Rishabh Bhattacharya

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github.com/ribhattacharya linkedin.com/in/rishabhbhattacharya

Education

UNIVERSITY OF CALIFORNIA SAN DIEGO

MS IN MECHANICAL ENGINEERING

Mar 2023 (exp.) La Jolla, CA

GPA: 3.97/4.00

- Emphasis on Robotics and Control

INDIAN INSTITUTE OF TECHNOLOGY GANDHINAGAR

B.TECH (WITH HONOURS) IN MECHANICAL ENGINEERING

2015-2019 Gandhinagar, India

GPA: 8.53/10.00

Coursework

GRADUATE

Planning and Learning
Robotics (A+)
Sensing and Estimation
Mathematics for Robotics
Computer Vision
Non-Linear Systems
Linear Systems Theory (A+)
Linear Control Design (A+)
Non-linear control (A+)
Safety in Autonomous Systems

Skills

PROGRAMMING

Python • C++ • MATLAB • SQL

MISCELLANEOUS

ROS • Linux • LaTeX • Microsoft Office • Git

Internships

ROBOTICS RESEARCH INTERN

OMRON RESEARCH CENTER OF AMERICA (ORCA)

Jul 2022 - Sept 2022 San Ramon, CA

- [Python, C++, ROS] Developed a **trajectory planner** for a 7-DOF Franka Emika Panda robot which avoids moving obstacles by using motion prediction

Projects

PLANNING AND LEARNING

DYNAMIC PROGRAMMING, PATH PLANNING, OPTIMAL CONTROL

Mar 2022 - Jun 2022 UC San Diego

- [Python] Implemented **dynamic programming** to compute the optimal open-loop policy for a given doorkey environment. Used the optimal policy to instruct the agent to pick a key, unlock doors, avoid walls and reach the goal.
- [Python] Used a **weighted A*** path planning algorithm to determine the shortest path and intercept a moving target in an environment with obstacles.
- [Python] Applied a CEC controller to solve an infinite horizon discounted stochastic **optimal control** problem for reference trajectory tracking.

SENSING AND ESTIMATION

IMAGE SEGMENTATION, PARTICLE FILTER, VI-SLAM USING EKF

Jan 2022 - Mar 2022 UC San Diego

- [Python] Trained a probabilistic color model to recognize and classify recycling-bin specific blue color using **Gaussian Discriminant Analysis**
- [Python] Implemented **particle filter SLAM** using odometry, 2-D LiDAR scans, and stereo camera measurements from an autonomous car. Used the odometry and LiDAR measurements to localize the robot and build a 2-D occupancy grid map of the environment
- [Python] Implemented **visual-inertial SLAM** based on an **Extended Kalman filter** (EKF) to localize a robot and map its environment using synchronized measurements from an inertial measurement unit (IMU) and a stereo camera

ROBOT MOTION PLANNING

ROBOT TRAJECTORY GENERATION AND CONTROL

Jan 2022 - Mar 2022 UC San Diego

- [MATLAB] Implemented **trajectory generation and motion control** for a pick-and-place problem on a KUKA youBot 5 arm robot using coppeliaSim simulation package

SAFETY FOR AUTONOMOUS SYSTEMS

HAMILTON-JACOBI REACHABILITY

Sept 2021 - Dec 2021 UC San Diego

- [Python, MATLAB] Improved **safety guarantees** in RRT/A* path planning algorithms using Hamilton-Jacobi reachability