

Yunha Jo

626-487-7378 | yjo@caltech.edu | [linkedin.com/in/yunha-jo](https://www.linkedin.com/in/yunha-jo) | github.com/yunhaJo03

Education

California Institute of Technology

Bachelor of Science in Computer Science — GPA 3.9

Pasadena, CA

Sept 2021 – May 2025

Relevant Coursework

- Decidability&Tractability
- Database Systems
- Compilers
- Algorithms
- Functional Programming
- Computer Vision
- Machine Learning
- Robotics
- Artificial Intelligence
- Web Development
- Operating Systems
- Distributed Systems

Technical Skills

Languages: Java, Python, C, JavaScript, HTML/CSS, OCaml, Haskell, C++

Developer Tools: Git, VS Code, Visual Studio, IntelliJ, ROS2, PX4, Gazebo, Docker

Libraries: pandas, NumPy, Matplotlib, Tensorflow, Pytorch

Experience

Caltech Seismo Lab UAV Research

June 2024 – Now

California Institute of Technology

Pasadena, CA

- Led a UAV project focused on the detection, identification, and mapping of Precariously Balanced Rocks (PBRs) using advanced robotic and computer vision technologies as part of Professor Ross' group
- Developed a modular ROS-based system integrating real-time perception, mapping, and motion planning for autonomous exploration and data collection
- Designed containerized environments to ensure reproducibility and streamlined system deployment using Docker
- Conducted simulations and parameter tuning in PX4/Gazebo to enhance UAV performance and system reliability

PID Controller Project

April 2024 – November 2024

Protomer Technologies @ Eli Lilly

Pasadena, CA

- Developed and integrated a closed-loop PID controller system linking input and output scientific instruments, automating data-driven actions.
- Incorporated MX2 to measure blood glucose levels and calculate precise injection volumes and Harvard Instruments Pump 11 Elite for injection
- Programmed and fine-tuned algorithms for tighter feedback control in experimental setups
- Enhanced system accuracy and reliability through iterative testing and algorithm optimization

Teaching Assistant

September 2024 – Now

California Institute of Technology

Pasadena, CA

- Worked as a Teaching Assistant for CS133ab (Robotics) at Caltech, providing support to students by conducting office hours, grading, and offering one-on-one consultations

SNU Programming Languages Lab Internship

June 2023 – August 2023

Seoul National University

Seoul, South Korea

- Shadowed a project for creating parsers for Makefiles and Batchfiles in Professor Yi's Programming Languages Lab at Seoul National University
- Aimed to simplify Samsung's complex CI build system, which was fragmented and hard to understand The main objective was to determine which files were compiled with specific flags in the final build step.
- Helped define syntax and semantics for parsing and worked on creating Makefile parsers

SNU Inorganic Molecule Conversion Lab Internship

June 2022 – September 2022

Seoul National University

Seoul, South Korea

- Worked on synthesis and characterization of diphenyl-substituted acridane PNP ligand as visiting researcher at Prof. Yunho Lee's Inorganic Molecule Conversion lab at SNU
- Synthesized ligand was utilized in conversion of CO₂ into CO in carbon monoxide dehydrogenase reaction.
- Learned about experiment techniques and important research skills such as problem solving, data interpretation and analysis, time-management, and communication.

Projects

Robotic Tangram Constructor | *ROS*

January 2024 – March 2024

- Developed a robotic system using a 5 DOF arm and a Realsense Depth camera to recreate tangram configurations from images, involving piece detection, manipulation, and placement
- Implemented kinematics and trajectory planning with quintic task splines and gravity compensation for smooth, continuous operation
- Created software architecture enabling computer vision-based detection and human-robot interaction for collaborative tangram building

Autonomous Maze Navigation and Localization Game | *ROS*

February 2024 – March 2024

- Developed a hide-and-seek game where a robot uses A* algorithms to track a player in a maze with limited information
- Implemented path planning, maze mapping, and semi-perfect localization to balance exploration and pursuit
- Employed different robotics algorithms to create an engaging, interactive experience

Atlas Simulation | *ROS*

November 2023 – December 2023

- Simulated Atlas robot's running motion through leg and arm movements in Robotics Operating System (ROS)
- Engineered leg trajectories using sinusoidal function; motion was calculated using kinematic chain and physics
- Ensured that the arms effectively countered the leg movements at each cycle without encountering singularities

Full-Stack E-Commerce Store Development | *HTML, CSS, Node.js, Javascript*

May 2023 – June 2023

- Developed a beta version of a comprehensive full-stack e-commerce platform tailored to facilitate the buying and selling of used goods within the local community.
- Featured a versatile product display, efficient filtering, a shopping cart, and customer support
- Implemented user review functionality and promotional highlights for enhanced user experience

Database Website Project | *HTML, CSS, Node.js, Javascript, SQL*

February 2024 – March 2024

- Developed a web-based application to enhance course management and user experience for a school registration system
- Created features for seamless navigation between course offerings, schedules, and feedback systems
- Built a structured database using publicly available course registration data, simulating additional details
- Created role-based access for students to view personalized schedules and for administrators to manage course conflicts and registrations

On the Run |

May 2022 – June 2022

- Conceptualized and developed a Jetpack Joyride-type Scroller Adventure game with 3 other teammates
- Players navigate an escape scenario, dodging obstacles, and aiming to survive as long as possible
- Worked on features of the game such as game controls, complex physics, increasing challenges, and dynamic graphics
- Particularly focused on physics of the game, involving superfluid player movements, collisions among objects, and obstacle generation

Zip |

May 2023 – June 2023

- Developed a Zip utility program using C++, which included myzip and myunzip utilities for compression and inflation
- Implemented myzip0 and myunzip0 for basic compression and decompression
- Developed inflate function for decompression and huffman and lz77 algorithms for compression.

SSH |

May 2023 – June 2023

- Implemented a multi-precision number library in C for modern authentication protocols
- Developed an RSA key generator compatible with OpenSSH's standard implementation
- Created a custom library to handle multi-precision integers using 64-bit "limbs" for efficient computation

JPEG Algorithm |

May 2023 – June 2023

- Implemented JPEG compression using DCT, quantization, run-length compression, and Huffman encoding
- Developed JPEG_encoder and JPEG_decoder for conversion between JPEG and PPM image formats
- Handled pixel transformation, MCU processing, and Huffman decoding per JPEG specifications

Pintos Operating Systems Projects |

April 2024 – June 2024

- Developed a command shell and implemented Pintos features including threads, user programs, virtual memory, and file systems