Nagula Sai Sathvik

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Education

BE(Hons)-CSE(Artificial Intelligence and Machine Learning) **2021–2025**
Chandigarh University, Gharuan, Punjab ***CGPA: 8.29***

Senior Secondary Education **2019–2021**
Sri Chaitanya Junior Kalasala, Hyderabad, Telangana ***Percentage: 94.4***

Experience

Indian Space Research Organization (ISRO - ISTRAC) ***Bengaluru, Karnataka***
AI Project Intern – Satellite Health Monitoring System ***August 2024 - November 2024***

- Fine-tuned **Graph Neural Networks (GNN)** on matlab for satellite health anomaly detection, achieving **96.7%** accuracy on domain-specific time-series data.
- Implemented **Multivariate LSTM** model for predictive health monitoring of satellites, reaching **93.7%** accuracy under real-world constraints.
- Deployed **YOLOv9** for object segmentation into graphical satellite health metrics, attaining a **55.3% mAP** at IoU 0.50:0.95, enhancing real-time detection capabilities.
- Integrated DETR **(52.0% mAP)** and YOLOv5 **(51.4% mAP)** with YOLOv9 using ensemble methods, enhancing reliability of anomaly detection and supporting automated analysis of satellite graphical imagery data.
- Collaborated with domain experts at ISRO-ISTRAC to design, validate, and operationalize ML pipelines, improving satellite health diagnostics and system automation.

Projects

Early Detection of Diabetic Retinopathy using Computer Vision | *Computer Vision, Cloud* ***April 2025***

- Developed a web application for early detection of diabetic retinopathy using SOTA CNN architectures.
- Fine-tuned and trained the SOTA yolov11 CNN archieture with mAP@0.50:0.95 of **59.0%** for instance segmenting the diabetic retinopathic charecteristics from a fundus image.
- Implemented a cloud-based deployment of the YOLOv11 model on AWS EC2, utilizing S3 for storing model artifacts and enabling scalable inference.
- **Technologies Used :** ultralytics, pytorch, YOLOv11, flask, AWS EC2 and S3

NAVBOT: Environment Awareness for Indian Roads | *Computer Vision, Embedded Systems* ***Febraury 2024***

- Integrated advanced Deep Learning and Computer Vision models to detect drivable regions in complex on-road scenarios across India.
- Leveraged the YOLOv9 model, achieving a mAP of **53.4%**, for robust segmentation in challenging real-world traffic conditions.
- Built a working prototype utilizing a cascaded CNN architecture and replicated real-world on-road scenarios within a custom indoor track for controlled testing and evaluation.
- **Technologies Used :** CCNN(Cascaded CNN), YOLOv11, DETECTRON2, Raspberrypi, tf-lite, Keras, OpenCV

Terrain Classification and Identification for Autonomous Vehicles | *Computer Vision* ***December 2023***

- Identified terrain types ahead of an unmanned vehicle to support better maneuvering in diverse operational conditions.
- Employed a state-of-the-art YOLOv8 model, achieving a mean Average Precision (mAP) of **46.2%** for precise terrain detection.
- **Technologies Used :** Python, Pytorch, YOLOv8, Keras, Ultralytics, OpenCV.

Technical Skills

Languages: **Expert:** Python ; **Intermediate:** C/C++, Java, SQL, Latex, Matlab ; **Basic:** HTML/CSS, R
Developer Tools: VS Code , Jupyter, Matlab, Amazon Web Services, Git, CI/CD Tools, Dockers, Kubernetes
Operating Platforms: Linux(RHEL, kalilinux, Ubuntu), Windows, MacOS
Frameworks: kubeflow, pytorch, tensorflow, Keras, openCV, scikit-learn, numpy, pandas, matplotlib, nextflow, flask
Areas Of Speciality: Computer Vision, MLOps, Generative AI, NLP, LLM's(Large Language Models), Embedded Systems

Publications

- **Off-Road Terrain Identification and Analysis** - *Journal of Electrical Systems*, December 2023
  DOI: https://doi.org/10.52783/jes.636
- **A Reliable V2V Communication: An Autonomous Perspective** - *IEEE*, February 2023
  DOI: 10.1109/ICAC3N60023.2023.10541590
- **AI and ML in Vehicular Communication: A Cybersecurity Perspective** - *IEEE*, August 2022
  DOI: 10.1109/ICCES54183.2022.9835791