



PROTO IT



**WHERE MINDS CONNECT
AND FUTURES BEGIN**

INSTITUTE VISION

To become a globally recognized institution that develops professionals with integrity who excel in their chosen domain making a positive impact in industry, research, business and society.

INSTITUTE MISSION

- To provide the ambience necessary to achieve professional and technological excellence at the global level.
- To undertake collaborative research that fosters new ideas for sustainable development.
- To instill in our graduates ethical values and empathy for the needs of society.

VISION OF IT DEPARTMENT

“To become a globally recognized centre of excellence in the field of Information Technology, providing technology excellence that advances learning, teaching, research to produce budding IT professionals, researchers, innovators and entrepreneurs.”

MISSION OF IT DEPARTMENT

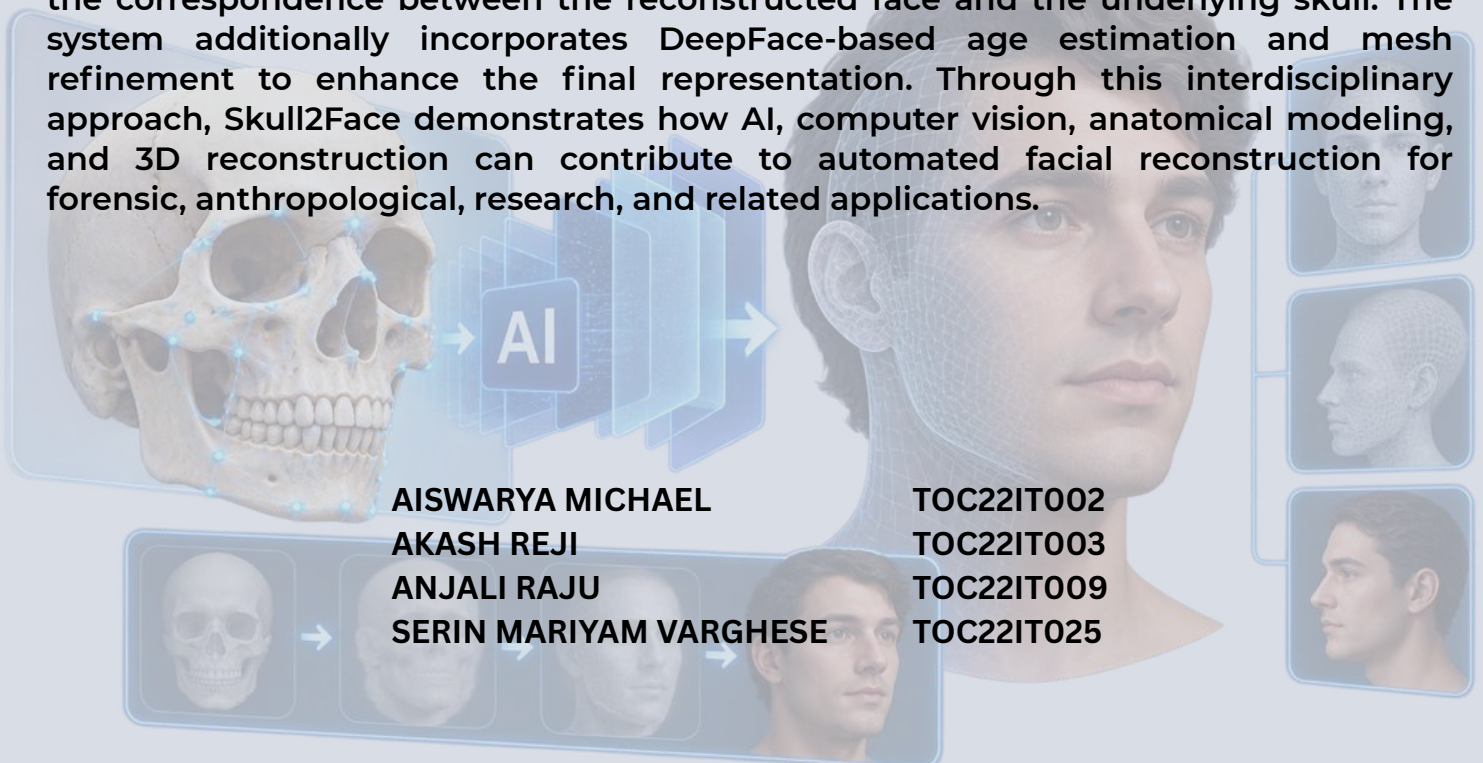
- Produce graduates with the best knowledge and practical skills by imparting innovative skills, research aptitude, ethics, and social responsibility.
- To create ambience of academic excellence through state of the art infrastructure and learner centric pedagogy leading to employability, and research.
- Imbibe and in still in them the required qualities to become leaders who can make positive contribution to the society.
- Enhance the student’s knowledge in the latest technologies by organizing and participating in technical programs
- Interact and work closely with industries and research organizations to accomplish technology transfer

Proto IT

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SKULL2FACE: ANATOMY-GUIDED 3D FACIAL RECONSTRUCTION SYSTEM USING DEEP LEARNING AND TISSUE DEPTH MODELING

This project explores the innovative application of deep learning and generative AI for reconstructing realistic human faces from skull images. By combining anatomical landmark analysis, probabilistic tissue-depth modeling, diffusion-based image synthesis, and 3D facial reconstruction, the system aims to create anatomically consistent facial representations from skeletal structures. The process begins with skull image input and identification of key anatomical landmarks, followed by tissue-depth estimation to represent variations in soft-tissue thickness. A pretrained diffusion model, RealisticVision-v6.0, is then used to generate an initial 2D facial representation, which is converted into a 3D facial mesh using 3DDFA-V2. Geometric alignment techniques, including Iterative Closest Point (ICP), are applied to improve the correspondence between the reconstructed face and the underlying skull. The system additionally incorporates DeepFace-based age estimation and mesh refinement to enhance the final representation. Through this interdisciplinary approach, Skull2Face demonstrates how AI, computer vision, anatomical modeling, and 3D reconstruction can contribute to automated facial reconstruction for forensic, anthropological, research, and related applications.



POTHOLE DETECTION AND MONITORING IN AUTONOMOUS VEHICLES USING MACHINE LEARNING AND IOT

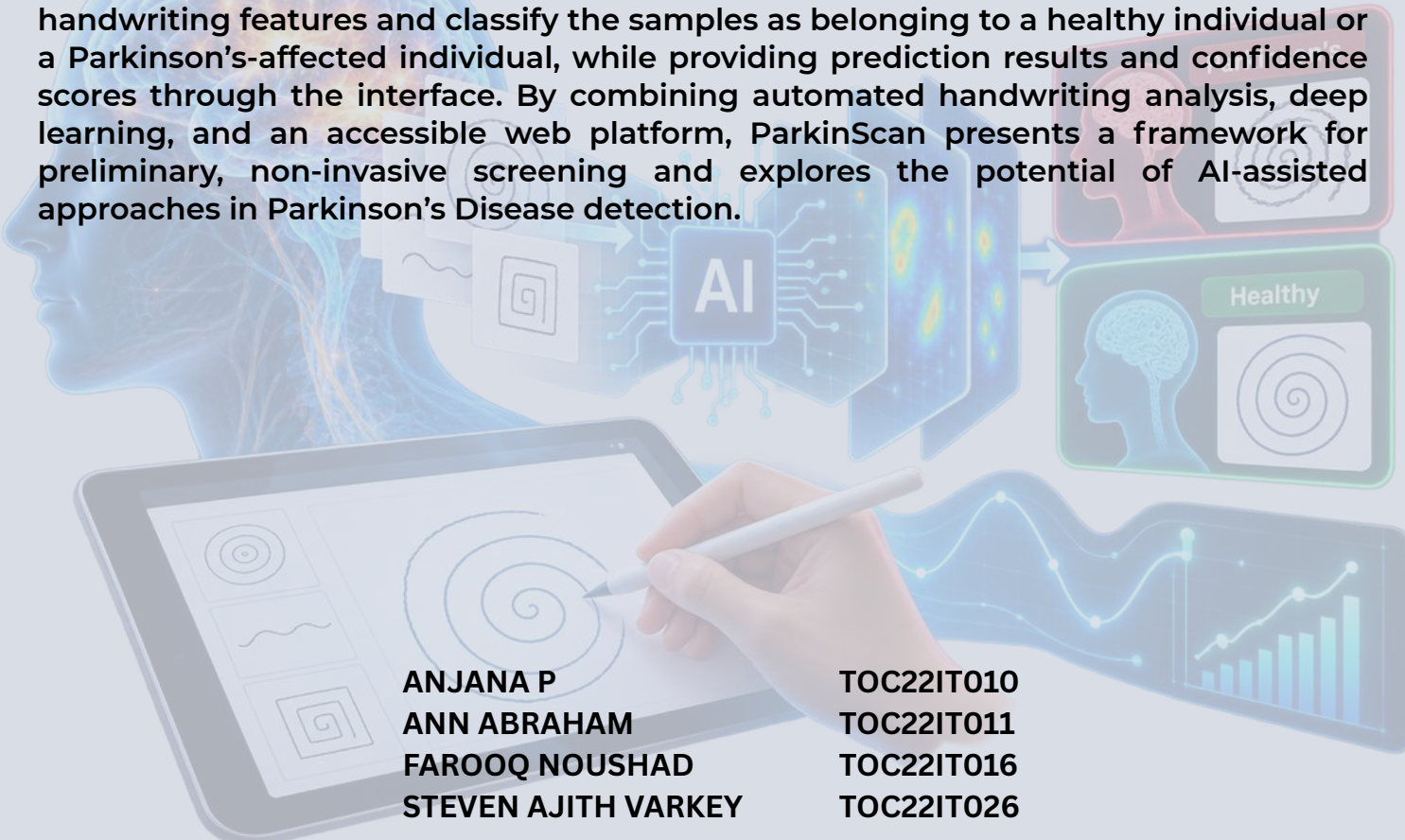
This project explores the integration of machine learning, computer vision, embedded systems, and IoT to develop an intelligent autonomous vehicle capable of detecting and responding to road hazards in real time. The system combines a Raspberry Pi, Pi Camera, ultrasonic sensors, and Arduino-based motor control to support lane detection, obstacle avoidance, traffic signal recognition, and pothole identification. A YOLOv8-based deep learning model is used to detect potholes from road images, while ultrasonic sensors assist in identifying obstacles and changes in road depth. When a pothole is detected, its location can be recorded using GPS and transmitted through an IoT platform for monitoring and road-maintenance purposes. Through the integration of autonomous navigation, real-time road-hazard detection, and cloud-based reporting, the project demonstrates how affordable embedded technologies can contribute to intelligent transportation systems, improved road safety, and infrastructure monitoring.

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PARKINSCAN: PARKINSON'S DETECTION USING DEEP LEARNING

This project explores the use of deep learning and handwriting analysis for the non-invasive screening of Parkinson's Disease. The system focuses on identifying subtle motor impairments reflected in handwriting patterns, such as tremors, irregular strokes, and micrographia. Users provide handwriting samples, including spirals and geometric patterns, through a web-based interface. The collected images undergo preprocessing techniques such as noise removal, normalization, resizing, and stroke smoothing before being analyzed using CNN-based models, particularly ResNet50 and EfficientNet through transfer learning. The trained models extract meaningful handwriting features and classify the samples as belonging to a healthy individual or a Parkinson's-affected individual, while providing prediction results and confidence scores through the interface. By combining automated handwriting analysis, deep learning, and an accessible web platform, ParkinScan presents a framework for preliminary, non-invasive screening and explores the potential of AI-assisted approaches in Parkinson's Disease detection.



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AI POWERED POST DISASTER SURVEILLANCE DRONE SYSTEM

This project explores the integration of artificial intelligence, computer vision, thermal sensing, edge computing, and drone-based surveillance to support search and rescue operations in disaster-affected environments. The system is designed to identify human presence in challenging conditions such as smoke, dust, poor visibility, and damaged infrastructure by combining visual detection with thermal sensing. A lightweight YOLOv8 model analyzes live camera footage to detect potential human figures, while thermal data is used to validate the detection and reduce false positives. The processing is performed on a Raspberry Pi-based edge computing platform, allowing real-time operation without depending entirely on cloud connectivity. When a human presence is confirmed, the system captures relevant images and metadata and uses a GPS module to provide location information. A Flask-based web dashboard enables rescue teams to remotely view live video, detection status, captured images, and location information. Through this combination of AI-based detection, multi-sensor fusion, and real-time monitoring, the project aims to provide a cost-effective and scalable technological framework for improving situational awareness and supporting faster and safer disaster-response operations.

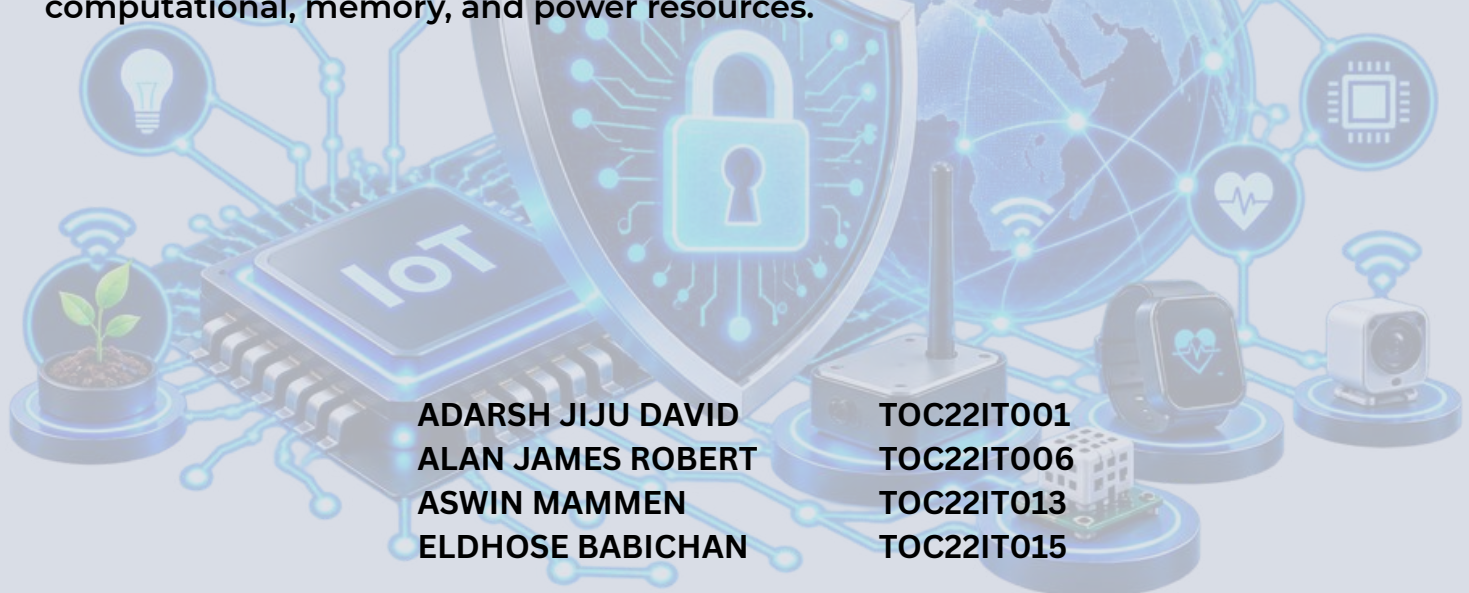


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A SCALABLE AND SECURE CRYPTOGRAPHIC SOLUTION FOR RESOURCE-CONSTRAINED IOT DEVICES

This project explores the development of a lightweight cryptographic solution designed to provide secure communication for resource-constrained IoT and embedded devices. The proposed system combines the PRESENT cipher structure, RECTANGLE row-shift diffusion, and a TEA-inspired key scheduling mechanism to achieve a balance between security, hardware efficiency, and performance. The cipher is implemented using Verilog and evaluated with Xilinx Vivado on an FPGA platform, with parameters such as area, latency, throughput, and power consumption considered for hardware evaluation. To demonstrate its practical applicability, the project incorporates the encryption algorithm into an RFID-based user verification system for automated toll collection, where RFID identifiers are encrypted before transmission to protect against unauthorized access and cloning attempts. Through this combination of lightweight cryptography, FPGA implementation, and an IoT-based authentication application, the project presents a framework for secure data communication in systems with limited computational, memory, and power resources.

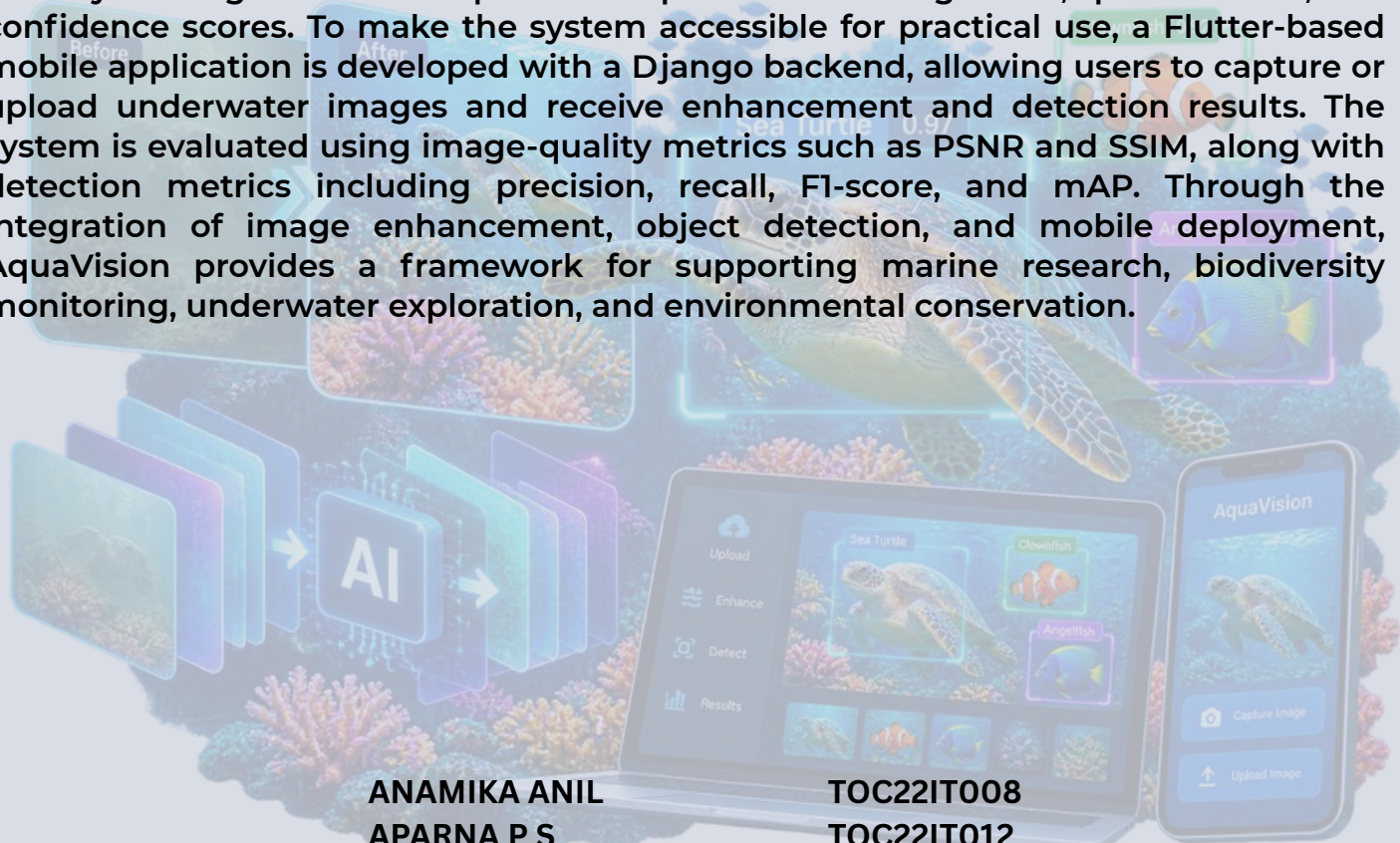


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AQUAVISION

This project explores the application of deep learning and computer vision for enhancing underwater images and detecting endangered marine species. Underwater images often suffer from poor visibility, low contrast, and colour distortion caused by light absorption and scattering, making marine-life observation and analysis difficult. AquaVision addresses these challenges using a modified CycleGAN architecture for unpaired underwater image enhancement, supported by CBAM attention mechanisms, domain adaptation, and transformer-based components to improve important regions, colour balance, and structural details. The enhanced images are then processed by a YOLOv8-based detection module to identify endangered marine species and provide bounding boxes, species labels, and confidence scores. To make the system accessible for practical use, a Flutter-based mobile application is developed with a Django backend, allowing users to capture or upload underwater images and receive enhancement and detection results. The system is evaluated using image-quality metrics such as PSNR and SSIM, along with detection metrics including precision, recall, F1-score, and mAP. Through the integration of image enhancement, object detection, and mobile deployment, AquaVision provides a framework for supporting marine research, biodiversity monitoring, underwater exploration, and environmental conservation.



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