

SUMMARY

Ph.D.-level Software Engineer & Machine Learning Researcher with 16+ years of experience developing high-performance applications, IoT solutions, and cutting-edge AI/ML systems. Adept in React, Python, C++, and PostgreSQL, with specialized expertise in image segmentation, multi-agent systems, LLM integration (OpenAI, Claude, LLaMA, Gemini), and network programming (socket creation, data communication). Published multiple peer-reviewed articles on medical imaging and computer vision. Passionate about optimizing system performance, real-time inference, and innovative workflows, from conceptual design to deployment.

CORE COMPETENCIES & TECHNICAL SKILLS

- **AI & Deep Learning:** PyTorch, CNNs, U-Net, ResNet, custom architectures, LLMs (OpenAI, Claude, LLaMA, Gemini)
- **Computer Vision:** Object detection, tracking, image segmentation
- **Networking & Data Communication:** Socket programming (TCP/UDP), real-time data transfer, protocol deployment
- **Web & Cloud:** React (front-end), Flask (back-end), Microsoft Azure, RESTful APIs
- **Programming & Scripting:** Python, C++, JavaScript/ES6, MATLAB, Java
- **Databases:** PostgreSQL, SQL (queries, optimization, data modeling)
- **IoT & Embedded:** C++ firmware, device-to-cloud communication (MQTT, REST), real-time data capture
- **Automation & Multi-Agent Systems:** Power Automate, LangChain, asynchronous pipelines
- **Software Development:** Agile methods, CI/CD, peer code reviews, distributed systems
- **Languages:** Fluent in English and Arabic

PROFESSIONAL EXPERIENCE

THEOSYM | Software Developer

Toronto, ON | Sep 2023 – Dec 2024

- **Full-Stack & Flask Implementations**
 - Built new features using React (front-end) and Python (Flask) microservices for internal prototypes and scalable APIs.
- **Advanced API & LLM Integration**
 - Designed APIs incorporating multiple LLMs (OpenAI, Claude, LLaMA, Gemini), enabling dynamic model selection based on request parameters.
- **Performance Optimization**
 - Achieved 80%+ reduction in API response times through asynchronous calls and optimized caching strategies; also resolved IoT bottlenecks to reduce response times by 40%.

- **Automation & Multi-Agent Systems**

- Created automated workflows with Power Automate and Python scripts; integrated multi-agent orchestration (Claude Sonnet API) for task distribution.

- **Peer Code Reviews & QA**

- Ensured maintainability and compliance with best practices via structured code reviews, leveraging Jest/Cucumber for test automation where applicable.
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TORONTO METROPOLITAN UNIVERSITY (Formerly Ryerson) | Ph.D. Researcher

Toronto, ON | Sep 2014 – Jan 2021

- **Deep Learning in Echocardiography**

- Developed a U-Net-based model for left-ventricle segmentation in poor-quality echocardiograms, achieving ~0.97 Dice scores for End Diastole (ED) and End Systole (ES).

- **Progressive Resolution & Data Augmentation**

- Implemented a multi-stage training regimen (low- to high-resolution), applying advanced augmentation (rotation, flipping, scaling) for robust real-world performance.

- **Real-Time Inference**

- Demonstrated ~0.05-second inference per image on standard GPUs, supporting near real-time clinical use.

- **Publications & Impact**

- Authored multiple first-author papers in high-impact journals on deep learning architectures for medical imaging; advanced the field of automated image analysis.
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SEBHA UNIVERSITY | Assistant Lecturer & Network Advisor

Sebha, Libya | Mar 2010 – Jun 2013

- Taught computer science fundamentals through hands-on labs in C++ and Python; mentored undergraduates on advanced research projects.
 - Led network installations and managed software configurations across the university, evaluating protocols like HTTP, WebSockets, SSL, WebRTC, and RTSP.
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UNIVERSITY OF MALAYA | Research Assistant

Kuala Lumpur, Malaysia | Sep 2007 – Sep 2009

- **M.Sc. in Computer Science – Specialization in Networking & Data Communication**

- Acquired strong skills in network programming, including creating and managing sockets (TCP/UDP) and implementing secure data communication.

- **Iris-Based Digital Signatures**

- Developed a novel technique for extracting unique iris signatures, secured by elliptic curve cryptography in a client-server application.

- **Testing & Validation**

- Employed scripting to ensure software reliability; integrated early test frameworks to catch and resolve defects pre-deployment.

- Deployed and maintained server hardware, operating systems, and critical patches across campus.
 - Developed internal administrative applications, improving workflow efficiency and end-user support.
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SELECTED PROJECTS

- **Dynamic LLM Integration Tool**
 - Python-based platform for on-demand integration of multiple LLMs, supporting large-scale AI workflows.
 - **Research Aggregator App**
 - Aggregates large volumes of web data, compiles into PDFs, and uses LLM-driven scoring for relevance filtering.
 - **Large Document Handling**
 - Employs LLM-based processing for lengthy documents (e.g., scientific papers, reports), enabling context-aware Q&A.
 - **Multi-Agent System**
 - Decomposes user tasks via LLM reasoning and distributes them among specialized agents, automating complex workflows.
 - **React & Flask Web App**
 - Real-time IoT device monitoring portal handling thousands of daily requests, deployed on Azure.
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EDUCATION

- Ph.D. in Electrical & Computer Engineering – Toronto Metropolitan University, 2022
 - M.Sc. in Computer Science (Networking & Data Communication) – University of Malaya, 2010
 - B.Sc. in Computer Science – Sebha University, 2000
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SELECTED PUBLICATIONS

1. Y. Ali et al., "Echocardiogram Segmentation Using Active Shape Model..." *Biomedical Signal Processing and Control*, 2021
 2. Y. Ali et al., "Echocardiographic Image Segmentation Using Deep Res-U Network..." *Biomedical Signal Processing and Control*, 2021
 3. Y. Ali et al., "Tracking Left Ventricle in Echocardiograms with a Hybrid Tracking Algorithm..." *Signal, Image and Video Processing*, 2023
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Keywords: Full-Stack Development, Machine Learning, AI, LLMs, React, Python, C++, Networking, Data Communication, Socket Programming, IoT, Edge Computing, Image Segmentation, Medical Imaging, PyTorch, Data Augmentation, Agile, RESTful APIs, Azure, Automation, Multi-Agent Systems, SQL, PostgreSQL, Deep Learning, Real-Time Inference.