Zachary Tianyi Tang

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Education

University of Toronto Toronto, ON

B.S., Computer Science; GPA: 3.93/4.00 *Aug 2024 – expected June 2027*

- Elected UofT New College iTech (Innovation & Technology) Community Floor Representative (2024-25)
- Engineering Director at University of Toronto Machine Intelligence Student Team (2025-26)

Work Experience

Philer AI (University of Toronto Machine Intelligence Student Team) Toronto, ON

Lead Developer *Apr 2025 - Present*

- Led 10+ student engineering team to design and deploy AI intake assistant, integrating Twilio Voice API with Python/Flask backend and LangGraph workflow
- Built advanced experimental RAG pipeline with Pinecone involving prompt optimization and multi-step retrieval
- Developed quantitative RAG evaluation framework using RAGAS to compare different paper implementations
- Built custom chatbot frontend with Next.js/React, hosted on Firebase

FORMS Syntron Information HK Hong Kong SAR, China

ML Intern *May 2025 - Jun 2025*

- Scripted SLURM jobs to fine-tune sharded DeepSeek and Qwen models using HuggingFace PEFT
- Designed custom text augmentation pipelines using Python nlpaug library, including back-translation and typos
- Built Hugging Face embedding evaluation pipeline to compare semantic similarity between ground truth and LLM
- Processed unstructured text data in Markdown and CSV files using pandas and Microsoft Excel

Lovelytics (University of Toronto Machine Intelligence Student Team) Toronto, ON

ML Developer *Feb 2025 - May 2025*

- Implemented multi-agent RAG system with LangGraph on Python to optimize task output
- Implemented structured validation using Pydantic to enforce consistency in LLM outputs in JSON format
- Presented at CUCAI 2025 on multi-agent orchestration and DSPy prompt optimization in enterprise AI systems

Projects

Vision Transformer (ViT) implementation | *PyTorch, NumPy* **(GitHub)**

- Implementing Vision Transformer (ViT) architecture from scratch in PyTorch
- Integrating Rotary Position Embedding (RoPE) adapted to 2D spatial encoding for vision-specific attention
- Planning scalable deployment via Kubernetes, enabling model serving and distributed training

AlphaReversi | *PyTorch, NumPy* **(GitHub)**

- Implemented Google DeepMind's AlphaGo paper on the game reversi, using ResNet for policy/value estimation
- Optimized Monte Carlo Tree Search (MCTS) with NumPy for efficient move selection
- Trained deep RL agent in PyTorch with self-play and policy/value network updates

Computer Vision Fruit Defect Detection | *YOLOv5, Python* **(GitHub)**

- Fine-tuned YOLOv5 computer vision model to detect "ugly fruit" and reduce food waste post-importation
- Cleaned, reshaped and normalized image data for efficient fine-tuning
- Presented poster for selective CityU EE AIoT Skills Education Gifted Program, supervised by Dr Ray Cheung

Research

Soundscape Audio Analysis on Hong Kong Pink Dolphin Population Nov 2023

- Applied FFT to hydrophone audio for Hoi Ha Wan marine park conservation research with WWF
- Analyzed the efficacy of a new boat ban law to protect rare Chinese white dolphins
- Presented at IEEE 2024 Young Engineer's Conference (Merit award) at Hong Kong University and American Geophysical Union Fall Meeting 2023 (Chicago)

Technical Skills

Languages: Python | JavaScript | C++

Frameworks/Tools: PyTorch | React | Flask | Django | NumPy | SciPy | OpenCV | PIL | Bootstrap | Git | LangGraph