

Raihan Seraj

📍 3616 Rue Durocher, H2X 2E8 Montreal, Canada ✉️ raihan.seraj@mail.mcgill.ca

☎️ 5149988234 🖱️ [raihan-seraj.github.io](https://github.com/raihan-seraj) in [raihan-seraj](https://www.linkedin.com/company/raihan-seraj) 🐙 [Raihan-Seraj](https://github.com/Raihan-Seraj)

Education

Doctor of Philosophy

McGill University 

Jan 2019 – present

Montreal, Canada

- **Research Interest:** Reinforcement Learning, Multi-agent systems, Game Theory, Human Automation Teams
- **Affiliations:** Montreal Institute of Learning Algorithms (MILA), Group for Research in Decision Analysis (GERAD), Center for Intelligent Machines (CIM).

MEng, Electrical & Computer Engineering

McGill University 

Jan 2017 – Jan 2019

Montreal, Canada

- **Thesis:** Learning in the presence of partial observability and concept drifts.
- **Graduate Courses:** Applied Machine Learning, Optimization and Optimal Control, Reinforcement Learning, Intelligent Robotics, Stochastic Control and Markov Decision Processes.

BSc, Electrical & Electronic Engineering

Islamic University of Technology 

Dec 2011 – Dec 2015

Dhaka, Bangladesh

- **Thesis:** Classification of malignant and benign tissue using logistic regression with dynamic sigmoid function.

Research Experience

Research Scientist Intern

Valence Drug Discovery

Jun 2021 – Sep 2021

Montreal, Canada

- Implemented fibrous auto-encoders for constructing a latent space to generate molecules with different structures having the same activity level.
- Used latent molecular representation to construct a Markov Decision Process, and formulated a Reinforcement learning problem with the R&D team to identify scaffold hopping in molecules.

Research Scientist Intern*Paladin AI*

Mar 2020 – Oct 2020

Montreal, Canada

- Designed learning algorithms for automatic flight data segmentation through automatic feature learning.
- Performed time series analysis with data from aircraft simulators and segmented pilot reactions during faults to assign them a proficiency metric.

Research Scientist Intern*Aerial Technologies*

Mar 2018 – May 2019

Montreal, Canada

- Performed automatic feature extraction of WiFi Channel State Information (CSI) data that is robust to concept drift for the application of real-time indoor localization.
- Analyzed time series data and trained deep learning models to classify fall detection using WiFi Channel state information.

Research Engineer*Department of Biomedical Physics and Technology, University of Dhaka*

Dec 2015 – Dec 2016

Dhaka, Bangladesh

- Designed learning algorithms to automatically classify QRS complexes to detect acceptable ECG traces.
- Developed a personal computer-based telemedicine system with integrated diagnostic equipment that uses the internet for live (real-time) data transfer.
- Worked on software development for automatic frequency domain analysis to identify neurological disorders from evoked EMG responses.
- Performed software interfacing of a 12 lead computerized ECG machine in android that allows near real-time data transmission to and from remote areas.

Research Intern*IUT Innovation Lab*

Feb 2014 – Nov 2015

Dhaka, Bangladesh

- Designed embedded security systems for homes using Arduino and Raspberry Pi.
- Developed a device capable of remotely switching and regulating any 220V AC devices with real-time tweets.

Publications

Tsetlin Machine for Solving Contextual Bandit Problems

Neural Information Processing Systems (NeurIPS) 2022

Raihan Seraj, Jivitesh Sharma, Ole-Christoffer Granmo

Approximate Information State for Approximate Planning and Reinforcement Learning in Partially Observed Environments

Journal of Machine Learning Research (JMLR)

Jayakumar Subramanian, Amit Sinha, **Raihan Seraj** and Aditya Mahajan

Mean-Field Approximation for Large-Population Beauty-Contest Games.

IEEE Conference on Decision and Control (CDC)

Raihan Seraj, Jerome Le Ny and Aditya Mahajan.

Reinforcement Learning for Mean-Field Teams

AAMAS workshop on Adaptive And Learning Agents

Jayakumar Subramanian, **Raihan Seraj** and Aditya Mahajan

The K-Means Algorithm: A Comprehensive Survey and Performance Evaluation

Multidisciplinary Digital Publishing Institute (MDPI), Electronics

Mohiuddin Ahmed, **Raihan Seraj**, Salimur Chowdhury and Syed Mohammed Samsul Islam.

Entropy Regularization with Discounted Future State Distribution in Policy Gradient Methods

NeurIPS 2019 workshop on Optimization Foundations for Reinforcement Learning.

Riashat Islam, **Raihan Seraj**, Pierre-Luc Bacon and Doina Precup.

Doubly Robust Off-Policy Actor Critic Algorithms for Reinforcement Learning

NeurIPS 2019 workshop on Safety and Robustness in Decision Making

Riashat Islam, **Raihan Seraj**, Samin Yeasar Arnob and Doina Precup

Concept Drift for Big Data

Combating Security Challenges in the Age of Big Data. Advanced Sciences and Technologies for Security Applications. Springer, Cham

Raihan Seraj, Mohiuddin Ahmed

Handling concept drift in wi-fi-based localization

US Patent App. 17/383,654, 2021 "Handling concept drift in wi-fi-based localization

LIU Qianyu, N Ghourchian, MA Martinez and **Raihan Seraj**

Skills

Programming Languages

Python, Matlab, C, Java, Julia

Frameworks

Numpy, Pandas, Scikit-Learn,
Pytorch, Tensorflow, Chainer

Systems

Linux, OSX

Raihan Seraj



Positions of Responsibility

Reviewer <i>International Conference on Machine Learning (ICML)</i>	2022
Reviewer <i>American Control Conference (ACC)</i>	2021
Teaching Assistant <i>COMP 360, Algorithm Design, McGill University</i>	2020 Montreal, Canada
Teaching Assistant <i>ECSE 324, Computer Organization, McGill University</i>	2019 Montreal, Canada
Teaching Assistant <i>COMP 760, Intelligent Robotics, McGill University</i>	2019 Montreal, Canada
Volunteer <i>Neural Information Processing Systems</i>	2018 Montreal, Canada
Reviewer <i>International Journal for Computers and Applications</i>	2018 Montreal, Canada
President <i>IEEE, IUT Student Branch</i>	2014 Dhaka, Bangladesh



Awards

GERAD co-supervised student award <i>GERAD</i> Winner of the GERAD research grant competition for co-supervised graduate students.	Feb 01, 2019
McGill Engineering Doctoral Award (MEDA) <i>McGill University</i> Awarded to doctoral students based on the excellence of the student's academic and research record.	Jan 01, 2019
MITACS Accelerate Fellowship <i>MITACS</i> Award provided to carry out extensive research in industries.	May 05, 2018
Graduate Excellence Fellowship <i>McGill University</i> Award to support outstanding Master's students.	Jan 01, 2018

Daily Star Award

Jun 01, 2011

The Daily Star

Award to recognize outstanding performers in GCE O and A-levels.

Entrance exam scholarship

Dec 25, 2011

Islamic University of Technology

Merit-based scholarship awarded during the university entrance examination.

**References**

Available upon request.