Qiche (Lucas) Sun

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Education

University of Waterloo *Computer Engineering(BASc) - 4.0GPA* **Sept 2024 – May 2029**

Experience

Research Assistant *UW Assistive Robotics Lab, Waterloo, ON* **Jul 2023 – Jul 2024**

- **Evaluated stress response** during **exoskeleton**-assisted walking through **Galvanic Skin Response** signals.
- Developed a **binary classification algorithm** in **python** for GSR signals using trained **KNN/Naive Bayes classifie**r to classify stress in unlabeled data. Analyzed gait data from **EMG** sensors and **ground reaction force**
- Applied **principal component analysis** and **statistical tests** to assess stress response patterns.
- Statistical analyses were performed using the **two-tailed Wilcoxon Signed-Rank** and the **Friedman test** to evaluate the correlation between the distribution of phasic components, the number of peaks, and the selection of exoskeleton controllers.

Mechanical Design Member *Rebel 2702 – FIRST Robotics Competition, Waterloo, ON* **Jun 2023 – Apr 2024**

- Designed and implemented **CAD models** critical to the **climbing mechanisms** of the robot using **SolidWorks**.
- Machined parts and contributed to final assembly and integration.

Website Designer *Good Land Home and Essentials Ltd, Remote* **On Going**

- Developing a responsive **house-renting platform** using **React**, **Vite**, and **TypeScript**.Implementing dynamic features, including user-submitted housing applications and **mobile-friendly** interfaces.

Student Design Team

Processor Board Firmware Design *Waterloo Rocketry* **Sept 2024**

- Developed and implemented a **UART interface** as part of **canards control board**(**STM32**) firmware, allowing for IMU module communication and serial debugging. Implemented reading from debugger for HIL testing.
- Utilized **mutexes** and **binary semaphores** to enable thread-safe, concurrent access to **UART** peripherals in **FreeRTOS**.

Selected Projects

STM32 Environment Detection Rover *Github* **Nov 2024**

- Designed and constructed a environment detecting **rover**, a system using two **STM32** boards, with one acting as a controller that communicate with rover using **UART** protocal.
- Implemented **ultrasonic sensing** with **interrupts** and **clock manipulation**, temperature measurement using **I2C**, and data transmission back to the controller via **UART** protocol.

Firefighter Robot *TEJ4MI Final Project* **Jan 2023 – Jun 2024**

- Created an **infrared sensor-based** autonomous robot capable of navigating through a **maze** and detecting fire.
- Designed and fabricated **PCB boards** for control and motor driver.
- Integrated an **8-bit PIC microcontroller** and developed a **BASIC** language program for navigation.

Visual Memory Aid Software for Dementia *Dorahacks* **Jun 2024**

- Developed an application to assist individuals with **dementia** by transforming memory journals into **visual networks** of human relationships. Developed **front-end webpage** using **Next.js** and deployed on **Vercel**.
- Integrated **OpenAI API** to process journal entries and generate relationship connections, using **vis.js** for visualizations of relationship networks, and **Neo4j Aura(Graph Database)** for data storage.

Skills

Software: Python, C++, Java, Ansys, Verilog, Matlab, FreeRTOS, HTML, CSS, React, Next.js, Scipy, Git
Technologies: ARM (STM32), FPGA (DE10-lite), KiCad