

Sahasrajit Anantharamkrishnan

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EDUCATION

Northeastern University, Boston, MA **May 2024**

Master of Science in Robotics Engineering - GPA: 4.0/4.0

Courses: Numerical Optimization Methods, Graph Theory, Deep Learning, Autonomous Field Robotics, Mobile Robotics, Computer Vision, Reinforcement Learning & Sequential Decision Making

Anna University, Chennai, India **May 2022**

Bachelor of Engineering in Electrical and Electronics Engineering - CGPA: 8.66/10.00

WORK EXPERIENCE

Autonomy & Intelligence Laboratory, Boston, MA, USA. - ([Website](#)) **January 2023 - Present**

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

- Modified and Fine-tuned STEGO, a self-supervised semantic segmentation head, for DINOv1 vision transformer.
 - Achieved clear class clusters for RGB image semantic segmentation
 - Planned future incorporation of online learning in STEGO to increase robustness to unknown objects.
- Employed sensor fusion techniques to combine 3D-LiDAR data with semantically segmented RGB images, resulting in a Semantic Point Cloud, essential for downstream perception, control and motion planning tasks
- Improved the Direct LiDAR-Inertial Odometry (DLIO) SLAM algorithm to accept semantic point cloud as additional input, enabling the integration of semantic information derived from the vision transformer model
- Developed a tailored navigation system encompassing representation, planning, and control components for operation in challenging, unstructured off-road terrain
- Implemented MPC and MPPI algorithms, incorporating tailored cost functions to ensure resilient planning and optimal control in challenging off-road terrains.
- Utilized Fusion 360 to engineer and assemble a customized compute and sensor suite payload, designed to meet the distinct needs of AgileX's scout and Clearpath's Warthog robotic platforms, to enable high-speed offroad autonomy capability

Rigbeta Labs LLP, Pune, India. **August 2021 - November 2021**

Robotics Engineer, Intern

- Created a novel algorithm, Road Anomaly Detection System (RADS), in C++ to detect road anomalies (Potholes, Speed Bumps, etc.) using normal estimation
- Reduced cost by 90%, by generating a 3D Pointcloud from a series of moving 2D Laserscans
- Simulated a multi-agent (robot) mapping environment in Gazebo ROS to create a cohesive 2D map
 - Tested viability of the same in a cloud environment (AWS Robomaker) to enable multi-user control of an agent

Capgemini Technologies Services, Bangalore, India. - ([GitHub](#)) **July 2020 - December 2020**

Robotics (Medical Devices), Intern

- Designed in Fusion 360 a ROS-based autonomous ground vehicle to sterilize and sanitize offices from SARS-COV2 virus with Ultraviolet (UV-C) irradiation
- Managed Communications and task delegation between the team and the client

SKILLS

| | |
|------------------------------|---|
| Languages / Libraries | Python, PyTorch, C++, C, MATLAB, OpenCV, Tensorflow, PCL, CUDA |
| Software and Tools | ROS, Ubuntu Linux, Git, LaTeX, CMake, Docker, Gazebo, Nvidia Isaac Sim, MQTT, Simulink, Fusion 360, Blender |

PROJECTS

Implementing Batch Informed Trees (BIT*) Motion planning Algorithm - ([More Info](#)) **March 2023 - April 2023**

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

- Optimized the intensive calculations in the algorithm using hash-maps, parallelization, and pre-computation in python.
- Designed intuitive visualization techniques to better analyze the BIT* algorithm.
- Tested the algorithm against baselines results such as RRT, RRT*, FMT*, and RRT Connect.

Learning Inverse Kinematics using Reinforcement Learning - ([GitHub](#)) **October 2022 - December 2022**

A 7 DoF robot arm which will reach a goal location trained with Reinforcement Learning

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