Sachi Bharwada

smbharwa@uwaterloo.ca | (416)-450-6190 | linkedin.com/in/sachi-bharwada | github.com/sachi-bharwada

Tools & Technologies

Languages: Python, C++, HTML, CSS, JavaScript, MATLAB
Other Tools: OpenCV, Pygame, Arduino, CVZone, MediaPipe, Git, OpenGL, SolidWorks, OnShape, Figma, Visual Studio, FDM/SLA, Soldering, Microsoft Office, CNC machinery

Work Experience

Hardware/Mechanical Engineering Intern | Sienci Labs — **May 2023 – Aug 2023**

- Engineered and programmed an **automated tapping system** achieving an **85% reduction** in tapping errors compared to manual methods; successfully produced **over 400 accurate threads** per hour.
- Deployed a precision **D-Shaft Milling Machine Jig**, leveraging **3D printing** and **CAD design**, expediting production by **50%** through a streamlined, rapid process for achieving uniform D-shaped profiles on motors.
- Designed a telescopic **Torque Reaction Arm** for **ergonomic enhancement** in industrial fastening processes, integrating aluminum tubes, precision bearings, and 3D-modelled components to revolutionize **fastening efficiency**.

Projects

Computer Vision-based Robotic Hand Using Python, Arduino, OpenCV, and MediaPipe | Solo Project — **Aug 2023**

- Utilized Python libraries to capture and analyze hand gestures from live webcam feed with **over 90% accuracy.**
- Enabled real-time control of the robotic hand's five fingers, **responding to user's gestures** with a latency of less than 1500ms.
- Established **bidirectional serial communication** between Python and Arduino for transmitting control data.

Personal Website Using HTML, CSS, and JavaScript | Solo Project — **Jul 2023**

- Utilized **ScrollReveal.js** to implement interactive scroll animations and employed **Typed.js** to show rotating professional titles.
- Implemented **CSS flexbox and grid systems** to achieve consistent and responsive design across various screen sizes.

Zelda-Themed Game Using Pygame and Python | Solo Project — **Jun 2023 - Aug 2023**

- Implemented **collision detection algorithms**, enabling precise interactions between character/sword and enemy entities.
- Applied vector mathematics to calculate fireball trajectories to determine speed components for **realistic projectile motion**.
- Customized UI elements, combining **graphical and text-based cues** to deliver concise instructions and health status feedback.

B-Mode Beamforming in Ultrasounds Using C++ and OpenGL | Solo Project — **Dec 2022**

- Utilized OpenGL, C++, and beamforming algorithms to produce and **render ultrasound images** using echo data.
- Implemented linked lists to effectively organize and handle intricate multi-dimensional data.
- Created **personalized class libraries** featuring member methods and user-specified data.

Arduino-Based Plant Watering System Using C++ and Arduino | Solo Project — **Dec 2022**

- Utilized an Arduino to design and build a system and automate the process of watering a variety of plants based on the moisture level of the soil increasing the **lifespan of the plant by 35%.**
- Developed a C++ program to measure and monitor the moisture levels through the use of soil moisture sensors.

Motion Intruder Sensor using C++ and Arduino | Solo Project — **Jun 2022**

- Leveraged the Arduino microcontroller to orchestrate intricate control signals, ensuring servo movement accuracy.
- Crafted code to process ultrasonic transducer data, achieving rapid response times of **under 100 milliseconds** for servo activation upon detecting motion.

Leadership and Experience

Science Club President, Ontario | Richmond Green Secondary School — **May 2021 – June 2022**

- Collaborated with the executive team to lead a group of **20+ students**.
- Extended the school curriculum by incorporating post-secondary material **into multiple experiments** run by the club.

Education

B.A.Sc. - Honours Biomedical Engineering, Co-op | University of Waterloo | Waterloo, ON — **Sept 2022 - Apr 2027**

- Relevant Courses: Data Structures and Algorithms, Digital Computation, Engineering Biology