SAI ROHIT MURALIKRISHNAN

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Education

University of Illinois at Urbana-Champaign Aug 2024 - June 2026
M.Eng. Robotics & Autonomy GPA : 3.61/4.0
- *Relevant Coursework: Autonomous Systems, Systems for GenAI, Computer Vision, Robotics*

Vellore Institute of Technology, Chennai Aug 2019 - May 2023
B.Tech. Mechanical Engineering GPA : 8.4/10.0
- *Affiliations and Certifications: IEEE Automation, VITEACH, Machine Learning at Atom Robotics; CSWA Certified*

Professional Experience

Rivian, *Robotics Intern* – **Normal, IL** *May 2025 – Present*
- Building a suite of robotics validation and automation tools integrated into an **Agentic RAG system**, enabling unified workflows for data validation, task automation, and intelligent query support across robotic platforms.
- Integrating the **Keyence vision system** into the **R2 battery production line**, enabling automated inspection, improving defect detection accuracy, and enhancing production reliability.

CapeStart, *Associate Machine Learning Engineer* – **Chennai, India** *Nov 2023 – May 2024*
- Utilized **LangChain**, **Kor**, and **GPT-4-32k LLM** model to optimize data collection elements for medical research articles in a GenAI-based systematic literature review tool, increasing accuracy from 71% to 85%.
- Designed a pipeline for generating single-article summaries of case reports and case series medical research articles using **RAG** and **GPT-4 Turbo LLM** model, implemented with **LlamaIndex** and **FAISS index**, achieving an accuracy of 84.14%.

University of Winnipeg, *Machine Learning Research Intern* – **Winnipeg, MB** *May 2022 – Sep 2022*
- Optimized server portal for simultaneous plant dataset downloads by structuring data into organized folders, enhancing the GUI with **wxWidgets** for better user interaction; annotated and incorporated **EAGL-I** plant data into the **Dryad dataset**.
- Conducted power law analysis to estimate model accuracy without full dataset training; presented findings at the **17th Annual Randy Kobes Undergraduate Poster Symposium**.

Academic Projects

Simulation Engineer – GEMstack ***[GITHUB]*** **UIUC**, May 2025
- Developed a modular **YAML-based** scene creation system in **Gazebo**, enabling automated simulation of cones, pedestrians, and agents with **3D reconstruction** and actor collision support.
- Built a static and dynamic object spawner with trajectory logic, enhancing **photorealistic** scenario-based testing and cross-team compatibility for the **perception** and **planning** stacks.

Emotion-Adaptive Music Generation ***[GITHUB]*** **UIUC**, May 2025
- Built a real-time, text-to-music system using LoRA-tuned **DistilBERT** for emotion detection and a transformer-based symbolic generator for **music-theory-based control**.
- Reduced generation latency by **35%** via **KV caching**, enabling emotion-aligned music output on a single GPU.

YOLOPose : RGB-D 6-DoF ***[GITHUB]*** **UIUC**, May 2025
- Developed a multi-modal object detection system using RGB-D fusion via a custom **YOLOv8-based** network, achieving **66% mAP@0.5** on the **BOP dataset**.
- Implemented a full **6-DoF pose estimation** pipeline using camera intrinsics and 3D mesh projections to localize detected objects in real-world coordinates.

Vision Language Model for Autonomous Vehicles ***[GITHUB]*** **UIUC**, Dec 2024
- Implemented object tracking and ego-vehicle motion estimation using **YOLOv8**, **SAM2**, and **optical flow** on the **nuScenes dataset**, leveraging multi-camera vision to compute 3D motion fields and refine vehicle localization in world coordinates.
- Architected a multi-camera pipeline integrating **SpatialBot**, leveraging **RGB-D processing** to enable vehicle detection and spatial reasoning in autonomous driving scenarios.

Autonomous Drone Racing ***[GITHUB]*** **UIUC**, Dec 2024
- Designed and implemented a hybrid control architecture in **AirSim**, integrating **MPC** for x-y planar motion and cascaded **PID controllers** for z-axis stabilization, achieving **98.39%** gate navigation accuracy across four diverse maps.
- Implemented **cubic spline-based trajectory planning** with velocity constraints, integrating **NanoSAM** and keypoint detection to correct misaligned gates, achieving a **0.05m** positional error.

Skills

Languages	Python, C, C++, Matlab, Java, CSS, HTML, SQL.
Libraries & Framework	OpenCV, Scikit-learn, NumPy, Pandas, Keras, PyTorch, TensorFlow, LangChain, FastAPI
Tools & Technologies	ROS, Git, Github, AWS, Azure, Linux, Docker, Jira
Design and Simulation	Gazebo, Airsim, SolidWorks, Carla, Fusion360

Achievements

- **Outstanding Presentation Award** at **RIACT'23** for research on wearable assistive devices [Link].
- **Published** a paper on lane detection and speed-monitoring system at **CADS, VIT Chennai** [Link].
- **Finalist** at **Techgium'22** conducted by **Larsen & Toubro**, with over **30,000 participants** across India.[Link].
- Awarded the prestigious **Mitacs Globalink Research Fellowship**.[Link].