Ziyao Yin

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EDUCATION

Duke University GPA: 3.71/4.0 — Durham, NC
Master of Engineering (M.Eng.) Mechanical Engineering — *Aug 2023 -Dec 2024*
Graduate Certificate in Robotics & Autonomy
Courses: Robot Learning, Advanced Design and Manufacture, Experiment Desigh and Research Tools, Advanced Robotics, Model Predictive Control, Data Science and Machine Learning for Science and Engineering, Intro to Medical & Surgical Robotics

Rose-Hulman Institute of Technology — Terre Haute, IN
Bachelor of Science (B.S) Computer Science — *Sept 2019 - May 2023*
Dean's List, Rose-Hulman Global Scholarship
Courses: iOS App Development, Cross-Platform Mobil Development, Web Programming, Database Systems (SQL), Artificial Intelligence, Data Structures & Algorithm Analysis, Design & Analysis of Algorithms, Theory of Computation, Computer Networks

EXPERIENCE

Research - Distributed Denial of Service Attack Mitigation — Rose-Hulamn Institute of Technology
Python, C#, MergeTB, Ansible-playbook, DPDK Platform — *Aug 2022 - May 2023*
- **Developed and Simulated Client Puzzle Defense Mechanism:** Investigated modern methods to mitigate Distributed Denial of Service (DDoS) attacks by implementing client puzzle mechanisms, a cryptographic challenge that requires attackers to solve computationally expensive puzzles, making attacks more costly and less feasible
- **Conducted Comparative Analysis:** Designed and executed a series of simulations using the Merge Test Bed and DPDK framework to compare the effectiveness of traditional strategies (e.g., filtering and absorption) against client puzzle strategies
- **Authored Research Paper:** Co-authored a paper titled "Exploring Modern DoS Mitigation using Client Puzzles," which discusses a novel approach to DDoS mitigation leveraging scalable, dynamically adjustable client puzzles
- **Research Outcomes:** Demonstrated that our proposed client puzzle systems, particularly when combined with other mitigation strategies offer a robust defense against DDoS attacks by effectively balancing security and service availability

Software Development - Internship, Rose-Hulman Ventures — Terre Haute, IN
ASP.NET, Typescript, C#, SQL, Micro-service API — *September 2022 - March 2023*
- **Implemented a Dynamic Notes Feature:** Developed a notes page feature for each individual webpage, allowing users to take and save notes directly on the page they are viewing, increasing user engagement
- **Created a Comprehensive Report Page:** Designed and implemented a new web page enabling multiple account creations within the database, which improved the account setup process efficiency
- **Developed Full-Stack Infrastructure for Check Validation:** Built a full-stack infrastructure, including front-end and back-end components, to allow customers to file and manage invalid check entries against existing checks in the system. This solution improved the overall check validation workflow efficiency

PROJECTS

- **UR5e Robot Arm Arcade Sim (CAD, Gazebo, ROS, Planit, Python)** — *Fall 2023*
  - Developed an interactive arcade game using the UR5e robotic arm, with motion planning in ROS, Gazebo, and Planit. Designed and 3D-printed custom components to securely fit the arm's gripper, and implemented an Arduino-based sensory system to track scores and gameplay metrics
  - Programmed a Python-based motion planning script to execute precise end-effector paths, validated through both simulated and real-world tests, enhancing the game's difficulty and user engagement
- **Aircraft Orientation using Convolutional Neural Networks (Python, AlexNet, CNN)** — *Fall 2023*
  - Trained a deep learning model using the AlexNet architecture to determine aircraft orientation (Roll, Pitch, Yaw) using a combination of real and synthetic images generated through a custom Java program, simulating diverse flight conditions
  - Achieved high accuracy with a limited dataset by applying hyperparameter tuning and validation techniques, enhancing the model's reliability and applicability in real-time flight monitoring systems
- **Rose Market (Flutter Dart, Firebase) https://corssplat-finalproject.web.app:** — *Winter 2022*
  - Developed and published a cross-platform marketplace application (Web, Android, iOS) using Flutter Dart and Firebase, designed to facilitate seamless buying and selling of products. Implemented features such as product listing with images, dynamic updates, and user-specific authentication to secure access and enhance user experience
  - Enhanced user engagement by integrating automated email notifications for new product listings and user interactions. Developed a custom backend using Firebase to store and manage data efficiently
- **Zone - iOS Message Application (Swift, Firebase) Project Page** — *Summer 2021*
  - Led the development of an iOS messaging app using Swift and Firebase, featuring secure user authentication and account management. Implemented core functionalities including a registration and login system, user profile customization, and secure storage for user data using Firebase authentication
  - Developed additional features such as dynamic content creation, photo uploads, and a real-time feed for sharing and viewing content, enhancing user engagement and satisfaction. Created a favorite content feature and a streamlined user interface with navigation elements, resulting in improved user retention and usability

SKILLS

- **Coding**: Java, Python, Flutter Dart, JavaScript, C, C#, C++, TypeScript, Swift, MySQL, Scheme
- **Development Tools**: ROS, CAD, Arduino, Matlab, Github, Firebase, ASP.NET, Gazebo, Planit