Matthew Jiang

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Education

University of Southern California, B.S. in Computer Engineering and Computer Science   Expected May 2025

W.V.T. Rusch Engineering Honors Program – Research Track

- GPA: 3.78/4.0
- **Coursework:** Data Structures and Algorithms, Networking, Embedded Systems, Computer Architecture, Machine Learning, Natural Language Processing, Digital Circuit Design, Operating Systems, System-on-Chip, VLSI, Probability Theory

University of California, Santa Barbara, B.S. in Computer Science   September 2021 - June 2022

Professional Experience

Software Engineering Intern, Safran Passenger Innovations – Brea, CA   June – Aug 2024

Safran Passenger Innovations is a leading provider of in-flight entertainment and connectivity systems.

- Reproduced and fixed various bugs given tight time constraints to demo product to Air France clients.
- Created service to monitor DHCP status and reset DHCP assignment of handheld control devices in first class seats.
- Replaced existing automated testing framework with a new Gherkin based python framework called Behave. Reimplemented existing test processes for compatibility with this new framework.

Embedded Software Engineering Intern, Singular Medical, Inc. – Irvine, CA   June – Aug 2022

Singular Medical, Inc. is a medical device company that develops implantable cardiac defibrillators and monitors.

- Developed firmware and software for a device to play electrocardiogram records to be read by ICD (Implantable Cardiac Defibrillator) software. Developed simulator software which connects to an ICD via TCP/IP protocol and simulates various commands and heart situations

Research Experience

Undergraduate Researcher, Robot Locomotion and Navigation Dynamics, University of Southern California   June 2023 - Present

Funded by NASA's LASSIE grant.

- Perform research to create a novel navigation algorithm for extraterrestrial robotics that considers information reward and locomotion risk due to differences in terrain shear strength, for environments with non-physical blocking obstacles.
- Participate in laboratory meetings to present research on various robotics literature.
- **Proposed Thesis:** Risk Aware Reactive Navigation for Granular Terrain Exploration

Undergraduate Researcher, Dynamic Robotics and Control Laboratory, University of Southern California   April 2023 - December 2023

- Created software that allows quadrupedal robots to mimic human actions.
- Used open-source pose estimation software to track human movements, used reinforcement learning to allow robots to learn how to mimic these movements.

Publications

Risk Aware Reactive Navigation for Granular Terrain Exploration   In Preparation

Matthew Jiang, Shipeng Liu, Feifei Qian

Activities

USC Autonomous Underwater Vehicle (AUV) Design Team – Los Angeles, CA　　　　August 2022 - Present

- Recruit and lead a group of about a dozen engineering students to develop software for an Autonomous Underwater Vehicle. Delegate tasks and personally assist the team in learning robotics software.
- Design software architecture for new custom submarine used in the annual RoboSub Competition
- Implment networking systems such as DHCP and DNS servers on an Nvidia Jetson Orin to allow for networked communication between devices on the AUV.
- Dockerize ROS based services for submarine components.
- Designed a TCP/IP based thruster control server to interface with an RP2040 microcontroller and Wiznet W6100 networking chip based PWM generation system.
- Organized a panel discussion that had 40+ attendees with robotics industry professionals, including the CEOs of RoboMart and Sorting Robotics, and engineers who worked on the Apple Vision Pro.
- Organized a mixer event that had 150+ attendees for engineering students to network, planned social activities within the mixer and set up panel discussions with industry professionals.
- Communicate with USC Viterbi School of Engineering faculty to secure funding and resources for the team.

Projects

Wumbo Game – 2024 USC IEEE Hack IOT 1st Place Winner

- Inspired by the video game Guitar Hero, Wumbo is an IOT rhythm game controlled by an embedded systems powered physical guitar unit. Wumbo included a physical guitar controller which utilized an ESP32 to connect via Wi-Fi with a custom designed rhythm game written in C++ using SDL libraries.

FPGA Blind Maze Game

- Implemented a game on an FPGA board (Digilent Nexys A7) using Verilog. The game was displayed on a VGA monitor and controlled by the FPGA's button inputs. Randomly pregenerated mazes were loaded into the FPGA's memory and displayed on a grid coordinate system with the player. The player's goal was to navigate the maze without hitting a wall, with maze blocks becoming invisible after a short period of time.

Technologies

Programming: C, C++, QML, Python, Rust, C#, Java, Verilog, System C, Bash, MIPS, x86

Platforms: Docker, MQTT, Jira, git, Linux, SQL
Robotics: ROS, Gazebo, Kernel-based Estimation, Control Theory, PID, LQR, MPC

Honors and Awards

- Dean's List – All Semesters
- VEX Robotics Competition – 2019, 2020 California State Champion, 4x World Championship Qualification
- Eagle Scout – Boy Scouts of America, Troop 645