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 3.66/4.0
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 Intern* May 2025-Present
- Delivered 8+ AWS-hosted automation systems for a 1000+ Fanuc fleet using Docker, Terraform, and GitLab CI/CD.
- Reduced robot program & safety review time by ~98% using containerized validators and fleet-wide DCS analyzers.
- Designed the Robot MCP Server, a cloud + LLM knowledge base unifying manuals, standards, and telemetry, integrated with the factory-wide AI chatbot for intelligent robot decisions.
- Deployed secure OT→IT + AI automation pipelines (TCP→HTTPS proxy, n8n + Ollama + Slack bots) and built OctoSync, reducing backup costs 96% (~$15K/yr).

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

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.

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.

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.