

# 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 3.61/4.0

*Relevant Coursework:* Autonomous Vehicle Systems, Safe Autonomy, Computer Vision

**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 Engineer Intern**

May 2025-Present

- Engineered multi-camera Keyence vision pipeline with calibration and mapping to correct positional variance in R2 EV line.
- Architected and containerized robotics tools on AWS, integrated with MCP Server for LLM-driven factory automation.
- Engineered secure OT network proxy for robot-app API communication, enabling file retrieval, diagnostics, and exchange.
- Built robotics standards RAG hub with semantic chunking, hybrid search, and MCP Server integration for controlled access.

**Capestart | Chennai, India | Associate Machine Learning Engineer**

November 2023-May 2024

- Improved data extraction from unstructured documents with LangChain, Kor, GPT-4, increasing accuracy from 71% to 85%.
- Built a summarization pipeline for medical articles with RAG, GPT-4, LlamaIndex, and FAISS, achieving 84.14% accuracy.

**MMForgings | Chennai, India | Robotics Intern**

August 2023-October 2023

- Built and trained a VGG19 deep learning model to classify steel defects into four categories with 82.7% validation accuracy.
- Programmed industrial FANUC robots for automated, waypoint-based pick-and-place and object handling tasks.

## RESEARCH EXPERIENCE

**University of Winnipeg | Winnipeg, MB | Mitacs Globalink Research Intern**

May 2022-September 2022

- Streamlined server for bulk plant dataset downloads, enhancing GUI with wxWidgets and integrating EAGL-I data into Dryad.
- Analyzed power laws to predict model accuracy without full training; presented at the 17th Annual Randy Kobes Symposium.

**VIT CADS | Chennai, India | Summer Research Intern**

June 2021-August 2021

- Developed lane detection with Hough transform and OpenCV, achieving 96.3% straight-road and 80.4% curve accuracy.
- Engineered speed sensor and alert system to adjust vehicle speed by lane conditions; presented at i-PACT'21.

## PROJECT EXPERIENCE

**Autonomous Drone Racing | UIUC**

[\[GITHUB\]](#)

- Engineered autonomous hybrid AirSim controller with MPC (x-y) and cascaded PID (z), achieving 98.39% on four maps.
- Developed cubic spline trajectory planner with NanoSAM keypoint correction, achieving 0.05 m positional error.

**Autonomous Vehicle Simulation Development | UIUC**

[\[GITHUB\]](#)

- Built YAML-based Gazebo scene generator automating cones, pedestrians, agents with 3D reconstruction and collisions.
- Built object spawner with trajectory logic, enabling photorealistic testing and cross-team compatibility for perception stack.

**YOLOPose: RGB-D 6-DoF | UIUC**

[\[GITHUB\]](#)

- Developed RGB-D fused YOLOv8 network for multi-modal object detection, achieving 66% mAP@0.5 on BOP dataset.
- Implemented 6-DoF pose estimation using camera intrinsics and 3D mesh projections to localize objects in real-world.

**Emotion-Adaptive Music Generation | UIUC**

[\[GITHUB\]](#)

- Built real-time text-to-music system with LoRA-tuned DistilBERT for emotion detection and transformer-based music control.
- Reduced generation latency by 35% via KV caching, enabling emotion-aligned music output on a single GPU.

**Vision Language Model for Autonomous Vehicles | UIUC**

[\[GITHUB\]](#)

- Implemented object tracking and ego-motion on nuScenes using YOLOv8, SAM2, and optical flow to refine 3D localization.
- Architected multi-camera SpatialBot pipeline using RGB-D for vehicle detection and spatial reasoning in autonomous driving.

**SketchUR3 | UIUC**

[\[GITHUB\]](#)

- Engineered UR3 robotic drawing system with contour keypoint detection and coordinate transformation for precision.
- Developed ROS inverse kinematics planner for autonomous keypoint tracing with smooth trajectories and safe transitions.

## SKILLS

Python, PyTorch, TensorFlow, C++, Git, AWS, OpenCV, Bash, FastAPI, Docker, ROS, AirSim, Gazebo, LangGraph, Carla, SLAM

## AWARDS

Awarded Mitacs Globalink Research Fellowship, Outstanding Presentation Award at Riact'23, Finalist at Techgium'22.