Urara Kono

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Philadelphia, PA, 19104, the United States

Technical Skills

Programming: Python, MATLAB, Simulink, C, C++   **OS**: Linux   **Language**: English, Japanese (Native)
Software: ROS2, Numpy, PyTorch, Git, PyChrono, Docker, Nerfstudio, OptiTrack, dSPACE, Eagle PCB, CAD
Hardware: PCB Milling Machine, Arduino, NVIDIA Jetson Xavier, IMU, GNSS, Wheel Encoder, LiDAR

Experience

xLab, University of Pennsylvania — *Graduate Research Assistant*   Oct 2023 - Present
- Leading a project of wheeled mobile robot for **off-road** racing. Set up a robotic platform by integrating electronics such as Nvidia Jetson, RealSense, Fixposition (GNSS, IMU, camera), LiDAR, and wheel encoders onto a RC car. Ran 3D SLAM with LiDAR and IMU. Developing a sampling-based **MPC** controller. - **debugging, ROS2, AI, ML**
- Simulated **MPC** for autonomous vehicles on multi-friction surfaces in a **vehicle simulator** PyChrono. [code]

Figueroa Robotics Lab, University of Pennsylvania — *Graduate Research Assistant*   May 2023 - Sep 2023
- Simulated the reachability of a robotic arm for collision avoidance in Python. - **Safety, matlab**

Scalable Autonomous Robots Lab, University of Pennsylvania — *Graduate Research Assistant* July 2021 - Apr 2023
- Computed the reachable sets and time-optimal paths of **multi-agents** under flow in Python.
- Conducted experiments with micro autonomous surface vehicles using OptiTrack and ROS. [report] [code]

Hori-Fujimoto Laboratory, The University of Tokyo — *Undergraduate Research Assistant*   Feb 2020 - Mar 2021
- Developed a **localization** method for wheeled mobile robots on deformable terrain by estimating the wheel slip from wheel encoder and vehicle dynamics by an observer using **MATLAB/Simulink, dSPACE and CAN**. [Paper]

Projects

Learning Local Ocean Flows Using Neural ODEs Neural Network, PyTorch [report]   Dec 2022
- Learned the dynamics of the time varying/invariant double gyre flow using Neural ODEs.

Optimal Control and State Estimation on different robotic platforms   Sep 2022 - Dec 2023
- Implemented controllers of a planar arm by **LQR**, **iLQR**, **MPC**, and **Reinforcement Learning**
- Implemented **SLAM** of a humanoid robot with IMU and LIDAR by **Particle Filter**

Visual Inertial Odometry and Motion Planning of Quadcopter [report]   Jan 2022 - Apr 2022
- Estimated the pose of quadrotor with IMU and stereo camera pair using Error State **Kalman Filter**.
- Implemented graph search algorithms such as **Dijkstra** and **A*** to find obstacle free paths.
- Implemented non-linear geometric controller and minimum-jerk trajectory generator for smooth trajectory.

A Rocket Launch for International Student Satellites (ARLISS) [poster] [article]   Apr 2019 - Oct 2019
- Designed and fabricated a **PCB** for a casing deployed by a rocket at 4km height. Achieved the world record of fixed-wing aircrafts flyback.

Publication

U. Kono, H. Fujimoto and Y. Hori "Localization of Wheeled Robots from Slip Ratio Estimation with Simple Model," IEEE International Conference on Mechatronics 2021, Mar 2021. [Conference Paper]

Education

University of Pennsylvania   July 2021 - Aug 2024 (Expected)
Master of Science - Electrical Engineering (GPA: 3.88 / 4.00)   *Philadelphia, PA*
Interests: Robotics, Control Theory, Motion Planning, Optimization, State Estimation, Sensor Fusion, Machine Learning, AI
The University of Tokyo   Apr 2017 - Mar 2021
Bachelor of Engineering - Electrical and Electronics Engineering (GPA: 3.55 / 4.00)   *Tokyo, Japan*