Sai Rohit Murali

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EDUCATION

University of Illinois at Urbana-Champaign | Urbana-Champaign, IL August 2024-May 2026
Master of Engineering in Autonomy and Robotics, GPA 3.70/4.0
Relevant Coursework: Autonomous Vehicle Systems, Safe Autonomy, Computer Vision, Machine Learning

Vellore Institute of Technology | Chennai, India August 2019-June 2023
Bachelor of Technology in Mechanical Engineering, GPA 8.4/10.0

PROFESSIONAL EXPERIENCE

Rivian | Normal, IL | *Robotics Integration Intern* May 2025-December 2025

- Built automated **fault-detection** and **regression-testing** analyzers distinguishing genuine production faults from noise pre-deployment, cutting validation time **98%** across **1000+** Fanuc robots
- Architected and owned **8 CI/CD pipelines** (**Docker, AWS, Terraform**) automating deployment and fleet management across **1000+** Fanuc robots
- Built **OT-IT** proxy server enabling secure, segmented communication between factory-floor OT systems and cloud infrastructure across **1000+** robots, applying **industrial networking protocols** for real-time telemetry pipelines
- Built a production multimodal inference platform (**FastAPI**) for **real-time monitoring** across **1000+** robots in a **safety-critical** factory environment
- Optimized fleet backup system via job aggregation redesign, achieving **96%** cost reduction (**$14K/year**) with full coverage

Capestart | Chennai, India | *Associate Machine Learning Engineer* November 2023-May 2024

- Improved data extraction from **10K+** medical records with **LangChain**, **Kor**, and **GPT-4**, increasing accuracy from **71%** to **85%**
- Designed a summarization pipeline for medical articles with **RAG, GPT-4, LlamaIndex**, and **FAISS**, achieving **84.14%** accuracy

TEACHING & RESEARCH EXPERIENCE

CS588 – Autonomous Vehicle Systems | Champaign, IL | *Graduate Course Assistant* January 2026-Present

- Mentoring **60+** graduate students across the AV stack: state estimation **(Kalman filtering, GNSS/GPS/IMU/LiDAR fusion, probabilistic localization**), perception (**BEV, CenterPoint, Faster R-CNN**), and multi-sensor calibration

Parasol Lab | Champaign, IL | *Graduate Research Assistant* January 2026-Present

- Built a **ROS2 closed-loop** RGB-D grasp-execution pipeline integrating **Contact-GraspNet** (**PyTorch**) inference with a **UR5** arm, using **SAM3** semantic segmentation over **ZMQ IPC** for keypoint-free task and motion planning in unstructured scenes
- Researching scalable multi-robot TAMP algorithms with **Prof. Nancy Amato**, focusing on distributed large-scale planning

University of Winnipeg | Winnipeg, MB | *Mitacs Globalink Research Intern* May 2022-September 2022

- Built bulk download server for plant datasets with **C++/wxWidgets GUI**, integrating EAGL-I data into Dryad repository
- Analyzed power laws to predict model accuracy without full training; presented at the **17th Annual Randy Kobes Symposium**

PROJECT EXPERIENCE (SELECTED)

Autonomous Vehicle Simulation Development | *UIUC* ***(GITHUB)***

- Built a **YAML**-driven parameterization layer for **Gazebo** enabling declarative environment-map configuration with schema-driven obstacle and agent behaviors across **4+** environments for edge-case AV testing

Autonomous Drone Racing | *UIUC* ***(GITHUB)***

- Designed and tuned a real-time hybrid **MPC + dual-PID** flight control loop with **cubic-spline** trajectory generation and geometric path analysis, achieving **98.39%** gate passage across **4+** simulated environments
- Deployed a **30-50 Hz onboard** depth-masked NanoSAM perception pipeline under **hard real-time constraints**, holding **0.05 m** tracking accuracy via in-flight recalibration

Monocular Ego-Motion & Pose Estimation | *UIUC* ***(GITHUB)***

- Modeled ego-vehicle **3D motion** by fusing optical flow (Farneback), monocular depth (Depth Anything), and **YOLOv8** road segmentation to disentangle ego-motion from dynamic agents across a **6-camera nuScenes** sensor suite
- Built a zero-shot multi-camera scene understanding stack by integrating a transformer-based **3B VLM** with **SAM2** video segmentation and **Lucas-Kanade** optical flow for dynamic object tracking and spatial reasoning across sequential frames

TECHNICAL SKILLS

Languages: C++, C, Python, Embedded C, Bash, MATLAB, SQL

Robotics & Autonomy: ROS1/ROS2, ZMQ, MPC, PID Control, Sensor Fusion, Motion Planning, IMU, GNSS, Kalman Filtering

Simulation: CARLA, AirSim, Gazebo, Isaac Sim, RViz, Omniverse

Perception & AI: OpenCV, Open3D, SLAM, YOLOv8, SAM3, Optical Flow, Segmentation, Object Detection, PyTorch, TensorFlow

Tools & Systems: Docker, CMake, Bazel, Linux, FastAPI, Git, Terraform, AWS, LangGraph, Networking Protocols