SHANKARA NARAYANAN VAIDYANATHAN

+1(857) 376-1356 ◇ Boston, MA
vaidyanathan.sh@northeastern.edu ◇ LinkedIn ◇ Personal Website ◇ GitHub

EDUCATION

Master of Science in Robotics, Northeastern University — Expected May, 2024
Relevant Coursework: Robotics Sensing and Navigation, Mobile Robotics, Algorithms, and Reinforcement Learning.
GPA: 4.0/4.0

Bachelor of Engineering in Mechanical Engineering, BITS Pilani — 2017 - 2021
GPA: 3.3/4.0

SKILLS

Programming Skills	C++, Python
Software tools	GTSAM, ROS, MATLAB, Fusion360, Git, Gazebo, PyBullet, AirSim, Docker
Hardware	ZED Stereo Camera, 2D RPLidar, BU-353 GPS, VectorNav VN-100 IMU

EXPERIENCE

Research Assistant — Oct 2022 - Present
Robust Autonomy Lab, Northeastern University — *Boston, MA*

- Implemented the IMU preintegration module to improve the accuracy and robustness of the estimation in a multi-camera Visual SLAM system using the GTSAM library
- Developed a custom GPS factor utilizing GPS measurements and IMU preintegration to perform online estimation of the transformation between VIO and GPS global frame under a non-linear optimization framework using the GTSAM library.

Research Intern — Jul 2021 - Jun 2022
Robotics Research Center, IIIT Hyderabad — *Hyderabad, India*

- Won 3rd place amongst 24 teams from 8 countries at the Open Cloud Robot Table Organization Challenge (OCRTOC) in ICRA 2022.
- Completed the task sequence planning, motion planning and integration of all 4 major modules of the end- to-end framework in ROS using the MoveIt package for the OCRTOC project
- Addressed collision avoidance for Micro Air Vehicles (MAVs) amongst urban high-rises with a single monocular camera and showed successful avoidance on 93.75% of the cases in airsim environment

Navigation Intern — Oct 2020 - Jun 2021
Invento Robotics — *Bangalore, India*

- Created the Unified Robot Description Format (URDF) models for the C-Astra and the RoboDoc robots and demonstrated performance of Navigation algorithms in simulation
- Completed ROS data integration from robots to a web portal built to remotely operate robots and collect data to analyze the real-time functioning of 20 deployed robots across multiple locations in the country

ACADEMIC PROJECTS

Advanced Path Planning: Batch Informed Trees - Coded the Batch Informed Trees algorithm from scratch, and tested its performance in R2 space for 6 different motion planning scenarios leveraging a custom-written visualizer [Code] [Report]

State Estimation: Investigating the Issues During Indoor-Outdoor Transitions - Explored some frequent problems faced when performing global state estimation during environment transitions using three key sensors: Stereo Camera, IMU, and RTK-GPS. [Code] [Report]

PUBLICATIONS

P. Kaveti, **S.N. Vaidyanathan**, A.T. Chelvan and H. Singh, "*Design and Evaluation of a Generic Visual SLAM Framework for Multi-Camera Systems*," in IEEE Robotics and Automation Letters, Sep 2023. [Paper]

H.K. Sankhla*, M.N. Qureshi*, **S.N. Vaidyanathan***, V. Mittal, G. Gupta, H. Pandya, and K.M. Krishna, "*Flow Synthesis Based Visual Servoing Frameworks for Monocular Obstacle Avoidance Amidst High-Rises*," in IEEE International Conference on Automation Science and Engineering (CASE), 2022. [Project Page] [Paper]

A. Agarwal*, B. Sen*, **S.N. Vaidyanathan***, V.R. Mandadi*, B. Bhowmick, K.M. Krishna. *Approaches and challenges in robotic perception for table-top rearrangement and planning.* arXiv preprint arXiv:2205.04090. 2022 May 9.[Paper] [Competition]