

# Zain Mahmoud

AI & Software Developer | 2B Mechatronics Student at the University of Waterloo

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🐙 [GitHub](#)

🌐 [LinkedIn](#)

🌐 [Website](#)

## Skills

- Team player with highly effective communication skills demonstrated through several successfully executed projects.
- Coding languages include Python, C++, JavaScript/TypeScript, HTML, CSS/SASS, on Linux, Debian, Windows, and MacOS.
- Fluent in full stack development tools such as ReactJS/React Native, Next.js Node.js, Flask, Selenium, Git, and Flutter.
- Database and cloud management systems PostgreSQL, GCP, AWS, with Azure Fundamentals certification (AZ-900).
- Robotics and AI driven, utilizing ROS2, TensorFlow, PyTorch, OpenCV, with Azure AI Fundamentals certification (AI-900).
- Skilled with data visualization tools including Excel, Tableau, and Python libraries such as Pandas, and Matplotlib.
- CI/CD implementation with GitHub Actions, with strong expertise in various software testing methodologies.
- Detailed oriented and focused to deliver high quality technical documentation.

## Education

### University of Waterloo, Waterloo, ON

2022 - 2027

Bachelor Of Applied Science (BSc) In Mechatronics Engineering Honors, Co-operative Program

Relevant Coursework: Digital Computation, Algorithms and Data Structures, Intro to Microprocessors and Digital Logic (GPA: 3.0/4.0)

### George Brown College, Toronto, ON

2019 - 2022

Advanced Diploma in Electromechanical Engineering Technology (GPA: 3.8/4.0; Dean's List)

## Relevant Experience

### Lead AI & Software Developer – AI Healthcare Planner

Feb 2024 – December 2024

#### Workhorse Health, Toronto ON

- Built interactive front end (React, Next.js) and back end (FastAPI, Uvicorn, Nginx, PostgreSQL) of an AI-powered healthcare planning app using OpenAI API, Langchain, and Hugging Face libraries for summarization, with CUDA for GPU acceleration.
- Created and implemented a RAG (Retrieval-Augmented Generation) database for medical information utilizing FAISS for singular use and Qdrant for multiple users to ensure accurate and efficient data retrieval, enhancing the app's capabilities.
- Developed a robust web scraping tool using Selenium, BeautifulSoup, and OpenAI's API to retrieve, clean, and embed text from trusted medical sources into RAG databases, ensuring secure data integration.
- Deployed the app using Docker with CI/CD pipelines (GitHub Actions) for scalable deployment in GCP, configuring an external load balancer to ensure public access and seamless communication between the front end and back end.

### AI & Software Developer

Feb 2023 – Present

#### UW Biotron Design Team - University of Waterloo, Waterloo ON

- Developed and optimized code for robotic prosthetic arm utilizing EMG mesh/fabric signal processed by ESP32, reducing the latency between the prosthetic and the EMG sensor by approximately 200 milliseconds (56% more efficient).
- Implemented a K-Nearest Neighbors (KNN) machine learning algorithm for fast performance to enhance prosthetic pattern recognition, utilizing full stack development to create a robust interface for monitoring and controlling the prosthetic arm.

### Hardware & Software Engineering Intern

Sept 2023 – Dec 2023

#### Hub and Neuroengineering Solutions (University of Lethbridge), Lethbridge AB

- Utilized Python to automate experimental caging systems to quantify the growth of test subjects as well as provide automated control environmental management.
- Enhanced animal detection algorithms with OpenCV, increasing recognition accuracy by 25% in controlled settings.
- Programmed a calibration system to efficiently tare autonomous systems to enhance data collection utilizing a PD controller.
- Documented project software, mechanical, and electrical design in a technical report for ongoing co-op students.

## Projects

### Personal Portfolio Website

May 2023 - Present

- Developed a responsive website using React, TailwindCSS, and Node.js to showcase projects, with a Llama AI chatbot for interactive user engagement (AI coming soon).
- Integrated Firebase for hosting and SQLite3 for efficient data management.

### Hand Gesture Controlled Mouse

March 2022

- Built an AI-powered mouse using Python, OpenCV, and PyAutoGUI for real-time hand gesture control.
- Enhanced accessibility with gesture-based commands and optimized performance using multithreading.