Gayathri Rajesh

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Education

University of California San Diego Sep 2025 – Jun 2027
Master of Science in Computer Science

National Institute of Technology, Tiruchirappalli Aug 2021 – May 2025
Bachelor of Technology in Electrical and Electronics Engineering ***CGPA: 9.36/10***

Relevant Coursework: Pattern Recognition, Control Systems, Introduction to Data Analysis

Activities and Societies: Robotics and Machine Intelligence, SPIC MACAY NIT Tiruchirappalli Chapter

Experience

National Institute of Technology Tiruchirappalli | *Project Report* Jan 2025 - May 2025
Final Year Project - Guide: Prof. Ankur Singh Rana *Tiruchirappalli, India*

- Implemented a **Game Theory** based approach to determine the optimal selling price for Electric Vehicles; ensuring user satisfaction while maximising charging station profits
- Used reinforcement learning techniques like **Q-Learning**, **Deep Q Networks (DQN)** and **Learning to Search (LEARCH)** to perform EV routing with constraints such as charging time, waiting time and price of charging
- Tested the joint framework for EV routing and pricing on the Sioux Falls Road Transportation Network and achieved a maximum success rate of **88.58%** with DQN.

University of Southern California | *Project Report* May 2024 - Mar 2025
Summer Research Student - Guide: Prof. Daniel Seita *Los Angeles, USA*

- Employed pre-trained foundation models for fabric manipulation tasks like folding and smoothing via robotic arms
- Constructed prompts for GPT-4o, GPT-4 and GPT-4 Vision to generate low-level instructions for manipulation. Examined methods such as fine-tuning and Set-of-Mark prompting to help in visual grounding
- Implemented hand-eye calibration between the camera and bimanual UR5 arms using **MoveIt** and **ROS Noetic**
- Boosted performance by 50% in folding tasks and extended smoothing tasks to non-square fabric by simulating experiments in **SoftGym**

Indian Institute of Technology, Madras | *Project Report* May 2023 - Jul 2023
Summer Research Student - Guide: Prof. Kaushik Mitra *Chennai, India*

- Enhanced extreme low-light videos with illuminance in the 0.1 to 5 lux range. Studied retinex-based and deep learning methods including LLNet and U-Net
- Trained the **U-net architecture** on extreme low-light JPG images and achieved an average Peak Signal-to-Noise Ratio (PSNR) of 22.4064 during training and 19.3361 on the test dataset
- Achieved an average PSNR of 21.4331 during training and 14.5273 during testing on the modified U-net architecture designed for faster computation and evaluated the above on the **Oxford Robotcar** Dataset

Projects

Unmanned Underwater Vehicle for Inspection and Repair | *Report* Sep 2023 - Feb 2024

- Built a 5-DOF underwater robot with open frame architecture and identified cracks and corrosion in underwater structures using computer vision techniques
- Performed transfer learning on VGG16 in **PyTorch** for corrosion detection and achieved an accuracy of 96.55% on the validation set. Used a Convolutional Neural Network for crack detection and deployed them on a **Jetson Nano**
- Finalist in the Smart India Hackathon 2023 organised by the Govt. of India among *2000+* participating teams

Sight Stick | *Report* Jan 2023 - Apr 2023

- Designed an intelligent blind stick that can assist the visually impaired by detecting objects and providing haptic feedback using a vibrating wristband
- Implemented an object detection algorithm using **TensorFlow Lite** and **OpenCV** on a **Raspberry Pi 4**
- Devised features for additional safety and emergency assistance using a mobile application connected to the stick. Interfaced the Pi to the wristband using an HC05 Bluetooth module
- Finished among the *top 5* from *100+* teams at Sangam, a national-level hardware hackathon organised by NIT Trichy

Technical Skills

Programming Languages: Python | C/C++ | Matlab | GNU Octave | Arduino C
Libraries and Tools: PyTorch | OpenCV | NumPy | Matplotlib | ROS2 | Linux | Git
Programmable Boards: Arduino | Raspberry Pi | Jetson Nano | ESP 32

Honours and Awards

- Received the **Micron URAM Scholarship 2023-24**, based on brilliance in STEM fields and willingness to contribute to society. Chosen in the top 60 students among thousands of applicants and awarded a cash prize for the same
- Won the **Jitheshraj Scholarship for Promising Freshmen** (2021-22 cycle), among 1200+ candidates, based on an initiative to attain technological awareness and generate positive change in society
- Awarded the **SJ Chainulu Medal of Excellence** for securing **first rank** in the Department of Electrical and Electronics Engineering in the year 2021-2022. Consistently among the **top 4%** in a class of 124 students