Shankara Narayanan Vaidyanathan

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Education

Northeastern University, Boston, MA — Expected May 2024
Candidate for Master of Science in Robotics — *Current GPA: 4.0/4.0*
Relevant Coursework: Robotics Sensing and Navigation, Algorithms, Mobile Robotics

BITS Pilani, India — Aug 2017 – May 2021
Bachelor of Engineering in Mechanical Engineering — *GPA: 3.3/4.0*

Technical Skills

Programming: Python, C++
Software tools: ROS, MATLAB, Fusion360, Git, Gazebo, PyBullet, CARLA Simulator, AirSim, Docker
Hardware: ZED Stereo Camera, 2D RPLidar, BU-353 GPS receiver, VectorNav VN-100 IMU, Arduino Mega

Experience

Robust Autonomy Lab — Research Assistant [Website] — October 2022 – Present
Northeastern University — *Boston, MA*

- Implementing the IMU preintegration module to improve the accuracy and robustness of the estimation in a multi-camera Visual SLAM system using the GTSAM library.
- Performing GPS integration with a multi-camera SLAM system for global-aware localization tasks.

Robotics Research Center—Research Intern — July 2021 – June 2022
IIIT Hyderabad — *Hyderabad, India*

- **ICRA 2022: Open Cloud Robot Table Organization Challenge (OCRTOC)** [Website] [pdf]
  - Completed the task sequence planning, motion planning and integration of all the modules of our end-to-end framework in ROS
  - **Won 3rd place amongst 24 teams from 8 countries** and presented our solution at the competition event of ICRA, 2022
- **Flow Synthesis Based Visual Servoing Frameworks for Monocular Obstacle Avoidance Amidst High-Rises — IEEE CASE, 2022** [Website] [pdf]
  - Addressed the problem of navigation of Micro Air Vehicles (MAVs) amongst urban high-rises with a single monocular camera as the essential sensing modality instead of the depth cameras used in other methods
  - Implemented radial flow and conducted experiments to test our work on AirSim environment, compared with other popular flow-based obstacle avoidance methods and **showed successful avoidance on 93.75% of the cases**

Invento Robotics — Oct 2020 – June 2021
Navigation Intern — *Bangalore, India*

- **URDF**: Designed the Unified Robot Description Format (URDF) models for the C-Astra and the RoboDoc robots and demonstrated their applicability in the development and testing of SLAM and navigation algorithms on simulation
- **HealthCare Mitra**: Integrated multiple healthcare devices including a wireless stethoscope, Bluetooth scale and an infrared thermometer with the Mitra Robot for healthcare for automated vital tests, allowing doctors to assess patients remotely
- **Fleet Portal**: Completed ROS data integration from robots to a web portal built to remotely operate robots and collect data to analyze their real-time functioning

Academic Projects

1. **Advanced Path Planning: Batch Informed Trees** [Code][Report]
   - Coded the Batch Informed Trees algorithm from scratch, and tested its performance in R2 space for different motion planning scenarios using a custom-written visualizer.
2. **State Estimation: Investigating the Issues During Indoor-Outdoor Transitions**[Code][Report]
   - Explored some frequent problems faced when performing global state estimation during environment transitions using three key sensors: Stereo Camera, IMU, and RTK-GPS.