

# 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: Filter Banks and Wavelets, Digital Image Processing, Digital Signal Processing, Linear Algebra, Statistical learning 1, Computer Vision 1, Intro to Visual Learning, Deep Generative Models, Recommender Systems, 3D Deep Learning*
- Indian Institute of Technology, Palakkad** Kerala, India  
• *Bachelor of Technology, Electrical Engineering; GPA: 8.53/10* Aug 2017 - Apr 2021  
*Courses: Wireless Communications, Analog and Digital Communication Systems, VLSI Architectures for Signal Processing, Signals and Systems, Microprocessors System Design and Interface, Biomedical Instrumentation and Signal Processing*

## TECHNICAL SKILLS

- **Programming Languages:** Python, C, C++, MATLAB, PHP, Dart, Javascript
- **Python Libraries:** PyTorch, TensorFlow, Scikit, NumPy, OpenCV, Pandas, Matplotlib, Flask, Streamlit
- **Dev Ops:** Kubernetes, Docker, GIT
- **Data Base:** PostgreSQL, MySQL, MongoDB
- **UI Development:** React, Flutter, Qt
- **Internet of Things(IoT):** Embedded C, Socket Programming, ARM Assembly Language, Arduino, Raspberry Pi

## EXPERIENCE

- Graduate Student Researcher - Data Science** Nov 2022 - Present  
• *SOPAC Lab, Scripps Institute of Oceanography, UC San Diego, La Jolla, CA*
  - Developing a multi-threaded software application using Qt, incorporating server-client architecture and APIs to connect to and process data from hundreds of servers. Implemented data processing techniques, and data publishing to a new server.
  - Working on a machine learning project in collaboration with NASA JPL to classify anomalies and outliers in a vast geodetic time series dataset. Created an end-to-end pipeline with CNNs, RNNs, and Graph Convolutions(GCNs) for feature extraction and spatial analysis. Implemented distributed training on Kubernetes for scalability.
- Software Development Engineer,R&D** July 2021 - Sept 2022  
• *ITS Planners and Engineers, Hyderabad, India*
  - Engineered Nayanam, real-time vehicle tracking algorithm, adept at counting vehicles crossing stop lines via live CCTV. Incorporated a configurable software with an integrated socket server for efficient transmission of vehicle counts.
  - Spearheaded the development and deployment of TIMv2 traffic management software on Raspberry Pi, focusing on optimizing traffic flow and integrating various traffic detectors into the Traffic Intelligent Server. Successfully released two stable versions for direct installation on edge devices. Played pivotal role in developing TIMv3 and backend algorithms.
- Software Development Engineer Intern,R&D** Apr 2020 - Jul 2020  
• *ITS Planners and Engineers, Hyderabad, India*
  - Developed back-end codes and APIs using Python, PostgreSQL(PostGIS) to analyze public transport data, including selective vehicle priority algorithms and scripts for generating alerts like bunching alerts, speed alerts, geofencing alerts.
  - Developed Margadarshi app using Flutter, which integrates a multi-modal journey planner using OpenTripPlanner API.

## PROJECTS

- **Multiple Stream Vehicle Detection and Tracking**
  - Developed a GPU-accelerated vehicle detection and tracking system, capable of processing multiple video streams. The system is configurable and supports various tracking and detection models to optimize for accuracy and streaming needs.
  - Integrated a socket server for real-time broadcasting of unique vehicle detections to authenticated clients, with advanced features like batch inference for multi-stream handling and polygonal zone assignment for precise vehicle location tracking.
- **Machine Learning-Based Error Control Code Design for Wireless Channel**
  - Developed error control codes using deep learning for block codes, targeting AWGN and Rayleigh wireless channels. Successfully replicated the 7,4 Hamming code using synthetically curated datasets, demonstrating the model's efficacy.
  - Explored higher length codes with neural networks, implementing various regularization and hyperparameter tuning techniques. Despite these efforts, BER performance did not match theoretical codes as message length increased.

## PUBLICATIONS

- **BEAR-Data: Analysis and Applications of an Open Multizone Building Dataset**
  - *Authors: Yuxin Bian, Xiaohan Fu, Bo Liu, Rohith Rachala, Rajesh K. Gupta, Yuanyuan Shi*
  - Published in ACM Buildsys-23. Introduced BEAR-Data, a comprehensive dataset detailing temperature and HVAC actions in over 80 building zones. The paper covers dataset collection, feature analysis, and its application in building research, including energy forecasting and performance benchmarking, to enhance building energy system innovation.
- **Hand-Drawn Electrical Circuit Recognition using Object Detection and Node Recognition**
  - *Authors: R.R. Rachala, Mahesh Panicker*
  - Published in SN Computer Science, 2022. This journal introduces a real-time algorithm for automatic recognition and reconstruction of hand-drawn electronic circuits. Utilizing YOLOv5 for component detection and a novel Hough transform-based method for node recognition, it achieves 98.2% accuracy in component detection and 80% in schematic reconstruction, with a rapid performance of 0.33 seconds per schematic.