Kunal Chavan

Email: kunalchavan245@gmail.com
Linkedin: Kunalchavan245
Mobile: +91-9610006458
Github: https://github.com/KunalChavan245
Portfolio: https://kunalchavan245.github.io

Education

- **Vellore Institute of Technology** — Vellore, India
  Bachelor of Technology - Electronics and Communication Engineering; GPA: 8.30 — *July 2021 - June 2025*
  Courses: *Internet of Things, Artificial Intelligence, Machine Learning, Natural Language Processing,Image Processing*

Experience

- **Indian Institute of Technology, Guwahati.** — Guwahati
  Research Intern — *May 2025 - September 2025*
  - **Objective**: Worked on image restoration for weather-degraded images, implementing a novel method to enhance image quality while optimizing computational efficiency.
  - **Result**: Achieved an increase of 5 percent in both PSNR and SSIM compared to baseline methods, with reduced computational resource requirements.
- **National University of Singapore.** — Remote
  Research Intern — *Jan 2024 - August 2024*
  - **Objective**: Implemented an advanced anomaly detection models, consisting of machine learning and ensemble learning techniques to identify and tag potential security threats in IoT devices.
  - **Result**: The advanced anomaly detection model achieved an overall accuracy of 0.952 in classifying potential security threats and mitigating the attack in IoT devices.The ensemble learning technique improved the detection rate by 15 percent with decrease in inference time by 50 percent compared to deep learning models.
- **Indian Institute of Technology, Dharwad.** — Dharwad , India
  Research Intern — *June 2024 - July 2024*
  - **Objective**: Developed and deployed object detection and distance tracking models on the Nvidia Jetson Nano, utilizing the YOLOv8 model for better accuracy and performance.
  - **Result**: Gained hands-on experience with edge devices and troubleshooting deployment challenges, including working with the flash-attn library for implementing Vision Language Models.
- **Vellore Institute of Technology.** — Vellore , India
  Computer Vision Intern — *March 2024 - June 2024*
  - **Objective**: Worked on an Edge Device capable of leveraging Computer Vision to detect objects in both daylight and low illumination environments. By integrating advanced algorithms and optimizing hardware resources, our goal is to develop a robust solution that can accurately identify objects in varying lighting conditions.
  - **Result**: Developed an advanced Edge Device capable of real-time object detection under varying lighting conditions, enabling applications in surveillance and autonomous vehicles that improved response times by identifying key objects within 0.5 seconds.
- **Quickheal.** — Pune , India
  Data-Science Intern — *Sept 2023 - Nov 2023*
  - **Objective**: Contributed to the implementation of Machine Learning techniques, particularly focusing on handling High Cardinality Categorical Features in Actuarial Applications, as outlined in a published research paper..
  - **Result**: Played a key role in supporting the senior data scientist throughout the project, providing valuable assistance in data analysis and model development.

Publications

- **AIoT Enhanced Night Vision Object Detection for Vehicle Safety Using Transfer Learning on Raspberry Pi 5**: Implemented YOLOv5 through YOLOv8 models on a Raspberry Pi 5 with an infrared camera for night vision object detection, improving vehicle safety in smart cities. Leveraged transfer learning to optimize efficiency and accuracy under limited resources, with adaptable modes and alert mechanisms. The system demonstrates promising performance with improved precision, recall, and mean Average Precision (mAP), despite minor distance measurement deviations. Paper is accepted in NETAPPS 2024 (Malaysia) conference and avaliable on IEEE Xplore. To access click on ***Paper***
- **Optimizing IoT Security: A Machine Learning Pipeline for Fast and Accurate Intrusion Detection**: Developed a real-time Intrusion Detection and Prevention System for IoT devices using ensemble models, achieving a balance of 0.95 in accuracy, precision, recall, and F1-score. The system significantly reduces inference time compared to deep learning methods, providing robust, high-speed protection against network intrusions. Paperr is accepted in NETAPPS 2024 (Malaysia) conference and is available on IEEE Xplore Click on ***Paper***
- **VocalEyes: Enhancing Environmental Perception for the Visually Impaired through Vision-Language Models and Distance-Aware Object Detection.**: This paper presents a novel real-time system designed to improve situational awareness for visually impaired users by offering audio descriptions of their surroundings. Leveraging a fine-tuned and quantized Florence-2 model optimized for the NVIDIA Jetson Orin Nano, this system provides efficient, low-latency descriptions of objects and distances to support safe navigation. This work has been accepted for presentation at the ICEI 2024 Conference at IIT Dharwad. To access the IEEE Access paper click on ***Paper***
- **NoiseFed: Augmentation-Enhanced Federated Learning for Resilient Breast Cancer Detection**: Proposed a privacy-preserving federated learning framework for breast cancer classification using CNNs with Gaussian and Salt-and-Pepper noise augmentation, improving robustness and accuracy while reducing data-sharing risks. o can access the preprint click on ***Paper***.

Projects

- **Object Detection and Distance Tracking at Night for Vehicle Safety**: Utilized advanced computer vision tech niques with YOLOv8,YOLOv7, YOLOv6, and YOLOv5 models on a Raspberry Pi 5 platform to develop a vehicle safety system for low-light conditions. The system accurately detects nearby vehicles and measures distances to preemptively using Vision Eye and alert drivers or adjust autonomous vehicle trajectories, enhancing road safety and advancing autonomous driving technology.
- **Email Generator using LLAMA-2**: Developed an Email Generator using LLAMA-2 LLM.Employed techniques such as fine-tuning and tokenization to optimize model performance and achieve better results in email compo sition.And Deployed on Website Application through Streamlit
- **Anamoly Detection in IoT Devices using machine learning**: Implemented an advanced anomaly detection models, consisting of machine learning and ensemble learning techniques, to identify and tag potential security threats in IoT devices.Obtained accuracy of 0.95 and decrease the inference time by 50 percent
- **VocalEyes: Enhancing Perception for the Visually Impaired**: This project develops a digital eye for blind people using advanced technologies. It employs YOLO for real-time object detection, eye vision tracking for distance calculation, and a vision-language model to describe the environment. Integrated with an edge device, it improves the understanding of blind individuals of their surroundings, promoting independence and quality of life.

Skills Summary

- **Languages**: Python,C, C++, SQL, JAVA
- **Frameworks**: TensorFlow, PyTorch ,Hugging Face, Keras, Scikit-learn , SpaCy
- **Dev Tools**: VS Code, Jupyter Notebook, Anaconda, AWS Cloud , GPT/LLM API integrations
- **Platforms**: Linux, Windows, Arduino, Raspberry,Nvidia Jetson, AWS,IBM Cloud
- **Soft Skills**: Leadership, Event Management, Writing, Problem Solving, Networking.

Certifications

- AWS Certified Cloud Practitioner
- IBM Machine Learning with Python