Jean Charle Yaacoub

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EDUCATION

Master of Science in Applied Computing (MScAC) *Sep. 2022 – June 2024*

University of Toronto

Artificial Intelligence Concentration

Courses: CSC2559 Trustworthy ML, CSC2552 Topics in Computational Social Science, CSC2231 Visual and Mobile Computing Systems, and CSC2545 Advanced Topics in ML – Causal Learning

cGPA: **3.85/4.0**

Bachelor of Computing (Honors) *Sep. 2018 – June 2022*

Queen's University (Kingston, ON)

Artificial Intelligence Specialization

cGPA: **4.17/4.3**

WORK EXPERIENCE

Princess Margaret Cancer Center - UHN *Jan. 2024 – Present*

ML Research Analyst (full-time)

- Improved model memory capacity of proteins structure model by **1.7x** enabling us to explore **40% more** proteins, with no increase in inference time, as part of our continued research into building DL models for drug discovery.
- Boosted lab productivity with code optimizations and setting up ML pipelines, and **mentored rotation students.**

Princess Margaret Cancer Center - UHN *May 2023 – Dec. 2023*

Co-op Master's Student (intern)

- Worked on project to improve precision oncology using GNNs (see MutDTA project below).
- Effective communication through multiple presentations in and outside the lab, including final poster presentation for ARIA.

Vancouver Prostate Centre - UBC *Aug. 2020 – Dec. 2021*

Undergraduate Academic Assistant (part and full-time)

- Helped improve the performance of Deep Docking (DD) which was designed to accelerate drug discovery utilizing AI and physical docking programs like AutoDock Vina. Optimized performance of code to run up to **3x faster** and improved model accuracy.
- Co-lead in the design and development of a GUI application that made DD **more accessible** to lab members and other researchers.
- Wrote and reviewed papers for **publication**.

PROJECTS

MScAC Thesis – MutDTA | PyTorch Geometric, Ray[Tune], Graph Networks, SLURM, HPC *May 2023 – Dec. 2023*

GNNs with Protein Dynamics for Enhanced Drug Targeting – github.com/jyaacoub/MutDTA

- Researched, designed, and iterated on models under **limited resources** requiring creative solutions to overcome with distributed **multi-node computing** and leveraging pretrained ESM-2 **foundation protein language models**.

CSC2231 – Visual and Mobile Computing Project | TensorFlow-Federated, FLower, Computer Vision (CV) *Winter 2023*

Federated Learning with Vision Transformers – github.com/jyaacoub/FL-ViT

- Researched the performance of novel ViT models under challenging **federated learning** environments for private **distributed** learning with **non-IID** conditions. Found that distilled ViTs were up to **2x faster** in training with less memory consumption.
- The attention mechanisms employed in the ViT architecture were found to be more effective in handling the challenges of non-IID data.

CSC2559 –Trustworthy ML Project | HuggingFace, Natural Language Processing (NLP) *Fall 2022*

Cross-Domain Attacks in NLP – github.com/jyaacoub/ Cross-Domain-Attacks-NLP

- Researched transferability of adversarial examples across problem domains in **NLP** to understand why such examples exist.
- Found that transferability across domains was weak causing drops in performance of only **5-12%** under different domains indicating that adversarial examples arise from "non-robust features" (same as with CV).

OpenAI Hackathon for Climate Change | Natural Language Processing (NLP) *Fall 2022*

Net Zero AI – github.com/jyaacoub/CSR_summarizer *Nov. 11-14*

- Team lead for a tool designed to eliminate purposeful obfuscation behind lengthy Corporate Social Responsibility reports.
- Carefully **recruited, organized, and delegated tasks** to team members for effective work. The team consisted of a UX designer, software engineer, and environmentalist.
- Designed backend and pdf parser utilizing **OpenAI** API for semantic search and summarization **with GPT-3.** Resulted in fully fleshed out prototype and demo video as part of the submission in less than **3 days**.

SKILLS

Languages: Python, JavaScript, Java, C, and MATLAB

Machine Learning: PyTorch, PyTorch Geometric, Lightning, Matplotlib, Pandas, Numpy, HuggingFace, Scikit-learn

HPC and Distributed Learning: SLURM, Ray[Tune,Train], FLower