Tejal Simran Cheema

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I am a Software Engineering student passionate about AI and Robotics, with a strong foundation in Java and Object-Oriented Programming. I enjoy tackling complex problems and have experience building applications using React, Typescript, and Java, with a focus on clean, maintainable code. I'm driven to expand my technical skills through diverse and challenging projects.

Education

Bachelor of Engineering – Software Engineering   **Sept 2020 - Expected Aug 2026**
University of Victoria   *Victoria BC*

Skills

Programming Languages	Java	Python	C	C++	TypeScript/JavaScript	SQL	HTML/CSS	Bash
Tools & Frameworks	FastAPI	React	Node.js	LangChain	Docker	Git	GitHub Actions	ROS (Robot Operating System)	ServiceNow
AI/ML & Data Science	TensorFlow	Scikit-learn	Retrieval-Augmented Generation (RAG)	LLM Orchestration	Prompt Engineering	Qdrant	Groq API
Systems & Hardware	Linux	Embedded C (STM32)	VHDL (GHDL)	Async Python	REST APIs	Full Stack Develoment	CI/CD
Other	UML Diagrams	API Integration	Technical Writing	Documentation	Team Collaboration

Experience

BC Ministry of Citizen Services   **Sept 2022 - April 2023**
Security Coop   *Victoria BC*

- Designed and implemented two apps in ServiceNow: PDF Generator App and a Mobile App
  - Developed custom features for improved user experiences, replacing legacy processes with modern solutions
  - Applications are actively used by security professionals in the BC Government
- Delivered technical documentation for the PDF Generator App and trained end-users on functionality
- Created and executed test cases to ensure production-ready code quality

Notable Projects

ONC AI Chatbot – University Course Project [https://github.com/NautiChat-SENG499-Capstone/NautiChat-Backend]

- Built an AI-powered chatbot using Llama 3 (Groq API) and LangChain in a RAG pipeline, enabling accurate, real-time responses with semantic retrieval from Qdrant.
- Developed an asynchronous Python backend with FastAPI and a secure PostgreSQL database on Supabase to support scalable, concurrent usage.
- Deployed production services via Docker on a VM with Github Actions CI/CD, Watchtower, and Cloudflare tunneling.
- Implemented a comprehensive automated testing suite (Pytest) covering endpoints, integrations, and mock services to ensure system reliability.

Toxicology Predictions – *UVic AI Club* [*https://github.com/Tristant2005/Toxicology-Prediction*]
- Developed neural networks using TensorFlow and implemented SVMs with Scikit-learn for toxicity prediction
- Analyzed dataset distributions and visualized key performance metrics, including Precision, Recall, F1-score, and PR-AUC
- Applied techniques to handle data imbalance, such as dimensionality reduction (PCA, LDA) and resampling (SMOTEENN)
- Optimized model performance by fine-tuning hyperparameters, adjusting PCA/LDA components, refining SMOTEENN settings, and modifying focal loss parameters (alpha, gamma)

Embedded Systems Optimzation – *University Course Project* [*https://github.com/tej117/seng440-cordic*]
- Optimized CORDIC algorithm in C on ARM Cortex-A72 using loop unrolling, pipelining, and branch elimination, achieving 21% faster execution.
- Designed a custom assembly instruction set and utilized gdb-debugger for register level analysis.
- Built custom VHDL hardware modules (datapath, controller, ROM) and validated using GHDL.
- Developed a benchmarking framework with microsecond precision timing, cache profiling and performance analysis across software, firmware, and hardware implementations.

Robotics Vision System – *UVic Robotics Club*
- Set up and configured the ZED2i stereo camera on a ROS Noetic system for real-time 3D vision and depth sensing
- Developed and tested ROS nodes to capture video, record point cloud data, and stream images over a network for remote operation

STM32F0 Embedded Signal Processing – *University Course Project*
- Developed an embedded system on STM32F0 using C and Eclipse, integrating ADC/DAC for signal modulation and measurement
- Interfaced with SSD1306 OLED via SPI to display real-time resistance and frequency; implemented interrupt-driven input handling
- Used oscilloscope and multimeter to validate system output and account for hardware limitations

Modern Tetris – Personal Project [https://github.com/tej117/Tetris---Java]
- Built a Tetris game in Java using Swing for the GUI and threads for real-time responsiveness
- Applied the MVC architecture pattern and developed a custom EventDispatcher for efficient event handling
- Optimized game performance with creative solutions for space, time, and memory efficiency

Interests

- Reading sci-fi and fantasy books
- Doing calisthenics workouts
- Playing soccer and taking dance classes
- Playing video games

Conferences & Events

Presenter, *Canadian Undergraduate Conference on Artificial Intelligence (CUCAI)*
Presented a research project on toxicity prediction models to peers and industry professionals, discussing methods for improving class balance for optimal performance.

Publications

[1] T. W. Tucker and T. S. Cheema, "Toxicity prediction based on molecular structure using machine learning," in CUCAI 2025 Proceedings, 2025, pp. 212–216.