Daniel Zhan

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Education

Johns Hopkins University - M.S. Robotics and Autonomous Systems | Aug. 2024
Notable Coursework: Artificial Intelligence, Machine Learning, Reinforcement Learning, Robotics, Algorithms, Game Theory

Cornell University - B.S. Computer Science, Engineering Physics | May 2023
Notable Coursework: Machine Learning, Robot Learning, Algorithms, Operating Systems, Computer System Organization
Served as a Teaching Assistant for: Mechanics and Heat, Electromagnetism, Waves and Quantum Physics, Data Analytics

Experience

Software Engineer - Lockheed Martin | Aug. 2023 - Present | (Secret Clearance)

- Designed a MATLAB-based simulation driver framework to facilitate cross-company collaboration between Lockheed Martin and Raytheon, enabling efficient identification of discrepancies in simulation results. This streamlines cross-company debugging processes and reduces bug identification and resolution time by over 80%.
- Implemented Java-based functionality enabling Navy ship operators to quickly initiate radar searches by selecting pre-defined default search algorithms, eliminating the need to manually configure search areas and patterns. This streamlines operator workflow, reduces search setup time, and facilitates faster response to potential threats.
- Improved the handling of mission-critical alerts for Navy ship operators by implementing new C++ and Java functionality. This includes reducing alert frequency to minimize clutter and implementing an alert prioritization system that de-queues lower-priority alerts within specific groupings to ensure message clarity and prevent contradictions.

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

- Designed and implemented an Inverse Kinematics control scheme, enabling direct control of the end-effector's position and orientation. This resulted in a >90% reduction in completion time for complex manipulation tasks, such as retrieving geological samples, and a 300% increase in the number of tasks achievable during competitions.
- Upgraded the C++ control package of a 7-DOF manipulator arm from ROS 1 to ROS 2, reimplementing a Forward Kinematics control scheme and integrating the MoveIt 2 motion planning library to leverage the updated framework.

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.
- Experimented with initial conditions in a plasma dynamics simulation to produce plasma jets for use in nuclear fusion.

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

- Automated testing for Honeywell's trapped-ion quantum computer chips with a Python-based test suite to verify capacitance and voltage are within specifications. Reduced test time by 95% and measurement error rate by 99%.

Projects

- **Chess AI:** Developed a chess agent using reinforcement learning with the Proximal Policy Optimization and Monte Carlo Tree Search algorithms. Features a custom neural net to extract board info. Achieved an elo rating of ~1100.
- **Robot Maze Navigation**: Developed a software stack for a simulated robot in ROS2 Foxy to interpret sensor readings from lidar and odometry, internally map surroundings, and execute path planning algorithms to reach goals.
- **Aphelion Defense**: Led a team of 10 to develop a video game in C++. Fostered a productive and focused team environment and facilitated communication. Implemented pathfinding algorithms, modular graphics, and UI systems.

Skills and Miscellaneous

Skills: Research, Robotics (ROS 2), 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 Design