Yuxiao (Sonia) Lai

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EDUCATION

Northwestern University   **Evanston, IL**
M.S. in Robotics, GPA: 3.93/4.00   *Sept. 2020 - Aug. 2021*

Rose-Hulman Institute of Technology   **Terre Haute, IN**
B.S. in Mechanical Engineering, GPA: 3.77/4.00   *Aug. 2016 - May 2020*
Minor in Robotics, GPA: 4.00/4.00; Computer Science, GPA: 3.70/4.00; Japanese, GPA: 3.83/4.00

Selected Courses: Robotic Manipulation, Embedded Systems in Robotics, Machine Dynamics, Sensing Navigation and Machine Learning for Robotics, Electrical Systems, Mechanical Systems, Control Systems, Mechatronic Systems, Intro to Nonlinear Theory, Data Mining, Introduction to AI, Machine Learning

PROJECT

Myo Gesture Recognition and Robot Arm   **Evanston, IL**
Program Final Project   *Spring - Summer 2021*
- Learned sEMG signal acquisition, processing, and analysis to relate arm muscle motions with hand gestures
- Learned to use Self-Calibrating Asynchronous Domain Adversarial Neural Network (SCADANN) to recognize hand gestures from sEMG signals recorded in the 3DC dataset
- Verified SCADANN improves accuracies in classifying sEMG signals recorded in the long-term Myo dataset across days, users, and wearing locations without recalibration by 12±5.2%, (avg±sd), 9.6±5.0%, and 9.3±3.5%
- Confirmed that better selection of initial model and incremental source data increases overall testing accuracy from 68.8% to 81.5%
- Acquired, processed, and analyzed sEMG and IMU signals from two Myo armbands to control a PincherX 100 robot arm for grabbing and placing an object
- Designed control scheme to allow mapping right arm joints and hand gestures with the robot joints

TurtleBot SLAM   **Evanston, IL**
Sensing, Navigation, and Machine Learning for Robotics Course Project   *Winter 2021*
- Showed a TurtleBot's odometry, slam, and real trajectories in rviz with slam and real obstacles
- Wrote ROS nodes to control a burger TurtleBot with a commanded twist
- Designed C++ libraries to perform 2D rigid body transformations, calculate forward and inverse kinematics of a two-wheel-robot, implement Feature-Based Kalman Filter SLAM, and detect landmarks from laser scan information
- Wrote ROS node to simulate noises while running a burger TurtleBot in the real environment with user-specified obstacles

Fast Tower   **Evanston, IL**
Group Member, Embedded Systems Final Project   *Nov. 2020*
- Controlled a Baxter robot to stack a fixed number of cups into a tower
- Built a system with Baxter ROS Interface and ROS MoveIt to plan and execute fast and stable arm motion to grab and place cups with random or specified locations
- Used ROS Apriltag to detect cups within the workstation and generate coordinate frames in rviz
- Designed a simulated environment in Gazebo for debugging before running the system on the actual robot

SKILLS

Technical: Git, Linux, SolidWorks, MATLAB, MongoDB, Firebase, PyTorch, OpenCV
Software Programming: Java, JavaScript, HTML, CSS, Kotlin, XML, Python, C/C++
Robot Programming: MPLAB, Arduino, ROS, Gazebo, MoveIt
Languages: Chinese (Native), English (Fluent), Japanese (Intermediate), French (Entry Level)