

SAMIN YEASAR ARNOB

Ph.D. student in Computer Science — McGill University — Mila

[Webpage](#) [LinkedIn](#) [Github](#) [Google Scholar](#)

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RESEARCH INTEREST

Currently working on improving merging multiple experts for LLMs using sparse adaptors, an alternative to LoRA for efficient performance and merging.

General interest: Reinforcement Learning, RLHF/ Preference fine-tuning, Mixture of experts (MoE), Parameter-efficient finetuning in LLM, Improving mergability of a mixture of experts.

EDUCATION

McGill University

Jan. 2020 – Present

Ph.D. student, Computer Science

Montreal, Canada

- Advised by [Doina Precup](#), currently a Ph.D. student in Computer Science at McGill University and Mila-Quebec AI Institute.
- **Research Focus:** Enhancing the learning capacity of neural networks, with a focus on Reinforcement Learning (RL) and Large Language Models (LLMs).
- Exploring innovative network architectures inspired by the human brain, specifically through the use of multiple specialized pathways within a single network to optimize task-specific performance. [NeurIPS 2024](#), [NeurIPS 2021-offlineRL](#)
- Worked on improving sample complexity and learning capacity in offline RL. [NeurIPS 2021-offlineRL](#), [Preprint](#)

McGill University

Jan 2018 – Dec 2019

M.Eng. in Electrical and Computer Engineering

Montreal, Canada

- Advised by [Aditya Mahajan](#), worked on Imitation learning and Inverse Reinforcement learning algorithms
- **Research Focus:** Improving robustness of the performance in imitation learning and transfer learning using domain-independent reward learning. [ICML 2020-LifeLongML](#)
- Worked on variance reduction method in off-policy algorithm.

RESEARCH EXPERIENCE

Microsoft Research, Montreal

March, 2024 - Present

Visiting Researcher

Montreal, Canada

- I am a visiting researcher at *MSR Montreal* working with [Alessandro Sordoni](#) on Sparse Adapter for Mixture of Expert training in LLM.
- **Research Focus:** Working on parameter efficient fine-tuning (PEFT) using sparse masks on extensive multitask datasets with the goal of building a mixture of experts LLM.
- Improving the ability to merge Library of Experts (LoE) such that new experts can be merged at zero-shot.
- **Application:** Working on building an open-source LoE.

Microsoft Research, New York

May, 2023 - August, 2023

Applied Research Scientist Intern

New York, USA

- Advised by [John Langford](#) and [Alex Lamb](#).
- **Research Focus:** Worked on "Hierarchical Planning in Latent Space" (HPL), an applied Reinforcement Learning (RL) initiative focused on efficient exploration strategies.
- Developed methods for large-scale exploration problems using *reward-free* hierarchical model-based planning techniques.
- **Application:** Collaborated with the Microsoft Windows team to implement HPL for automated software bug detection.

Ubisoft-La forge, Montreal

Sept. 2021 - Aug, 2022

Research Intern

Montreal, Canada

- Advised by [Joshua Romoff](#).
- **Research Focus:** Conducted research on large map navigation for bots, experimenting with the GPT-2 model to enhance performance and generalization in automating bot navigation for future games.
- **Application:** Developed an internal Reinforcement Learning (RL) library to support and advance research in bot navigation.

- Advised by [Doina Precup](#), we explore learning transferable skills over multiple environments from *MineCraft gaming environment* using imitation learning.

AWARDS AND RECOGNITION

DeepMind Graduate Award

Jan. 2020 – Present

McGill University

Spot Light Presentation

RLDM 2019

Graduate Excellence Fellowship Award

Jan. 2018 – Dec. 2018

McGill University

Honorable Mention

2016

IEEE Signal Processing Cup

[Report](#)

[Github](#)

TECHNICAL SKILLS

Python

Java

bash scripting

Linux environment

PyTorch

Tensorflow

PROJECTS AND PUBLICATION

- "Efficient Reinforcement Learning by Discovering Neural Pathways".
 - **SY Arnob**, R Ohib, Amy Zhang, A. Sordoni, Doina Precup
 - **NeurIPS 2024** - [Paper](#)
- "Improving Sample Complexity of Offline Reinforcement Learning using Sparse Regularization."
 - **SY Arnob**, Scott Fujimoto, Doina Precup
 - **Under review - Please do not distribute** - [Paper](#)
- "Importance of Empirical Sample Complexity Analysis for Offline Reinforcement Learning".
 - **SY Arnob**, R Islam, D Precup
 - **NeurIPS 2021**- Offline Reinforcement Learning Workshop - [Paper](#)
- "Single-Shot Pruning for Offline Reinforcement Learning".
 - **SY Arnob**, R Ohib, S Plis, D Precup
 - **NeurIPS 2021**- Offline Reinforcement Learning Workshop - [Paper](#)
- "Offline Policy Optimization with Variance Regularization".
 - R Islam, S Sinha, H Bharadhwaj, **SY Arnob**, Z Yang, Z Wang, A Garg, L Li, D Precup
 - **NeurIPS 2020**- Offline Reinforcement Learning Workshop [Open Review](#)
- "Off-policy adversarial inverse reinforcement learning".
 - **SY Arnob**
 - **ICML 2020**- [Lifelong Learning Workshop](#) [Open Review](#) — [Github](#) — [Project Page](#)
- "Doubly Robust Estimators in Off-Policy Actor-Critic Algorithms".
 - R Islam, **SY Arnob** and D Precup
 - **RLDM-2019: Spot Light Presentation**, Montreal, Canada. Extended version available online - [Arxiv](#)
 - **NeurIPS 2019**- Safety and Robustness in Decision Making Workshop
- "Power File Extraction Process from Bangladesh Grid and Exploring ENF Based Classification Accuracy using Machine Learning".
 - **SY Arnob**, R. Ohib, M. Muhaisin, T. Bin Hassan.
 - **IEEE Region 10 Humanitarian Technology Conference 2017**. [IEEEExplore](#)
- "ENF Based Machine Learning Classification for origin of Media Signals: Novel Features from Fourier Transform Profile".
 - R. Ohib, **SY Arnob**, M. Muhaisin, R. Arefin, T. Reza and MR. Amin
 - Accepted at [:ICEECS 2018](#) and presented on 13-14 Nov, 2018.

TEACHING EXPERIENCE

Teaching Assistant

COMP 551 - Applied Machine Learning

Fall 2020, Winter 2020

- I was a teaching assistant (TA) in Winter 2020 and Fall 2020 for the Applied Machine Learning course, one of the most popular courses taught at McGill to about 300 graduate and undergraduate students per semester.
- I have designed projects and graded them along with helping students with their class projects in both of the terms.

COMP 424 - Artificial Intelligence

Winter 2021

- I was in charge of the final project, where proposed solving pentago-twist, a variant of popular pentago boardgame.
- The competition lasted for a month, during which I advised about 400 undergraduate students. All of the students individually were pitted against each other over multiple rounds and the challenging part was to debug the submissions and auto-mate the evaluation.
- see the [GitHub](#) link

GRADUATE COURSE

- IFT 6760C - Reinforcement Learning and Optimal Control
- COMP 767 - Reinforcement Learning
- COMP 652 - Machine Learning
- ECSE 509 - Probability and Random Signals 2
- COMP 551 - Applied Machine Learning
- ECSE 506 - Stochastic Control and Decision Theory