# Sai Jagadeesh Muralikrishnan

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## SUMMARY

Master of Engineering in Robotics graduate with a added background in AI/ML, computer vision, and perception-based robotics. Skilled in object detection, obstacle avoidance, SLAM, and real-time path optimization for autonomous systems. Proficient in TensorFlow, PyTorch, and GPU programming (CUDA) to develop deep learning models on embedded platforms. Experienced in multi-sensor fusion (camera, LiDAR, IMU) and ROS/ROS2-based development, with a focus on cobot manipulation and autonomous navigation. Eager to leverage advanced perception and control algorithms to solve complex robotic challenges in a fast-paced environment.

## EDUCATION

**University of Maryland | College Park, MD** *May 2025*
*Master of Engineering in Robotics | GPA: 3.8/4.0*
***Relevant Coursework:*** *Advanced Machine Learning, Deep Learning, Computer Vision, Reinforcement Learning*

**Rajalakshmi Engineering College | Chennai, India** *Jul 2022*
*Bachelor of Engineering in Mechatronics | CGPA: 8.7/10.0*
***Relevant Coursework:*** *Industrial Automation, Electrical Circuits, Power Electronics*

## PROFESSIONAL EXPERIENCE

**Robotics Software Engineer Intern** **College Park, MD**
*KICK Robotics, College Park, MD* *May 2024 – Aug 2024*

- Developed and optimized C++ and Python control algorithms for autonomous robotic systems.
- Integrated MATLAB-based simulation pipelines for robotic control and motion planning validation.
- Integrated ROS-based AMRs (Autonomous Mobile Robots) with sensor fusion for enhanced perception.
- Debugged robotic hardware issues, improving system reliability and uptime by 30%.
- Integrated LiDAR, vision, and IMU sensor data to improve localization and navigation reliability.

**Embedded Systems Engineer** **Chennai, India**
*TuTr Hyperloop – An IIT-MADRAS Start-up* *Oct 2022 – Jul 2023*

- Created MATLAB/Simulink-based models for vehicle control units (VCU) and battery management systems (BMS).
- Designed closed-loop control frameworks for propulsion and braking systems, leveraging multi-threaded C++ firmware to reduce communication latency by 25%.
- Collaborated on real-time sensor fusion for safety-critical subsystems, ensuring robust performance under dynamic conditions.

## RESEARCH EXPERIENCE

**Graduate Research Assistant** **College Park, MD**
*Maryland Robotics Center | Research Advisor: Dr. Derek A Paley* *Sep 2024 – Dec 2024*

- Implemented stereo camera calibration using MATLAB's Computer Vision Toolbox for high-precision calibration.
- Developed deep learning pipelines (TensorFlow, PyTorch) for robotic vision tasks, exploring advanced perception algorithms.
- Applied LQR and LQG controllers in MATLAB for control system stability optimization and robust trajectory tracking.

## PROJECT EXPERIENCE

**Versa-BOT V1.0 – A Shop-Floor Mobile Manipulator** **College Park, MD**
*Robotics and Autonomy Laboratory, UMD* *Nov 2023 – Dec 2023*

- Designed a 7-DOF robotic manipulator, integrating motor controllers, LiDAR, and power management circuits.
- Utilized Peter Corke's Robotics Toolbox to verify robotic arm kinematics in a multi-DOF system.
- Implemented path planning algorithms (RRT, PRM variants) in ROS to enable safe and efficient manipulation tasks.
- Integrated robot vision for object recognition, grasping, and kinematic path planning.

**MoveIt Motion Planning on the Panda Arm** **College Park, MD**
*Maryland Applied Graduate Engineering, UMD* *Mar 2024 – May 2024*

- Architected a ROS-based motion planning framework using MoveIt, optimizing the pipeline for real-time performance.
- Enhanced power efficiency and thermal management in servo actuation, boosting overall system performance by 25%.
- Validated end-to-end integration with multi-sensor feedback loops for complex industrial pick-and-place tasks.

**MULTI VIZ: Advanced Multi-Robot Application** **College Park, MD**
*Maryland Applied Graduate Engineering, UMD* *Nov 2024 – Dec 2024*

- Architected and implemented a ROS2-based GUI for real-time multi-robot telemetry, combining odometry, LiDAR, and camera feeds into a single user-friendly dashboard.
- Implemented a Voice Command Interface with text-to-speech (TTS) feedback, reducing manual interactions by 60% and improving operator response time.
- Developed Dockerized CI/CD pipelines for seamless deployment and automated testing.

## SKILLS

**Programming Languages:** Python, MATLAB, C, C++, Bash (Ubuntu), NVIDIA CUDA
**Software & Systems**: CICD, Cloud Computing (AWS, Azure, Google), Containerization, Multithreading**,** ROS/ ROS2, Gazebo, Docker, GitHub
**Networking & Embedded:** Socket Programming (TCP /UDP), Basic Low-Level Network Protocols, Arduino, Raspberry Pi, STM32, ESP32
**Robotics & Software:** Machine Learning (TensorFlow, PyTorch), Computer Vision (OpenCV), Optical Sensors, MoveIt, CAD, SLAM
**Mathematics & Optimization:** Linear Programming, Nonlinear Optimization, AI-driven decision making, multi-tiered architectures
**Soft Skills:** Team Collaboration, Problem-Solving, Documentation, Cross-Functional Communication, decision making