ARUSHI JAIN

Mila, McGill University, Montreal, Canada
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RESEARCH INTERESTS

Reinforcement Learning (RL), Safe RL, Off-Policy RL.

EDUCATION

McGill University, Montreal, Canada

Ph.D., Computer Science	GPA: 4.00/4.00	*Sept 2019 - Present*
MSc, Computer Science	GPA: 4.00/4.00	*Sept 2017 - Sept 2019*

<u>Mila</u>
Supervisor: <u>Doina Precup</u>, <u>Pierre-Luc Bacon</u>

Indraprastha Institute of Information Technology Delhi (IIIT-D), India

Bachelor of Technology, Computer Science and Engineering   GPA: 9.42/10.00   *Aug 2012 - May 2016*
Image Analysis and Biometrics (IAB) lab
Supervisor:<u>Mayank Vatsa</u>, <u>Richa Singh</u>

AWARDS

- **Bourse du Centre de Recherche Informatique de Montréal (CRIM) pour Études Supérieures (2018-2019)** Graduate Scholarship provides financial support to only one master and a doctoral student.

PUBLICATIONS

1. **Variance Penalized On-Policy and Off-Policy Actor-Critic**[**Paper**][**Poster**][**Slide**]
   Arushi Jain, Gandharv Patil, Ayush Jain, Khimya Khetarpal, Doina Precup

   Accepted to the Thirty-Fifth AAAI Conference on Artificial Intelligence (**AAAI**), 2021.

2. **Safe Option-Critic: Learning Safety in the Option-Critic Architecture**[**Paper**][**Poster**][**Slide**]
   Arushi Jain, Khimya Khetarpal, and Doina Precup

   Accepted in Adaptive Learning Agents (**ALA**), **AAMAS** Workshop, 2018.
   Accepted in The Knowledge Engineering Review (KER) Journal 2021. [Impact Factor 1.07]

3. **Safe Actor-Critic**[**Paper**][**Poster**][**Slide**]
   Arushi Jain, Ayush Jain, and Doina Precup

   Accepted in Safety, Risk and Uncertainty in RL, Uncertainty in AI (**UAI**) Workshop, 2018.
   Accepted in Women in ML (WiML), (**NeurIPS**) Workshop, 2018.

4. **Learning Options using Constrained Return Variance**[**Paper**][**Poster**]
   Arushi Jain and Doina Precup

   Accepted in Safety and Robustness in Decision Making, **NeurIPS** Workshop 2019.

5. **Safe Policy Learning with Constrained Return Variance**[**Paper**][**Poster**]
   Arushi Jain

   Accepted in Graduate Student AI Symposium held at **Canadian AI Conference** 2019. The proceeding is also published in the <u>**LNAI**</u> Series by Springer Verlag.

6. **Safe Hierarchical Policy Optimization using Constrained Return Variance in Options**[**Paper**]
   Arushi Jain, Doina Precup
   Accepted at **RLDM** 2019.

7. **Safety using constraint variance in policy-gradient methods**[**Link**]
   Arushi Jain
   Master Thesis, McGill University, Montreal, March 2020.

RESEARCH & WORK EXPERIENCE

Mila, RL Lab, McGill University September 2017 - Present
Graduate Student *advised by Prof. Doina Precup, Pierre-Luc Bacon*

· Designing a novel, generic **on-policy and off-policy safe actor-critic** framework to learn safe policies such that objective function trades off between minimizing the effects of model uncertainty and maximizing the mean return.
· Worked on introducing novel safety solutions in Options (**hierarchical RL**) known as Safe Option-Critic. We derived a policy-gradient algorithm where variance in the temporal difference (TD) error was regularized.

SPORTLOGiQ, Montreal, Canada June 2019 - Sept 2019
RL Research Intern *mentored by Norm Ferns*

Worked on formally comparing and contrasting the agents in a given Markov Decision Process (MDP) by coming up with behavioral pseudo-metrics following the work on *lax-bisimulation*.

Borealis AI, Edmonton, Canada May 2018 - Aug 2018
AI Research Intern *mentored by Nidhi Hedge*

Worked on **safe recommendations** in RL setting which would help provide recommendations with certain guarantees. This would provide life-long learning as well as long-term goal maximization which would be particularly useful in financial applications.

Microsoft Research (MSR), India June 2016 - July 2017
Research Fellow *advised by Sundararajan Sellamanickam, Arun Iyer*

· Developed a **service monitoring and diagnostic tool** for unsupervised hierarchical monitoring of services which replaced a heuristic-based system failing to jointly model multivariate time-series.
· Worked on **entity matching problem across heterogeneous sources** with missing data in the source.
· Worked on **email solutions using DNN** to build intelligent approaches to solve problems like multi-label classification, learning a useful representation of email content, etc.

TECHNICAL SKILLS & COURSEWORK

Programming Languages: Python, Tensorflow, Java, C

Coursework: Reinforcement Learning, Probabilistic Analysis of Algorithms, Applied ML, Theoretical ML, Probabilistic Graphical Modeling, Matrix Computation, Mathematical Foundation of ML, Reinforcement Learning and Optimal Control.