Elizabeth Shim

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SKILLS

CAD Design: Siemens NX, SolidWorks, AutoCAD, MicroStation, Revit, BIM360, Teamcenter, PDM, Autodesk
Hardware: Rapid prototyping, soldering, assembly design, cabling and wiring, drill press usage, heat setting, safety circuitry
Software: Python (Arduino, Serial, Script), C, JavaScript, HTML/CSS, Node.js, Docker, Git, Bash, Linux, MATLAB, Simulink

EXPERIENCE

Product Operations Support | Apple May 2024 - Aug 2024

- Conceptualized and assembled optical **modular systems** with adjustable degrees of freedom using extrusions and 3D printed **prototyped** components to enable and validate the vision research processes through DOEs and reduce setup time
- Retrofitted and 3D CAD **modelled** a new testing station in **NX** by redesigning hardware mountings and implementing safety barriers which ensured the correct hardware integration, leading to reliable imaging, accurate data collection, post production quality increase, and a **100%** improvement in **safety compliance**
- Designed and constructed a robust mechanical enclosure utilizing extrusions, incorporating **safety circuitry** to prevent accidental contact, and ensuring secure and safe interaction with the robotic system and enhancing operational safety
- Supported budget development and component replacements by **coordinating with vendors** for quotes, resolving part compatibility issues with manufacturing and improving system hardware

Mechanical Engineering Assistant | Arcadis IBI Group Jan 2024 - Apr 2024

- Revised shop drawings and submittals in **MicroStation**, ensuring accuracy and compliance to design specifications
- Performed **airflow and thermal load calculations** for fan and louver selections, designing and sizing exhaust fan systems to meet Ontario building code requirements
- Modelled selected fans, **HVAC systems**, equipment, plumping pipes, compressed air drops, and pneumatic systems in **Revit**, coordinating with external teams for integration and ensuring accurate system representation and layout
- Contributed to the design and sizing of pipes, plumbing fixtures, drainage systems, and domestic water systems, ensuring **optimal functionality** and **compliance** with project specifications

Advanced Research and Collaboration Engineer | Christie Digital Systems May 2023 - Aug 2023

- Designed and prototyped a robot that projected focused content while in motion by integrating features such as a lidar depth sensor and dynamic projection mapping
- Utilized an **Arduino** and **servo motors** to implement a **crank lever mechanism** to eliminate the need for manual focus adjustment on a projector, enabling real-time, precise adjustment and **reducing** the time required to locate the optimal focus position of at least **5 seconds**
- Established data transmission between the **Arduino** and the **Jetson Nano** via **serial USB communication**, along with **WebSocket** integration between the Jetson Nano and a backend database, resulting in **immediate** transmission rates and improving data exchange efficiency
- Investigated and integrated an open-source speech-to-text service into the robot's functionality using **Docker**, optimizing voice command recognition and execution and reducing errors by 40% to improve user experience

PROJECTS

Robotic Car Sept 2023 - Dec 2023

- Assembled an autonomous robot using a **STM32F01 Nucleo 64** board, integrating RGB and IR sensors and implementing motor control and characterization through **PWM modulation**
- Utilized **analog-to-digital converters** to acquire sensor readings and converted to readable custom formatted data
- Configured the robot's behaviour with a PID controller for **autonomous** line navigation and task execution using polling and global **interrupts** to ensure prompt responses to dynamic system changes

EDUCATION

University of Waterloo - Mechatronics Engineering, Co-op (BASc - Honours) Sep 2020 - Apr 2025

Relevant Courses: Graphics and Design, Circuits, Mechanics of Deformable Solids, Microprocessors and Digital Logic, Linear Systems and Signals, Sensors and Instrumentation, Microprocessor Systems and Interfacing, Kinematics and Dynamics of Machines, Actuators and Power Electronics, Electromechanical Machine Design, Automatic Control Systems, Digital Controls

Cumulative GPA: 3.7/4.0