Hamzah Jamal-Eddin

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EDUCATION

Masters of Engineering - MSE, Computer Engineering Expected May 2028
University of Michigan - Dearborn GPA: 3.70

Bachelor of Engineering - BE, Computer Engineering Expected May 2026
University of Michigan - Dearborn GPA: 3.85

Associate of Science - AS, Engineering
Henry Ford College GPA: 3.95

Software and Data Engineering Boot Camp
Strayer University - Devmountain

EXPERIENCE

Research Assistant: University of Michigan, Dearborn, MI Oct 2024 – Dec 2024

- Contributed to the development of **xBOT**, a versatile robotic platform designed for high-fidelity testing of autonomous and connected vehicles.
- Analyzed BLE data transmissions from a commercial mobility platform to reverse-engineer proprietary command structures and evaluate the feasibility of external motor control.
- Investigated UART communication protocols to assess feasibility of hardware-level integration.

Associate Technical Consultant: Perficient, Livonia, MI Oct 2022 – Aug 2024

- Developed serverless **Azure Functions** using **TypeScript** and **Node.js** to create APIs that validate JSON data against strict schemas for a large utility provider.
- Engineered scalable data pipelines and automated reporting using **Databricks**, **pySpark** ,and **SQL**, utilizing **Lakehouse** architecture concepts to improve data accessibility.
- Optimized **CI/CD** pipelines by implementing **YAML**-based configurations, **PowerShell** scripting, and **Synopsys Black Duck** for automated open-source vulnerability scanning.
- Provided **Adobe Experience Manager (AEM)** support for an automotive client, managing CDN configurations, clearing cache, and updating **TOML** files via **Jenkins** to ensure site security and stability.
- Facilitated robust API quality through **Contract Testing** with **Postman** collections and **Jest** unit testing, ensuring 100% adherence to data contract specifications.
- Automated daily operational reports by scripting **Jenkins** jobs with **CRON** commands and generating dynamic **HTML** output for stakeholders.
- Provisioned cloud infrastructure using **Bicep** and managed containerized environments with **Docker** and **Podman**, focusing on server maintenance and Linux-based deployments.

Operations Manager: Kareem Mart Inc, Garden City, MI Sep 2019 – Present

- Streamlined inventory tracking and order fulfillment processes.
- Created technical documentation and visual aids.
- Collaborated with stakeholders to resolve issues.

Team Leader: First Robotics Competition, Dearborn Heights, MI Dec 2017 – Aug 2020

- Collaborated with multidisciplinary teams to design, build, and program competitive robots, gaining hands-on electronics and robotics experience.

PROJECTS

LoRaWAN based IoT Network Nov 2025

- Engineered a point-to-point LoRa link using two **Heltec ESP32** boards to transmit motion data over **LoRaWAN**.
- Integrated an **MPU6050** sensor to capture real-time acceleration and gyroscope data via the **I2C** communication protocol.
- Developed a reliable transmission protocol featuring **ACK**/**NACK** handshaking and **CRC** validation to ensure data integrity.
- Implemented a data parsing system to visualize real-time sensor readings and displayed on an integrated display.

Real-time Object and Emotion recognition Oct 2025

- Developed a real-time image processing system utilizing an **ESP32-CAM** to stream video data over **Wi-Fi** via **TCP** protocols.
- Integrated **YOLO** and **DeepFace** models to perform simultaneous object recognition and human emotion detection.
- Engineered a video pipeline using **OpenCV** for live frame capture, image preprocessing, and rendering of annotated output.
- Authored **Bash scripts** to automate multi-service startup and utilized **Conda** environments to manage complex library dependencies.

Binary Search Tree Explorer Dec 2024

- Developed a C++ application using the **Qt Framework** to visualize a **Binary Search Tree** data structure.
- Implemented recursive algorithms for node insertion, search, and deletion while maintaining tree integrity.
- Designed custom drawing logic to dynamically render node positions and connecting lines.
- Integrated data validation to monitor tree state.

Translate Mate Apr 2024

- Built a full-stack web app that facilitates cross-language communication by translating user input into multiple languages.
- Orchestrated real-time audio generation of translated text using the **Cloud Text-to-Speech API**.
- Deployed the application on **GCP** using **App Engine** and **Compute Engine** for scalable hosting and reliable performance.
- Leveraged **BigQuery** and **Cloud SQL** to store, manage, and analyze translation history for data-driven insights.
- Integrated **Cloud Storage** and **VPC Networks** to manage static assets securely and optimize internal traffic flow.

Space Invaders Game Apr 2023

- Developed a desktop arcade game using **C++** and the **openFrameworks** toolkit to replicate classic mechanics.
- Engineered a **Finite State Machine (FSM)** to manage transitions between the game states.
- Integrated responsive user input handling and an object-oriented scoring system to track gameplay progress.
- Managed dynamic memory for projectile and enemy fleet arrays to ensure efficient real-time rendering.

COVID-19 Data Science Study Oct 2022

- Conducted a comprehensive analysis the combined effects of COVID-19 and of geopolitical conflicts on economic stability.
- Utilized **Jupyter Notebooks** to perform data cleaning, exploratory analysis, and pattern recognition on selected datasets.
- Leveraged **Pandas** and **NumPy** for multi-source data integration and processing of datasets.
- Created visualizations using **Seaborn** and **Matplotlib** to illustrate trends.

Daily App Jun 2022

- Developed a full-stack web application using **Node.js**, **Express**, and **PostgreSQL** to assist users with daily tasks, motivation and focus.
- Integrated multiple **REST APIs** to provide real-time weather data, news headlines, and motivational content.
- Deployed the application and database via **AWS** and **Heroku**, implementing **dotenv** for secure API key management and ensuring a fully responsive design.

CLUBS AND ORGANIZATIONS

Tau Beta Pi Association - Michigan IOTA Engineering Honor Society
Intelligent Systems Club - TinyKart Designed and built an autonomous kart using robotics and embedded systems.

TECHNICAL SKILLS

Languages: C, C++, Python, JavaScript, TypeScript, VHDL, SQL, Bash, HTML, CSS

Frameworks & Libraries: Qt, openFrameworks, OpenCV, Express, React, Node.js

Data Science & AI: Databricks, Pandas, NumPy, Matplotlib, Seaborn, YOLO, DeepFace, Jupyter Notebooks

Cloud & Tools: GCP, AWS, Azure, Git, Docker, Linux, Conda, ArduinoIDE

Hardware: ESP32, Raspberry Pi

INTERESTS

Building PCs | Learning new skills | Exploring | Nature | Biking | Hiking | Web3 & Crypto | Open Source | Car Repair