Sai Jagadeesh Muralikrishnan

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SUMMARY

Master's-level Robotics Software Engineer with a proven track record in designing, developing, and deploying deep neural network (DNN) architectures for multi-modal data ingestion and generalization. Expertise in Python, C++, PyTorch, ROS, and NVIDIA CUDA programming on Ubuntu/Linux platforms. Adept at translating academic research into scalable, robust R&D solutions, leveraging AWS cloud computing, Git, CICD, and Docker to streamline development. Recognized for delivering high-performance systems that efficiently process millions of data points and support real-time decision-making in complex robotics applications.

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

PROFESSIONAL EXPERIENCE

Robotics Software Engineer Intern **College Park, MD**
KICK Robotics, College Park, MD *May 2024 – Aug 2024*
- Developed and optimized robotic control pipelines in C++ and Python, reducing latency by 15%.
- Designed scalable machine learning modules for path planning and obstacle detection using multi-modal sensor data in ROS.
- Leveraged Git version control, CICD pipelines, and Docker containerization to ensure robust, maintainable code across agile.
- Authored comprehensive documentation and conducted code reviews to support system scalability and maintenance.

Embedded Systems Engineer **Chennai, India**
TuTr Hyperloop – An IIT-MADRAS Start-up *Oct 2022 – Jul 2023*
- Engineered multi-threaded data handling systems in C++, reducing communication delays by 25% for advanced robotics applications.
- Deployed scalable control systems integrating PLC and HMI technologies to automate critical processes.
- Collaborated with cross-functional teams to design, test, and refine production-ready solutions using agile methodologies and Git.

RESEARCH EXPERIENCE

Graduate Research Assistant **College Park, MD**
Maryland Robotics Center | Research Advisor: Dr. Derek A Paley *Sep 2024 – Dec 2024*
- Developed deep learning architectures for calibrating multi-modal sensor data, improving 3D depth mapping accuracy by 15%.
- Created Monte Carlo-based simulation models for multi-agent exploration, integrating insights from academic research into practical robotics applications.
- Built high-speed data acquisition and processing pipelines on Ubuntu/Linux, ensuring robust performance in real-time.

PROJECT EXPERIENCE

Multi-Agent Robotic Exploration Using Monte Carlo Tree Search **College Park, MD**
Robotics and Autonomy Laboratory, UMD *Nov 2023 – Dec 2023*
- Designed and implemented scalable AI-driven search algorithms using Python, C++, and reinforcement learning techniques.
- Integrated AWS RoboMaker to simulate robot behavior in cloud environments, leveraging sensor fusion (camera and LiDAR).
- Optimized computation and storage in a distributed environment, achieving 30% faster path planning.

Autonomous Navigation using Double DQN and Dueling Architecture **College Park, MD**
Maryland Applied Graduate Engineering, UMD *Mar 2024 – May 2024*
- Improved path planning using Double DQN and Dueling DQN, increasing success rates by 75% in simulated multi-obstacle arenas.
- Designed AI-driven search algorithms using Python, C++, and reinforcement learning techniques, optimizing path planning speed by 30%.
- Collaborated with data acquisition and robotics planning teams to fuse sensor inputs (camera, LiDAR) into a robust, real-time decision-making system

Adaptive Text-to-Command Translation for Robot Navigation (natural language processing) **College Park, MD**
Maryland Applied Graduate Engineering, UMD *Nov 2024 – Dec 2024*
- Architected and implemented a transformer-based model (T5-Small with LoRA) for natural language command translation in robotic navigation, achieving 98.5% accuracy while significantly reducing trainable parameters.
- Integrated the model within ROS 2 and Gazebo environments, demonstrating effective deployment for processing diverse multi-modal inputs.
- Utilized PyTorch and NVIDIA CUDA programming to accelerate model training and inference, ensuring scalability to handle over 1.5 million datapoints per day.

SKILLS

Programming Languages: Python, MATLAB, C, C++, Bash (Ubuntu), NVIDIA CUDA
Software & Systems: CICD, Cloud Computing (AWS, Azure, Google), Containerization, Multithreading, Agile Development
OS Fundamentals: Data Structures (queues, stacks, heaps, lists), Concurrency (semaphores, mutual exclusion), Scheduling, Signals & Exceptions
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, System Integration
Mathematics & Optimization: Linear Programming, Nonlinear Optimization, AI-driven decision making, multi-tiered architectures
Soft Skills: Team Collaboration, Problem-Solving, Documentation, Fast-paced Project Delivery