Rohith Reddy Rachala

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Education

- **University of California, San Diego** — La Jolla, California
  Master of Science, ECE, Signal and Image Processing; GPA: 3.92/4 — *Sept 2022 - Mar 2024*
  Courses: Computer Vision 1, Advanced Computer Vision, 3D Deep Learning, Visual Learning, Deep Generative Models, Software Foundations, Scalable Data Systems, Digital Image&Signal Processing, Linear Algebra
- **Indian Institute of Technology, Palakkad** — Kerala, India
  Bachelor of Technology, Electrical Engineering; GPA: 8.53/10 — *Aug 2017 - Apr 2021*

Technical Skills

- **Programmming Languages**: Python, C++, C, Javascript, SQL, PHP, Dart, OOPs
- **Frameworks**: OpenCV, Flask, Django, ReactJS, Flutter, Qt, gRPC
- **Technologies**: PostgreSQL, MongoDB, AWS, Kubernetes, Docker, Git, Linux
- **Machine Learning and Data Science**: AWS Sagemaker, PyTorch, TensorFlow, Sklearn, Numpy, Pandas, Matplotlib

Experience

- **Graduate Student Researcher** — Nov 2022 - Present
  SOPAC Lab, Scripps Institute of Oceanography, UC San Diego, La Jolla, CA
  - Developing a **ML pipeline** in collaboration with NASA JPL, to classify spatio-temporal anomalies. Executed exploratory data analysis for feature extraction and conducted experiments with **random forests and GCNs**.
  - Implemented distributed training on **Kubernetes**, enhancing scalability for large datasets. Experimented with various ML architectures and performed **hyperparameter tuning**, improving model accuracy.
  - Developed a **multi-threaded Qt-based software**, enabling real-time processing of sensor data from over 100 servers, and engineered a **scalable server** capable of handling simultaneous client connections with secure user authentication and designed an intuitive **GUI** for monitoring client statuses and managing server connections.
- **Software Development Engineer, R&D** — July 2021 - Sept 2022
  ITS Planners and Engineers, Hyderabad, India
  - Spearheaded Nayanamv2 development, **a GPU-based vehicle tracking system** on edge devices, utilizing deep learning models to achieve accuracy between 85-97% based on streaming needs. Integrated **socket server** for client data broadcasting and executed **batch inference deployment** of a multi-stream processing model on Jetson.
  - Conceptualized and developed Nayanamv1, a real-time image processing solution. Designed for low-resource environments, this system accurately counts vehicles at stop lines using live stream.
  - Led TIMv2 and TIMv3 projects enhancing traffic signal optimization and detector integration with improvements in algorithms and system reliability. Worked in **docker environments** for testing software in traffic simulation.
  - Deployed Open Trip Planner on an **AWS instance** for public transport and walking route planning. Contributed to the Margadarsi app using **Flutter**, focusing on features like journey planning and bus timetables.

Academic Projects

- **3D-Hand Pose Estimation**: Researching **multi-modal fusion** for hand pose estimation in highly occluded scenarios. Developed a synchronized approach to collect a structured dataset from multi-view cameras and a wearable sensor.
- **Counterfactual Image Generation**: Developed a pipeline for counterfactual image generation using **GANs and neural nets**, to generate visually similar alternative images with desired attribute changes for improved image editing.
- **6D Pose Estimation**: Implemented a 6D pose estimation system combining DeepLabv3 for segmentation and Dense Fusion for pose estimation. Obtained 80% accuracy by integrating ICP with Dense Fusion weights for pose refinement.
- **Instance Eraser**: Developed an algorithm inspired by Google's MagicEraser to remove specified objects from images. Utilized **instance segmentation** and Pix2Pix model for **image reconstruction**, achieving background recovery.

Publications

- **BEAR-Data: Analysis and Applications of an Open Multizone Building Dataset** — Github
  Conference Paper, Published at ACM BuildSys-23
- **Hand-Drawn Electrical Circuit Recognition using Object Detection and Node Recognition** — Github
  Journal Paper, Publised at SN Computer Science