by the judges. This was especially true when problem statements included multiple layers of complexity or ambiguous phrasing. The organizers had to be proactive in addressing any questions or clarifications teams had regarding the problem statement.

- Time Constraints: With the tight timeline of the hackathon, some teams were forced to make assumptions or proceed without fully understanding the problem statement, which affected the quality of their solutions. Organizers had to make sure there was enough time during the initial phase for teams to seek clarifications, review the problem, and align their approach accordingly.

- Communication Channels for Clarification: Organizers set up communication channels where teams could ask questions, but some teams failed to leverage these opportunities, leading to confusion. Making sure all participants were aware of these channels and encouraged to seek clarifications was key to ensuring that everyone was on the same page.

- Revisions and Updates to the Problem Statement: Occasionally, the problem statement had to be refined or updated based on participant feedback. Handling these revisions and ensuring all teams were informed without disrupting their progress required careful management.

Despite these challenges, the organizers worked diligently to provide clear guidance and support to participants, ensuring that any misunderstandings or issues with the problem statement were addressed promptly. Regular check-ins and a responsive help desk helped mitigate confusion and ensure that teams were on track.

9. Outcomes and impact

The hackathon not only provided a platform for participants to showcase their technical skills but also encouraged them to consider broader societal impacts. The outcomes and lasting effects of the event

highlighted the importance of empathy, accessibility, and real-world problem-solving, leading to meaningful contributions from all involved.

1. Encouraged Participants to Design Solutions with Empathy for Underserved Communities

One of the core objectives of the hackathon was to inspire participants to design solutions that addressed real-world challenges, particularly for underserved or marginalized communities. This emphasis on empathy-driven design ensured that participants considered the needs of those who are often overlooked in the development of digital technologies:

- Understanding Diverse Needs: Participants were encouraged to think beyond the typical user base and focus on creating solutions that would have a positive impact on communities with limited access to resources or technology.
- Social Responsibility: By tackling challenges faced by underserved groups, participants began to understand the importance of social responsibility in tech development. The event shifted the focus from purely technical achievement to designing solutions that can bring about tangible change in society.
- Inclusive Innovation: Solutions designed with empathy not only solved problems but also contributed to creating more equitable access to technology, ensuring that digital platforms and services cater to a wider audience.

2. Highlighted the Importance of Accessibility and Inclusivity in Digital Platforms

The hackathon underscored the critical importance of accessibility and inclusivity in the design and development of digital platforms. As the tech industry continues to grow, ensuring that digital solutions are accessible to all users—regardless of their abilities, backgrounds, or resources—is paramount:

- Design for All: Participants were encouraged to integrate accessibility features such as easy navigation, text-to-speech, and multi-language support into their solutions. This helped raise awareness about the need for products and platforms that cater to individuals with disabilities or those in underserved areas.
- Expanding the User Base: The hackathon highlighted that inclusive design does not just benefit marginalized communities but can also help expand the overall user base, leading to more widespread adoption of technologies.
- Creating Equitable Solutions: Teams were encouraged to focus on solutions that prioritize equal access to information, products, and services. By integrating inclusive design principles into their solutions, participants ensured that they were building products that could be used by a wider range of individuals, regardless of their technological literacy or physical limitations.

3. Inspired Students to Think Critically About Real-World Problems and Create Meaningful Solutions

Beyond technical skills, the hackathon inspired participants to think critically about real-world problems and how their work could make a difference:

- Problem-Solving with Purpose: The hackathon emphasized that technology should not just be a tool for innovation, but also a means to solve pressing global issues. Students were motivated to tackle problems related to healthcare, education, environmental sustainability, and social inclusion, fostering a sense of purpose in their work.
- Innovative Thinking: By encouraging participants to step outside their academic frameworks and focus on practical solutions, the event inspired students to think innovatively and critically. This experience helped them connect theory with practice and understand the broader societal impact of their work.
- Meaningful Impact: Participants recognized that their solutions could lead to lasting change—whether it was improving access to essential services, creating more sustainable systems, or supporting

marginalized communities. This understanding led to deeper engagement with the problem statements and more thoughtful solutions.

10. Acknowledgements

We would like to extend our sincere gratitude to everyone who contributed to the success of the hackathon. This event would not have been possible without the collective efforts of the organizing departments, faculty members, sponsors, judges, and participants.

Institution: A special thanks to MSRIT for providing the infrastructure and support that enabled us to host such a successful event.

Sponsors: We are grateful to our esteemed sponsors, including the IEEE Computational Intelligence Society, CSI Bangalore Chapter, and the Institution Innovation Council for their valuable support in making this event a reality.

Student Coordinators: We would like to acknowledge the hard work and dedication of the student coordinators, who played a pivotal role in ensuring the smooth running of the hackathon. Our sincere thanks to Jeevitha, Shri Ram, Shree Lakshmi, Shreya R, and Sameeksha P for their unwavering commitment.

Faculty Convenors: A heartfelt thank you to our faculty convenors for their guidance and mentorship:

Dr. Anita Kanavalli (ISE)

Dr. S Ajitha (MCA)

Dr. R China Appala Naidu (CSE)

Faculty Coordinators: We are grateful to our faculty coordinators for their constant support throughout the event:

Dr. Sumana Maradithaya (ISE)

Dr. Sruthi G (ISE)

Dr. D Evangeline Geetha (MCA)

Dr. Sushma B (CSE)

Judges: Our sincere thanks to the panel of judges for their valuable time and expertise in evaluating the participants' projects:

Rishabh Priyadarshi

Shreehari Wadawadagi

Mr. Arun Kumar

Manoj R K

Participants: Lastly, we would like to express our gratitude to all the participants for their enthusiasm, creativity, and hard work. Your innovative solutions and determination made this event truly memorable

11. Appendices

unstop

Stages & Timeline Details Dates & Deadlines Reviews FAQs & Discussions

13 Dec 24

Project Proposal

Teams submit a detailed project plan outlining the following:
Project scope
Resource requirements
Team member roles

Start: 13 Dec 24, 11:00 AM IST
End: 13 Dec 24, 01:00 PM IST

Submission

13 Dec 24

Technical Progress Check

Teams submit evidence of their technical progress. This may include:
Code snippets
Infrastructure documentation
Technical concepts used

You're not eligible to participate in this round.

Start: 13 Dec 24, 01:00 PM IST
End: 13 Dec 24, 03:00 PM IST

Milestones of the participants in the Unstop website

1	Technovators	3 Players		Not Submitted	--
2	Dawn	3 Players		Not Submitted	--
3	Hackz	3 Players		Not Submitted	--
4	Ctrl	3 Players		Not Submitted	--
5	Jugaadus	3 Players		Not Submitted	--
6	Pixel Pioneers	2 Players		Not Submitted	--

Elimination of the participants



Inauguration of the offline submissions



Participants showcasing their prototype



Handing over thankyou letters to the judges

S.NO	Team Name	Team Lead Name
1	Team Scratch	Animeeth Ghosh
2	choco	Manu Smriti
3	Binary	Srushti S
4	Strivers	AARIB ANWAR
5	The Secret Coders	Ankit Kumar
6	SnackOverflow	Nabhanyu B M
7	Sleep(100)	Akash
8	Tech9Baaz	Patel Jashmin Kumar
9	CodeAid	Niketana L
10	SKY	Vidushi Gupta
11	Crakzzz	DHRUV GUPTA
12	The Bug Buster's	Gireesh Hegde
13	Nexus	Harsh Gaurav

The list of participants that got shortlisted for the final round

S.NO	Team Name	Team Lead Name
14	Error404	Tanish Mehta
15	mavericks	Sanvi Nikkam
16	Losers	Shakthivel M
17	Humans for Humanity	Ruthwik Bhargav N
18	Super Shanmugans	Atharv Kulkarni
19	HUMANITECH	Abhishek L Gowda
20	BridgingGaps	Paridhi Khemka
21	Socket Synergies	Kumar Kaushik
22	404 Brain_Not_Found	Ishan Chitkarsh
23	Walter Black	Manjunath Patil
24	Minions	Anurag Singh
25	Haxx	KARTIK SUNDARRESH
26	YJ	Jeeth Bhavesh

S.NO	Team Name	Team Lead Name
27	TOXIC	Vishnu J
28	SyntaxError	Ankita Jaka
29	Millibytes	Urvi Umesh
30	Loserz	Blen Pinto
31	ACT	C christopher
32	NO GPA	Deepika T
33	Alpha	Samrudh p
34	SCORPIO	Vedang Srivastava
35	Helptech	Parnika N
36	Humanity hackers	Mahantesh Patil
37	Natural stupidity	HARSH RAJ
38	Vs Le club	VATSAL Kumar
39	Bug de'buggers	Amith Braggs

S.NO	Team Name	Team Lead Name
40	MSV	Vishwas Desai
41	SANDWICH.APK	KRISHNA KAPALE
42	KafkaBytes	Shubham Saurav
43	algorun	Sandeep Shivashettar
44	Astra	Nagashree N S
45	The boyz	Aneek Shah
46	System error	Shawn Avinash
47	Tech Triad	Shashwath Prabhu
48	Team rangnorock	Preetham Gowda
49	TED Hack	Sachin Kumar
50	Team karnaatabala	Basavaraj addnur
51	Russel stover	CHIRUDEEP KURALLA
52	Bits and bytes	Mudit sethia

Judges

Mr Shreehari Wadawadagi	2000
Mr Rishabh Priyadarshini	2000
Mr Manoj K R	2000
Mr Arun Kumar	2000
	8000

Food Arrangements

On 14/12/2024 for judges and organizers	1770
For valedictory event (16 Jan 2025)	2550
	4320

Printing

Sumukha Print	200
Certificates - Sumukha Print	2400
	2600

Winner Prizes

First Prize	10000
Second Prize	7000
Third Prize	5000
	22000

Money contributed by IEEE CIS 34370



RAMAIAH
Institute of Technology



DEPARTMENT OF AI AND DS

&

DEPARTMENT OF AI AND ML

PRESENTS

HANDS-ON SESSION ON USECASES OF Machine Learning

CONDUCTED FROM

7TH DECEMBER 2024

HANDS-ON SESSION ON USECASES OF Machine Learning

IN COLLABORATION

WITH IEEE-COMPUTATIONAL INTELLIGENCE SOCIETY



ACKNOWLEDGEMENT

I would like to express my sincere gratitude to **Artificial Intelligence and Data Science & Artificial Intelligence and Machine Learning** for organizing the insightful and engaging hands-on session on Artificial Intelligence and Machine Learning.

A special thanks to **NISHANTH KRISHNA** and the entire team for their valuable guidance, practical demonstrations, and in-depth knowledge sharing. The session provided a great opportunity to enhance my understanding of AI/ML concepts, algorithms, and real-world applications.

I also extend my appreciation to my peers and fellow participants for their collaboration and engaging discussions, making this learning experience even more enriching.

Thank you once again for this wonderful opportunity.



INTRODUCTION

Artificial Intelligence (AI) and Machine Learning (ML) are transforming industries by enabling intelligent decision-making, automation, and predictive analytics. The AI & ML with Advanced Intelligent Data Systems (AIDS) program is designed to provide participants with a deep understanding of fundamental and advanced concepts in AI/ML while integrating cutting-edge data-driven approaches.

This 8-session hands-on training will cover key topics such as machine learning algorithms, neural networks, deep learning, natural language processing, and AI-driven applications. Participants will engage in practical exercises, real-world case studies, and interactive discussions to enhance their technical proficiency and problem-solving skills.

By the end of the program, attendees will have gained hands-on experience in building AI/ML models, optimizing data workflows, and applying these technologies in various domains. This course is ideal for students, researchers, and professionals looking to enhance their expertise in AI/ML and its real-world application

TARGET AUDIENCE

The undergraduate students at MS Ramaiah Institute of Technology.

OBJECTIVES

The AI and Data Science program is designed to provide participants with a strong foundation in Artificial Intelligence (AI) and Data Science, equipping them with the necessary skills to analyze data, develop machine learning models, and derive meaningful insights for decision-making.

VENUE

The event was held in the AI&ML and AI&DS CLASSROOMS AND LABS, MS Ramaiah Institute of Technology, MSR Nagar, Mathikere, Bengaluru- 560054, Karnataka, India.



EVENT DAY

DAY 1-Understanding fundamentals of AI & data science

(Learn core concepts, real-world applications, and the role of AI in data-driven decision-making) date:

7/12/2024

time: 9:00am to 1:00 pm

DAY 2:Explore Data Collection & Preprocessing Techniques

(Gain hands-on experience in data wrangling, cleaning, and feature engineering) date:

12/12/2024

time: 6:00pm to 8:00pm

DAY 3:Master Exploratory Data Analysis (EDA)

(Learn statistical and visualization techniques to uncover patterns and trends in data.) date:

17/12/2024

time: 6:00pm to 8:00pm

DAY 4:Learn Machine Learning Algorithms

(Understand supervised and unsupervised learning techniques, including regression, classification, and clustering)

date: 19/12/2024

time: 6:00pm to 8:00pm

DAY 5:Apply Deep Learning & Neural Networks

(Explore advanced AI techniques such as deep learning, CNNs, and NLP.)

date: 21/12/2024

time: 6:00pm to 8:00pm

DAY 6:Work on Real-World Data Science Projects

(Apply AI and data science techniques to solve practical problems in industries like healthcare, finance, and marketing)

date: 24/12/2024

time: 6:00pm to 8:00pm

DAY 7:Understand Model Evaluation & Optimization

(Learn techniques to assess, fine-tune, and improve AI/ML models for better performance)

date: 26/12/2024

time: 6:00pm to 8:00pm



KEY HIGHLIGHTS

1. Understanding the Fundamentals of AI and Data Science

Participants will start by learning about core AI and ML concepts, their real-world applications, and their impact across industries such as healthcare, finance, and automation. They will explore how AI is revolutionizing decision-making, improving efficiency, and driving innovation. This session will also focus on distinguishing AI from ML and deep learning, helping participants understand their interconnections. Moreover, participants will gain insights into how data serves as the backbone of AI, fueling intelligent models and automation.

Additionally, discussions on AI ethics, responsible AI, and the challenges of implementing AI in real-world scenarios will help participants build a solid foundation for their learning journey.

2. Exploring Data Collection and Preprocessing Techniques

A crucial step in AI and Data Science is data preprocessing. Participants will gain hands-on experience in handling raw data, performing data wrangling, cleaning, and transforming data into a structured format suitable for analysis. They will learn how to handle missing values, identify and eliminate outliers, and perform feature engineering to enhance model performance. Techniques such as normalization, standardization, and encoding categorical variables will be discussed in detail. This session will also introduce participants to essential Python libraries such as Pandas and NumPy, which are widely used for data manipulation and preprocessing.

Understanding how to prepare high-quality data will ensure that participants can build more accurate and efficient AI models.

3. Mastering Exploratory Data Analysis (EDA)

A significant focus will be placed on exploratory data analysis, which is essential for understanding datasets before building machine learning models. Participants will learn how to explore and summarize data using statistical methods and visualization techniques. They will use libraries like Matplotlib and Seaborn to create visual representations of data, helping them uncover patterns, correlations, trends, and anomalies. They will also learn how to interpret descriptive statistics such as mean, median, variance, skewness, and kurtosis. This session will also introduce correlation matrices and pair plots to identify relationships between variables, as well as outlier detection methods to improve data quality.

4. Learning Machine Learning Algorithms

Participants will dive deep into machine learning algorithms, starting with supervised learning techniques such as regression and classification. They will understand the working of algorithms like Linear Regression, Decision Trees, Support Vector Machines (SVM), and Random Forests. The session will also introduce unsupervised learning methods, including clustering techniques like K-Means and hierarchical clustering. They will gain practical experience in implementing models using Scikit-Learn and evaluating them using metrics such as accuracy, precision, recall, and F1-score. Additionally, the session will cover important concepts such as bias-variance tradeoff, model overfitting, and regularization techniques for improving model performance.



5. Applying Deep Learning and Neural Networks

Building on machine learning, participants will explore deep learning and its applications. They will learn about artificial neural networks (ANNs) and their architecture, including layers, neurons, activation functions, and backpropagation. Convolutional neural networks (CNNs) will be introduced for image recognition tasks, while recurrent neural networks (RNNs) will be discussed for processing sequential data. The session will also touch upon Natural Language Processing (NLP) and its real-world applications, such as text classification and sentiment analysis. Participants will implement deep learning models using TensorFlow and Keras, gaining hands-on experience in training and optimizing neural networks.

6. Working on Real-World Data Science Projects

Participants will apply their knowledge by working on real-world projects using datasets from industries such as healthcare, finance, and e-commerce. They will experience the complete end-to-end project workflow, from data collection to model deployment. Case studies will include predictive analytics for business decision-making, customer segmentation, and fraud detection. They will also explore time-series forecasting models for applications like financial market prediction and demand forecasting. The session will emphasize best practices for structuring and documenting data science projects while promoting teamwork and collaborative problem-solving.

7. Understanding Model Evaluation and Optimization

To build reliable AI models, participants must learn to evaluate and optimize them effectively. This session will cover various model evaluation techniques, such as confusion matrices for classification problems and RMSE (Root Mean Squared Error) for regression models. Participants will understand common issues like overfitting and underfitting and learn methods such as cross-validation and hyperparameter tuning to improve model performance. Additionally, ensemble learning techniques like bagging and boosting will be explored to enhance model accuracy and robustness.



CONCLUSION

Over the past seven sessions, participants have developed a strong foundation in AI and Data Science, gaining hands-on experience in data collection, preprocessing, exploratory data analysis (EDA), machine learning algorithms, deep learning techniques, and real-world applications. They have learned how to clean and transform data, implement supervised and unsupervised learning models, optimize performance using evaluation techniques, and apply AI to solve industry-specific problems. The sessions provided valuable insights into neural networks, natural language processing (NLP), and best practices for model optimization. As we conclude, participants are now equipped with the skills to analyze data, build intelligent models, and drive AI-powered solutions. The final session will focus on deploying AI models, ensuring that participants can transition from development to real-world implementation, making a tangible impact in their respective domains.

PHOTO GALLERY

The poster features the logos of RAMAIAH Institute of Technology, IEEE Computational Intelligence Society, and AI. It includes a 3D rendering of a brain and a circular portrait of a robotic head. The text on the poster reads:

DEPARTMENT OF AI&DS AND AI&ML

**HANDS-ON SESSION ON USE CASES
OF AI AND DATA SCIENCE**

BY
NISHANTH KRISHNA

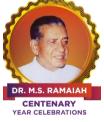
Nishant Krishna is a cybersecurity entrepreneur, inventor, and educator with 24+ years of expertise in tech innovation, IoT, and product scaling.

DATE	TIME
7/12/2024	09:00 AM - 01:00 PM
12/12/2024	06:00 PM - 08:00 PM
17/12/2024	09:00 AM - 11:00 AM
19/12/2024	02:00 PM - 04:00 PM
21/12/2024	09:00 AM - 01:00 PM
24/12/2024	09:00 AM - 11:00 AM
26/12/2024	02:00 PM - 04:00 PM

Dr Vijaya kumar B P
Advisor, IEEE CIS, Bangalore section
Professor and Head, AI and DS,
RIT

Dr Sumana M
Chair, IEEE CIS, Bangalore section
Professor, ISE dept., RIT

Dr. Jagadish S Kallimani
Professor and Head , AI and ML
RIT







RAMAIAH
Institute of Technology



ACTIVITY :

Faculty Development Programme on

'From Data to Deployment : A Practical Approach to AI, NLP and MLOps'

The banner features the logo of Dr. M.S. Ramaiah Institute of Technology (RAMAIAH Institute of Technology) and the portrait of Dr. M.S. Ramaiah. It also includes logos for IEEE Computational Intelligence Society Bangalore Chapter, IQAC, and Institutions Innovation Council.

Chief Patrons

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About RIT

Dr. M. S. Ramaiah a philanthropist, founded 'Gokula Education Foundation' in 1962 with an objective of serving the society. M S Ramaiah Institute of Technology (MSRIT) was established under the aegis of this foundation in the same year, creating a landmark in technical education in India. MSRIT offers 18 UG programs and 13 PG programs. All Undergraduate programs are approved by AICTE and PG programs are accredited by National Board of Accreditation (NBA). The institute is accredited with 'A+' grade by NAAC in March 2021 for 5 years. University Grants Commission (UGC) & Visvesvaraya Technological University (VTU) have conferred Autonomous Status to MSRIT for both UG and PG Programs since 2007. The institute has also been conferred autonomous status for Ph.D. program since 2021. The institute is a participant to the Technical Education Quality Improvement Program (TEQIP), an initiative of the Government of India. The institute has 380 competent faculty out of which 70% are doctorates. Some of the distinguished features of MSRIT are: State of the art laboratories, individual computing facility for all faculty members, all research departments active with sponsored funded projects and more than 30 scholars pursuing Ph.D. To promote research culture the institute has established Centre of Excellence for Imaging Technologies, Centre for Advanced Materials Technology, Centre for Antennas and Radio Frequency systems (CARES), Center for Cyber Physical Systems, Schneider Centre of Excellence & Centre for Bio and Energy Materials Innovation, Ramaiah Institute of Technology has obtained "Scimago Institutions Rankings" All India Rank 182 for the year 2024. The Entrepreneurship Development Cell (EDC) and Section 8 company "Ramaiah Evolve" have been set up on campus to incubate startups. M S Ramaiah Institute of Technology is recognized by Atal Ranking of Institutions on Innovation Achievements (ARIIA), MoE, Govt. of India. MSRIT has a strong Placement and Training department with a committed team, a good Mentoring/Proctorial system, a fully equipped Sports department, large air-conditioned library with good collection of book volumes and subscription to International and National Journals. The Digital Library subscribes to over 1500 e-journals from Springer, Elsevier, Wiley, Taylor & Francis, Springer Link, etc. The Institute is a member of DELNET, CMTI and VTU E-Library Consortium. The Institute has a modern auditorium, recording studio, and several hi-tech conference halls with video conferencing facilities. The institute has excellent hostel facilities for boys and girls. MSRIT Alumni have distinguished themselves by occupying high positions in India and abroad and are in touch with the institute through an active Alumni Association. As per the National Institutional Ranking Framework (NIRF), MoE, Government of India, Ramaiah Institute of Technology has achieved 75th rank among 1463 top Engineering Institutions & 21st Rank for School of Architecture in India for the year 2024.

Supported by

From Data to Deployment: A Practical Approach to AI, NLP and MLOps

24th February – 1st March, 2025

Organized by

Department of Information Science and Engineering
&
Department of Computer Science and Engineering
Ramaiah Institute of Technology
(Autonomous Institute, affiliated to VTU)
MSR Nagar, MSRIT Post, Bengaluru- 560 054

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Principal, RIT

Dr. Pradipkumar Dixit
Vice – Principal, RIT

Dr. Archana
Registrar (Academic), RIT

Sri. Mahadev Kokkari
Registrar (Admin), RIT

Conveners

Dr. Anita Kanavalli
Professor and Head, Dept. of ISE, RIT

Dr R China Appala Naidu
Professor and Head, Dept. of CSE, RIT

Resource Person

Mr Sachin Shivakalimuth	AI/ML Professional, Genpact
Mr Basudev Panda	Data Science Expert, Genpact

About the Workshop

This interactive workshop offers participants a practical, hands-on deep understanding of AI and ML concepts, with experience in developing and deploying AI-driven solutions. Through guided exercises and real-world examples, participants will gain proficiency in setting up a virtual environment, understand the vision of Artificial General Intelligence (AGI), identify the importance of data and its classification as the groundwork for ML. This FDP focuses on providing practical knowledge on Transfer Learning, Self-Supervised Learning, and the foundations of Large Language Models (LLMs), including representation learning and latent space. The Attention Mechanism and Transformer-based architectures are explored, with practical applications of Generative AI leveraging transformers. To optimize collaboration, automation, and efficiency within their development workflow, MLOps are introduced that covers version control with Git, containerization with Docker, and deploying AI models via Streamlit for real-time predictions. Overall, this FDP provides a comprehensive roadmap to effective usage of tools and methodologies for achieving data-driven decision-making.

Objectives:

- Explore the significance of data, its classification, and its role in Machine Learning.
- Understand and apply advanced RNN architectures (LSTM, GRU, Seq2Seq) and Transformer models and obtain hand-on experience in Deep Learning and NLP.
- Deploy AI Models Using MLOps Practices.

Coordinators

Dr. Sumana M
Professor., Dept. of ISE, RIT

Dr. Ganeshayya Shidaganti
Assoc. Prof., Dept. of CSE, RIT

Dr. Anitha P
Asst Prof., Dept. of ISE, RIT

Ms. Prathima M N
Asst Prof., Dept. of ISE, RIT

Mr. Mushtaq Ahmed D M
Asst Prof., Dept. of ISE, RIT

Mr. Shivananda S
Asst. Prof., Dept. of ISE, RIT

Organizing Committee

Faculty & Staff
Department of Information Science and Engineering
&
Department of Computer Science and Engineering

Venue
ISE Lab 1 (R. No. 309)
DES Block

Event Dates
24th February – 1st March, 2025

Who Can Attend the Workshop?
Faculty and Post-graduates of RIT and Other Engineering colleges/Universities.

Address for Communication

Dr. Anitha P
E-Mail: anithap@msrit.edu
Mobile No.:9591297454

Mr. Shivananda S
E-Mail: shivanandagowda@msrit.edu
Mobile No.:974127850

Dr. Ganeshayya Shidaganti
E-Mail: ganeshayyashidaganti@msrit.edu
Mobile No.:9886030842

Registration
Link: <https://forms.gle/91lhEPQwM3CN45qZHA>

Note: No Registration Fee

FDP on “From Data to Deployment: AI, NLP and MLOps”

PROGRAMME SCHEDULE

Date & Day	Venue	Session 1 (10AM – 11.30 AM)		Session 2 (11.45 AM to 1 PM)		Session 3 (2:00 PM to 4:00 PM)
Monday 24/02/2025	AB-703(AI &ML Lab)	Inauguration and Basics of Python (data handling, writing functions), Creating Virtual environment in VSCode.		Introduction to Machine Learning, Need of Data, Classification of Data.		Introduction to World of AI, Branches of AI a. Deterministic AI b. Generative AI c. Futuristic AGI, Deterministic AI Vs Generative AI and their intersections
Tuesday 25/02/2025	AB-703(AI &ML Lab)	Introduction to Deep Learning, Building block of a single Neuron, Multi-layer perceptron / Neural Network	Tea Break 11.30M- 11.45AM	Introduction to layers of neural network and hyper parameters, Calculation of number of hyper parameters from NN, ANN (Architecture, Example of ANN – hands on)	LunchBreak 01.00PM- 02.00PM	Introduction to Computer Vision, Why not ANN? ,CNN (Architecture, Example of CNN – hands on)

Thursday 27/02/2025	AB-703(AI &ML Lab)	Need of NLP and use cases, Language Models: -NLP Basics – Tokenization (character, n-gram, sentence, paragraph, regex), Vectorization (TF to Word2Vec to ELMO) - hands on		Introduction to Vector Data bases, Transfer Learning, Introduction to representation Learning and Latent Space.		RNN – (Introduction, Architecture), Vania RNN – Example Hands On, RNN LSTM, RNN GRU – Hands On
Friday 28/02/2024	AB-703(AI &ML Lab)	Language Modelling Basics (MLM and Self Supervised Learning, NSP, RTD)- Hands ON, Introduction to LLM	Tea Break 11.30M-11.45AM	Seq2Seq Models- Hands On, Encoder-Decoder Architecture, Attention Mechanism	LunchBreak 01.00PM-02.00PM	Transformer Architecture - Hands On, How Generative AI Models use transformer-based architecture
Saturday 01/03/2024	AB-703(AI &ML Lab)	MLOps (Introduction, Git, Docker)		MLOps(Connecting model to streamlit app to predict automatically)		Valedictory Function

Five days Faculty Development Programme on

**“From Data to Deployment: A Practical Approach to
AI, NLP and MLOps”**

Supported by,



REPORT

CONDUCTED FROM

24th February to 1st March, 2025

Organized by

**Department of Information Science and Engineering &
Department of Computer Science and Engineering**

Day 1: Monday, 24th February 2025

Day 1 started with the inaugural of the Faculty Development program .



The Faculty Development Program (FDP) commenced with an inauguration session, setting the stage for an insightful week of learning. The keynote speaker for the first four days, Sachin Shivakalimath, introduced the objectives of the FDP, emphasizing its role in enhancing knowledge in Artificial Intelligence and Machine Learning (AI & ML).

Session 1: Basics of Python

The session covered fundamental concepts, including data handling, writing functions, and creating a virtual environment in VSCode. The speaker provided hands-on demonstrations to help participants get familiar with the development environment. This session was instrumental in equipping attendees with the foundational knowledge required for AI and ML applications.

Session 2: Introduction to Machine Learning

The post-break session delved into Machine Learning (ML). Topics included the need for ML, data classification, and real-world applications of machine learning. Participants learned about supervised and unsupervised learning approaches, along with the significance of training data in model development.

Session 3: Introduction to AI and its Branches

In the final session of the day, the speaker provided an overview of AI and its various branches. The discussion included deterministic AI, generative AI, and futuristic AGI. Participants explored the intersections between deterministic AI and generative AI, with an emphasis on real-world use cases.

The day concluded with hands on implementation of the concepts learnt throughout the day and an interactive Q&A session, where participants engaged with the speaker on AI-related queries.

Day 2: Tuesday, 25th February 2025

Session 1: Deep Learning Introduction

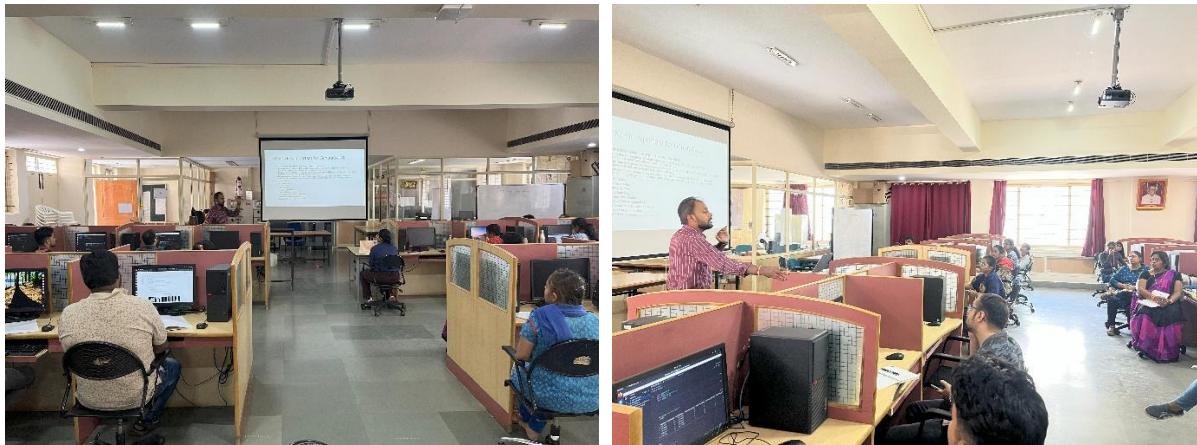
The second day began with an introduction to deep learning. The session covered the fundamental building blocks of neural networks, including single neurons, multi-layer perceptrons, and their role in AI models. Hands-on exercises helped participants understand the practical implementation of neural networks.

Session 2: Neural Networks and Hyperparameters

The second session of the day focused on the structure of neural networks. The speaker explained the different layers of neural networks and the importance of hyperparameters. Participants explored the calculation of hyperparameters, ANN architecture, and examples of artificial neural networks in real-world applications.

Session 3: Computer Vision and CNN

The final session introduced the concept of Computer Vision (CV). The discussion revolved around why Convolutional Neural Networks (CNNs) are preferred for CV tasks. The session included hands-on exercises where participants implemented a simple CNN architecture for image classification.



The day ended with a practical discussion on the applications of CNN in modern AI systems.

Day 3: Thursday, 27th February 2025

Session 1: Natural Language Processing (NLP) Basics

The third day focused on Natural Language Processing (NLP) and its applications. The session covered essential language models, including tokenization techniques such as character-level, word-level, n-grams, stemming, and lemmatization. Participants gained hands-on experience in applying these concepts using NLP tools.

Session 2: Introduction to Data Representation and Transfer Learning

The second session explored data representation techniques, databases for AI models, and transfer learning concepts. Participants learned how pre-trained models could enhance AI applications, reducing the need for extensive datasets.

Session 3: Recurrent Neural Networks (RNNs)

The day concluded with a deep dive into RNNs. The speaker introduced different RNN architectures, including vanilla RNN, LSTM, and GRU. Participants engaged in practical exercises to implement these architectures and understand their advantages in sequential data processing.



The session provided valuable insights into the importance of sequence models in AI applications.

Day 4: Friday, 28th February 2024

Session 1: Language Modeling and LLMs

The fourth day focused on language modeling. The speaker introduced machine learning techniques for text processing, including Masked Language Modeling (MLM) and Self-Supervised Learning. Participants explored concepts such as NSP, RTD, and hands-on exercises related to Large Language Models (LLMs).

Session 2: Sequence-to-Sequence (Seq2Seq) Models

This session provided insights into Seq2Seq models, including hands-on implementations. The discussion covered encoder-decoder architectures, attention mechanisms, and their significance in NLP applications.

Session 3: Transformer Architecture and Generative AI

The final session covered transformer architectures. Participants explored the role of transformers in generative AI models, understanding how they outperform traditional architectures. Hands-on activities reinforced the application of transformers in modern AI systems.



The session was seemingly relevant given the rise of generative AI models.

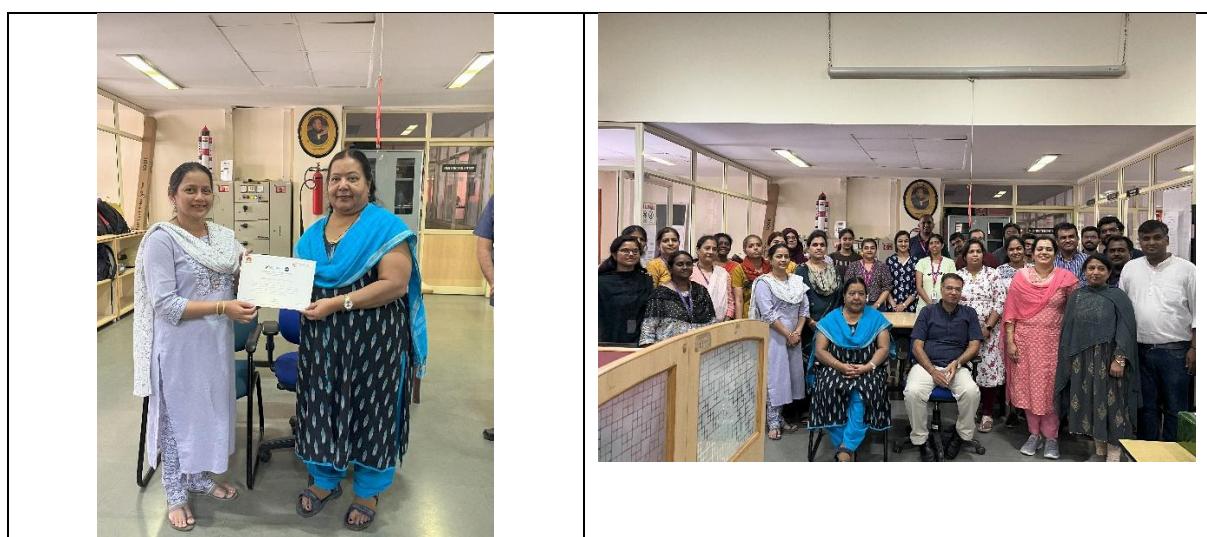
Day 5: Saturday, 29th February 2025

Session 1: Advanced AI Architectures and Applications

The final day of the FDP was conducted by Basudev, who provided insights into advanced AI architectures. The session covered real-world applications of AI models, including multimodal learning, reinforcement learning, and cutting-edge AI advancements.

Session 2: AI in Industry and Research

The second session focused on the industry applications of AI. Participants learned about AI's role in healthcare, finance, and automation. Research trends in AI were discussed, highlighting emerging fields and future developments.



Final Remarks

The event concluded with an appreciation for the efforts of the organizing committee, speakers, and attendees. The knowledge imparted during this FDP will undoubtedly empower participants to contribute meaningfully to the field of AI and ML in academia and industry. With the ever-growing advancements in AI, such initiatives play a crucial role in bridging the gap between theoretical knowledge and practical implementation. The FDP successfully achieved its objectives, leaving participants motivated and well-equipped to explore further innovations in Artificial Intelligence and Machine Learning.

Coordinators:

Dr Sumana M

Dr Anitha P

Dr Ganeshayya

Prof. Prathima M N

Prof. Shivananda S

Prof. Mushtaq Ahmed

S.No	Activities	In Rupees
1.	Activity 1 – Partial Delivery of Course Mr Sachin Shivalimath	60000/-
2.	Activity 2 – Hackathon 1 By Amrittha University, Bangalore	10000/-
3.	Activity 3 - AI Conclave "NirvAI" In NMIT, Bangalore	25000/-
4.	Activity 4- Industry Interaction (Nishant Krishna) In AI/ML dept, MSRIT	50000/-
5.	Activity 5- Hackathon Hack4Humanity At MSRIT	
6.	Activity 6- Faculty Development Programme on From Data to Deployment (MSRIT)	45000/-
7.	Reading , Writing material, printing	40000/-
Total:		Rs. 2,64,370 (\$3100)

