Jithendaraa Subramanian

 Github ◆   LinkedIn ◆   Scholar ◆   Webpage ◆   Email ◆ **Citizenship: USA**

Education

McGill University, Mila Quebec AI Institute   *Sep 2021 – Aug 2024*
M.Sc. (Thesis), Computer Science   *GPA: 4.0 / 4.0*
Advisors: Derek Nowrouzezahrai, Samira Ebrahimi Kahou
Courses: Applied ML, Matrix Computations, Causal Inference and ML, Mathematical Tools for Computer Science

National Institute of Technology, Tiruchirappalli   *Sep 2017 – May 2021*
B.Tech, Production Engineering with minor in Computer Science   *GPA: 8.3 / 10.0, CS GPA: 9.67 / 10.0*

Skills

Deep learning frameworks: JAX, PyTorch, TensorFlow, Flax, dm-haiku
Programming Languages: Python, C++
Other: Multi-GPU training and inference, CPU multiprocessing, Large-scale data processing Git, SQL, Shell scripting, WandB

Work Experience

Toyota Research Institute   *Nov 2024 – present*
AI Resident   *Los Altos, California*
◆ Multimodal foundation models for predicting material properties.

ServiceNow Research   *Apr 2024 – Sep 2024*
Visiting researcher   *Montreal, Quebec*
Supervisors: Valentina Zantedeschi, Alexandre Drouin
◆ Change point detection for time series causal discovery.
◆ Benchmarking LLMs (GPT-4o, LLaMa etc.) on text-conditioned forecasting (under review)

Amazon   *Jun 2023 – Sep 2023*
Research scientist intern   *San Diego, California*
Manager: Sergiy Zubatiy
◆ Led the development of long-term revenue forecasting models for Amazon Fresh and Amazon Go. The proposed transformer-based approach resulted in **44% lower error rate** over the best baselines.
◆ **Scaled** the approach to train the model on 1 billion transactions, with **distributed, multi-GPU training**.
◆ Model to be **deployed** internally for use in basket recommendation and to quickly iterate over business strategies.

Academic Research

De novo Protein Design
◆ Reinforcement Learning with Protein Language Models as a reward model for de novo protein design.

Latent DAG GFlowNets   *Jan 2023 - present*
◆ Extending DAG-GFlowNets to learn an approximate joint posterior over latent variables and causal structures from low-level data. Currently exploring GFlowNet-EM to alternatingly learn the reward of the GFlowNet and the joint posterior.

Centralized Codebase for Benchmarking Bayesian Causal Discovery Algorithms   Code
◆ Co-led the effort on building a central codebase for running Bayesian Causal Discovery algorithms. The repository currently supports synthetic **data generation**, running **over 10 algorithms** off-the-shelf, and contains numerous metrics for **evaluating model performance** in a systematic manner.

Mila Quebec AI Institute, École de Technologie Supérieure Montreal   *Nov 2020 – Sep 2021*
Research intern
◆ Physical reasoning tasks (PHYRE), video prediction using Neural ODEs, disentangled representations for videos.

Carnegie Mellon University   *Apr 2020 – Feb 2021*
Research intern, RoboTutor Team   Code
Advisor: Jack Mostow

◆ Designed a Reinforcement Learning framework for personalizing Intelligent Tutoring Systems (ITS) for underprivileged students in Africa. Proposed algorithm was instantiated in the context of the RoboTutor app, one of the five **$1M Finalists in the $15M Global Learning XPRIZE competition**, and deployed in Tanzania.

◆ **Spotlight presentation** at the Educational Data Mining 2021 Workshop on RL for Education.

University of California, Berkeley   *Sep 2019 – May 2020*
Research intern
Advisor: Dawn Song, Lun Wang

◆ Secure frameworks for Machine Learning programs: enforcing privacy policy regulation in ML programs

◆ Presented findings at the **NeurIPS** 2020 Workshop on Dataset Curation and Security, and at **USENIX Security**, 2022.

PUBLICATIONS AND PREPRINTS

Context is Key: A Benchmark for Forecasting with Essential Textual Information   Paper
Andrew Williams, Arjun Ashok, Ètienee Marcotte, Valentina Zantedeschi, Jithendaraa Subramanian, Roland Riachi, James Requeima, Alexandre Lacoste, Irina Rish, Nicolas Chapados, Alexandre Drouin
Under Review

Reinforcement Learning for Sequence Design Leveraging Protein Language Models   Paper
Jithendaraa Subramanian, Shivakanth Sujit, Niloy Irtisam, Umong Sain, Derek Nowrouzezahrai, Samira Kahou, Riashat Islam
Under Review

Learning Latent Structural Causal Models   Paper
Jithendaraa Subramanian, Yashas Annadani, Ivaxi Sheth, Nan Rosemary Ke, Tristan Deleu, Stefan Bauer, Derek Nowrouzezahrai, Samira Ebrahimi Kahou
ICML 2022 Workshop on Spurious Correlations, Invariance, and Stability

Joint Bayesian Inference of Graphical Structure and Parameters with a Single Generative Flow Network   Paper
Tristan Deleu, Mizu Nishikawa-Toomey, Jithendaraa Subramanian, Nikolay Malkin, Laurent Charlin, Yoshua Bengio
NeurIPS 2023

Bayesian Learning of Causal Structure and Mechanisms with GFlowNets and Variational Bayes   Paper
Mizu Nishikawa-Toomey*, Tristan Deleu*, Jithendaraa Subramanian, Yoshua Bengio, Laurent Charlin
*GCLR Workshop at **AAAI 2023** | Under review at **TMLR***

PrivGuard: Privacy Regulation Compliance Made Easier   Paper
Lun Wang, Usmann Khan, Joseph Near, Qi Pang, Jithendaraa Subramanian, Neel Somani, Peng Gao, Andrew Low, Dawn Song
USENIX Security 2022

Deep Reinforcement Learning to Simulate, Train, and Evaluate Instructional Sequencing Policies   Paper
Jithendaraa Subramanian, Jack Mostow
Spotlight at Educational Data Mining 2021 *Workshop on Reinforcement Learning for Education*

AWARDS & HONOURS

◆ Mitacs Accelerate Umbrella Scholarship worth **15000$**   2024

◆ McGill graduate student award worth **1500$**   2023

◆ Awarded an AI Talent Bursary of **1500$** for the AI Week at the Alberta Machine Intelligence Institute (Amii)   2022, 2023

◆ **Finalist** at the Smart India Hackathon Software Edition: **Top 1%** among **0.5 million** participants   2020

◆ **Winner** of TransfiNITTe Hackathon v2, intra-university hackathon at NIT Trichy. Awarded **200$**.   2019

VOLUNTEERING & RESPONSIBILITIES

◆ Reviewer: NeurIPS, ICLR   2024

◆ ICML Volunteer   2022

◆ Lead TA for ECSE 343 Numerical Methods in Engineering, McGill University   Winter 2022

◆ Head of the web operations team at E-Cell, NIT Trichy   2018 – 2021

◆ Core member, Delta Force (NIT Trichy's programming club). Mentored several students and helped them take their first steps into Machine Learning.