



MeitY-Visvesvaraya Post-Doctoral Fellowship for Electronics & IT

No. of Post Doctoral fellowship available: 01

Departments where seats are available: CSE, ECE, EEE, IT and MACS.

Post Doctoral Application Deadline: **06 November 2026.**

The highlights of the **Visvesvaraya PhD Scheme for Electronics and IT: Phase II Post Doctoral Fellowship**

(PDF) for AY 2026-27 are as follows:

1. Duration of the fellowship is 12 months. It is a full-time, non-transferable, temporary position tenable in India only.
2. The PDF awardee, enrolled & verified by the institution, is eligible to receive a monthly fellowship, which will be transferred directly to the bank accounts of the awardee.
3. Financial highlights:
 - PDF Fellowship @ Rs. 1,08,393/- per month
 - PDF Contingency @ Rs. 1 Lakh per Year
 - A travel support up to Rs. 2.10 Lakhs is available under limited heads as per the scheme's Terms & Conditions, on reimbursement basis.
4. PDF applicants currently in regular employment will not be considered. However, scientists or researchers with temporary positions in academia or research institutions would be considered, but they would be required to relinquish their current roles if selected for the fellowship. Also, the applicant should be an Indian citizen.
5. The PDF applicant must have obtained a PhD degree from a recognized University with first class (in terms of grades, etc.) in all preceding levels and a good academic record throughout.
6. The eligible participating institution must ensure that the PDF applicant should have completed PhD within the past 5 years on the last date of submission of application to the institution.
7. PDF applicants should not have completed their PhD at the same institution (host institution) where the PDF fellowship is to be awarded.
8. The upper age limit for the fellowship is 40 years on the date of submission of application to the eligible participating institution (host institution).
9. Preference would be given to the PDF applicants who have active industry linkages and their research proposal is directed towards industry specific problems
10. The topics for the postdoctoral programme are given in **Annexure 1**.

Eligibility: PhD degree in a relevant topic.

Application Portal: <https://iris.nitk.ac.in/admission/application/login>

For more information visit <https://phd.dic.gov.in/>

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Annexure 1

Sl. No	Name	Branch (Alphabetical Order)	Postdoctoral Research Topic	Abstract for the Postdoctoral Research Topic (around 250 words)
1	Dr P. Santhi Thilagam	CSE	Security Testing of COTS UAVs	Unmanned Aerial Vehicles (UAVs) are increasingly being used in commercial, industrial, civilian, and military applications due to their versatility, autonomous capabilities, and cost-effectiveness. Many commercial off-the-shelf UAVs are designed with a primary focus on functionality, rapid deployment, and affordability over cybersecurity, resulting in significant security vulnerabilities. Moreover, UAV operations rely extensively on wireless communication making them susceptible to various cyberattacks. These attacks can compromise flight safety, mission reliability, and the confidentiality, integrity, and availability of mission-critical data. In addition, limited onboard computing resources, diverse communication protocols, and the lack of standardized security frameworks make it difficult to implement effective, lightweight, and interoperable security solutions. This research aims to systematically identify and assess cybersecurity vulnerabilities in UAV communication and control systems through security testing of representative commercial off-the-shelf drones. The study will evaluate attack vectors targeting communication links and flight control mechanisms to determine their impact on operational safety and system resilience. Based on the findings, the research will develop lightweight and resource-efficient security mechanisms to improve the cyber resilience of UAVs while maintaining the performance requirements of resource-constrained platforms.
2	Dr. B. R. Chandavarkar	CSE	Load-Balanced Proxy Mobile IPv6 (PMIPv6) through LMA using AI in 5G Networks	The ever-increasing user demands for high data rates, low latency, and seamless communication during movement are among the main challenges in 5th Generation (5G) communication systems. One of the use cases of 5G - Massive Machine-Type Communications (mMTC), which connects most of the processing devices to the communication backbone and expects seamless communication during the handover. Moreover, the involvement of these resource-constrained devices during handover results in reduced lifetime, higher delay, and data loss, which is a significant hurdle to the successful deployment of 5G. However, one way to achieve seamless communication during handover in 5G is to integrate it with the network-level mobility protocol, namely Proxy Mobile IPv6 (PMIPv6). In PMIPv6, with a Local Mobility Anchor (LMA) and a Mobile Access Gateway (MAG), the involvement of mobile devices during handover is avoided, thereby improving network lifetime. Additionally, the appropriate selection of LMA during the handover process in terms of equal distribution of load among the LMAs or based on the data traffic results in reduced latency with data loss. This research topic proposes an AI-assisted solution to appropriately select the LMA for load-balanced PMIPv6 in 5G. The primary objective of this proposal is to integrate the two different architectures, i.e, 5G and PMIPv6. The secondary objective is to upgrade the 5G entities, namely gNB and 5GC, to support the MAG and LMA functionality of PMIPv6. Finally, developing the AI module is either an inbuilt function in MAG and/or LMA or an additional entity within the 5G architecture for load balancing and traffic segregation.
3	Dr. Sourav Kanti Addya	CSE	AI-Powered Edge Intelligence for Urban Traffic Management	India's rapidly expanding urban vehicle population has placed immense pressure on road infrastructure, resulting in severe congestion, inefficient traffic flow, and a growing number of road accidents at signalised intersections. Hazardous driving behaviours—such as abrupt braking, unsafe lane changes, and aggressive overtaking—coupled with conventional, static traffic management systems further exacerbate these challenges, compromising both road safety and mobility. To address this critical problem, this project aims, an innovative Vehicle Trajectory Prediction (VTP) framework designed to transform traffic management through predictive intelligence. The core of this project is a Transformer-based deep learning model capable of forecasting vehicle trajectories across both short-term (1–3 seconds) and long-term (3–5 seconds) horizons, enabling early identification of collision risks and emerging traffic congestion. The framework integrates six interconnected modules, spanning vehicle detection and tracking, trajectory prediction, collision risk assessment, congestion analysis, and adaptive traffic signal control, to deliver real-time alerts and

				dynamically optimise traffic operations. Unlike conventional systems that respond only after congestion or conflicts occur, this project proactively anticipates traffic events, enabling timely interventions that enhance safety, improve traffic efficiency, and ensure equitable traffic movement. By leveraging existing CCTV infrastructure and cost-effective edge computing devices, the proposed solution is highly scalable, affordable, and well suited to the heterogeneous traffic conditions prevalent in Indian cities.
4	Dr DHARAVATH KISHAN	EEE	Wireless Power Transfer Technologies for Electric Vehicle Charging: Topologies, Control, and Future Trends	Wireless Power Transfer (WPT) technology has emerged as a promising solution for enhancing the convenience, safety, and automation of electric vehicle (EV) charging. By eliminating physical connectors, WPT systems improve user experience while enabling applications such as autonomous charging and dynamic charging infrastructure. Recent developments in high-frequency power electronics, magnetic coupler design, compensation networks, and control strategies have significantly improved system efficiency, power density, and interoperability. This work presents a comprehensive review of state-of-the-art WPT technologies for EV charging, covering inductive and resonant power transfer principles, compensation topologies, coil structures, misalignment tolerance techniques, and power converter architectures. Furthermore, recent advancements in foreign object detection, electromagnetic field mitigation, interoperability standards, and bidirectional vehicle-to-grid (V2G) operation are discussed. Challenges associated with efficiency, cost, alignment sensitivity, and standardization are also highlighted. Finally, emerging research directions, including dynamic wireless charging, multi-coil systems, wide-bandgap semiconductor-based converters, and intelligent control using artificial intelligence, are presented. The review provides researchers and engineers with a comprehensive overview of current technologies and future opportunities in wireless EV charging systems
5	Dr. DASTAGIRI REDDY B	EEE	High-Power Electric Vehicle Supply Equipment with Improved Power Quality, Upgradability, Efficiency, and Structural-Thermal co-Design (QUEST)	India's EV charging infrastructure is scaling rapidly across two-wheelers, commercial fleets, and passenger cars. The Ministry of Power 2024 Guidelines mandate Bharat DC-001 and IS 17017-compliant DC charging at fleet depots, workplaces, and semi-public stations — with the 15–30 kW segment being the most critical underserved tier. All chargers currently deployed in this segment are imported at Rs.3–5 lakh/unit (ABB Terra, Tesla, Porsche), with 35–90 switches, 3–9 harmonic mitigation filters, and rectifier module costs of \$6,750–\$11,041 per unit. AFE/NPC reliability (0.15–0.28) makes these unsuitable for unattended 24/7 fleet operation. India has 85%+ EVSE import dependency. This project proposes systematic scaling of a novel 12-pulse Bridge Rectifier + modular n-leg Interleaved Boost Converter (12pBR+nIBC) — hardware-validated at 1 kW (IEEE Trans. IE, Jan 2025, DOI: 10.1109/TIE. 2024.3423482; SERB CRG/2020/001848; 6 granted patents). The proposed topology uniquely achieves IS 17017 / IEEE-519 compliance without any harmonic mitigation filter — active or passive — through inherent overlap angle shaping; uses only 24 total semiconductor devices (vs 35–90 commercial); reliability = 0.9999 (highest of all rectifier topologies); power density 0.528 kW/L (3.8× better than AFE); dual-fleet capability via independent IBC and IBBC ports; rectifier cost \$145–\$1,791 (10–50× cheaper than AFE). The central hypothesis: a unified generalised coordinated design methodology — anchored in overlap angle μ — maintains compliance as the system scales 1 kW → 20 kW through modular IBC leg addition. Loss analysis confirms $\eta = 95.04\%$ at 5 kW. Three research thrusts: (T1) generalised scaling design rules for k, LX%, LDC, n, fs, α at 5/10/20 kW; IS 17017-24 CAN-bus interface (IEC 61851-24) on TI DSP — no PLC, 3–4 months; (T2) experimental thermal mapping + CFD-optimised microchannel/porous cold plates at NITK ME CNC workshop (Al6061, over 0.5mm channels, brazed) targeting Tj below 125°C, and characterisation of electro-thermal coupling (Tj ↔ overlap angle ↔ efficiency); (T3) IP54 modular enclosure — forced-air cooling, digital panel meters (V/I/energy), MCB/RCD/fuses, Type 6 (IS 17017-2-6) connector — campus demo NITK
6	Dr. Karthikeyan Anbalagan	EEE	PV Integrated Reduced Switch Galvanically Isolated Three-Phase Multiport Bidirectional	India is progressively trying to reduce carbon dioxide (CO ₂), methane (CH ₄), nitrous oxide (N ₂ O) and dependency on fossil fuels. In this regard, renewable energy sources and electric vehicles directly support achieving the UN's Sustainable Development Goals (SDGs) by promoting clean energy (SDG 7), building sustainable cities (SDG 11), and driving climate action (SDG 13). The following key steps enhance the demand for galvanically isolated, efficient, reliable, and controllable bidirectional power flow, as well as cost-effective three-phase grid-tied converters (AC-DC). These elements are crucial for electric vehicle (EV) charging and for integrating renewable energy sources such as solar,

			Converter for Electric Vehicle Charging Applications	wind, and fuel cells into the grid. Typical AC-DC converters are lower in power density, costlier, and less efficient because power is processed through multiple stages—each adding component count, control complexity, and cumulative switching losses. To address the above issues, multiport converters with galvanic isolation between the load and the source are being explored. Converters like these enhance safety, prevent ground loops, and provide dependable voltage transformation. The galvanically isolated bidirectional Multiport Converter with reduced switches is attracting attention for its regulated bidirectional power flow, high power density and compactness. This Multiport Converter combines different energy sources, such as photovoltaic (PV) and the AC grid, with the electric vehicle load. The main goal of this proposal is to develop a novel PV-integrated reduced switch three-phase bidirectional galvanically isolated multiport converter for charging electric vehicle batteries with 400V configurations. The proposed converter will be validated through mathematical modelling, simulation, and prototype implementation.
7	Dr. PRAJOF P.	EEE	Integrated Isolated OBC and Rare-Earth-Free Sensorless Drive System for Cost-Effective Indigenous EV Powertrain Development	The rapid proliferation of electric vehicles (EVs) has created an urgent demand for compact, cost-effective, and indigenous powertrain technologies. Current EV powertrains rely heavily on imported rare-earth permanent magnet motors, standalone on-board chargers (OBCs), and mechanical position sensors, resulting in increased system cost, weight, complexity, and vulnerability to supply chain disruptions. This research proposes the design and development of an Integrated Galvanically Isolated OBC and Rare-Earth-Free Sensorless Motor Drive System as a unified, cost-effective indigenous EV powertrain platform. The research will investigate novel power converter topologies that enable functional integration of the OBC and motor drive, sharing power circuit elements to reduce component count, weight, and cost. Galvanic isolation will be ensured through high-frequency transformer-based architectures compliant with EV safety standards. The motor drive subsystem will employ rare-earth-free motors driven using advanced sensorless control algorithms that eliminate mechanical position sensors, thereby enhancing system reliability, reducing maintenance requirements, and lowering manufacturing costs. Key research outcomes will include novel integrated converter architectures (with galvanic isolation), robust sensorless control strategies for rare-earth-free traction motors, and an indigenous EV powertrain technology. The proposed research has substantial potential for generating intellectual property and for industrial translation. Further, it directly aligns with India's vision of technological self-reliance and supports the national objectives of the ESDM sector.
8	Dr. Venkatesa Perumal Balasubramanian	EEE	Development of wide bandgap devices based high frequency inverter for Switched Reluctance Motor (SRM) drive applications	Project Objectives To develop a high-frequency inverter using wide-bandgap (WBG) semiconductor devices. To develop a suitable PWM switching scheme for high-frequency operation. To estimate and minimize converter losses to improve efficiency and thermal performance. Project Summary High-speed motor drive applications require variable-frequency operation, typically up to 600 Hz. High-frequency switching of the inverter can provide several advantages, including improved motor efficiency, faster dynamic response, reduced torque ripple, improved sinusoidal motor currents, and reduced filter size and cost. However, increased switching frequency also results in higher switching losses. The use of wide-bandgap (WBG) devices, particularly silicon carbide (SiC) and gallium nitride (GaN), provides an effective approach to reducing these losses while enabling high-frequency operation. The proposed project focuses on developing a high-frequency WBG-based inverter with improved efficiency and reduced power losses. Appropriate PWM switching techniques, gate-drive design, thermal management, and filter optimization will be investigated. The impact of high-frequency switching, parasitic inductance, DC-link capacitance, short-circuit protection, and high dv/dt on converter and motor performance will also be considered. The proposed inverter will employ SiC or GaN switching devices and a digital closed-loop controller for effective speed control. The switching frequency and output filter will be optimized to reduce harmonic distortion in the motor current.

				The developed inverter will be evaluated with different high-speed motor technologies, including induction motors, switched reluctance motors, BLDC motors, and permanent-magnet synchronous motors. The project is expected to result in a prototype high-frequency inverter, optimized switching and control algorithms, improved power density and efficiency, research publications.
9	Dr Prabu K	ECE	AI-Native Energy-Autonomous 6G Infrastructure for Carbon-Neutral Intelligent Wireless Networks	The transition towards sixth-generation (6G) wireless networks is expected to support unprecedented levels of connectivity, intelligence, and automation for smart cities, Industry 5.0, autonomous transportation, and massive Internet of Things (IoT) applications. However, the rapid densification of network infrastructure and the increasing computational demands of AI-native services will significantly elevate energy consumption and carbon emissions, challenging the sustainability of future communication systems. This research proposes an AI-Native Energy-Autonomous 6G Infrastructure that leverages renewable energy harvesting, edge intelligence, digital twins, and intelligent resource orchestration to enable carbon-neutral, resilient, and self-sustainable wireless networks. The proposed framework will integrate hybrid renewable energy sources, advanced battery energy storage, and AI-driven energy management to minimize dependence on conventional power grids while ensuring uninterrupted network operation. Machine learning and reinforcement learning techniques will be employed to predict renewable energy generation, communication traffic, user mobility, and network conditions, enabling adaptive energy allocation, radio resource optimization, and intelligent workload scheduling. A Digital Twin will continuously model the physical infrastructure to facilitate predictive maintenance, fault diagnosis, battery health monitoring, and autonomous network optimization. The research will further investigate energy-aware communication techniques, including AI-assisted beam management, edge computing, and intelligent network orchestration, to maximize spectral and energy efficiency under dynamic operating conditions. The proposed work aims to develop an indigenous prototype validated through simulation and hardware-assisted experimentation, contributing novel algorithms, sustainable 6G infrastructure architectures, high-impact publications, patents, and technology demonstrators. The outcomes will directly support Bharat 6G Vision, Digital India, and India's Net Zero goals by enabling intelligent, energy-autonomous, and environmentally sustainable next-generation wireless communication networks.
10	Dr. Krishnamoorthy Kandasamy	ECE	Space and Time Modulated Metasurface with Multi-Functional Capability for Communication and Sensing Applications	The wireless networks of the future face rising demand for secure, high-data-rate information transfer and for sensing with greater precision and bandwidth efficiency. To satisfy these demands, a large frequency bandwidth is needed. Circuits and components with high bandwidth can be easily designed to operate at higher frequencies without compromising the quality factor. However, high-frequency or lower-wavelength signals are more prone to distortion in practical wireless channels than lower-frequency signals. To mitigate channel effects, intelligent reflective surfaces (IRSs) are among the enabling technologies for next-generation wireless standards such as 6G. An IRS is a programmable metasurface that manipulates electromagnetic waves as needed. Multi-functional programmable metasurfaces are the need of the hour. Reconfigurable surfaces can be used to control the propagation of radio waves by varying factors such as amplitude, polarisation, and phase. For ultra-dense networks, metasurfaces that support multiple polarisation states are required. In this work, we propose a space-time modulated metasurface that can transmit and receive at distinct frequencies while maintaining polarisation sensitivity. The information to be transmitted can be directed to specific users, and the information to be reflected can be used for sensing or target detection. This kind of architecture with multiple functionalities is useful in environments with limited infrastructure. In time-modulated metasurfaces, a time-varying control signal is used to switch between transmissive and reflective states by altering the impedance of the surface. By integrating electronic circuits, such as lumped active elements, with the metasurface, the surface impedance can be controlled to achieve the desired functionality. The unit cell geometry can be precisely altered to achieve desired functionalities, such as independent control of amplitude and phase with improved aperture efficiency.

				The advantage of space-time-modulated metasurface designs is that applications such as sensing and communication can be combined and integrated on a single hardware platform, reducing system complexity and cost. The proposed work aims to design a prototype of a space-time-modulated metasurface that can be reconfigured to transmit and receive at distinct frequencies with polarisation sensitivity. Implementing space-coding techniques will enable the metasurface to perform multiple functions, efficiently manipulating wavefronts. The findings of this project will provide insights into the development of metasurfaces that enable sensing and communication on a single platform for 6G wireless systems. If the propagation of EM waves can be controlled with high precision, it can lead to revolutionary changes across various research areas, including wireless communication, sensing platforms, imaging systems, automation, and radar technologies.
11	Dr. Nikhil K S	ECE	Development of Compact model and AI assisted PDK of Nanowire Field Effect Transistors for Cryogenic Electronics Applications.	The compact models and PDKs available are developed considering ambient temperature conditions. These models are not able to predict the effects arising due to less temperature at cryogenic conditions. Cryogenic condition is maintained for quantum circuit applications. This work aims to develop the compact model considering the thermal network as well as low temperature effects. The developed models are implemented in Verilog-A. Using the available experimental data and TCAD simulations, PDK will be prepared. These PDKs are integrated into circuit simulators like Cadence. Validation of these models will be done at mixed-mode circuit level simulations.
12	Dr. Rajshree Rajkumari	ECE	Multifunctional Metal Oxide Thin Films Heterostructure for Dual-Mode Memristive Switching and Photodetection	The rapid advances in nanoelectronics and optoelectronics require miniature, energy-efficient devices that can perform multiple functions on a single platform. This work proposes a multifunctional metal-oxide thin-film heterostructure that concurrently exhibits high-performance photodetection and non-volatile resistive switching. The proposed device is expected to leverage efficient charge transport, tunable defect states and increased light-matter interaction. The heterostructure device is anticipated to exhibit good photoresponse, enhanced sensitivity, and fast response under optical illumination. In parallel, stable, reproducible resistive switching behaviour with a high ON/OFF ratio, excellent endurance, and long retention at low power is expected. These dual features coexist owing to defect engineering, interface modification, and controlled charge-trapping mechanisms in the heterostructure device. By reducing circuit complexity and boosting system efficiency, integrating photodetection and memory functions into a single device offers a potential alternative to conventional device scaling. Such multifunctional devices are highly relevant for emerging applications in nanoelectronics, optoelectronics, and neuromorphic computing. In summary, this work is expected to present a scalable and low-cost strategy for designing the next generation of multifunctional devices for intelligent sensing, in-memory computing, and adaptive electronic systems.
13	Dr. Shyam Lal	ECE	Design and Developing Quantum AI-Driven Basal Cell Carcinoma Grade Classification from Whole Slide Histopathology Images	Basal Cell Carcinoma (BCC) is the most common skin cancer worldwide, underscoring the need for accurate and computationally efficient diagnostic solutions. This project proposes a novel multi-stage quantum assisted deep learning framework for automated BCC detection in Whole Slide Images (WSIs). To overcome key limitations of existing deep learning models, we introduce enhanced Mixed Precision Training (MPT), Progressive Resolution Analysis, and a Spatial Coherence Enhancement module. The proposed system will be extensively validated on multi-institutional WSI datasets collected from seven medical centers as well as open source datasets. Expected diagnostic accuracy, 96%, while maintaining computational efficiency. These findings will establish the potential of the proposed framework as a reliable tool for clinical decision support in digital pathology.
14	Dr Anand Kumar M	IT	Adversarial Attacks on Large Language Models	Language Models (LLMs) have emerged as vital components in a wide range of practical applications, underscoring the importance of their robustness and safety. However, LLMs remain susceptible to adversarial inputs designed to exploit vulnerabilities. Adversarial LLM attack involves manipulating a Large Language Model's inputs to bypass its built-in safety measures, manipulate its logic, or access and extract restricted information. Jailbreaking and prompt injection are

				attack techniques that use crafted prompts or appended suffixes to manipulate language models into producing harmful or restricted content. This research focuses on analyzing adversarial attacks on large language models (LLMs) across three operational categories based on the level of accessibility the attacker has to the models: Black-Box Attacks, White-Box Attacks, and Grey-Box Attacks. The expected objective is to identify novel mitigation and defense strategies to effectively counter these types of attacks, working on the industry applications of Adversarial Models and identifying the relationship with the explainability models and adversarial attacks .
15	Dr. Dinesh Naik	IT	A Hybrid Framework for Image-Based 3D Mesh Reconstruction with Knowledge Graph Generation	Three-dimensional (3D) mesh reconstruction from a single image is a challenging task in computer vision due to the absence of depth information, occlusions, and viewpoint ambiguities. Although recent advancements in diffusion models and transformer-based architectures have significantly improved reconstruction quality, most existing approaches primarily rely on visual features and often overlook the semantic relationships among object components. To address this limitation, this research proposes a hybrid framework for image-based 3D mesh reconstruction integrated with knowledge graph generation. The proposed framework consists of four major modules. First, a De-noising Autoencoder (DAE) and Vector Quantized Variational Autoencoder (VQ-VAE) are employed to remove noise and generate compact latent representations from input images. Second, a Multi-View Diffusion Model combined with a Swin Transformer generates consistent multi-view feature representations while preserving structural information through Deep Structural Cross-View Consistency (DSCC) loss. Third, a Vision-Language Model (VLM) is utilized to extract object attributes and relationships for constructing a validated knowledge graph. Finally, the generated knowledge graph is fused with multi-view visual features through a decoder cascade to guide 3D mesh reconstruction. The effectiveness of the proposed framework will be evaluated using standard benchmark datasets and reconstruction metrics, including Chamfer Distance, Intersection over Union (IoU), F-score, and Normal Consistency. The proposed approach aims to improve both geometric accuracy and semantic consistency in image-based 3D mesh reconstruction.
16	Dr. KIRAN M	IT	A Reinforcement Learning Based Intelligent Framework for Real Time Traffic Prediction and Road Safety Enhancement	In recent years, the Intelligent Transport System (ITS) has become increasingly important to provide road safety, traffic management, and a more immersive user experience. However, due to the limited computational capability and lack of self-decision taking ability of On Board Units (OBUs), Road Side Units (RSUs), and other supporting edge devices, proactive decision making based on effective sensor data fusion has become a major challenge. Thus, in this proposal, a semantic communication-based intelligent decision making framework is proposed which aims to enhance the safety, connectivity, dynamic decision-making of vehicles, and improve assisted driving in ITS for supporting envisioned next generation ITS use cases. In the proposed work, a multisensory data fusion strategies with appropriate Reinforcement Learning (RL) based models will be designed to support semantic communication between OBUs, RSUs, and Edge Devices for a comprehensive understanding of the vehicle's surroundings for reliable Vehicle to Vehicle (V2V) and Vehicle to Infrastructure (V2I) communication. The RL agents can predict the behavior of vehicles, considering individual vehicle characteristics and global traffic conditions. The challenges associated with training agents on data from OBU, RSU, and edge devices will also be addressed by designing lightweight learning models that can be deployed on the edge for real time analytics. The main hypothesis of this work is to develop RL based agents for real-time prediction of traffic conditions, vehicular movements, potential accidents, optimize emergency response coordination, and identify patterns in driver behavior to enhance overall road safety.
17	Dr. Shrutilipi Bhattacharjee	IT	Spatio-Temporal Contact Graph Analysis to Forecast the Super-spreaders	The project's idea revolves around the application of contact tracing during disease outbreaks. The source could be an individual contact or a group of contacts gathered for an event. In order to understand the future movement patterns of the human contacts and find the potential super spreaders in the future in the network, the digital footprint data and the social connections of the exposed contacts must be predicted. By analysing this future contact graph, it will be feasible for us to accurately identify the superseder individuals or events in the near future.

				Therefore, this work aims to trace the future super spreaders from the contact graph generated from the digital footprints data. Because this work learns the present network and predicts the future movement pattern of the contacts, the social connections of the contacts also play an important role. It is also reported that individuals with many social contacts, such as celebrities and politicians, could be the ideal sentinel nodes for epidemic outbreaks. Here, the contact's behaviour learning also involves the social network data analysis alongside human trajectory prediction. Therefore, this work adopts an amalgamation approach of different techniques and datasets. The flow of the work to identify hidden spreaders is as follows: combine spatio-temporal digital footprint data and social media data for the contact graph generation, complex network analysis for identifying the super spreaders in the network, and graph neural network-based approaches to learn the spatio-temporal contact graph and the super spreaders' characteristics, predict the network in the future time and identify the hidden spreaders.
18	Prof. Jaidhar C. D.	IT	Design and Development of Artificial Intelligence-based Quishing Detector	Phishing is a technique that utilizes social and technological tactics to steal a customer's personal and financial information. Phishers steal user information through a variety of ways, including email, Uniform Resource Locators (URLs), instant chats, forum postings, phone calls, and text messages. Phishing content has a similar structure to legitimate content, and it encourages consumers to browse it in order to obtain sensitive information. Phishing's main goal is to obtain personal information in order to make money or commit identity theft. Phishing attacks are wreaking havoc on businesses all around the world. Furthermore, the majority of phishing attacks are directed at financial/payment institutions and webmail. Criminals create unauthorized replicas of legitimate websites and emails, usually from financial institutions or other organizations that deal with financial data, in order to get confidential information. HTML's design and structure make it possible to copy images or a full website. It's also one of the reasons for the Internet's rapid expansion as a communication medium, as it allows for the misappropriation of logos, trademarks, and other company identifiers that customers use as authentication systems. Quishing (Quick Response (QR) code phishing) is a type of cyberattack where attackers use malicious QR codes to trick individuals into visiting fake websites, downloading malware, or providing sensitive information like passwords and financial data. The aim of the project is to design and develop an artificial intelligence-based quishing detector. The main objectives of the projects are as follows: • The aim of the work is the design and development of an artificial intelligence-based quishing detector (tool). • Evaluate the efficiency of the developed tool by using real-time data, using standard performance metrics available in the literature. • Release the developed tool for real-world application.
19	Dr. Jidesh P.	MACS	Privacy preserving protocols for secure, scalable and efficient federated learning	Federated learning (FL) has seen a paradigm shift in recent years. One of the main reasons for employing federated learning in distributed environments is to ensure the privacy of data stored on the clients. FL has found numerous applications in collaborative machine learning in various domains such as healthcare, finance, transportation, and Internet of Things (IoT). Nevertheless, FL is not fully secure per se, as the exchange of model parameters is still vulnerable to various attacks such as gradient leakage, model inversion, membership inference, and poisoning attacks. Therefore, developing advanced privacy preserving protocols for secure parameter transmission without compromising the model accuracy and communication efficiency are the need of the hour. The recent advancements integrate Differential Privacy (DP), Secure Multi-Party Computation (SMPC), Homomorphic Encryption (HE), Secure Aggregation, Trusted Execution Environments (TEEs), etc. to secure the learning process. The main focus of this study is to design a FL framework using adaptive differential privacy, lightweight homomorphic encryption, and hybrid cryptographic network that balances privacy, scalability, and computational cost. This framework is expected to handle the existing challenges, including high cryptographic overhead, heterogeneous client environments, non-IID data distributions, dynamic privacy budget allocation, and resistance to sophisticated

				adversarial attacks, eventually leading to trustworthy federated learning systems capable of operating efficiently in large-scale decentralized environments under resource constraints. This study also aims to establish secure federated learning as a practical solution for privacy-sensitive AI applications under resource constrained set-up across diverse real-world domains.
20	Dr. Jisna V A	MACS	Prediction of treatment response and prognosis of oral cancer using artificial intelligence	According to the WHO Global Cancer Observatory, oral cancer is one of the most common cancers in India, ranking among the top five in incidence and mortality. Genetic aberrations in oral cancer are influenced by risk factors such as tobacco use, alcohol consumption, smoking, and HPV infection, requiring population-specific markers rather than a universal profile. For clinical decision-making, risk assessment, and treatment planning, it is essential to estimate patient survival, recurrence, and treatment response accurately. Early detection of recurrence and survival probabilities can be improved using multimodal biomarkers. Indian patients will not benefit from Western datasets because they have different comorbidities, genetics, dietary habits, late detection, imaging equipment, and treatment practices. A dataset specific to India is therefore needed to predict survival, recurrence, and treatment response in cases of oral cancer. With the aim of addressing these gaps, this proposal seeks to develop a multimodal AI framework that can predict oral cancer prognosis and treatment response based on data collected across the South-West coast of India. The proposal aims to predict individual survival probability and recurrence in oral cancer patients using clinical and imaging biomarkers; to develop a predictive model for treatment response to enhance clinical decision-making; to construct an India-specific oral cancer dataset integrating clinical and imaging features in collaboration with multiple hospitals along the South-West coast of India; and to register and submit patient-level clinical and imaging data to the National Cancer Registry Programme (NCRP-ICMR) registry.
21	Dr. Madhusudhan R	MACS	Secure and Scalable Data Management of Smart Cities Using Blockchain	Smart cities generate an enormous volume of data from countless sources- social media feeds, traffic sensors, utility meters, environmental monitors, surveillance cameras, and citizen apps. This data comes in all types and sizes, from neatly structured database entries to unstructured video streams and everything in between. This heterogeneity creates significant hurdles for cities attempting to build unified analytics platforms. When data arrives from different sources simultaneously, categorizing and organizing it becomes genuinely difficult. Traditional database management systems struggle with this scale and diversity. Studies on big data management in smart cities indicate that existing spatial database systems, while providing full support for geographic data, suffer from scalability issues when confronted with massive volumes of urban information. Smart cities collect sensitive information about citizens' movements, behaviours, and personal lives. Protecting this data from unauthorized access and malicious attacks represents both a technical imperative and an ethical obligation. Every internet-connected device involved in collecting, transmitting, or receiving data represents a potential security vulnerability. IoT devices are commonly targeted precisely because they frequently lack robust security protections. This research proposes a multi-layer blockchain framework integrating edge computing, blockchain, and Software Defined Networking (SDN) to manage smart city data. The framework uses blockchain and a sidechain to handle high data volumes in smart cities. Edge devices process IoT data in real-time, classifying it as critical or non-critical. Critical data is stored on the private blockchain, while non-critical data is stored on the sidechain. The private blockchains and sidechains from various organizations can be brought together onto a consortium blockchain. A decentralized SDN can be used to reduce network latency during data transfer between the private and consortium blockchains. Thus, with the help of multi-layer blockchain framework, most of the data management problems of smart cities can be solved.
22	Dr. Mahima	MACS	Generative Priors for Gap-Filling and Uncertainty Quantification in Satellite-Derived	Satellite-derived SST products suffer from substantial missing data because clouds block infrared sensors, and even microwave sensors have limitations near coastlines and in heavy precipitation. This creates a classic inverse problem: reconstructing a physically plausible, spatially coherent temperature field from a partial, irregularly-masked observation. A constrained generative prior would encode realistic spatial structure (fronts, eddies, gradients) learned from historical SST fields, allowing posterior sampling to fill gaps while respecting known physical bounds and quantifying reconstruction uncertainty — which tends to be highest in large, persistently cloud-obscured regions.

			Sea Surface Temperature	
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