

Johnnie Tse

B. A. Sc (Computer Engineering) Candidate
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EDUCATION

• Queen's University, Kingston, Ontario

2022 - 2027

Bachelor of Applied Science (BASc) in Computer Engineering

PROFESSIONAL EMPLOYMENT EXPERIENCE

• Freelancer.com

May 2024 - August 2024

Android App Development Freelancer

Remote

- Built a feature-rich proof-of-concept e-commerce Android application for my client's brand, **ChillnCharm**, from concept to delivery using **Kotlin, MVVM Clean Architecture**, and **Repository pattern**, creating a modular codebase that reduced future development time by an estimated 20%.
- Integrated **Retrofit** for accessing the **FAKE STORE API** and **ROOM Database** for local caching, achieving an **85% faster content load time** for cached content compared to API calls and enabling offline functionality.
- Developed and designed an intuitive UI/UX in **Android Jetpack Compose** (or **XML** if applicable) based on high-fidelity **Figma prototypes** that enhanced users' shopping experience, facilitating features like multi-category browsing, wishlist, and a shopping cart.
- Managed full project lifecycle and client collaboration using **Agile methodologies**, delivering the complete prototype on schedule & adapting to evolving client requirements.

• Foresoon Computer Engineering Company Limited

August 2023 - September 2023

Electrical & Robotics Engineer Assistant

Hong Kong SAR

- Engineered a **real-time computer vision pipeline** using Python and OpenCV with depth segmentation and ArUco marker tracking to estimate 3D poses, enabling a **Kinova Gen3 6-DOF arm** to guide its end-effector with **sub-centimeter accuracy** for a robotic feeding system.
- Co-developed a **modular ROS-based state machine** to orchestrate an autonomous assistive feeding workflow on a **Clearpath Jackal UGV**, integrating **Cartesian impedance control** for force-limited, compliant manipulation and ensuring safe physical interaction with users.
- Designed and prototyped a compliant spoon end-effector using **SolidWorks** and **FDM 3D printing**, applying **DFM/DFA principles** to minimize assembly parts and maximize user safety during force-limited physical interaction.
- Leveraged **industry-standard tools** (Foxglove, rqt) for real-time visualization and data logging, **reducing system debugging and iteration time by an estimated 30%** during component-level and end-to-end autonomous trials.

• Arista Networks

May 2023 - August 2023

Project Financial Management Intern

Hong Kong SAR

- Modeled **financial viability** for a **\$2M portfolio** of client pilot and internal automation projects using advanced Excel (NPV, XIRR, ROI, Goal Seek) to evaluate network upgrade, software development, and data center expansion initiatives; analysis directly supported executive decision-making, leading to the prioritization of **3 high-ROI automation pilot projects** and the deferral of low-impact initiatives.
- Conducted **monthly budget variance analysis** for **6 active projects** in SAP S/4HANA, identifying and investigating **\$150K+ in potential cost overruns**; partnered with Project Managers to pinpoint root causes and develop mitigation strategies, preventing last-minute budget cuts and ensuring project financial health.
- Engineered a **Power Automate workflow** integrated with SharePoint Dataverse to automate a legacy, manual data collection process for financial reporting; the solution **reduced manual effort by 15+ hours per week** and **improved report turnaround time by 20%**, accelerating monthly financial close cycles.
- Developed an **interactive Power BI dashboard** to synthesize fragmented Excel data into visual insights on project performance; the tool empowered PMs to **identify \$75K in cost variances** between project proposals and execute resource reallocation, **boosting per-project efficiency by approximately 25%**.
- Implemented and managed **Jira** to track project deliverables using a **Scrum framework** to consolidate tracking from 3 prior sources of information (**SAP S/4HANA, Excel spreadsheets, and SharePoint lists**) into a single source of truth; enhancing cross-functional visibility and coordination between finance and engineering teams.

EXTRACURRICULAR ACTIVITIES

• Queen's AutoDrive Team

August 2025 - Current

Embedded Systems Engineer

Kingston, ON

- Engineered a multi-threaded C++ ROS2 node to transmit and decode CAN 2.0b messages over a **dual-channel automotive CAN bus**, implementing **ISO-TP** diagnostic protocols to access ECU data & read ECU memory addresses and control vehicle propulsion, steering, and braking systems.
- Developed and validated protection values and rolling counts for safety-critical CAN messages related to torque, braking, and steering per **GM 8772 PPE1** specifications, ensuring 100% data integrity and zero fault codes during autonomous operation.
- Integrated a MATLAB Stateflow model into the ROS2 stack, creating a state machine that orchestrates the autonomous startup sequence, manages driver override detection, and ensures safe disengagement, directly supporting SAE Level-4 compliance.
- Designed, built, validated, and deployed a custom CAN harness supporting multiple bus topologies, including high-speed and single-wire networks, enabling reliable communication for all subsystems. For instance, we resolved signal integrity issues through integrating **120Ω termination** for the Scoring CAN bus and utilizing a **PCAN-AU5790** adapter for the single-wire **LS GMLAN** bus.
- Authored comprehensive technical documentation, including system architecture diagrams, protocol implementation guides, and test validation procedures, facilitating knowledge transfer for a team of **6 engineers** and ensuring readiness for formal SAE design reviews.

• Engineering Society of Queen's University

March 2025 - Current

Sci '26 Vice-President

Kingston, ON

- Co-led a 12-member executive team to strategize, plan, and execute **10+ large-scale events** (social, academic, networking) for **800+ students** in the Class of 2026, enhancing student engagement and community building.
- Represented the class of 800+ students as a voting member on the Engineering Society Council, advocating for student interests in governance decisions impacting the **3,000+ engineering student body**.
- Championed student advocacy initiatives, including policy proposals and feedback forums, directly influencing faculty-level academic and policy decisions to align with student needs.
- Served as the primary liaison between student body, faculty, and university administration, negotiating resources and collaboration opportunities that improved academic support services for first-year engineers.
- Championed 3+ student-led policy initiatives from conception to presentation, resulting in the successful adoption of new academic accommodations and wellness resources.

• Queen's High-Performance Computing Club

December 2023 - Current

Co-Founder, Sponsorships Lead, and Financial Lead

Kingston, ON

- Spearheaded the founding and strategic development of the university's first HPC club along with other two co-founders of the club, establishing a **sprint-based training framework** for **40+ members** that prepared the team for **international Student Cluster Competitions (SCC)**, including the **SC26**.
- Prepared and delivered **5+ technical workshops** on HPC fundamentals (Linux, MPI/OpenMP, Slurm, HPL/HPCG), resulting in **50+ hours of training** and increasing member competency in cluster administration and performance benchmarking.
- Developed an Android expense-tracking application to automate financial reporting, **reducing manual reconciliation time by 25%** and streamlining budget management for competition travel. (<https://github.com/johnnietse/travelExpenseTracker.git>)
- Optimized **cluster performance** by applying advanced techniques in parallel processing, shell scripting, and power management, directly contributing to the team's readiness for competition scenarios.
- Translated complex HPC research into **10+ accessible presentations** on applications like LAMMPS and Phasta, onboarding **100% of first-year members** and building foundational knowledge.

PROJECTS

• **Mini RISC-V Softcore platform for FPGA designs** *(Verilog, Quartus II, Intel ModelSim Altera, Cyclone V FPGA)* *January 2025 – May 2025*

Coursework Project

– Constructed a **virtual 32-bit softcore computer** that uses **RISC-V Instruction Set Architecture** using **Verilog & Quartus II**, and tested on **Modelsim Altera**

– Prepared for **hardware implementation** on a **Cyclone V 5CEBA4F23C7** device; simulated with **34,481 logical elements, 32 registers**, and **168 pins**; theoretical operation up to **500 MHz** and average cycle per instruction of **12.29 CPI**.

• **AI-Powered Job Application Assistant (ApplicaAI)** *(LangGraph, Google Gemini 1.5 Flash, SerpAPI, Python)* *August 2025 – Present*

– Engineered a full-stack AI application using **LangGraph, Google Gemini 1.5 Flash, and LLM context injection** to automate and optimize the job search process, reducing application preparation time by **90%** and creating a scalable, multi-step orchestration pipeline.

– Developed an **ATS Optimization Engine** that simulates recruiter screening software, analyzing resume-job description fit to provide a compatibility score and keyword analysis, increasing the likelihood of application visibility.

– Integrated **SerpAPI** with a multi-step AI workflow to perform real-time company research, scraping, and synthesizing data from Google Search to deliver actionable insights on company culture and metrics.

– Architected a robust backend with a **LangGraph state machine** to manage a complex, multi-step orchestration pipeline for resume parsing, analysis, and content generation, ensuring reliability and scalability.

TECHNICAL SKILLS & INTERESTS

Languages: Java, Kotlin, C, C++, Embedded C++, Python, Verilog, VHDL, HTML, CSS, SQL, R, Bash/Shell, Assembly language, JavaScript, LaTeX, Tailwind CSS

Libraries & Modules: Standard Java, Python, and C Libraries, Python Open CV, NumPy, and C POSIX Libraries, Linux Kernel Modules

Frameworks, Platforms, and Methodologies: React.js, Node.js, Next.js, Express.js, Arduino, Flutter, ROS2, Android Jetpack Components, CI/CD Pipelines, Agile/Scrum Methodologies

Modelling & Simulation Tools: AutoCAD, SolidWorks, Fritzing, KiCAD, LTSpice, CPULator, Intel Quartus Prime, Intel ModelSim, MATLAB

Productivity Software & Business Tools: Microsoft Office (Excel, Word, PowerPoint, Project, Teams, SharePoint), Microsoft Power BI, Microsoft Power Automate, Cloudflare, Foxglove, rqt

Databases & Cloud Services: Relational Database (MySQL, Oracle), SAP S/4HANA Cloud, Google Cloud Platform, MongoDB, AWS Fargate

Embedded Systems & Hardware: FPGA Development (RISC CPU, Traffic Light Controller), Raspberry Pi, Arduino, Linux Device Drivers, SELinux, CAN Bus, ECU Systems, V2X/V2V Communication, Signal Processing, Sensor Calibration & Motor Control, PCB Design (KiCAD, Fritzing), Soldering & Circuit Prototyping

Relevant Coursework: Computer Architecture, Electronics I, Digital Systems Engineering, Data Structures & Algorithms, Object-Oriented Programming, Data Science, Microprocessors & Embedded Systems, Operating Systems, Economic and Business Practice, Computer Networks, Cryptography & Network Security, Artificial Intelligence, Machine Learning & Deep Learning, Computer Vision with Deep Learning, Probability & Random Processes, Database Management Systems, Software Specifications, Information Structures, Engineering Client-based Design Project, Computer Engineering Capstone Project, Algorithms Engineering Applications, Discrete Mathematics, Ordinary Differential Equations

AI/ML & Web Development: LangGraph, LangChain, LLM Integration (Google Gemini API, Claude API, ChatGPT API), LLM Injection, Prompt Engineering, Context Injection, Retrieval-Augmented Generation (RAG), Transformer Models, Computer Vision (OpenCV), RESTful API Design & Integration

Languages spoken: Native in English, Mandarin, and Cantonese and Limited working proficiency in French