ROBERTO CARRILLO AGUILAR

Worcester, MA | raguilar@wpi.edu | +1 (619) 679-5872 | linkedin.com/in/roberto-carrillo-aguilar | github.com/Roguillo

EDUCATION

Worcester Polytechnic Institute, Worcester, MA
B.S. in Robotics Engineering expected May 2027
Minor in Electrical and Computer Engineering | GPA: 3.68/4.00 | Dean's List: Fall 2023, Fall 2024

EXPERIENCE

Volunteer Research Assistant, RoboCare Lab May 2025

- Conducted Pepper robot perception tests and collected detection output
- Trained a Yolo model on hand-segmented images for improved accuracy
- Made adjustments to Python code, including updating file paths and adding parameters for testing

PROJECTS

4 DOF Robotic Arm for Ball Sorting, Unified Robotics III: Manipulation August - October 2025
https://github.com/Roguillo/RBE_3001

- Developed an autonomous sorting system implementing FK/IK/DK and trajectory planning to sort colored balls
- Implemented CV algorithm to detect balls and convert from pixel to task-space coordinates
- Designed custom functions for real-time motion control and trajectory execution in joint- and task-space
- Combined kinematics, vision processing, and manipulation for fully automated system

Mock Garbage Collection Robot, Unified Robotics II: Sensing March - May 2025
https://github.com/Roguillo/RBE_2002

- Collaborated with a team to develop an autonomous differential drive robot
- Developed gridless navigation using sensor fusion
- Incorporated an inertial sensor for precise movement control and a camera for object detection and alignment
- Implemented odometry for accurate path tracking and utilized an ultrasonic sensor for obstacle avoidance

ShopComp.online Web Application, Software Engineering October - December 2025
https://github.com/Roguillo/G.Project

- Built a serverless grocery store website using AWS lambda for backend and S3 for frontend
- Followed Entity-Boundary-Controller architecture for problem statement analysis and application design
- Integrated relational database using AWS RDS service and a ChatGPT-powered receipt scanner via the API
- Workflow consisted of developing features use case by use case locally, then merging and deploying to AWS

Snake Game on Tiva C Board using FreeRTOS, Real-Time Embedded Systems October - December 2025
https://github.com/Roguillo/ECE_3849

- Developed Tiva C application using FreeRTOS with tasks, queues, semaphores, and mutexes
- Implemented hardware drivers for LCD, joystick, and buzzer, configuring low-level peripherals
- Integrated system monitoring to display real-time CPU, stack, and task execution metrics
- Synchronized tasks and peripherals to ensure reliable input handling and execution timing

SKILLS

Programming Languages: embedded C/C++, Python, MATLAB, Java, Javascript, Typescript
Tools: GitHub, Arduino, VS Code, KiCAD, Oscilloscope/Multimeter, Serial Monitor, Linux, CMake, LaTeX
Technical Skills: Kinematics, trajectory & motion control, sensor integration, PID, FreeRTOS, state machines
Languages: Spanish (native), English (native), German (B2/upper-intermediate)

ACTIVITIES/LEADERSHIP

Vice President, German Club January 2025 - Present
Member, IEEE Student Branch February 2025 - Present
Member, Table Tennis Club August 2024 - Present