Houfu Chen

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SUMMARY

- **Applied Machine Learning & Artificial Intelligence**:
Featured alumnus of UofT's ML & Data Analytics Emphasis. Experienced in developing AI-driven applications and ML infrastructure. As an independent Machine Learning Engineer, built ML-based solutions, including an intelligent evacuation planner a monthly spending tracker, and a personalized recommendation engine, leveraging LLMs, reinforcement learning, and speech/audio processing. Showing enthusiasm for ML applications.

- **Data Analytics & Model Deployment**:
Proficient in data processing (Pandas, NumPy, SQL) and model development using TensorFlow, PyTorch, and Scikit-learn. Skilled in building end-to-end ML pipelines, model evaluation, optimization, and deploying models as APIs. Familiar with distributed computing and networking for scalable ML systems.

- **Software Engineering & QA**:
2+ years of combined experience across industry co-ops, internships, and academic projects in software development, QA automation, and web technologies. Skilled in various programming language and web design. Strong in debugging ML workflows, optimizing model performance, and designing test frameworks. Adept at large-scale ML engineering, writing clean, scalable code, and applying decision making and versatility in complex problem solving.

EDUCATION

- **University of Toronto (UofT)** — Toronto, ON
  Master of Engineering in Electrical & Computer Engineering — *Sep 2023 – Mar 2025*
  - **Featured Alumni**: Recognized as a featured alumnus for the ML & Data Analytics Emphasis at UofT.
  - **Teaching Assistant**: TA for multiple Machine Learning and Python-related courses, responsible for drafting questions for projects and exam, marking, tutorial instruction, and student support.

- **University of Waterloo (UWaterloo)** — Waterloo, ON
  Bachelor of Applied Science in Nanotechnology Engineering (with Co-ops) — *Sep 2018 – Jun 2023*
  - **Awards and Honors**: Recipient of President's Distinction Award (2019), President's Research Award (2019), Most Creative Design (2019), Graduated with Distinction (2023, GPA above 80/100)

CERTIFICATIONS & ACHIEVEMENTS

- **Euclid Math Contest**: Top 20% in Canada, Top 1 in high school (2018)

- **Stanford Algorithm & Data Structures Certification**: Divide and Conquer, Sorting, Searching, and Randomized Algorithms (Issued Jan 2025)

- **Stanford & DeepLearning.AI - Machine Learning Specialization**: Specialization in ML with concepts and projects (In Progress, expected by early March 2025)

MACHINE LEARNING PROFESSIONAL EXPERIENCE & PROJECTS

- **Teaching Assistant (Machine Learning & Python)** — Toronto, ON
  University of Toronto (Computer Science Dept.; Applied Science & Engineering Dept.) — *Sept 2023 – Present*
  - **Course Construction**: TA for ML and Python, assisting in drafting projects and exam questions. Familiar with the topics including K-Means Clustering; KNN; Monte Carlo; SVD, PCA decompositions; Neural Network; Gradient Descent; and simple Data structure and Algorithms.
  - **Grading & Feedback**: Evaluated assignments, midterms, and projects while providing constructive feedback.
  - **Student Support**: Managed Piazza discussions and office hours, clarifying ML and Python concepts.
  - **Mentorship & Leadership**: Led weekly tutorial sessions and mentored students in both undergraduate and graduate courses, demonstrating leadership and clear communication in explaining complex concepts.

- **Emergency Route Planner Framework (WIP)** — Toronto, ON
  Supervised (Under Prof. Alaa Khamis) Team Research Project — *Sept 2024 – Present*

- **Project Development**: Developed an AI-driven evacuation routing system integrating Dijkstra's algorithm (shortest path calculations) and Ant Colony Optimization for adaptive exploration. Utilized the natural language processing capabilities of LLMs to dynamically tune evacuation objectives and decision-making focus. Deployed a working prototype and published initial results on Medium (read here).
  - **Framework Expansion**: Expanding the framework with agent-based simulations (OctoTools) and advanced routing solvers (Google OR-Tools) to improve adaptability across different city scenarios.
  - **Scalability Evaluation**: Running multi-scenario simulations to evaluate scalability (varied city layouts, fleet sizes, etc.) and refining the model for a research publication (targeting submission by May 2025).

- **"Boop" Reinforcement Learning Game Agent**: *Personal Project (2024)*

  - **Reinforcement Learning Strategy**: Trained a reinforcement learning agent to master the board game "Boop," enabling it to learn optimal strategies through trial-and-error and adapt based on game outcomes.

- **LLM-Powered Financial Tool**: *Personal Project (2024)*

  - **Information Retrieval for Financial Insights**: Implemented LLM-powered retrieval techniques to extract and categorize transactions based on natural language queries, enhancing the accuracy of financial insights. Designed as a robust personal finance tracking solution.
  - **Insights & Automation**: Enabled natural language queries for personalized budget insights.
  - **Community Engagement**: Published a Medium article detailing the project, receiving positive feedback.

- **Food-Raccoon (Restaurant Recommender)**: *Personal Project (2024)*

  - **ML-Based Recommendations**: Developed a restaurant recommendation app integrating an LLM with Google Maps and Yelp APIs for personalized, location-based dining suggestions.
  - **Community Recognition**: Published a Medium article (20+ claps) and received positive engagement.
  - **Scalability**: Designed a modular architecture for the recommendation engine, enhancing scalability.

WORK HISTORY

- **Ford Motor; Imagine Communications; Teranet; Manulife**   Oakville, Mississauga, Waterloo
  QA-Dev   *Jan 2020 - Aug 2022*

  - **QA Research & Debugging Engineer (Automation)**   **May 2022 - Aug 2022**:

    * Executed daily TCU performance tests, increasing test reliability by 10%.
    * Resolved 40+ SSH & Selenium exceptions, reducing test failures by 20%.
    * Maintained test automation, work with the team to resolve issues within 24 hours, demonstrating resiliency, strong collaboration and problem solving skills.

  - **QA Developer**   **Jan 2021 - Apr 2021**:

    * Developed automated UI test scripts, improving test coverage by 30%.
    * Implemented server health checks, reducing manual intervention and downtime.

  - **QA Automation Specialist**   **Sep 2020 - Dec 2020**:

    * Designed and optimized UI automation for a large-scale system.

  - **QA Developer**   **Jan 2020 - Apr 2020**:

    * Developed BDD test scenarios for cross-browser testing, resolving 9 IE-specific defects.
    * Fixed 40+ SonarQube issues, achieving over 98% test coverage.
    * Delivered a product demo to 50+ stakeholders, improving feedback turnaround time.

- **University of Waterloo - Prof. Yuning Li's Lab**   Waterloo, ON
  Research Assistant - Organic Solar Cells   *May 2019 - Aug 2019*

  - **Chromatography & UV Testing**: Conducted chromatography and UV testing for organic solar cell research.

  - **Material Analysis**: Assisted in material analysis and testing protocols for optimizing cell performance.

  - **Collaboration**: Worked with a research team to document and present experimental findings.

Technical Skills

- **Machine Learning**: TensorFlow, PyTorch, Azure Machine Learning, Scikit-learn, OpenAI GPT (LLM) APIs, RL algorithms

- **Cloud & Tools**: Google Cloud Platform, Git

- **Data Storage & Processing**: NumPy, SQL (MySQL, Azure SQL), Apache Spark, Google Cloud, Azure ML

- **Programming**: Python, C, C++, C#, JavaScript

- **Networking**: TCP/IP, HTTP

Languages

- **English**: Fluent (IELTS 8/9)

- **Mandarin Chinese**: Native Fluency

- **French**: Beginner Level