

## Research Interests

Reinforcement Learning (RL), Large Language Models (LLMs), Reasoning, Code Generation, Reinforcement Learning from Human Feedback (RLHF), Inverse Reinforcement Learning

## Education

2022–present **Mila, Université de Montréal.**

PhD student supervised by *Prof. Irina Rish*

2013–2018 **Indian Institute of Technology Kharagpur.**

Integrated B.Sc. and M.Sc. in Mathematics and Computing

## Research & Work Experience

Feb'25– **Research Intern, Cohere Inc.**

Working on multi-turn LLM agents for code generation

Aug'24– **Visiting Researcher, PoRTaL lab, Cornell University.**

Visited Sanjiban Choudhury's lab for collaboration on IRL via Successor Features Matching (SFM), model-based IRL with diffusion policies for real world tasks and using RL to train LLM agents for Code Generation.

Aug'20 – **Data & Applied Scientist 2, Microsoft IDC.**

Dec'20 Worked with Dr. Manik Varma at MSR India to develop scalable and accurate eXtreme Classification algorithms for web-scale recommendation system (published at TheWebConf'21)

Jun'18 – **Data & Applied Scientist, Microsoft IDC.**

Jul'20 Worked on algorithms to improve cross-lingual retrieval of relevant keywords for a query.

May'17 – **Research Intern, HyperVerge Inc..**

Jul'17 Worked on object detection algorithms for video surveillance systems.

May'16 – **Research Intern, ParallelDots.**

Jul'16 Worked on lung nodule detection in 3D CT scans and mitosis detection in histology images.

## Patents

2021 Extreme Classification Processing using Graphs and Neural Networks,

*Kushal Dave, Deepak Saini, **Arnav Kumar Jain**, Amit Singh, Jian Jiao, Ruofei Zhang and Manik Varma.*

Pending Approval

## Publications

2025 Multi-Turn Code Generation Through Single-Step Rewards | [link](#),

**Arnav Kumar Jain\***, Gonzalo Gonzalez\*, Wayne Chen, Alexander M Rush, Wenting Zhao, Sanjiban Choudhury.

Under review.

2025 Non-Adversarial Inverse Reinforcement Learning via Successor Feature Matching | [link](#),

**Arnav Kumar Jain**, Jesse Farebrother, Harley Wiltzer, Irina Rish, Glen Berseth, Sanjiban Choudhury.

International Conference on Learning Representations (ICLR) 2025

Models of Human Feedback for AI Alignment Workshop, International Conference on Machine Learning (ICML) 2024

2023  $\eta\psi$ -Learning: Maximum State Entropy Exploration using Predecessor and Successor Representations | [link](#),

**Arnav Kumar Jain**, Lucas Lehnert, Irina Rish, Glen Berseth.

Neural Information Processing Systems (NeurIPS), 2023

Frontiers4LCD Workshop, International Conference on Machine Learning (ICML), 2023

2022 Learning Robust Dynamics through Variational Sparse Gating | [link](#),

**Arnav Kumar Jain**, Shivakanth Sujit, Shruti Joshi, Vincent Michalski, Danijar Hafner, and Samira Ebrahimi-Kahou.

Neural Information Processing Systems (NeurIPS), 2022

Deep RL Workshop, Neural Information Processing Systems (NeurIPS), 2021

- 2021 GalaXC: Graph neurAL networks with Labelwise Attention for eXtreme Classification | [link](#), Deepak Saini\*, **Arnav Kumar Jain\***, Kushal Dave\*, Amit Singh, Jian Jiao, Ruofei Zhang, and Manik Varma. The Web Conference (**TheWebConf**), 2021
- 2020 Predicting Regional Locust Swarm Distribution with Recurrent Neural Networks | [link](#), Hadia MO Samil\*, Annabelle Martin\*, **Arnav Kumar Jain\***, Susan Amin, and Samira Ebrahimi-Kahou. AI+HADR Workshop, Neural Information Processing Systems (**NeurIPS**), 2020
- 2020 Graph Regularization for Multi-lingual Topic Models | [link](#), **Arnav Kumar Jain\***, Gundeep Arora\*, and Rahul Agrawal. **SIGIR** Conference on Research and Development in Information Retrieval, 2020
- 2020 Prior guided GAN based Semantic Inpainting | [link](#), Avisek Lahiri\*, **Arnav Kumar Jain\***, Sanskar Agrawal, Prabir Kumar Biswas, and Pabitra Mitra. Computer Vision and Pattern Recognition (**CVPR**), 2020
- 2019 Faster unsupervised semantic inpainting: A GAN based approach | [link](#), Avisek Lahiri\*, **Arnav Kumar Jain\***, Divyashree Nadendla and Prabir Kumar Biswas. International Conference on Image Processing (**ICIP**), 2019
- 2018 Optimal Spline Trajectories by Modelling Kinematic Constraints in Robot Soccer | [link](#), Abhinav Agarwalla\*, **Arnav Kumar Jain\***, KV Manohar, Arpit Saxena, Jayanta Mukhopadhyay. Conference on Data Science and Management of Data (CoDS-COMAD), 2018
- 2017 Recurrent Memory Addressing for describing videos | [link](#), **Arnav Kumar Jain\***, Abhinav Agarwalla\*, Kumar Krishna Agrawal\* and Pabitra Mitra. DeepVision Workshop, Computer Vision and Pattern Recognition (CVPRW), 2017
- 2016 KgpKubs Team Description Paper, Abhinav Agarwalla, Kumar Abhinav, **Arnav Jain**, Kaustubh Mundhadha, Dhananjay Yadav, .... RoboCup, 2016

## Mentoring

- 2024- **Subin Kim** (KAIST, MS)
- 2024-2025 **Vibhakar Mohta** (CMU, MS), Now at Nuro

## Awards & Achievements

- 2024 **FRQNT Fellowship**.  
Received the Fonds de recherche du Québec PhD fellowship.
- 2019 **Excellence in Innovation, Microsoft**.  
Awarded for creating models resulting in business impact and reducing defect rate on Bing Ads platform
- 2018 **ACM India Student Travel Grant**.  
Received travel grant to present accepted paper in ACM IKDD CoDS COMAD 2018
- 2017 **Data Science Bowl 2017**.  
Received 5000\$ for the 3<sup>rd</sup> highest voted kernel on *Candidate generation and LUNA16 preprocessing*
- 2015 **FIRA RobotSoccer WorldCup, South Korea**.  
Participated in FIRA, 2015 in SIMUROSOT league and won Bronze in MIROSOT league, and were the first Indian team to have a podium finish
- 2015 **SudoCode, Kshitij, IIT Kharagpur**.  
Secured 1<sup>st</sup> Position (2015) and Best Freshers' (2014) in a national event to develop AI algorithms.
- 2013 **Innovation in Science Pursuit for Inspired Research (INSPIRE) Scholarship**.  
Scholarship awarded by the Department of Science and Technology, Government of India

## Other Activities

- 2014 **Texas Instruments certified Winter Workshop**.  
Mentored 60 freshmen to develop a bot that can follow lanes and detect shapes.
- 2013 – 2015 **National Service Scheme**.  
Organized two medical camps with free checkups and medicines, and volunteered to teach school children.