David Alex

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EDUCATION

Worcester Polytechnic Institute | Worcester, MA **May 2025**

Bachelor of Science in Robotics Engineering

- Relevant Coursework: Industrial Robotics, Robotic Navigation, Robotic Manipulation and Dynamics, Embedded Computing in Engineering Design, Control Engineering, Mechanical Applications in Robotics, Sensing and Perception in Robotics
- Research: YOLO Vision, Voice Commands, & End Effector Manipulation on a 3D-Printed Humanoid Robot advised by Pradeep Radhakrishnan and Taylor Andrews
- Club: Captain of the WPI Valorant E-sports Team

WORK EXPERIENCE

Li Industries:

Robotics Automation and Controls Engineer **September 2025 – December 2025**

- Created YOLO object detection models to be used in battery sorting operations to automate the sorting process in a battery sorting plant to be able to identify a wide range of differing chemistry of batteries.
- Developed an internal tool that a manual battery sorter would use to annotate and classify images to be able to capture a wide variety of data points the models could be trained on.
- Designed and optimized a pipeline for a pick and place operation with many scattered batteries on a conveyor belt needing to be sorted into a multitude of categories using the UR7e robot, a conveyor belt, as well as a Siemens PLC.

Stealth Startup:

Robotics Engineer Intern **June 2025 – September 2025**

- Contributed to the adaptation and integration of open-source ArduPilot and ROS 2 software for indoor autonomous navigation of ground and aerial robots using C++
- Developing a digital twin for construction robots, mainly working on simulation for now in ROS 2
- Implemented and tuned SLAM-based localization pipelines using LIDAR and IMU data to enable robust pose estimation

PROJECTS

End Effector Manipulation on a 3D-Printed Humanoid Robot:

Simulation Researcher **September 2024 – May 2025**

- Simulated a humanoid robot using CoppeliaSim, tested trajectory planning, inverse kinematics, and library implementations
- Implemented the IKPY python library to compute inverse and forward kinematics, which uses a URDF to describe the robot's geometries and joint positions
- Utilized object detection, face meshing, and OpenAI speech recognition to conduct human-robot interaction
- Conducted contactless temperature checks using an IR thermometer and Inverse Kinematics

Mobile Robot for Autonomous SLAM-Based Navigation:

Developer **October 2024 – December 2025**

- Developed an autonomous mobile robot capable of SLAM using LiDAR sensor data
- Implemented Monte Carlo Localization to perform accurate state estimation
- Integrated the A* algorithm and obstacle avoidance to navigate efficiently through the map
- Designed and tested frontier-based exploration algorithms to enable the robot to discover and map uncharted areas
- Utilized ROS to simulate and visualize with Gazebo and RViz and on a real map

TECHNICAL SKILLS

Languages: Python, C++, C, MATLAB, RAPID, Java, JavaScript, TypeScript, SQL, Racket
Robotics & Machine Learning: UR5e, ABB IRB Robots, CoppeliaSim, RobotStudio, ROS, ROS 2, PCL, MoveIt, Gazebo, Rviz, PyTorch, TensorFlow, OpenCV, SolidWorks, Fusion360, FEA, TF2, SLAM, AMCL, Computer Vision
Development Tools & Platforms: Linux, Arduino, Jetson Nano, React, GitHub, Node.js, VSCode, AWS, Jira, Agile, Scrum, Serial Communication (I2C/UART/SPI), Docker, Siemens PLC
Control Systems: State Estimation, PID Tuning, System Modeling, State Space Control, Localization