Marco Morales

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Education

Northwestern University	Graduation: Winter 2022
Master of Science in Robotics	GPA 4.0
University of Illinois at Chicago (UIC)	Graduated: May 2021
Bachelor of Science in Mechanical Engineering	GPA 3.88

Skills

Technical: C++, Python, C, Robot Operating System (ROS), ROS 2, CAD, Gazebo, Manipulation, Navigation, Machine Learning, OpenCV, Behavior Trees, State Machines, Git, Docker

Experience

Robotics Software Engineer   January 2023– January 2025

Tubular Network - Austin, Texas

- Played a key role in developing advanced autonomous robotic systems, using ROS 2 and Python, for a fast-paced startup environment, successfully taking projects from concept to deployment.
- Designed sensor fusion pipelines with Time of Flight sensors, infrared break-beam sensors, and IMUs, enabling reliable localization in unstructured and dynamic environments.
- Diagnosed and resolved post-deployment issues, such as encoder miscalibrations and intermittent communication failures between motor controllers and their nodes, achieving 98% operational uptime.
- Collaborated with multidisciplinary teams to ensure seamless hardware-software integration and optimized system performance.

Robotics Engineer Intern   June 2021– September 2021

Argonne National Laboratory - Lemont, Illinois

- Integrated ROS control for two manipulators and a mobile robot simultaneously and autonomously to replace the need for human interaction with the robots.
- Created a model of the system in Gazebo to be controlled with MoveIt in a simulated lab environment.

Projects

RoboKeeper   November 2021-December 2021

- Collaborated in a team to enable an HDT Adroit to prevent balls from entering a goal using MoveIt, computer vision, and low-level controls.
- Developed the computer vision pipeline to detect the ball it has to block using OpenCV.
- Programmed actions for the robot to complete such as picking up a paddle, and going to home pose.

Delivery Helper   January 2022-March 2022

- Worked with a robot system composed of a Ridgeback and Sawyer arm to place objects as it follows a person around.
- Integrated the Ridgeback, Sawyer arm, and perception components to communicate with one another to ensure it is able to complete the delivery with gestures made by the person it is following.

SLAM Package   January 2022-March 2022

- Created a ROS Simultaneous localization and mapping package based on an Extended Kalman Filter (EFK) that can be applied to a real Turtlebot3 robot.
- Developed a simulator for the Turtlebot3 to visualize the SLAM results in a simulated environment.
- Created a C++ library for the kinematics of a differential drive robot and the EKF.

Dual Arm Retrieval Robot   March 2022-December 2022

- Developed a system composed of a UR16e, UR5e, and a MiR 250 to retrieve a medical isotope in a radioactive environment.
- Created a MoveIt configuration file for the system to allow for manipulation of both arms simultaneously and created the model in a Unified Robot Description Format.