

# Alvin Zou

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## EDUCATION

**Carnegie Mellon University**, Pittsburgh, PA  
Master of Science in Robotics. GPA 4.0

**December, 2025**

**Carnegie Mellon University**, Pittsburgh, PA

**May, 2024**

Bachelor of Science in Electrical and Computer Engineering | Additional major in Robotics.

## EXPERIENCE

**Research under Professor Maxim Likhachev (CMU Search Based Planning Lab)**

**2024-2025**

- Co-authored *Attractor-based Closed List Search*, published and presented at IJCAI 2025.
- Developed an algorithm targeted for memory constrained applications such as drones, which improves the memory usage of A\* search by using a sparse closed list (average 91% reduction) while maintaining similar runtime complexity.
- Extending work by applying the sparse representation to speed up bidirectional search and using ML to learn the representation as subgoals to improve search efficiency.

**Teaching Assistant for 16-782 Planning and Decision-making in Robotics**

**August-December, 2025**

- Teaching assistant for graduate level class of 60 students for path planning and motion planning in robotics.

**Solution Architect Intern, Amazon Web Services, Seattle WA**

**May-August, 2023**

- Created a dashboard for data visualization of customer feedback from different events utilizing AWS services.
- Enabled cross event data aggregation/analysis, Improving data analysis efficiency for hundreds of internal employees.
- Received excellent reviews from the team.

**Machine Learning Software Engineer Intern, Cadence Design Systems, Austin TX**

**May-August, 2022**

- Initiated a project to enhance the efficiency of a scheduler by improving job cpu/ram predictions using an ensemble of ML models (neural networks and random forests) in Tensorflow. Received excellent reviews from the team.

## PROJECTS

**Robotics Project, Using Non-blocking Cells to Improve the Scalability of Conflict Based Search**

**January-May, 2025**

- Improved the efficiency of conflict based search by decoupling the problem into subproblems by finding non blocking cells within the map and assigning priorities to agents.
- Drastically increased the scalability of the algorithm, outperforming baselines such as Priority Based Search.

**Robotics Project, Mobile Manipulation for Buzz Wire Task using Unified Policy**

**January-May, 2025**

- Trained a mobile manipulator in Mujoco to complete the buzz wire task through an unified policy using proximal policy optimization. Designed the action/observation space, collision checking, and rewards for the robot.

**Robotics Capstone, Stair Climbing Food Delivery Robot**

**August-May, 2024**

- Designed and built a robot using system engineering principles that navigates and climbs stairs autonomously.
- Developed the navigation stack for the robot, with custom software for path planning and localization using python.
- Created custom software for the camera, including a stair detection algorithm using OpenCV.

**ECE Capstone, Analog Sequential Linear Programming Solver**

**January-May, 2024**

- Designed an analog computer consisting of a Raspi and a PCB that uses sequential linear programming to solve damped pendulum swing up with nonlinear model predictive control, demonstrating the feasibility of using custom analog computers to solve control problems faster than existing solutions.

**Robotics Project, Applying iSAM2 to Autonomous Racing Vehicle**

**August-December, 2023**

- Adapted iSAM2 from GTSAM as the SLAM framework for an autonomous race car, with a custom designed data association and loop closure routine based on the configuration of the race track.

**Robotics Project, Autonomous Vehicle Path Planning & Control**

**January-May, 2023**

- Created a simulation of AV navigation in a parking lot. Including creating lattice graph using motion primitives, finding best trajectory using weighted A\* search with collision checking, and path following using model predictive control with dynamics and environment constraints.
- Wrote the entire framework for path generation without libraries using python. Used libraries to perform mpc.
- Wrote a research report and presented my findings to the class. It was recognized as one of the top projects.

**Robotics Project, Robot Arm Manipulation**

**August-December, 2022**

- Programmed a six degree of freedom robotic arm to stack jenga blocks using matlab.
- Calculated the forward kinematics, analytical inverse kinematics and jacobians of the arm, and used them to generate a spline trajectory in the workspace for the robot arm to follow.

## ACTIVITIES & LEADERSHIP

**CMU Awareness of Roots in Chinese Culture**

**2019-2024**

- President of ARCC, led multiple cultural events that on average have over 200 participants.
- Directed the largest cultural play on campus with a cast of 40 students and performed in front of hundreds of students.