Ansh Agrawal

Work permit: Canadian | **Date of birth:** 27/12/2001 | **Place of birth:** India | **Nationality:** Indian | **Gender:** Male |

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EDUCATION AND TRAINING

01/09/2021 – 01/05/2026 Toronto, Canada

HONOURS BACHELORS OF SCIENCE University of Toronto

Relevant Courses:

- Theory of Computation (92% / A+),
- Introduction to Artificial Intelligence (86% / A)
- Software Tools & Systems Programming (88% / A)
- Computer Science Implementation Project (94% / A+)
- Computational Probability & Statistics (85% / A)
- Differential Calculus (93% / A+)
- Integral Calculus (94% / A+)
- Linear Algebra I (95% / A+)
- Calculus of Several Variables (96% / A+)

Extracurriculars:

- Director of Partnerships, UofT Artificial Intelligence
- Technical Writer, UofT Machine Learning Intelligence Student Team
- Member, ICPC Programming Club

Website https://www.utoronto.ca/ | **Field of study** Computer Science Specialist - Artificial Intelligence | **Final grade** 3.85/4 |

Level in EQF EQF level 6

01/01/2024 – 05/01/2024 Singapore, Singapore

HONOURS BACHELORS OF SCIENCE National University of Singapore

Semester exchange program

Relevant Courses:

- Machine Learning
- Computer Vision

Website https://nus.edu.sg/ | **Field of study** Computer Science Specialist - Artificial Intelligence | **Level in EQF** EQF level 6

SKILLS

C# | JavaScript | .NET | Angular | Devops: Docker, Jenkins | Java | Python | Numpy | scikit-learn | Selenium | Git | Bash | Springboot | C/C++ | SQL | AWS | PyTorch

WORK EXPERIENCE

AUTODESK – TORONTO, CANADA

MACHINE LEARNING INTERN – 05/05/2025 – CURRENT

Built a semantic search / RAG pipeline from scratch:

- Generated embeddings for ~10,000 Autodesk software package configurations (each configuration represents a custom collection of applications selected from ~ 380 total) to support vector-based retrieval.
- Powered a RASA-based chatbot that leverages these vectors to identify the correct package and trigger automated license download / installation flows, cutting manual look-up time from ~45 mins to a few minutes.

Containerized local development environment:

- Setup Docker to spin up RASA, Elasticsearch, dependency services, and custom micro-services for local end-to-end testing. Ensured the same setup could be deployed to a managed OpenSearch instance in production.
- Orchestrated multi-step workflows to allow custom install flags in a single interaction (e.g., “Install AutoCAD 2025 with Civil 3D tool-set and custom parameters”).

Led research and model-tuning efforts:

- Preparing to fine-tune an open-source transformer (Llama-3 8B) on support-dialogue transcripts and structured product-catalog data, with the goal of improving entity extraction and intent ranking in the RAG pipeline.
- Integrating the fine-tuned model with RASA to surface more accurate package-specific suggestions for user prompts.

Tech stack: Python, RASA, Hugging Face Transformers, ChromaDB (vector store), Docker & Docker Compose, RESTful micro-services, Linux, Git

THOMSON REUTERS – TORONTO, CANADA

SOFTWARE ENGINEERING INTERN – 09/09/2024 – 02/05/2025

Stabilized production & migrated backend services:

- Resolved 20 critical issues in the OneSource taxation platform and migrated C# services from LS2 to UserGroupService using feature flags - boosting platform stability by 15%. Utilized Postman to craft and validate HTTP requests for efficient debugging.

Orchestrated release management:

- Created and maintained release branches, cherry-picked cross-team changes, verified commits, and resolved merge conflicts, achieving 98% on-time delivery.

Automated data fixes & feature rollouts:

- Authored 25 SQL scripts, created new and modified existing stored procedures to correct defects and deploy new features across seven environments, supporting ~20 000 customers.

Tech stack: C#, .NET Framework, SQL Server, Postman, Git, AWS, Datadog

THE MATTER LAB – TORONTO, CANADA

RESEARCH INTERN – 01/12/2024 – 01/03/2025

Installed & documented DM21 integration:

- Installed and configured DeepMind's DM21 repository on the group cluster by creating a dedicated Conda/Mamba environment and resolving all dependencies, enabling 100% of built-in tests to pass unmodified.
- Explored the DM21 codebase to locate and document the neural network's inputs, outputs, and integration points with PySCF's NeuralNumInt.

Prototyped & validated PyTorch reimplementation:

- Defined PytorchNeuralNumInt and PytorchDM21 classes to mirror the original TensorFlow architecture.
- Derived second-order functional derivatives for the exchange-correlation hole ($h_{x}c$), coded consistency checks, and validated each step against small reference systems.

Engineered automated verification layer:

- Integrated a verification loop that retries failed low-level DFT routines until they meet expected criteria, ensuring robust and reliable DFT–ML workflows.

Tech stack: PyTorch, PySCF, NumPy, Conda/Mamba, Git.

MEDCVR, UNIVERSITY OF TORONTO – TORONTO, CANADA

RESEARCH INTERN – 01/09/2024 – 01/04/2025

Designed multi-agent robotic workflows:

- Used Gemini vision-language models and custom LLM pipelines (Python, ROS) to translate a single-line natural-language prompt plus surgical scene image into high-level task plans and low-level control code.

Built an end-to-end prototype:

- Captured real-time camera frames for object recognition, invoked the LLM to generate motion trajectories and actuator commands, and deployed the full pipeline via ROS on a Franka Emika Panda robot for autonomous suturing and suturing subtasks.

Engineered a robust verification layer:

- Implemented continuous checks on both plan validity and action execution, automatically retrying failed low-level routines until success to ensure safe, reliable operation.

Tech stack: Python, ROS, Gemini VLMs, custom LLM workflows, Franka Emika Panda.

TD BANK – TORONTO, CANADA

SOFTWARE ENGINEERING INTERN – 13/05/2024 – 18/08/2024

Designed & implemented holiday-management UI:

- Built "Maintain Holiday" page for the Registered Products Database (RESP, RIO, RSP & TFSA) using Spring Boot (Java), Angular (TypeScript), RESTful APIs, and SQL - delivering full CRUD operations, form validation, and error handling.

Engineered database schema & migrations:

- Authored SQL scripts to create and update holiday-related tables, views, and stored procedures; implemented data-migration and rollback logic to maintain integrity across development, staging, and production.

Built automated regression suite:
- Developed a Selenium-based test framework covering all UI workflows and edge cases, reducing end-to-end regression time by 500% and catching regressions early in the cycle.

Tech stack: Spring Boot, Java, Angular (TypeScript), SQL, Selenium

NOKIA – TORONTO, CANADA

SOFTWARE ENGINEERING INTERN – 01/05/2023 – 01/08/2023

Developed & tested iSIM usage tracking:
- Implemented a "last login" feature for iSIM using Java and RESTful APIs - enabling service providers like Airtel to monitor activity for millions of MNO users.

Refactored & optimized backend services:
- Resolved 100+ code issues in the DPP backend, boosting performance by 10% and improving production readiness.

Secured the platform:
- Identified and patched 7 critical security vulnerabilities, strengthening overall system stability and compliance.

Tech stack: Java, RESTful APIs, Docker, Kubernetes

UNIVERSITY OF TORONTO – TORONTO, CANADA

TEACHING ASSISTANT – 01/01/2023 – 01/05/2025

CSC207 Lab TA & Marker:
- Led weekly Java/JavaFX lab sessions, held office hours, and graded exercises, assignments, and exams for ~450 students, reinforcing software-design principles and MVC patterns.

CSC207 Assignment Development & Testing:
- Designed and delivered text-based and JavaFX GUI adventure-game assignments; authored a JUnit test suite for automated grading, ensuring bug-free delivery to all 450 students.

CSC209 Lecture TA & Marker:
- Assisted in lecture exercises, graded C programming assignments and exams, and held office hours to support students in pointers, memory management, and system calls.

Tech stack: Java, JavaFX, JUnit, Git, C

PROJECTS

02/2025 – 02/2025
Aegis

- Developed the hardware prototype by integrating an Arduino-controlled dual-reservoir peristaltic-pump system with an NVIDIA Jetson Orin Nano, enabling automated delivery of hemostatic and analgesic agents in response to trauma.
- Configured the Jetson Orin Nano to run a Vision-Language Model (VILA) and Terra API on edge, implementing a Flask server to keep models loaded for low-latency wound classification and biometric processing (Apple Watch via HealthKit).
- Streamlined hardware - software communication: captured camera frames for real-time wound analysis, optimized model-weight handling to fit Jetson's RAM constraints, and built a lightweight iOS app for data transmission, resulting in a functional end-to-end prototype.

Link https://devpost.com/software/aegis-kz4qnm

12/2024 – 12/2024
ReCall.ai - HackPrinceton Winner

- Integrated Gemini facial-recognition and lightweight speech-processing pipelines into smart glasses, giving users with mild cognitive impairment real-time prompts about people, past conversations, and daily routines.
- Built a FastAPI backend (SpeechRecognition API / MongoDB / FAISS / GeoPy) and a Next.js + Tailwind dashboard; split workloads between the wearable and cloud to keep face-matching and transcription under one second.
- Logged anonymized metrics (recognition frequency, conversation topics, activity levels) to aid cognitive-health research while preserving privacy; led a 4-member team from concept to functional prototype within one hackathon cycle.

Link https://dorahacks.io/buidl/19381

01/09/2024 – 03/09/2024
Watchful.AI – PennApps XXV Hackathon Winner

- Developed a FastAPI backend that ingests live campus video feeds, uses OpenCV for frame extraction, and leverages a CLIP-based PyTorch model to generate embeddings stored in ChromaDB for real-time threat detection.
- Engineered a multi-threaded processing pipeline with GPT-4o–driven anomaly classification and WebSocket alerts, optimizing vector-DB queries to deliver sub-second detection across multiple camera streams.
- Awarded two track prizes at PennApps XXV for “Best Privacy/Security Hack” and “Most Technically Complex Hack” out of 104 teams.

Link https://devpost.com/software/watchful-ai-u5id0v

01/09/2023
Platemate - UofTHacks X Hackathon Winner

- Led a 4-person team to develop a meal-sharing AI-powered app in a 36-hour hackathon, coordinating design decisions, prompt engineering, and feature integration.
- Integrated Cohere’s LLM API via Python scripts to extract user cuisine preferences, generate match recommendations, and compute compatibility scores for nearby users.
- Won the sponsor challenge out of 90 teams, earning prizes worth CAD 2,000.

Link https://devpost.com/software/platemate

02/2024 – 04/2024
Skin Cancer Detector

- Developed and compared multiple ML classifiers (Logistic Regression, SVM, AdaBoost, MLP) for early melanoma detection using dermoscopic images. Extracted features via RGB/HSV histograms and Gabor filters, then applied PCA for dimensionality reduction.
- Trained models on a curated dataset of skin lesion images, tuning hyperparameters to optimize performance under class imbalance.
- Achieved 50% precision and 81% recall, demonstrating a strong ability to identify malignant samples despite limited data.

Link https://github.com/anshag01/CancerDetection

LANGUAGE SKILLS

Mother tongue(s): **HINDI** | **ENGLISH**

HONOURS AND AWARDS

01/04/2021
International Scholar – University of Toronto

Awarded to the top 50 incoming international undergraduates based on academic excellence - Valued at CAD 180,000

01/04/2021
Principal’s Entry – University of Toronto

Merit-based award granted to the top incoming students for outstanding academic performance and leadership potential - Valued at CAD 12,000

01/04/2021
UofT Scholar – University of Toronto

Merit-based entrance scholarship awarded for outstanding academic achievement - Valued at CAD 7,500

Hackathon Awards

- PennApps XXV - Best Privacy/Security Hack (CAD 1,000 prize value)
- PennApps XXV - Most Technically Complex Hack (CAD 800 prize value)
- Hackprinceton - Diagnosis Consort by bgb group (CAD 1,100 prize value)
- Hackprinceton - Patient Safety Challenge (CAD 500 prize value)
- UofTHacks X @ UofT - Co:Here - Best Build With Co:Here Challenge (CAD 2,000 prize value)
- DeerHacks @ UofT - Best Usage of UiPath Products (CAD 1,000 prize value)