

# Tanay Jagadeesh

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## Education

**University of Waterloo** Bachelor of Applied Science in Management Engineering (Software/Industrial Equivalent) Waterloo, ON Sep 2025 – May 2030

# Experience

**Backend Engineer, Hands AI** | *TypeScript, PostgreSQL, Python, SupaBase, LLM Data and ML Infrastructure*      Toronto, ON  
Sep 2025 – Dec 2025

- Contributed to the production RAG pipelines using Ollama embeddings and vector search to deliver personalized recommendations to **250+ signup users** across **500+ recipes**
  - Built hybrid recipe parser achieving **80%** extraction success rate across blog and social media sources through **JSON-LD** structured data parsing with **GPT-4o-mini** fallback for unstructured content
  - Fixed critical signup and shopping-cart reliability and data-leakage risks by engineering concurrency-safe TypeScript services across normalized transactional schemas

**Data Engineer, Sephira Institute** | Python, SQL, FastAPI, PostgreSQL, ETL, LLM APIs  
ML & Analytics Platform Development Under University of Cambridge Prof. Roberto Foa      Remote  
Dec 2025 – Present

- Built an LLM-powered sentiment analytics platform processing **20K+** daily observations across **32** countries using GPT-4 with automated chart generation
  - Implemented a **7-category** guardrail system using regex pattern matching, rate limiting, and response sanitization to prevent data extraction and ensure compliance
  - Integrated NewsAPI for real-time news correlation with sentiment trends across **40+** country mappings

## Projects

**CORTEX – AI Chat Memory Visualization System** *Python, FastAPI, Three.js, Ollama, MCP*      Feb 2026

- **1st Place Overall** at the CxC Hackathon (**\$1,000** prize, **300+** hackers, **80+** teams), Canada's **largest** data science hackathon
  - Built a full-stack 3D semantic memory system that parses ChatGPT/Claude exports, generates embeddings via Ollama (nomic-embed-text, 768D), and reduces dimensions with UMAP to render an interactive Three.js visualization
  - Engineered a FastAPI backend with **10 REST endpoints**, a 7-stage ML pipeline (HTML parsing, LLM summarization, topic extraction, semantic embedding, UMAP 768D→3D reduction, K-means clustering, vector search)
  - Implemented a Model Context Protocol (MCP) server with 2 tools (`search_memory`, `fetch_chat`) enabling Claude Desktop to query and retrieve past conversations as continuous context, with Backboard.io guard filtering

Code Clash, Real-Time Competitive Coding Platform | Next.js, Supabase, WebSockets | Jan 2026

- Built a real-time 1v1 competitive coding platform with WebSocket matchmaking, opponent tracking, and synchronized match state serving **400+ trial users**
  - Designed concurrency-safe PostgreSQL schemas with triggers, functions, and RLS policies to persist **3,500+ match sessions** across normalized tables
  - Designed and implemented real-time ranking and matchmaking pipelines computing win rates, Elo-style ratings, streaks, and percentiles across **1,000+ competitive problem attempts**

Signature Forgery Detection System | Python, PyTorch, torchvision, CNN, scikit-learn | Jan 2026

- Built a CNN-based signature verification model achieving **81% accuracy** detecting forged signatures across **6000+ images** using transfer learning with ResNet-18 and a custom classification head
  - Implemented data augmentation pipelines (rotation, scaling, Gaussian noise) and preprocessing to handle real-world signature variation, improving model robustness by **12%**
  - Evaluated model performance using ROC-AUC (**0.94**) and confusion matrix analysis, optimizing decision thresholds to minimize false negatives for fraud prevention use cases

#### Technical Skills

**Programming & Backend:** Python, SQL, TypeScript, JavaScript, Microsoft Excel (VBA), FastAPI, PowerBI, Git

**Data Engineering & Analytics:** Azure, Databricks, Apache Spark (PySpark), Delta Lake, PostgreSQL, Supabase, Star-Schema Warehousing, CTEs, Window Functions, Streamlit, Power BI

**Machine Learning & Analytics:** PyTorch, scikit-learn, XGBoost, TensorFlow, pandas, NumPy, Matplotlib