Youssef Chouay

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EDUCATION

Masters in Computer Science - Thesis Ottawa, ON
University of Ottawa *Jan 2025 – Dec 2026*
- **Supervisor:** Vida Dujmovic (Wikipedia Link) | Received over **$52,000** in research scholarships

Bachelor of Applied Science in Software Engineering Ottawa, ON
University of Ottawa *Sept 2020 – Dec 2024*
- **Relevant Coursework:** Data Structures & Algorithms, Embedded Systems, Databases, Discrete Math, Real-Time Systems Design, Enterprise Architecture

EXPERIENCE

Artificial Intelligence Researcher May 2024 – Present
National Research Council *Ottawa, ON*
AI-Enhanced Building Automation (BAS) for Modern Facilities:
- **First-author, peer-reviewed paper** at **IEEE EPEC 2025**; presented live-building results on an AI agent layer for BAS.
- Designed and deployed **Python**/**LangChain** agents bridging BAS and LLM tools, cutting data-processing time and operator workload by **49%**.
- Built a **SQLite**-backed ingestion pipeline to process and integrate real-time BAS streams reliably.
- Partnered with **Delta Controls** and **Carleton University** to deliver AI building agents, achieving a **56%** reduction in maintenance costs via automated fault detection, predictive maintenance, and real-time alerts.

Enhanced Utilities chatbot:
- Built a multi-agent, tool-using utilities chatbot that explains bills, simulates alternate rate plans, and diagnoses anomalies by linking AMI data with **weather/holidays/tariffs**—turning raw usage into clear, actionable insights.
- Designed a **retrieval-augmented** policy/tariff QA layer with deterministic function calling and inline **citations**, ensuring every recommendation is auditable and compliant.
- Implemented a time-series engine (seasonal decomposition + change-point detection) to flag **spikes, persistent baseload, and overnight leaks**, then auto-generate plain-English "why it happened" narratives and savings playbooks.

Junior Software Engineer Sept 2022 – Aug 2023
Wind River Systems *Ottawa, ON*
- Designed and implemented an Automation Dashboard using **Angular**, **TypeScript**, and **Django**, with a **PostgreSQL** database, to streamline the management and analysis of services used by industry leaders such as **NASA, Airbus, and Ford**.
- Achieved over **90%** faster query execution and UI responsiveness by optimizing API endpoints, implementing efficient database queries, and reducing frontend rendering times.

Software Developer May 2022 – Apr 2024
University of Ottawa *Ottawa, ON*
- Redesigned and optimized the university's search engine using **PHP**, **MySQL**, and **Apache**, improving query response times by **80%**, benefiting over **5,000+ students** and saving the university over **$30,000** annually.
- Developed and deployed automation scripts using **PHP**, **Bash**, and **Cron jobs** to enhance search speed by **54%** and streamline data migration workflows.

Teaching Assistant Sept 2023 – Present
University of Ottawa *Ottawa, ON*
- Assisted in teaching **Graduate** classes such as **Machine Learning for Bio-informatics** and **Undergraduate** ones like **Data Structures & Algorithms**, **Design & Analysis of Algorithms**, **Programming Paradigms** and **Discrete Structures**.

PROJECTS

NLP Phishing Detection| *Bell Canada Research Project*
- Built a phishing detection system using **NLP** and computer vision (CNNs) for website classification and clustering, achieving **98.4%** accuracy.
- Developed a Chrome extension to integrate phishing detection directly into email clients and implemented an automated pipeline with **AWS S3** for retraining on new phishing data.

GeeGee's Intramural website | *Personal Project*
- Built a **GeeGees Intramural Sports Hub** from scratch using Next.js + TypeScript/Tailwind UI—delivering an accessible, responsive experience for thousands of students.
- Designed a **high-throughput Rust + Actix-web API** backed by **SQLx/PostgreSQL** that streams real-time standings, Elo ratings, and predictive match analytics with sub 20ms latency.
- Drove concurrency with async/await and strict type-safety to create a modular, fault-tolerant codebase that scales gracefully under heavy traffic.

Chess LLM Benchmark | *AI/ML Research Project*
- Engineered a **chess LLM evaluation framework** that rigorously assesses large language models against Stockfish at calibrated ELO ratings to determine true chess capabilities.
- Architected a **high-performance provider-based architecture** supporting OpenAI, Anthropic, and Google models with robust error handling, real-time metrics, and comprehensive PGN analysis for competitive insights.

SKILLS

Programming Languages: Python, Java, Go, Rust, C/C++, JavaScript/TypeScript, HTML/CSS, SQL, LaTeX
Frameworks & Tools: AWS CDK, React, Node.js, TensorFlow, Docker, Kubernetes, Firebase, Jira, Git, Mockito, Flask