Malnad College of Engineering, Hassan
Department of Computer Science & Engineering
(Artificial Intelligence & Machine Learning)

Date: 11/09/2025

To
The Principal
Malnad College of Engineering (MCE)
Hassan – 573202

Respected Sir,

Subject: Request for Permission to Organize Institutional Visit (Innovation Centers & Centre of Excellence) to MIT, Manipal for Final Year CSE (AI & ML) Students.

As part of the academic enrichment activities of the Department of Computer Science & Engineering (AI & ML), we have planned an **institutional visit to Manipal Institute of Technology (MIT), Manipal**, to provide our final-year students with exposure to cutting-edge research, advanced laboratories, and interactions with eminent faculty.

We have received confirmation from MIT regarding the visit, which is scheduled on 16th September 2025.

Facilities to be visited: Innovation Centers, Centre of Virtual Reality Lab, COIL-D Lab, AI–Centre of Excellence in Health, MAHE-ISAC Centre of Excellence on Cybersecurity, CAIF, and MUTBI

This program will provide our students with valuable insights into advanced research, innovations in AI, and industry-ready technologies.

We kindly seek your **permission to organize this visit** and to accompany the students along with faculty members on the scheduled date.

We request your approval and necessary guidance in this regard.

Recommended for needful
Permitted
11/09/25

Permitted
11/09/25

Sincerely,
11/09/25
Dr. Arjun B C
Head of the Department
CSE (AI & ML)
Malnad College of Engineering
Hassan-573202

MALNAD COLLEGE OF ENGINEERING, HASSAN

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

2022-26 Batch Students
Industrial visit to Manipal University

Semester: VII Academic Year: 2025-26

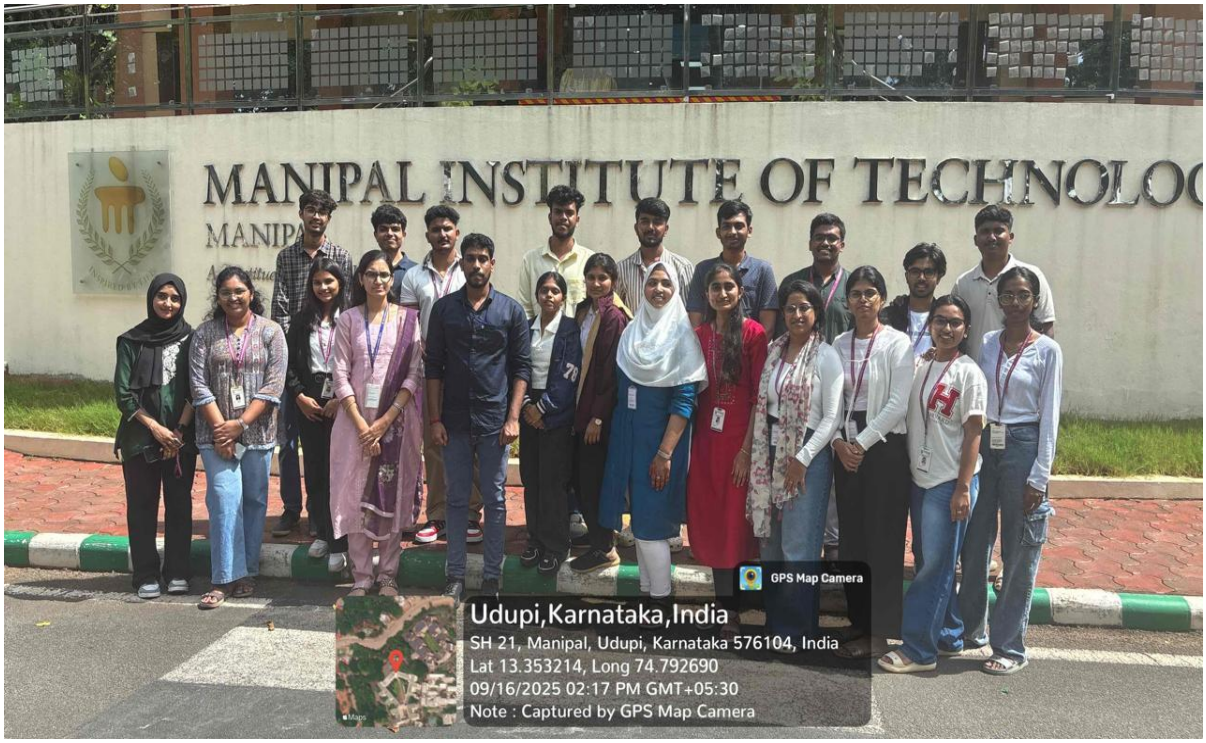
SL. No.	USN	STUDENT NAME
1	4MC22CI001	AISHWARYA A R
2	4MC22CI002	AKASH HARIHAR
3	4MC22CI004	ANUSHA B M
4	4MC22CI006	ARJUN D
5	4MC22CI009	DEEKSHA H P
6	4MC22CI010	DEEKSHA S
7	4MC22CI011	DHAVAN H S
8	4MC22CI012	HARSHITHA B V
9	4MC22CI014	KUMUDA D P
10	4MC22CI015	LIKHITHA H Y
11	4MC22CI016	MANIKYA K
12	4MC22CI017	MUSKAN
13	4MC22CI018	NANDAN JAVAGAL
14	4MC22CI019	NIDA FATHIMA
15	4MC22CI021	PRARTHANA B G
16	4MC22CI022	PRATHAM D U
17	4MC22CI023	PRATHAM M JAIN
18	4MC22CI024	RAKSHITHA K S
19	4MC22CI027	SINCHANA G P
20	4MC22CI028	TEJASWI H T
21	4MC22CI029	THEJASHWINI L GOWDA
22	4MC22CI030	VEDANTH R
23	4MC22CI031	VIJAY KUMAR S B
24	4MC23CI400	KARTHIK M L
25	4MC23CI402	SWATHI U

Faculty Members		
1	Mrs. Ankitha S	Assistant Professor
2	Mr. Manikanta Prasad J	Assistant Professor

The above students & faculties visiting Manipal university on 16th sept 2025 for one day.

(Dr. Arjun B C)
Head of the Department
CSE (AI & ML)
Malnad College of Engineering
Hassan-573202

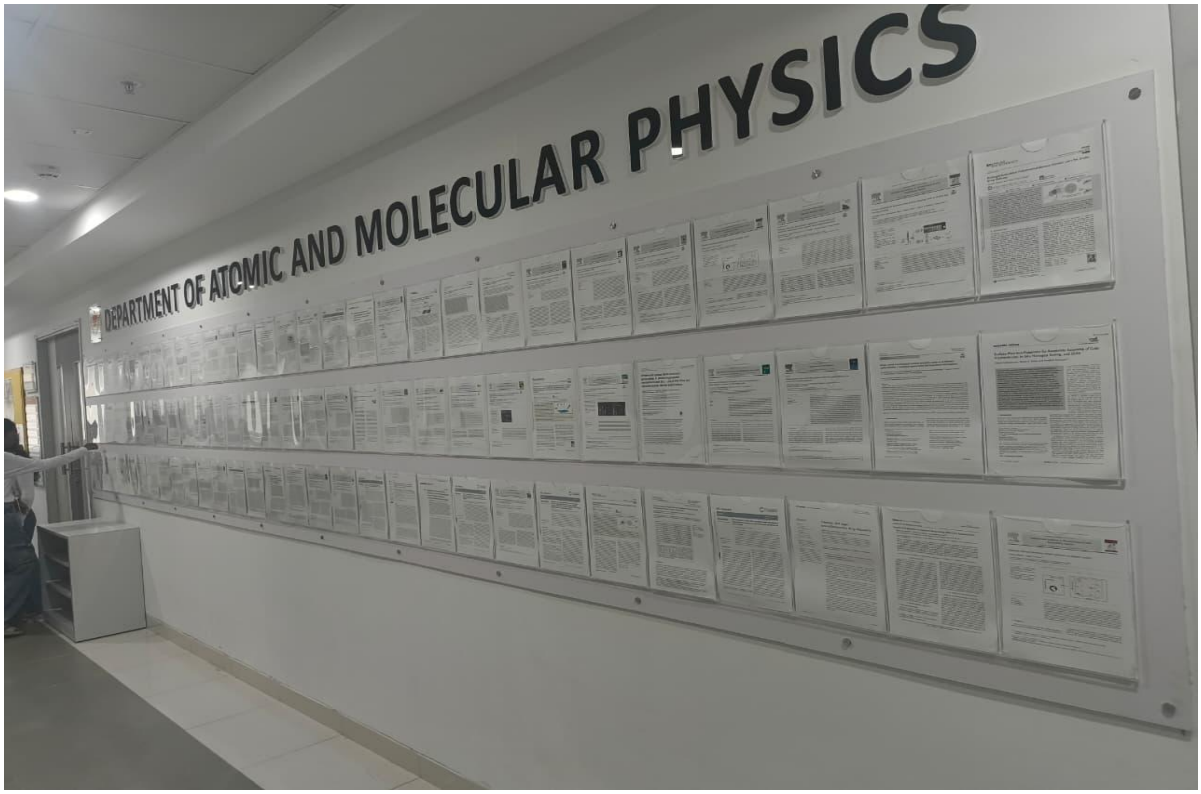
Glimpses of the Industrial Visit:




DATA CENTRE
SHOPPING MALL
GPS Map Camera
Manipal, Karnataka, India
9q2v+gw4, Eshwar Nagar, Manipal, Karnataka 576104, India
Lat 13.351228° Long 74.794762°
16/09/2025 12:23 PM GMT +05:30
Google


manipal.edu

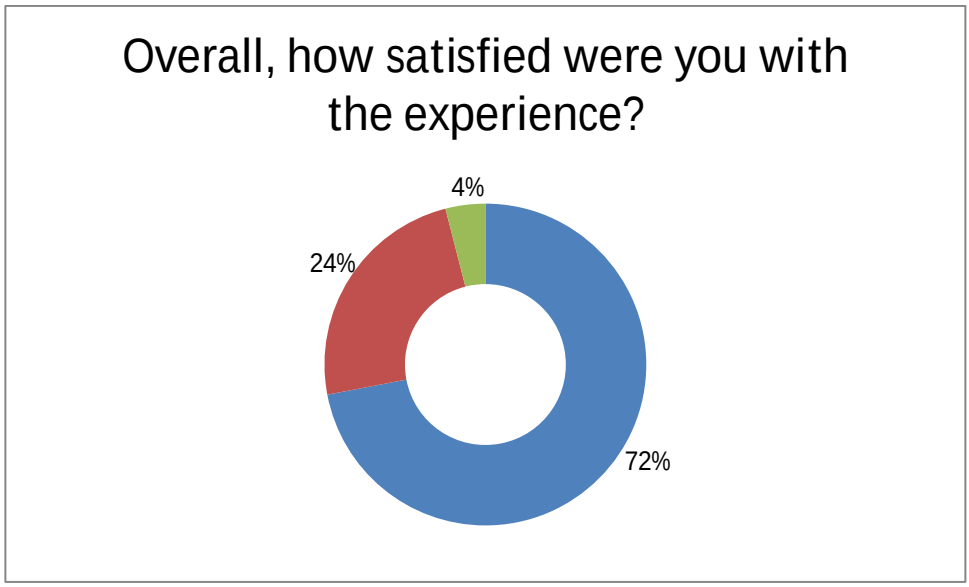

GC-MS/MS
1099 Samples
550 Samples
357 Samples
33 Samples
27 Samples
7 Samples
12 Samples


DEPARTMENT OF ATOMIC AND MOLECULAR PHYSICS

FEEDBACK

Timestamp	Name	USN	How well did the staff explain the procedure?	How professional and friendly was the staff?	Overall, how satisfied were you with the	Any Suggestions?
2025/10/24	Vijay Kumar S B	4MC22CI031	Very Good	4	5	No issues
2025/10/24	Muskan	4MC22CI017	Very Good	5	5	None
2025/10/24	Deeksha HP	4MC22CI009	Very Good	5	5	No
2025/10/24	Prarthana BG	4MC22CI021	Very Good	3	3	Take industrial visit again of two day
2025/10/24	Nida Fathima	4MC22CI019	Very Good	5	5	Need one more visit like this.
2025/10/24	Anusha bm	4mc22ci004	Very Good	5	5	Continue the same
2025/10/24	Sinchana G P	4MC22CI027	Very Good	5	5	No
2025/10/24	Nandan Javagal	4MC22CI018	Very Good	5	5	Nothing
2025/10/24	Karthik ML	4MC23CI400	Very Good	5	5	NA
2025/10/24	Manikya K	4MC22CI016	Very Good	5	5	NA
2025/10/24	Kumuda D P	4MC22CI014	Very Good	5	4	Need more such visits.
2025/10/24	Harshitha B.V	4MC22CI012	Good	4	4	..
2025/10/25	Pratham DU	4MC22CI022	Very Good	5	5	Nothing
2025/10/25	Vedanth R	4MC22CI030	Very Good	5	5	No
2025/10/25	Akash Harihar	4mc22ci002	Good	4	4	None
2025/10/25	Dhavan HS	4mc22ci011	Good	4	4	Good experience
2025/10/25	Aishwarya A R	4MC22CI001	Good	5	4	....
2025/10/25	Rakshitha K S	4MC22CI024	Good	5	5	,
2025/10/25	Pratham M Jain	4MC22CI023	Very Good	5	5	All good
2025/10/25	Likhitha HY	4MC22CI015	Very Good	5	4	It would be better if we could get a little more time to spend.
2025/10/25	Deeksha S	4MC22CI010	Good	5	5	No
2025/10/25	Arjun D	4MC22CI006	Very Good	5	5	No
2025/10/25	Tejaswi H T	4MC22CI028	Good	4	5	No
2025/10/25	Tejaswini L Gowda	4MC22CI029	Very Good	5	5	None
2025/10/25	Swathi U	4MC23CI402	Very Good	5	5	No

STUDENTS FEEDBACK ON INDUSTRIAL VISIT



Excellent	18
Very Good	7
Good	1
Fair	0
Poor	0

Report on Industrial Visit

Topic: Innovation Centre, AR VR lab, Centre of Indian language, AI Centre of Excellence in Health, MAHE ISAC Cybersecurity, Central Analytical and Instrumentation Facility, Manipal Universal Technology Business Incubator.

Date: 16/09/2025

Venue: Manipal Institute of Technology (MIT)

Institutional Visit Report: Innovation Centre, Manipal Institute of Technology (MIT), Manipal

Introduction:

The visit to the Innovation Centre at Manipal Institute of Technology (MIT), Manipal, was a resounding success. Our team had the privilege of exploring the facilities, interacting with students and faculty, and gaining insights into the innovation ecosystem. The centre is a hub for innovation and entrepreneurship, providing a platform for students, faculty, and industry professionals to come together and work on cutting-edge projects.

The Innovation Centre at MIT is a shining example of how academic institutions can foster innovation and entrepreneurship. With its state-of-the-art facilities and experienced faculty, the centre provides an ideal environment for students to explore their ideas and turn them into reality. The centre's focus on practical applications and industry partnerships ensures that students gain valuable hands-on experience and exposure to real-world challenges.

The visit was a valuable learning experience for our team, providing insights into the innovation ecosystem and entrepreneurial spirit of MIT. We were impressed by the centre's facilities, faculty, and students, and we believe that our institution can learn from their experiences.

About the Innovation Centre:

The Innovation Centre at MIT is a 16,000 sq. ft. space with advanced lab facilities, providing a platform for students, faculty, and industry professionals to come together and work on cutting-edge projects. The centre is equipped with state-of-the-art equipment, including 3D printers, laser cutters, and CNC machines.

The centre's research areas include IT in healthcare and agriculture, renewable energy, and energy conservation systems. The centre also provides support for patent filing, seed funding, and mentorship, encouraging innovation and entrepreneurship among students and faculty.

The Innovation Centre at MIT is a vibrant ecosystem that encourages innovation, entrepreneurship, and collaboration among students, faculty, and industry professionals. The centre's focus on practical applications and industry partnerships ensures that students gain valuable hands-on experience and exposure to real-world challenges.

The centre's faculty and staff are experienced professionals with expertise in their respective areas. They provide guidance and mentorship to students, helping them to develop their ideas and turn them into reality.

Key Highlights of the Visit:

The visit included a tour of the centre's facilities, including the advanced labs and equipment. We witnessed several innovative projects, including the development of a nanosatellite, Parikshit, in collaboration with ISRO, and a solar-powered car, SERVe.

We also learned about the centre's industry partnerships, including the Lifeathon 2024 hackathon, which brought together healthcare professionals and technology solution providers to tackle contemporary healthcare challenges. The centre's focus on practical applications and industry partnerships provides students with valuable hands-on experience and exposure to real-world challenges.

The visit highlighted the importance of innovation and entrepreneurship in driving economic growth and societal impact. The centre's achievements and recognition at the national and international levels demonstrate its commitment to excellence and innovation.

The centre's students and faculty are passionate about innovation and entrepreneurship, and their enthusiasm was evident throughout the visit. The centre provides a supportive environment that encourages students to explore their ideas and turn them into reality.

Observations and Takeaways:

The visit provided valuable insights into the innovation ecosystem and entrepreneurial spirit of MIT. The centre's focus on practical applications and industry partnerships ensures that students gain valuable hands-on experience and exposure to real-world challenges.

The centre's faculty and staff are experienced professionals with expertise in their respective areas. They provide guidance and mentorship to students, helping them to develop their ideas and turn them into reality.

Conclusion:

The visit to the Innovation Centre at MIT was a valuable experience, providing insights into the institution's innovative approaches and entrepreneurial spirit. The centre's focus on practical applications and industry partnerships ensures that students gain valuable hands-on experience and exposure to real-world challenges.

The centre's achievements and recognition at the national and international levels demonstrate its commitment to excellence and innovation. The visit highlighted the importance of innovation and entrepreneurship in driving economic growth and societal impact.

We appreciate the centre's efforts in fostering a culture of innovation and look forward to exploring potential collaborations and learning from their experiences.

Recommendations

Based on the visit, we recommend establishing similar innovation centres in our institution to foster a culture of innovation and entrepreneurship. The centre's focus on practical applications and industry partnerships provides students with valuable hands-on experience and exposure to real-world challenges.We also recommend encouraging industry partnerships and collaborations to provide students with practical experience and exposure to real-world challenges. Additionally, providing support for patent filing, seed funding, and mentorship would encourage innovation and entrepreneurship among students and faculty.

The visit highlighted the importance of innovation and entrepreneurship in driving economic growth and societal impact. We believe that our institution can learn from MIT's experiences and achieve similar success.

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Centre of Virtual Reality Lab

Introduction

During the visit to the Centre of AR/VR Lab, students were introduced to the fascinating applications of Augmented Reality (AR) and Virtual Reality (VR) technologies. The lab is dedicated to exploring immersive visualization and simulation systems that can transform learning, research, and practical applications in diverse fields such as medicine, engineering, and education. A key highlight of the visit was witnessing how AR is being leveraged to support neurologists in visualizing neurons and brain structures in an interactive 3D environment.

Key Highlights of the Lab Visit

AR Technology for Neurological Visualization:

The lab demonstrated an advanced AR system designed to assist neurologists in studying neural connections and brain pathways. Using AR headsets and interactive visual overlays, researchers can observe neuron structures in real time and explore how different neural connections respond to stimuli. This technology bridges the gap between 2D medical imaging and 3D visualization, helping specialists understand complex neurological data.

Integration of AR in Medical Research:

The implementation of AR in medical fields enables practitioners and researchers to visualize brain functions, detect abnormalities, and simulate surgical procedures. Such immersive tools are proving to be valuable in improving accuracy, reducing risks, and enhancing training for medical students and professionals.

Upcoming Projects in AR:

The lab team also discussed several upcoming AR-based initiatives, Development of AR-assisted anatomy learning tools for medical students. And many others that have cannot be shared.

Research and Development Tools:

The lab uses a combination of AR development platforms and visualization software such as Unity, Unreal Engine, and ARKit/ARCore for model creation and interaction design. These

tools enable high-quality rendering and real-time responsiveness, ensuring realistic and educational simulations.

Conclusion

The visit to the Centre of AR/VR Lab provided valuable insights into how immersive technologies are revolutionizing the medical and scientific fields. The innovative use of AR for neurological visualization showcased the potential of combining technology and healthcare to enhance understanding of complex biological systems. The upcoming AR projects reflect the lab's commitment to continuous innovation and interdisciplinary collaboration, promising a future where immersive technologies play a vital role in medical education, research, and patient care.

Centre of Indian language Data lab (COIL- D)

Introduction

During the visit to the Manipal Institute of Technology (MIT), students were introduced to the Centre of Indian Language Data Lab (COIL-D). The lab is primarily working on the development of language translation systems for Indian languages, aiming to make translations accurate, context-aware, and accessible. Along with text-based translation, the team is also incorporating speech-to-text translation to enable processing of spoken language. To support this work, the team has created an interface where the outcomes of their research can be demonstrated and tested.

Key Highlights of the Lab Visit

Language Translation (Main Project):

The central focus of COIL-D is building reliable and efficient translation systems for Indian languages. This involves not just literal translation but also context-based understanding to ensure the right meaning is conveyed. In addition to text translation, speech-to-text translation has been integrated to process spoken language and convert it into meaningful translations.

Named Entity Recognition (NER):

The lab is engaged in developing systems that can identify and classify named entities such as people, organizations, and locations in text. This is particularly important in Indian languages due to spelling variations and regional differences.

Sentiment Analysis:

The researchers are also working on sentiment analysis to determine whether a given text expresses positive, negative, or neutral emotions. This has applications in areas such as customer feedback, public opinion studies, and social media monitoring.

Collection of Data:

The research process begins with the systematic collection of large-scale language data from diverse sources, which is then used to train and test the translation models.

Part-of-Speech (PoS) Tagging:

Sentences are processed through PoS tagging, where each word is categorized grammatically (noun, verb, adjective, etc.). This step allows machines to understand the structure of sentences more effectively.

Cleaning and Parsing Tools:

Specialized tools are provided for cleaning and parsing the collected data. These tools ensure that the raw data is refined, free of errors, and ready for further processing.

Word Sense Disambiguation:

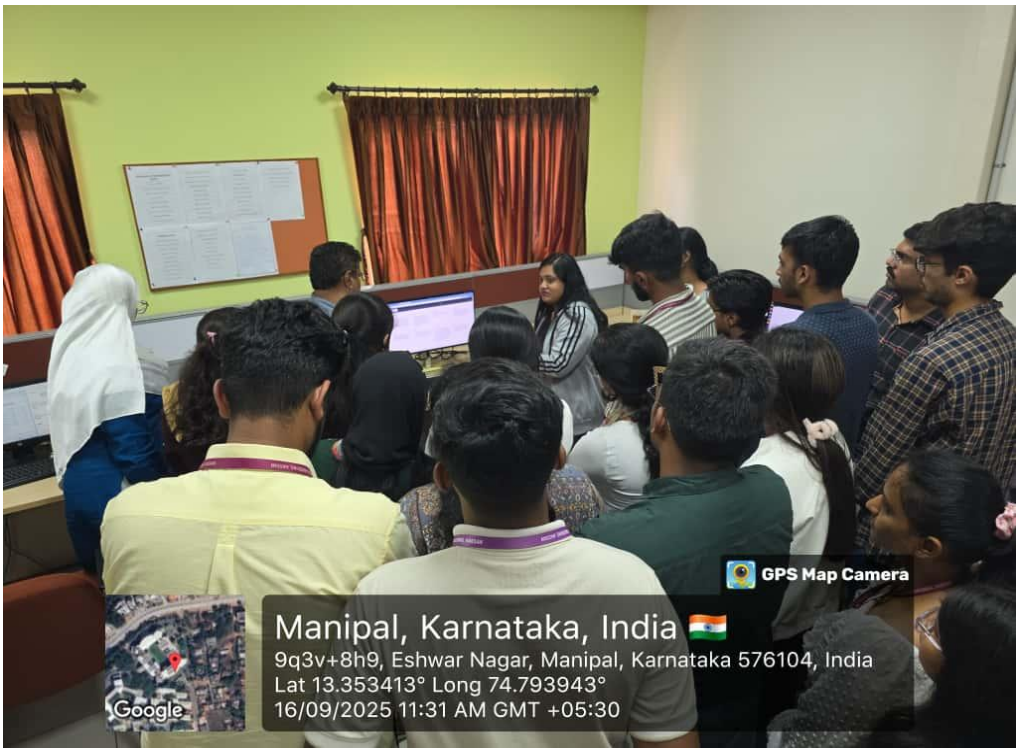
A major challenge highlighted was that a single word can carry different meanings depending on the context. For instance, a word may have one meaning in Science and Technology (SAT) and another in Climate (CLI). The lab is developing models capable of identifying the correct meaning based on context.

Interface Development:

To make their research more practical, the lab has designed an interface that allows users to interact with their models. This interface demonstrates how translation, named entity recognition, sentiment analysis, and speech-to-text processing can be applied in real-world contexts.

Conclusion

The visit to COIL-D provided valuable insights into the innovative work being carried out in the field of Indian language processing. By combining techniques such as named entity recognition, sentiment analysis, PoS tagging, data cleaning, speech-to-text translation, and word sense disambiguation, the lab is advancing the development of accurate language translation systems. The creation of an interface further shows their commitment to making this research accessible and usable. Such initiatives not only address technical challenges but also contribute to preserving and promoting the diversity of Indian languages in the digital world.



AI Centre of Excellence in Health

Introduction

During our institutional visit to MIT Manipal, we explored the AI Centre of Excellence in Health, which focuses on applying deep learning to automate cardiovascular disease diagnosis using CT scans. The lab demonstrated a system that detects arterial blockages (stenosis) with high speed and accuracy, supporting cardiologists in clinical decision-making. The visit highlighted real-world AI deployment under strict safety, privacy, and validation protocols.

Key Highlights of the Lab Visit

Cardiovascular Disease Management using AI

The lab's primary project centers on the automated detection of arterial blockages (stenosis) in CT scan images. The system is designed to assist cardiologists by intelligently highlighting regions of concern and classifying whether a significant blockage is present or not, thereby reducing diagnostic time and improving reliability.

CT Scan Analysis & 3D Rendering

The system processes CT scans covering the anatomical region from the neck down to the rib cage, with a specific focus on the heart and major coronary arteries. To enhance diagnostic

precision, a 3D slicer tool is used to visualize the artery across multiple planes, enabling the detection of even subtle variations in pixel intensity that may indicate early plaque formation. Additionally, 3D rendering provides a spatial understanding of the blockage's location, shape, and severity, offering clinicians a comprehensive view for decision-making.

Image Segmentation & Feature Extraction

Only the relevant portions of the CT scan—particularly the arterial walls—are segmented for detailed analysis. The system distinguishes between soft and hard plaques, a critical distinction in assessing the risk of arterial rupture or stroke. For each segmented region, 105 features are extracted, including statistical measures like mean, median, and mode, neighboring pixel values, and Hounsfield Unit (HU) values that quantify tissue density in CT imaging. To improve accuracy, segmentation is followed by a smoothing step that reduces image noise and enhances feature consistency.

Deep Learning Model & Classification

A deep learning model has been developed to classify each arterial segment as either "Blockage Present (YES)" or "No Blockage (NO)", achieving an impressive accuracy of 94%. Remarkably, the model was trained using a semi-supervised approach—relying not on manually labeled data, but on metadata and contextual cues from the scans. This strategy addresses the common challenge of limited annotated medical datasets while maintaining high diagnostic performance.

Catheter Method Simulation

The AI system digitally simulates the clinical catheter procedure, where a catheter is traditionally threaded through the artery to locate blockages. Mimicking this process, the software scans the entire artery from top to bottom, searching for narrowing, micro-holes, or irregularities. This end-to-end digital simulation enables a complete diagnostic assessment in under three minutes—significantly faster than conventional manual review by radiologists.

Data, Safety & Validation

The lab uses high-quality, diverse datasets sourced from multiple hospitals to ensure model robustness across different patient profiles. Strict protocols govern patient data privacy and security, with formal certification obtained from all collaborating medical institutions. Crucially, every AI output is validated by expert cardiologists from Kasturba Medical College

(KMC), ensuring that the system's predictions are not only technically sound but also clinically meaningful and trustworthy.

Conclusion

The visit to the AI Centre of Excellence in Health at MIT Manipal was an enlightening experience that highlighted the transformative potential of AI in modern medicine. From advanced image segmentation and deep learning classification to real-time 3D visualization and rapid diagnostic output, the lab demonstrated cutting-edge technology grounded in clinical needs. This visit reinforced the importance of interdisciplinary work and inspired our students to pursue research that bridges engineering excellence with societal impact.

MAHE-ISAC Centre of Excellence on Cybersecurity

1. Introduction

The MAHE-ISAC Centre of Excellence (CoE) on Cybersecurity is a strategic collaboration between Manipal Academy of Higher Education (MAHE) and the Information Sharing and Analysis Centre (ISAC). It was established at Manipal Institute of Technology (MIT), Manipal, to build advanced capability in cybersecurity, with specific focus on cyber-physical systems (CPS), Internet-of-Things (IoT), SCADA and simulation environments. The centre is aligned with India's digital transformation goals, capacity building for future digital jobs, and the emergence of Smart Cities and connected infrastructure.

2. Background & Need

Recognising the shortage of skilled cybersecurity professionals and the rising complexity of attacks on physical-digital infrastructures, MAHE signed an agreement with ISAC on 28 April 2022 to establish “phygital” (physical + digital) and virtual cybersecurity labs. The CoE is part of the Karnataka Digital Economy Mission (KDEM) initiative, envisaged as a “hub and cluster” model in Mangalore/Udupi region, with MIT acting as one of the clusters. With Smart Cities, IoT, SCADA systems, and CPS becoming integral to infrastructure (transport, energy, water, hospitals), it became imperative for academic institutions to provide hands-on simulation environments and real-world threat-defence training.

3. Key Features & Infrastructure

• Phygital + Virtual Labs: Physical simulation labs (for SCADA/IoT systems) and cloud-based virtual labs.
• Cyber Physical System (CPS) Core Focus: Simulation of smart-city/industrial attack-scenarios.
• Certification Programs: Courses such as “Basics in Information Security”, “Cyber Crime Intervention Officer”, etc.
• Smart-City & Urban Infrastructure Focus: Modules covering toll plazas, water treatment plants, airport gates, smart grids, etc.

4. Smart City Emphasis and Justification

Smart Cities integrate digital technologies, IoT systems, and cyber-physical infrastructure to enhance urban efficiency, safety, and sustainability, but their increased digitization makes them vulnerable to cyber threats that can disrupt essential services and public safety. The MAHE-ISAC Centre of Excellence on Cybersecurity addresses this by providing phygital labs simulating real-world smart-city environments, such as toll plazas, power grids, water treatment plants, and transportation systems. Through these simulations, students and professionals gain practical experience in monitoring, detecting, and mitigating cyber risks, including threats to IoT networks, SCADA systems, and industrial automation protocols. The CoE promotes interdisciplinary learning, aligns with India’s Smart Cities Mission and Karnataka Digital Economy Mission, and contributes to national objectives by developing cyber-resilient urban infrastructure, enhancing digital trust, and preparing future professionals for secure smart-city management.

Key Points:

- Smart Cities combine digital and physical systems for efficiency and sustainability.
- Digitization increases vulnerability to cyber-attacks affecting essential services.
- MAHE-ISAC CoE provides realistic Smart-City simulation labs for hands-on training.
- Focus areas include IoT security, SCADA systems, industrial automation, and incident response.
- Promotes interdisciplinary collaboration across engineering and urban management.
- Supports national initiatives like Smart Cities Mission and Karnataka Digital Economy Mission.
- Enhances cyber-resilience, digital trust, and professional readiness for secure urban governance.

5. Academic & Research Implications

Students gain interdisciplinary learning that combines IoT, CPS, cybersecurity, and AI. The CoE supports research on smart infrastructure threat-intelligence, anomaly detection in CPS,

and forensic investigation of IoT breaches. Certification and lab exposure improve employability and bridge the gap between academia and industry.

6. Strategic & Societal Impact

A secure digital infrastructure is foundational to Smart Cities. By focusing on CPS/IoT/SCADA, the CoE contributes to urban resilience, citizen safety, and service continuity. It creates jobs and supports the Digital India, Smart Cities, Industry 4.0, and KDEM initiatives, helping decentralise skill development beyond metro cities.

7. Conclusion

The MAHE-ISAC Centre of Excellence on Cybersecurity at MIT, Manipal, bridges academia and industry to safeguard smart infrastructure. Its emphasis on CPS, IoT/SCADA simulation, and skill development establishes it as a vital contributor to India's digital resilience and urban security.

Central Analytical and Instrumentation Facility (CAIF)

Introduction

It provides advanced analytical instrumentation and facilities to researchers from academia, R&D labs, and industries. The CAIF provides access to a range of sophisticated and high-end analytical instruments, which are essential for research across multiple scientific disciplines.

Key Highlights of the Lab Visit

Spectroscopy: One of the major areas of focus at CAIF is spectroscopy, which involves studying the interaction between matter and electromagnetic radiation. The facility houses advanced spectroscopic instruments such as Nuclear Magnetic Resonance (NMR) spectroscopy, UV-Visible spectroscopy, and Fourier-Transform Infrared (FTIR) spectroscopy. These instruments help researchers analyze the molecular structure, chemical composition, and physical properties of a wide range of materials. The NMR spectroscopy system, in particular, enables detailed investigation of molecular dynamics and structure determination of complex compounds, which is crucial in chemistry, pharmaceuticals, and materials science.

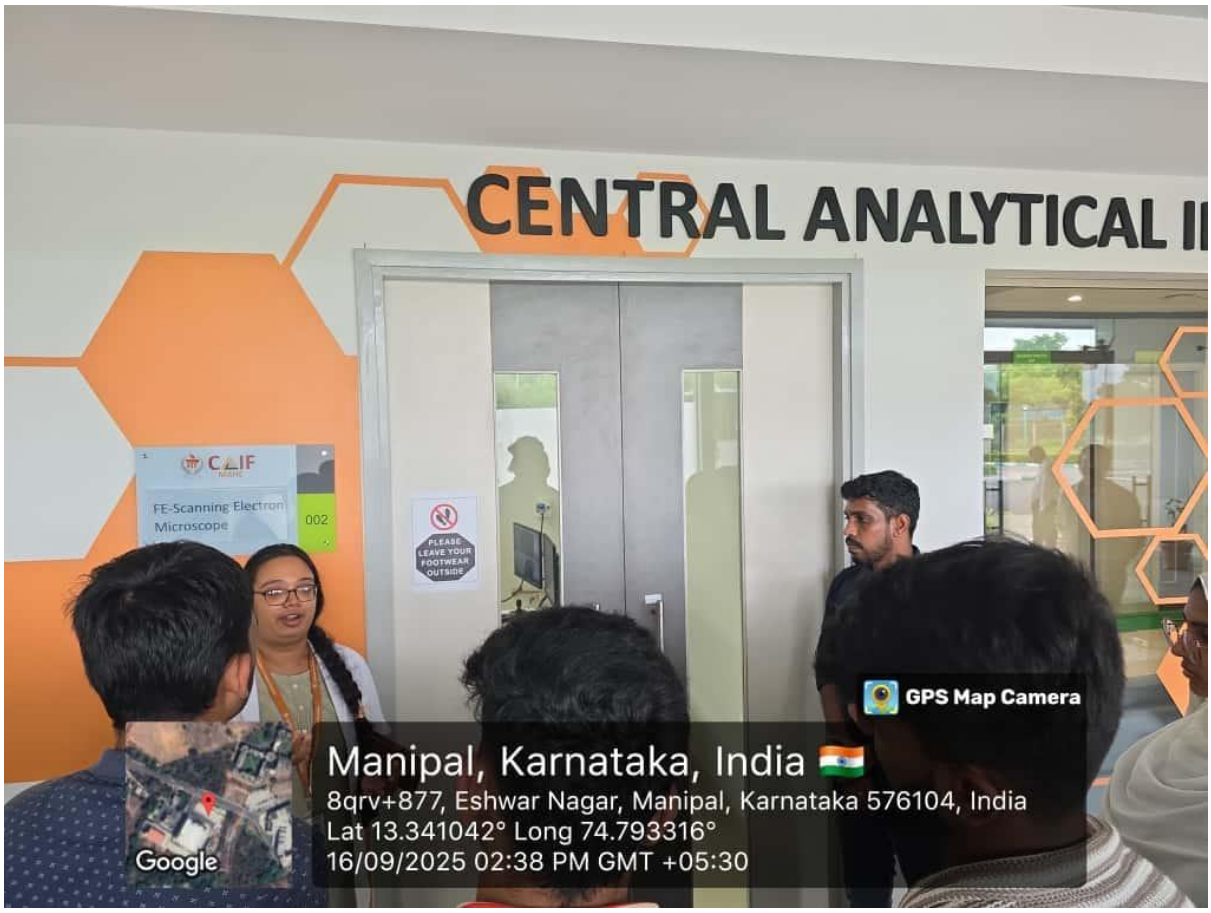
Thermal analysis: CAIF is equipped with various instruments for thermal analysis, such as Differential Scanning Calorimetry (DSC) and Thermogravimetric Analysis (TGA). These tools are used to study the thermal stability, melting point, heat capacity, and other thermophysical properties of materials. Thermal analysis plays a significant role in understanding material behavior under temperature variations, aiding the development of polymers, composites, and other advanced materials with enhanced performance characteristics.

Particle analysis: Another key facility available at CAIF is particle analysis. Techniques such as Dynamic Light Scattering (DLS) are utilized to measure particle size distribution, molecular size, and zeta potential in colloids and nanoparticles. These analyses are particularly important in nanotechnology, biotechnology, and pharmaceutical formulations, where the size and dispersion of particles directly influence product stability, efficacy, and quality.

Research Support and Collaboration:CAIF not only provides access to instruments but also extends expert guidance in sample preparation, data interpretation, and result validation. The facility encourages collaborative research by partnering with academic departments and industry leaders to develop innovative methodologies and material solutions. Training programs and workshops are also conducted periodically to enhance researchers' understanding of analytical techniques and best practices in instrumentation use.

Conclusion

The visit to the Central Analytical and Instrumentation Facility (CAIF) offered valuable exposure to advanced analytical technologies that play a crucial role in modern research and industrial development. The facility's diverse range of instruments, including spectroscopic, thermal, and particle analysis tools, empowers researchers to conduct precise and high-quality analyses. By fostering interdisciplinary research and providing access to state-of-the-art equipment, CAIF significantly contributes to scientific progress and innovation. The experience gained from this visit highlighted the importance of analytical facilities in transforming scientific ideas into practical applications and in advancing research across multiple domains.



Manipal Universal Technology Business Incubator (MUTBI)

Introduction

MUTBI helps new ventures by providing them with infrastructure, expertise, and guidance to develop products and start businesses. Manipal Universal Technology Business Incubator (MUTBI) is a pioneering initiative of the Manipal Academy of Higher Education (MAHE), established to nurture entrepreneurial aspirations among students, faculty, alumni, and regional innovators. The incubator provides comprehensive support for individuals aiming to transform innovative ideas into sustainable ventures, aligning with the social and economic objectives of the Government of India. Operational since March 2010, MUTBI is supported by the National Science & Technology Entrepreneurship Development Board (NSTEDB), Department of Science & Technology (DST), Government of India. MAHE's long-standing tradition of excellence in multidisciplinary education and research has created a strong foundation for the success of MUTBI in fostering innovation-driven startups. The incubator focuses on multiple domains such as Information Technology, Healthcare, Medical Devices, Agriculture, Renewable Energy, Energy Conversion Systems, and MEMS/Nanotechnology. MUTBI also extends support to startups working on emerging and interdisciplinary areas. Over the years, the incubator has assisted numerous startups founded by students, faculty, and external innovators, many of which have received funding and recognition for their impactful work**.**

Facilities and Support

MUTBI operates from a state-of-the-art 10,000 sq. ft. facility located in the Health Sciences Campus of MAHE. The incubator benefits from MAHE's ecosystem, including the Innovation Center, Central Instrumentation, and Technology Transfer Office, ensuring that startups have access to both financial and technical resources.

Innovation Center:

The Innovation Center plays a key role in fostering creative thinking and entrepreneurship among students and faculty. It includes divisions such as Idea Café, Excelerate Makerspace, and the Apple Creative Studio, all designed to encourage collaboration, ideation, and product development. Idea Café provides a platform for interdisciplinary networking and brainstorming, while Excelerate Makerspace offers tools such as 3D printers and laser cutters for prototype development. The Apple Creative Studio further empowers innovators by offering training in iOS App Development and assisting in the creation of commercially viable applications.

Central Instrumentation Facility:

This facility provides access to advanced instruments such as Scanning Electron Microscopes (SEM), X-Ray Diffractometers, Chromatography Systems, Nuclear Magnetic Resonance (NMR) spectrometers, Atomic Force Microscopes, Spectrophotometers, and specialized fabrication equipment like RF Sputtering and Electrospinning units. These tools are invaluable for startups engaged in materials research, biomedical engineering, and nanotechnology.

NIDHI-EIR Scheme:

In 2017, MUTBI was selected as one of the Programme Execution Partners (PEP) under the NIDHI-EIR Scheme. This initiative provides one-year fellowships to recent graduates to help them work on innovative ideas. Projects developed under this program include medical consultancy apps, vehicle tracking devices, advanced travel bags, automated seed sowing machines, cataract drug delivery systems, water purification solutions, and crowdfunding platforms for researchers. Some fellows even secured further funding through the BIRAC-BIG scheme, enabling them to scale their ventures successfully.

Case Study: Fracktal Works Pvt. Ltd.

A notable success story from MUTBI is Fracktal Works Pvt. Ltd., a 3D printer manufacturing and product development firm founded by MIT alumni Vijay Varada and Asil Rohit. Established in 2013 under MUTBI's incubation, Fracktal Works began with the "Julia" series of FDM 3D printers and has since expanded into product design and digital manufacturing services. The company has collaborated with leading industry giants such as Toshiba, Cisco Systems, L&T, and L'Oréal Paris India. It operates under two brands—Fracktal Works Pvt. Ltd. and Fracktal Studios—and received funding of ₹100 lakh, marking it as a flagship example of successful incubation at MUTBI.

Conclusion

The visit to the Manipal Universal Technology Business Incubator (MUTBI) provided a comprehensive understanding of how MAHE fosters a culture of innovation and entrepreneurship. The incubator's integrated ecosystem—comprising funding support, infrastructure, mentorship, and access to advanced research facilities—serves as a catalyst for converting creative ideas into scalable ventures. Through initiatives like the NIDHI-EIR Scheme and success stories such as Fracktal Works, MUTBI exemplifies how educational institutions can drive startup ecosystems and contribute to India's technological and economic growth. The experience from the visit highlighted the importance of interdisciplinary collaboration, innovation-driven education, and institutional support in shaping the next generation of entrepreneurs.