

# Zain Mahmoud

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

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## Skills

- Team player with highly effective communication skills demonstrated through several successfully executed projects.
- Coding languages include Python, C#, C++, Java, JavaScript/TypeScript, HTML, CSS/SASS, on Linux, Debian, Windows, and MacOS.
- Fluent in full stack development tools such as ReactJS/React Native, Angular + Nx, Node.js, Flask/Django, Selenium, Git, and Flutter.
- Database and cloud management systems PostgreSQL, SQLite, (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, Power BI, 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 Honors, Co-operative Program**

**Relevant Coursework: Digital Computation, Algorithms and Data Structures, Intro to Microprocessors and Digital Logic**

**Cumulative GPA: 3.0/4.0**

**George Brown College, Toronto, ON**

2019 - 2022

**Advanced Diploma in Electromechanical Engineering Technology**

**Cumulative GPA: 3.8/4.0; Dean's List**

## Relevant Experience

**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 200 milliseconds, approximately 56%.
- Implemented a K-Nearest Neighbors (KNN) machine learning algorithm for fast performance to enhance prosthetic pattern recognition, boosting user control to prosthetic response accuracy, and leading collaborative programming efforts among peers.

**Hardware & Software Engineer**

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.
- Programmed a calibration system to efficiently tare autonomous systems to enhance data collection utilizing a PD controller.
- Enhanced animal detection algorithms with OpenCV, increasing recognition accuracy by 25% in controlled settings.
- Summarized project software, mechanical, and electrical design in a technical report for ongoing co-op students.

**Junior Software Developer**

Jan 2017 – Sept 2022

**LeslieVille Home Improvements, Toronto ON**

- Formulated a Python-based visualization tool for real-time monitoring of construction projects, enhancing management of timelines and resources.
- Engineered an accurate construction quote app using the BeautifulSoup web scraping library to fetch real-time Home Depot prices, calculate costs with taxes, and predict future prices using XGBoost machine learning algorithm, boosting budget accuracy, and streamlining home projects.

## Projects

**Smart HUD Glasses (Ongoing)**

May 2023 - Present

- Integrated Raspberry Pi microcontrollers with air quality sensors and a security camera featuring AI facial recognition with YoloV8, enhancing environmental monitoring and security.
- Constructed a React and Flask-based system with MySQL for robust data visualization and management, improving accessibility and system reliability.

**Indoor Air Quality Relay (AQR)**

March 2022

- Enhanced a dual Raspberry Pi system with air quality sensors and AI facial detection which significantly improved response efficiency and strengthened security monitoring.
- Created and deployed a React-based user interface and Flask-driven backend using MySQL, increasing system reliability, and improving data accessibility.