

## RESEARCH INTEREST

**OFFLINE RL, IMITATION LEARNING, INVERSE REINFORCEMENT LEARNING, GENERATIVE ADVERSARIAL NETWORKS, HIERARCHICAL LEARNING** I'm a Ph.D. student supervised by Doina Precup, interested in offline RL, imitation learning algorithms with the focus of learning lifelong skills in games. In prior (during Masters), I have worked on Adversarial Inverse Reinforcement Learning algorithms focusing on improving robustness of the performance in imitation and transfer learning.

## CONTACT INFORMATION

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## EDUCATION

## MCGILL UNIVERSITY

PH.D. STUDENT | COMPUTER SCIENCE |  
 JAN'20-PRESENT

Reasoning and Learning Lab , Mila

Supervisor: Dr. Doina Precup

## MCGILL UNIVERSITY

M.ENG. (THESIS) | ECE | JAN'18-APRIL'20

Systems and Control Lab, Center for Intelligent  
 Machines(CIM)

Supervisor: Dr. Aditya Mahajan

## INTERNSHIP

- **UBISOFT, MONTREAL | SEP'21-PRESENT**  
 Learning from expert demonstrations.
- **MILA, MONTREAL | JUNE'19-DEC'19**  
 Project: MineRL competition , NeurIPS 2019.  
 We explore learning transferable skills over  
 multiple environments from MineCraft gaming  
 environment using imitation learning. **See the  
 trained agent play.**  
 Supervisor: Dr. Doina Precup

## ACADEMIC AWARD

- **DEEPMIND GRADUATE AWARD 2020**
- **GRADUATE EXCELLENCE FELLOWSHIP 2018**  
 McGill University
- **HONORABLE MENTION**  
 IEEE SP CUP 2016

## COURSEWORK

## TEACHING ASSISTANT

COMP 551 - Applied Machine Learning | Winter 2020,  
 Fall 2020.

COMP 424 - Artificial Intelligence | Winter 2021

## 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

## RESEARCH EXPERIENCE

## IMPROVING ROBUSTNESS IN ADVERSARIAL INVERSE REINFORCEMENT LEARNING

For masters thesis worked on Off-Policy Adversarial Inverse Reinforcement Learning (Off-policy-AIRL) algorithm which is sample efficient as well as gives good imitation performance compared to the state-of-the-art imitation learning algorithm in the continuous control tasks. Also show the utility of learning inverse reinforcement learning over imitation learning algorithms by using the learned reward function to retrain the policy over a task under significant variation where expert demonstrations are absent. **READ MORE** | [Open Review](#) | [Github](#) | [Project Page](#)

## DOUBLY ROBUST ESTIMATORS IN OFF-POLICY ACTOR-CRITIC ALGORITHMS

It's jointly collaborated with Riashat Islam and Doina Precup from MILA. Our partial work got accepted for **Spot Light presentation** at **RLDM 2019**. Policy gradient methods, a wide class of model-free algorithms is used to solve continuous control tasks, suffer from instability due to high variance in performance. In this work, we extend the idea of doubly robust off-policy evaluation in actor-critic algorithms to reduce performance variance.

## IDENTIFICATION OF ENF BASED GRID OF ORIGIN CLASSIFICATION SYSTEM FOR MEDIA SIGNALS USING MACHINE LEARNING

Worked on Classification of Media Files based on their location of recording, using Machine Learning for **IEEE SP CUP 2016**. Our work **ranked 11th** (Fourier's Underlings) worldwide among 52 teams representing 23 countries. [Github](#) , [Sigport](#)

## GRADUATE PROJECT

## ROBUSTNESS OF ADVERSARIAL INVERSE REINFORCEMENT LEARNING

For COMP-767 course project, compared the policy performance of DAC with off-policy AIRL and investigated robustness of the algorithm in transfer learning in dynamic environments.

## REPRODUCIBILITY-CHALLENGE - ICLR 2019

As a project for COMP-652 participating on reproducibility challenge on **"Discriminator Actor-Critic"** (DAC), which is a adversarial imitation learning algorithm solves sample efficiency and reward bias problem of previous standard algorithms. (Featured in course website: **COMP 652-Machine Learning**)

## PUBLICATION

- R Islam, S Sinha, H Bharadhwaj, SY Arnob, Z Yang, Z Wang, A Garg, L Li, D Precup - "Offline Policy Optimization with Variance Regularization". [Open Review](#)
- SY Arnob, "Off-policy adversarial inverse reinforcement learning," 2020. - **4th Lifelong Learning Workshop at ICML 2020**.  
[Open Review](#) | [Github](#) | [Project Page](#)
- R Islam, SY Arnob and D Precup."Doubly Robust Estimators in Off-Policy Actor-Critic Algorithms" - **Spot Light Presentation in RLDM-2019**, Montreal, Canada. Extended version available online - [Arxiv](#)
- SY Arnob, R. Ohib, M. Muhaisin, T. Bin Hassan. "Power File Extraction Process from Bangladesh Grid and Exploring ENF Based Classification Accuracy using Machine Learning" - **IEEE Region 10 Humanitarian Technology Conference 2017**. DOI: [10.1109/R10-HTC.2017.8288911](#)
- R. Ohib, SY Arnob, M. Muhaisin, R. Arefin, T. Reza and MR. Amin, "ENF Based Machine Learning Classification for origin of Media Signals: Novel Features from Fourier Transform Profile." Accepted at :**ICEECS 2018** and presented on 13-14 Nov, 2018.

## SOFTWARE

Python

Java

bash scripting

Linux environment

PyTorch

Tensorflow