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 — **May 2024**
Master of Science in Robotics — **GPA: 3.939/4.000**
Anna University, Chennai, India — **May 2022**
Bachelor of Engineering in Electronics and Communication Engineering — **GPA: 8.66/10.00**

SKILLS

Languages / Libraries Python, C++, Drake, CUDA, C, PyTorch, JAX, Tensorflow, MATLAB & Simulink, OMPL
Software and Tools ROS, Ubuntu Linux, Git, CMake, Docker, Gazebo, Nvidia Issac Sim, PyBullet, MuJoCo, MQTT, Fusion 360, Blender, CI/CD, Automated Testing, gRPC, Protobuf
Proficient Concepts Motion planning & Control, 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 — **June 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 Issac 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
- Tested and Deployed the code using a custom CI/CD pipeline to ensure safe and reliable code

PUBLICATIONS

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

PROJECTS

Learning Inverse Kinematics using Reinforcement Learning — **October 2022 - December 2022**
A 7 DoF robot arm which will reach a goal location trained with Reinforcement Learning — Project Link

- Implemented and evaluated Deep Deterministic Policy Gradients (DDPG), Twin Delayed Deep Deterministic Policy Gradients (TD3), Proximal Policy Optimization (PPO) and Soft Actor-Critic (SAC) algorithms , with TD3 demonstrating the best performance.