

# Quanting(Daniel) Xie

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## EDUCATION

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- **Carnegie Mellon University (CMU)** | GPA: 3.91/4.00 Pittsburgh, PA | 09/2021 - Current  
*Master of Science in Mechanical Engineering - Research Track*
- **Rensselaer Polytechnic Institute (RPI)** Troy, NY | 09/2017 - 12/2020  
*Bachelor of Science in Mechanical Engineering | GPA: 3.70/4.00*  
*- Innovator Award & Startup Founder Award*

## RESEARCH EXPERIENCE

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### CMU CLAW Lab - Object Goal Navigation in Outdoor Environments

 Pittsburgh, PA | 05/2023 - 09/2023

- Introduced the OUTDOOR (Outdoor Underspecified Task Descriptions Of Objects and Regions) task, which dramatically increases the complexity inherent in object goal navigation for outdoor settings.
- Introduced a novel use of LLMs as a planning agent to traverse real-world outdoor terrains with a Unitree Go 1 quadpad. Our approach imagines future notes for a RRT (Rapidly-exploring Random Tree) to improve agent success (+50.4%).
- Paper Link (Under Review for ICRA2024): <https://arxiv.org/pdf/2309.10103v1.pdf>

### CMU AirLab - RL-based Multimodal Local Planner

 Pittsburgh, PA | 09/2022 - 03/2023

- Developed a multi-modality(IMU, LiDAR, RGB) offline reinforcement learning model in the AirSim environment, aiming to be deployed as a local planner in robot navigation and exploration tasks.

### CeMSIM Lab - RPI

 Troy, NY | 06/2020 - 09/2020

- Developed a realistic VR Escharotomy Simulator in Unity and invented a quicker way to render the scalpel-cutting effect.

## WORK EXPERIENCE

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### Apple

 Shanghai | 02/2022 - 09/2022

#### *Manufacturing Design Engineer Intern*

- Designed automation layout optimization software (ALO) for the glue curing stations and reduced the total curing equipment by 36%. Techniques used are linear programming for task scheduling and PSO for best machine layout.
- Implemented RRT motion planning algorithm and polynomial trajectory to robot manipulators, shortened average pick and place time by around 30%.

### DeepWisdom

 Shenzhen, Guangdong | 06/2021 - 08/2021

#### *Product Manager Intern*

- Benchmarking algorithms Random Forest, KNN, and XGBoost with auto machine learning pipeline on ML tasks.
- Conducted a technical analysis and performance comparison on competitors in the AutoML industry, and collaborated with the web design and algorithm engineers to improve the company's product performance based on the result.

### United Aircraft Technologies

 Troy, NY | 09/2019 - 12/2019

#### *Mechanical Engineer Intern*

- Conducted the Finite Element Analysis to address stress concentrations on the product, and refined it using SolidWorks.
- Collaborated with the electronics team on a flexible PCB design that reduces the size of the product significantly.

## TECHNICAL SKILLS

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- **AI & Robotics:** DL, RL, ROS, Isaac Gym/Sim. Familiar with Unitree Go1/Alien GO quadpad.
- **Mechanical:** Lean Design for Six Sigma green belt. Familiar with CAD, FEA, CNC, 3D Printing.

## PROJECTS

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- **Solar Farm inspection simulation with Coverage Path Planning algorithm**
  - Used Cellular Decomposition method for coverage path planning over a randomly generated 2D terrain.
- **Simulation on Tesla Model 3 and Quadcopter Drone with Webot**
  - Implemented PID, LQR, MPC controllers on simulated Tesla Model 3 to investigate the relative performance differences and tuning methodologies.
  - Applied extended Kalman filter (EKF) that merges the odometer data with lidar sensor data to localize its position without global sensory data like GPS.
  - Designed a Model Reference Adaptive Controller (MRAC) on top of the baseline optimal controllers to accommodate accidents like 50% thrust loss in one motor.
- **Solar Panel Surface Defects Classification using Convolutional Neural Networks**
  - Finetuned ResNet50 and achieved 98.6% classification accuracy classification with a small self-collected dataset.