Kyle Wang

kylewang239@gmail.com | (732) 501-2292 | kylew239.github.io | linkedin.com/in/kylewang239

EDUCATION

Northwestern University **Evanston, IL**
M.S in Robotics *Sept 2023 - Dec 2024*

Case Western Reserve University **Cleveland, OH**
B.S.E in Electrical Engineering, Concentration in Robotics *Sept 2020 - May 2023*

SKILLS

Software Development: C++, Python, C, Git, Linux, Bash, Unit Testing, CMake, AWS, MATLAB, Django, Java
Robotics: ROS/ROS2, RVIZ, SLAM, Robot Kinematics, MoveIt, Path Planning, Feedback/Control Systems, AprilTags
Simulation: Gazebo, CoppeliaSim, Custom Simulation Environments, Sensor Simulation, Software-in-the-Loop
Hardware: Embedded Systems, Microcontrollers, Mechatronics, Unmanned Aerial Vehicles (UAVs)
Machine Learning: PyTorch, Reinforcement Learning, Imitation Learning, Diffusion Policy, Computer Vision, OpenCV

WORK EXPERIENCE

Astranis - Hardware Integration / Production Software Engineer Intern **Jun - Sep 2024**
- Automated rigorous hardware testing in an aerospace environment using Python and environmental chambers
- Utilized OpenHTF (Open Hardware Testing Framework) to interact with hardware, test equipment, and analyzers
- Created simulated flight cameras for software-in-the-loop testing to help address a lack of hardware

Cleanr - Innovation Engineer Intern **Mar - Aug 2023**
- Built a data logger system and website with NI DAQmx and GWeb to allow real-time and historical data access
- Collaborated with other engineers to design a PCB for a custom microcontroller board with a STM32 chip

PROJECTS

Robotic Learning from Demonstration Pipeline for Automated Shepherding **Mar - Dec 2024**
- Created a Python simulation to collect human demonstrations for controlling a robotic shepherd in a shepherding task
- Employed a generative action machine learning model using PyTorch to generate robotic shepherding actions
- Analyzed models using loss functions and simulation trials to tune training parameters and observation features
- Successfully herded sheep with a model and created an algorithm scaling the model to herd varying amounts of sheep

Autonomous Drone Swarm for Light Painting **Jan - Mar 2024**
- Generated quadcopter waypoint trajectories using OpenCV Canny Edge Detection and Nearest Neighbors Algorithm
- Created a controller wrapping the Crazyswarm2 API to fly a quadcopter and control its LEDs based on a trajectory
- Utilized ROS2 to create multiple nodes to interact with quadcopters, a DSLR Camera, and a motion capture system
- Successfully coordinated multiple quadcopters to create light paintings

Simultaneous Localization and Mapping (SLAM) From Scratch Using C++ **Jan - Mar 2024**
- Implemented an Extended Kalman Filter (EKF) SLAM algorithm from scratch in C++ using LiDARs and encoders
- Built a C++ Library for robot control, differential-drive robot kinematics, and odometry
- Created a simulation environment featuring collision detection, LiDAR, and a Turtlebot3 using C++ and ROS2
- Deployed algorithm in the simulation environment and on a Turtlebot3 robot

Industrial Robot Arm that Autonomously Makes Coffee **Nov - Dec 2023**
- Led a team of 5 students to program a 7 DoF Franka Emika Panda robot arm to brew pour-over coffee in Python
- Utilized ROS2, OpenCV, AprilTags, and various features of MoveIt including path constraints and inverse kinematics
- Implemented Software-in-the-loop testing to ensure reliable operations and to refine the pouring algorithm

Mobile Manipulation Simulation with CoppeliaSim **Nov - Dec 2023**
- Performed mobile manipulation in CoppeliaSim using a mobile robot with Mecanum wheels and a 5-DOF robot arm
- Generated a trajectory using robot kinematics and deployed a feed-forward controller and a PI controller in Python

Eagle Scout, Boy Scouts of America **Oct 2019**