Theodore Wu

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Education

- **University of Toronto** — Toronto, Canada
  BASc in Engineering Science, Machine Intelligence | **cGPA:** 3.95/4.0 — *Sept 2018 - June 2023*

Research Skills

- Experienced with conference manuscript writing and generating experimental result visualizations.
- Proven ability to quickly survey, summarize, and taxonomize research literature.
- Skilled in delivering industry-quality software applications that align with stakeholder needs.
- Skilled in implementation of complex deep learning models using Pytorch, Tensorflow, and Keras software.
- Skilled in data collection and preprocessing from signal, text, image, and tabular formats.
- Rigorous academic background in areas such as deep learning, machine learning, artificial intelligence, distributed systems, operating systems, convex optimization, Bayesian probability, decision support systems, data structures & algorithms, computer security, digital & computer systems, and ethics.

Honors and Awards

- **Engineering Science Award of Excellence** — Spring 2023
  Presented to the top 20 graduating Engineering Science students with a CGPA of 3.9 or higher.
- **Dean's Honours List** — Fall 2018 - Spring 2023
  Recognition for students who demonstrated academic excellence in an individual semester.
- **University of Toronto Scholars Program** — Fall 2018
  Awarded to top incoming University of Toronto undergraduate students to recognize outstanding academic performance.
- **Engineering Science Chairs' Scholarship** — Fall 2020
  Given to a student completing the foundation years and proceeding to year three of Engineering Science. Issued on the chair's recommendation on the basis of outstanding academic achievement and extra-curricular involvement.
- **Constant Temperature Limited Scholarship** — Fall 2021
  Awarded to a student who achieved high academic standing in their third year of studies and is proceeding into their fourth year of studies in engineering.

Work Experience

- **Amazon Canada Fulfillment Services, ULC.** — Vancouver, Canada
  Software Development Engineer Intern — *Summer 2022*
  - Designed and implemented a data analysis and visualization tool that provides insights on service runtime logs.
  - Leveraged Python, Scala, SQL, and TypeScript using various AWS technologies such as RedShift, EMR, and Lambda.
  - Reduced theoretical time-to-resolution for a historical high-severity ticket from the scale of dev-hours to dev-minutes and identified a group of clients producing potential inefficiencies within the system.
- **Huawei Technologies Canada Co., Ltd.** — Markham, Canada
  IC Lab Assistant Machine Learning Engineer — *Summer 2021 – Spring 2022*
  - Designed and deployed a machine learning tool using Python to estimate electrical properties during circuit design.
  - Tested and verified the tool's performance through iterative feedback and close collaboration with senior designers.
- **University of Toronto Multimedia Lab** — Toronto, Canada
  Research Intern — *Summer 2020*
  - Co-authored a research literature survey of over 700 works in the field of computational pathology.
  - Submitted literature survey as journal work to "Medical Image Analysis".

Notable Projects

- **Fault Classification in Connected Autonomous Vehicle (CAV) Platoons** Undergraduate Thesis
  - Implemented a multi-head attention deep learning network in PyTorch to classify CAV platoon fault classes.
  - Trained and tested on platoon velocity signals extracted from SimuLink simulations and experimental lab robots.
  - First author for an accepted contributed paper "Multi-Head Attention Machine Learning for Fault Classification in Mixed Autonomous and Human-Driven Vehicle Platoons" to *ICRA London 2023*.
- **Survey of Computational Pathology** Research
  - Authored a computational pathology research literature survey spanning over 750 published research articles.
  - Highlighted recent trends with a taxonomy of papers and a comprehensive discussion on the future of the field.
  - Submitted as "Computational Pathology: A Survey Review and The Way Forward" for a journal contribution to *Medical Image Analysis*. Pre-print available at https://arxiv.org/abs/2304.05482
- **Persistent, Scalable, and Replicated Distributed Key-Value Storage System** Academic (Group Project)
  - Implemented a distributed key-value store in Java with consistent hashing, failure detection, and replication features.
  - Designed communication protocols for server node addition/removal, data replication, and server-client interaction.
- **GM Blue Plan Asset Management Task Scheduler** Capstone Project
  - Consulted with stakeholders from GM Blue Plan to build a Python application that optimally schedules asset management tasks over a specified time frame with configurable weekly schedule constraints.
  - Designed two novel greedy algorithms that improve on historical task schedules in all relevant quality metrics.
- **Reactor Log Analysis Tool** Intern Project
  - Developed an automated data analytics pipeline for >1TB/hr runtime logs using distributed processing technology.
  - Visualized precomputed data summaries on an interactive user dashboard hosted on QuickSight for live data insights.
  - Presented project to a group of software developers, senior software managers, and business managers.
- **ParaEst: ML-based Parasitic Capacitance Estimation Tool** Intern Project
  - Deployed a Support Vector Regressor model to estimate parasitic capacitances on schematic circuits.
  - Encapsulated the ML model with a PyQt application to integrate with a SQL database and Cadence CAD software.
  - Conducted user testing and live demonstrations to maximize the useability of the tool for senior designers.
- **Breast Mammogram Lesion Detection and Diagnosis** Academic (Group Project)
  - Fine-tuned a Mask R-CNN object detection model to diagnose breast mammogram lesions in the INbreast dataset.
  - Validated the Mask R-CNN model's performance on test data alongside a fine-tuned baseline ResNet50 model.
- **ClutterCutter** Academic (Group Project)
  - Implemented a recurrent neural network in PyTorch to classify incoming emails into five distinct categories.
  - Integrated the Weights & Biases API to automate experiment and data visualization.
- **Deep Recurrent Attention Model** Personal
  - Implemented a deep recurrent attention model in TensorFlow and visualized the architecture in TensorBoard.
  - Achieved 95% classification accuracy on MNIST, which reproduces similar results from the original paper.

Major Leadership Positions

- **VP Academics** Summer 2021 – Summer 2022
  University of Toronto Machine Intelligence Student Team
  - Supervised the creation and operations of an ML study group, a paper reading group, and various ML student projects.
  - Organized a large-scale club event with distinguished academic speakers on the ethics of AI.
- **Co-President** Summer 2020 – Summer 2021
  Skule Badminton Club
  - Collaborated with a team of executives to run badminton-themed events for members.
  - Ideated novel virtual events and restructured the executive team to transition the club through a virtual semester.
  - Approved the club for its first University of Toronto Co-Curricular Record program accreditation.
- **Peer Mentor** Fall 2020 – Summer 2021
  NSight Mentorship Program
  - Mentored an Engineering Science student over their first year of undergraduate studies.
  - Held monthly check-ins to offer support and guidance from an upper-year perspective.
  - Demonstrated interpersonal communication, mentoring, and active listening skills.