

# Sahasrajit Anantharamakrishnan

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Full-Stack Robotics Engineer with expertise in hardware design, perception, planning, and control. Specializing in motion planning, classical, and learning-based control of mobile robots, manipulators, and legged systems. Skilled in C++, Python, CUDA, and ROS, with experience in GPU acceleration, real-time perception, and system integration.

## EDUCATION

**Northeastern University**, Boston, MA

Master of Science in Robotics

**May 2024**

**GPA: 3.939/4.000**

**Anna University**, Chennai, India

Bachelor of Engineering in Electronics and Communication Engineering

**May 2022**

**GPA: 8.66/10.00**

## SKILLS

<b>Languages / Libraries</b>	Python, C++, Drake, IPOPT, SNOPT, Gurobi, C, CUDA, PyTorch, JAX, Tensorflow, MATLAB & Simulink, OMPL
<b>Software and Tools</b>	ROS, Ubuntu Linux, Git, CMake, Docker, Gazebo, Nvidia Isaac Sim, PyBullet, MQTT, Fusion 360, Blender, CI/CD, Automated Testing, gRPC, Protobuf, MuJoCo
<b>Proficient Concepts</b>	Optimization, Motion planning, Control systems, Trajectory Optimization, Kinematics & Dynamics Modeling, Deep Learning, Reinforcement Learning, Machine Learning, Computer Vision, State estimation/SLAM

## WORK EXPERIENCE

**Robotics and Intelligent Vehicles Research Laboratory (RIVER)**, Boston, MA

**May 2024 - Present**

Robotics Research Assistant, **Project:** Stochastic Model Predictive Control for bipedal loco-manipulation

- Improved robustness against uncertainties in terrain and payload of Bipedal robot by adding soft-constraints to Model Predictive Control (MPC)
- Created novel simulation environments in NVIDIA Isaac Sim and PyBullet, for simulating, and testing the humanoid robot
- Improved the constraints and the dynamics model to guarantee stability

**Northeastern Autonomy and Intelligence Laboratory (NAIL)**, Boston, MA

**January 2023 - May 2024**

Robotics Research Assistant, **Project:** High-Speed Off-Road Autonomy Robot

[Lab Link](#)

- Set up the lab from scratch, showcasing full-stack expertise in hardware, perception, planning, and control

### **Motion Planning and Control:**

- Optimized the trajectory of AVs using a custom Model Predictive Path Integral (MPPI) algorithm, a costmap-based planner
- Formulated a custom cost function for the robot to account for kinematics & dynamic constraints, and terrain traversability
- Optimized algorithm runtime using GPU programming with CUDA C++ and JAX by 1000x

### **Perception:**

- Fine-tuned, using PyTorch, a Vision Transformer AI model on a custom dataset to semantically segment rough terrain
- Increased training ease by 38% using SLURM and Docker to train, and run inference on GPU server cluster
- Created a custom data pipeline for 50,000 RGB images that included data collection, logging, storage and training
- Monitored model training progress and performance using TensorBoard and Weights and Biases (WandB)

### **Hardware:**

- Fabricated a custom mobile robot using Fusion 360 to be used in high-speed off-road environments
- Engineered a custom electrical and network system of the robot to ensure safety and reliability

**Rigbetal Labs LLP**, Pune, India

**August 2021 - November 2021**

Robotics Engineer Intern

- Formulated a novel algorithm, Road Anomaly Detection System (RADS), in C++ to detect road anomalies
- Reduced cost by 90%, by generating a 3D Point cloud from a series of moving 2D Laser scans
- Developed a custom multi-agent path planning and mapping framework in AWS Robomaker and Gazebo

## PUBLICATIONS

- [1] A. Trivedi, **S. Anantharamakrishnan**, S. Bazzi, and T. Padir. "Chance Constrained Convex-MPC for biPedal lOcomanipulation (C3PO)". [In Progress]. Mar. 2025.

## PROJECTS

**Implementing Batch Informed Trees (BIT\*) Motion planning Algorithm for Robot Arms**

**March 2023 - April 2023**

Paper: [Batch Informed Trees \(BIT\\*\): Informed asymptotically optimal anytime search](#)

[Project Link](#)

- Increased run-time efficiency of the algorithm by using hash-maps, parallelization and caching
- Engineered intuitive visualization and analysis tools to validate the algorithm
- Tested and validated the algorithm against baselines algorithms such as RRT, RRT\*, FMT\*, and RRT Connect