Sahasrajit Anantharamakrishnan

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EDUCATION

Northeastern University, Boston, MA   **May 2024**
Master of Science in Robotics Engineering - **GPA: 4.0/4.0**
Courses: Mobile Robotics, Computer Vision, Robotics Sensing and Navigation, Reinforcement Learning & Sequential Decision Making

Anna University, Chennai, India   **May 2022**
Bachelor of Engineering in Electrical and Electronics Engineering - **CGPA: 8.66/10.00**
Courses: Digital Signal Processing, Embedded Systems, Robotics & Machine Vision System, Control Systems, and Data Structures

SKILLS

Programming	Python, C, C++, MATLAB, Bash, CMake, OpenCV, PyTorch, Tensorflow, PCL, LateX
Software and Tools	ROS, Linux, Git, IoT, Simulink, Fusion 360, Blender, Office Suite (Microsoft & Google)

WORK EXPERIENCE

Autonomy & Intelligence Laboratory, Boston, MA, USA.   **January 2023 - Present**
Research Assistant - **Project:** *High-Speed, Off-Road Autonomy Robot*

- Developed a novel Vision Transformer-based Deep Neural Network for Semantic Segmentation of RGB/RGB-D images.
- Incorporated Unsupervised and Online-learning techniques to enhance the network's robustness.
- Designed and Fabricated a custom Mobile Robot with High-Speed, Off-Road Autonomy capabilities.
- Implemented sensor fusion between 3D-LiDAR and camera to obtain precise RGB-D images.

Rigbetal Labs LLP, Pune, India.   **August 2021 - November 2021**
Robotics Engineer, Intern

- Created a novel algorithm, Road Anomaly Detection System (RADS), with Point Cloud Library (PCL) in C++ (roscpp) 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 in ROS a multi-agent (robot) mapping environment in Gazebo 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

- Fabricated in Fusion 360 a ROS-based Autonomous Ground Vehicle (AGV) used to sterilize and sanitize offices from SARS-COV2 virus with Ultraviolet (UV-C) irradiation
- Lead software (ROS) engineer in a team of three.

PROJECTS

Implementing Batch Informed Trees (BIT*) Motion planning Algorithm. - (GitHub)   **March 2023 - April 2023**
Batch Informed Trees (BIT): Informed asymptotically optimal anytime search*

- Implemented a motion planning system using the Batch Informed Trees (BIT*) algorithm in Python.
- Optimized the algorithm by using a hash-map data structure, parallelization, and pre-computation of computationally intensive calculations.
- Designed intuitive visualization techniques to better analyze the BIT* algorithm.
- Tested the algorithm to baselines 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 Deep Deterministic Policy Gradients (DDPG), Twin Delayed Deep Deterministic Policy Gradients (TD3), and Soft Actor-Critic (SAC) algorithms to solve the aforementioned problem
- Implemented TD3 algorithm in a team of three and had the best performance as compared to other algorithms.

Vargi Bots - e-Yantra Robotics Competition - GitHub   **November 2020 - March 2021**
Fabricated two robot arms to sort coloured boxes simultaneously according to priority (order & colour) in a conveyor belt

- Utilized IoT, ROS, and OpenCV to receive orders and for status updates, control robots, and for colour recognition