Daniel Zhan

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Education

Johns Hopkins University - M.S. Robotics and Autonomous Systems: expected Dec. 2025

Notable Coursework: Artificial Intelligence, Algorithms for Data Science, Mathematical Methods for Engineers

Cornell University - B.S. Computer Science, Engineering Physics: graduated May 2023

Notable Coursework: Machine Learning, Robot Learning, Algorithms, Operating Systems, Computer System Organization, Analytical Mechanics, Electrodynamics, Electronic Circuits, Mathematical Methods for Physicists, Experimental Laboratory

Served as a Teaching Assistant for: Mechanics and Heat, Electromagnetism, Waves and Quantum Physics, Data Analytics

Experience

Software Engineer - Lockheed Martin | Aug. 2023 - Present

- Implemented server-side functionality to enable usage of a default radar search algorithm in Java and SQL.
- Executed build verification and regression tests for new backend features to identify and correct critical issues.
- Utilized debugging strategies and analytical tools to diagnose and eradicate various bugs and code inefficiencies.

Software Engineer - Cornell Mars Rover, Cornell University | Sept. 2020 - June 2023

- Upgraded the C++ robotic arm controls package from ROS 1 to ROS 2, reimplementing all core functionality and leveraging the MoveIt 2 motion planning library for collision-free path planning and trajectory generation.
- Implemented a control scheme using Forward Kinematics, enabling precise control over individual joint angles.
- Designed and implemented a control scheme using Inverse Kinematics, achieving a >90% reduction in completion time for complicated arm tasks by enabling direct end-effector position and orientation control.

Research Assistant - Cornell University | Sept. 2021 - May 2023

- Developed a computational quantum dynamics model of the diamond Nitrogen-Vacancy center in Python using the QuTiP package. Discovered a ~20% reduction in transition photoluminescence upon driving the defect at resonance.
- Developed upon a 2D two-fluid MHD simulation of an ablating plasma in Fortran 90. Experimented with various magnetic fields and material configurations to produce coherent plasma jets for use in nuclear fusion applications.

Physics Laboratory Technician Intern - Honeywell | June 2021 - Aug. 2021

- Developed an automated tester for Honeywell's ion trap chip, ensuring its electrical properties met all specifications.
- Reduced ion trap chip testing time by 95% through a Python-based test suite with live calibration, capacitance and resistance tests, custom settings, and a modern GUI, eliminating human error and simplifying testing procedures.

Projects

- **Locomotor-Terrain Interaction Simulation** (ongoing): I'm simulating robot traversals through various terrain types in collaboration with the Terradynamics Lab at Johns Hopkins University. I'm programming multibody dynamics simulations using Project Chrono in C++ to better understand animal and robot locomotion in complex terrain.
- **ML Classifiers on Iris Dataset**: I implemented several machine learning algorithms from scratch, including a Bayes Classifier, a Parzen Window Classifier, a Support Vector Machine, and an RBF Neural Network to classify flowers.
- **Aphelion Defense**: I led a team of 10 to develop a mobile video game developed in C++, featuring networked multiplayer. As team lead, I proactively fostered a productive and focused team environment, facilitated communication between different sub-teams, and mediated team conflicts and disputes. As a programmer, I implemented unit pathfinding algorithms as well as modular graphics and UI systems. This game is available in beta.
- **Flappy Bird AI**: I developed a reinforcement learning model to train on Flappy Bird using Python and PyGame. After learning for several hours, the AI achieved a score of over 10,000, an impossible score to achieve for humans.

Skills and Miscellaneous

Skills: Research, Robotics (ROS, MoveIt), Software Development, Computational Modelling, Circuit Design and Analysis, Machine Learning (Pytorch), Programming Languages (Python, C++, Java), Databases (SQL), Version Control (Git), Linux, Unix

Non-Career Interests: Competitive Badminton, Amateur Weightlifting, Strategy Games (Chess, Civilization V, Game Theory)