Zain Mahmoud

AI & Software Developer | 2B 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++, 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 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 2023 – Present

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.
- Developed a robust web scraping tool using Selenium, BeautifulSoup, and OpenAI's API to retrieve, clean, and embed text from trusted medical sources, ensuring accurate and secure data integration into the AI-powered healthcare planner.
- 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.
- 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.
- Documented project software, mechanical, and electrical design in a technical report for ongoing co-op students.

Projects

Smart HUD Glasses (Ongoing) — May 2023 - Present

- Integrated Raspberry Pi microcontrollers with air quality sensors and a security camera featuring AI facial recognition, 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.