Abhishek Naik

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EDUCATION

- **Ph.D., Computing Science** CGPA: 4.0/4.0, *Sep 2018-March 2024*
  University of Alberta, Edmonton, Canada Supervisor: Richard S. Sutton
- **Integrated B.Tech.+M.Tech., Computer Science and Engineering** CGPA: 9.49/10, *2013-18*
  Indian Institute of Technology Madras, Chennai, India Supervisor: B. Ravindran

SELECTED RESEARCH

(* equal contribution)

- **Investigating Action-space Generalization in RL for Recommender Systems** [Paper, Poster]
  ***Abhishek Naik**, Bo Chang, Alexandros Karatzoglou, Martin Mladenov, Ed H. Chi, Minmin Chen*
  Oral presentation at the *Decision Making for RecSys workshop at WWW,* 2023
- **Multi-Step Average-Reward Prediction via Differential TD(λ)** [Paper, Poster]
  ***Abhishek Naik**, Richard S. Sutton*
  Presented at the *Conference on Reinforcement Learning and Decision Making (RLDM), 2022*
- **Average-Reward Learning and Planning with Options** [Paper, Poster]
  *Yi Wan, **Abhishek Naik**, Richard S. Sutton*
  In *Advances in Neural Information Processing Systems (NeurIPS),* 2021
- **Towards Reinforcement Learning in the Continuing Setting.** [Paper, Poster]
  ***Abhishek Naik**, Zaheer Abbas, Adam White, Richard S. Sutton*
  Presented at the *Never-Ending Reinforcement Learning (NERL) workshop at ICLR,* 2021
- **Learning and Planning in Average-Reward Markov Decision Processes** [Paper, Poster]
  Yi Wan, **Abhishek Naik***, Richard S. Sutton*
  In *International Conference on Machine Learning (ICML),* 2021
- **Discounted Reinforcement Learning Is Not an Optimization Problem** [Paper, Poster]
  ***Abhishek Naik**, Roshan Shariff, Niko Yasui, Hengshuai Yao, Richard S. Sutton*
  Presented at *The Optimization Foundations of RL workshop at NeurIPS,* 2019
- **MADRaS: Multi Agent DRiving Simulator** [Paper]
  *A. Santara, S. Rudra, S.A. Buridi, M. Kaushik, **Abhishek Naik**, B. Kaul, B. Ravindran*
  In *Journal of Artificial Intelligence Research (JAIR)*, 2021
- **RAIL: Risk-Averse Imitation Learning** [Paper]
  A. Santara, **Abhishek Naik***, B. Ravindran, D. Das, D. Mudigere, S. Avancha, B. Kaul*
  In *International Conference on Autonomous Agents and MultiAgent Systems (AAMAS)*, 2018

MASTER'S THESIS

Deep Reinforcement Learning: Reliability and Multi-Agent Environments [Thesis, Slides]

My goal was to make self-driving cars a reality in my country, India. Towards this end, I modeled it as a multi-agent learning problem in a safety-critical application and:

- proposed a risk-averse imitation learning algorithm that achieved lower tail-end risk compared to the then state-of-the-art,
- trialled a curriculum-based learning approach for multi-agent learning in RoboSoccer, and
- extended the TORCS racing game to release the first open-source driving simulator that supports multi-agent training – MADRaS (has 100+ stars on Github).

WORK EXPERIENCE

- Software, Automation, and Testing Team Member, **AlbertaSat** *April 2023–ongoing*
  Edmonton, Canada
  AlbertaSat is University of Alberta's student group that designs, builds, and operates nano satellites. My role is to simulate various operational and safety scenarios of our upcoming satellite to ensure it can robustly achieve all the mission objectives.

- Research Intern, **Google Research, Brain Team** *June–Sep 2022*
  Toronto, Canada Advisors: Bo Chang, Alexandros Karatzoglou
  Investigated methods for action-space generalization in RL for large-scale recommender systems like YouTube.

- Research Intern, **Huawei Research** *May–Aug 2019*
  Edmonton, Canada Advisor: Hengshuai Yao
  Began investigating the discounted-reward and average-reward formulations for continuing (non-episodic) problems in RL.

- Research Intern, **Intel Labs** *May–Jul 2017*
  Bengaluru, India Advisor: Bharat Kaul
  Started work on a risk-averse imitation learning approach that achieved up to 89% improvement over the then state-of-the-art on standard robotic control tasks.

- Research Intern, **Purdue University**, Dept. of Computer Science *May–Jul 2016*
  Indiana, USA Advisor: Bruno Ribeiro
  Analyzed the expected activity-lifespan of social-media users based on their early profile activity. Curated and released a rich social-media dataset for public use via a technical paper.

- Software Engg. Intern, **Amazon Development Center** *May–Jul 2015*
  Chennai, India Advisor: Sravan Bodapati
  Helped build a classifier to determine the start-reading-location of books.
  Now in production, this feature helps Kindle users start reading a book quicker after downloading it, without having to flip through pages like acknowledgements or copyright notices.

TEACHING EXPERIENCE

- Teaching Assistant, **Reinforcement Learning II** (CMPUT609) *Jan–Apr 2020, 2021, 2023*
  University of Alberta, Edmonton, Canada Instructor: Richard S. Sutton
- Teaching Assistant, **Reinforcement Learning I** (CMPUT397) *Sep–Dec 2020*
  University of Alberta, Edmonton, Canada Instructor: Martha White
- Content Developer, **Coursera Reinforcement Learning Specialization** *Jan–Oct 2019*
  University of Alberta, Edmonton, Canada Instructors: Adam White, Martha White
- (Head) Teaching Assistant, **Reinforcement Learning** (CS6700) *Jan–May 2018*
  Indian Institute of Technology Madras, Chennai, India Instructor: B. Ravindran
- Teaching Assistant, **Machine Learning** (CS4011) *Aug–Nov 2017*
  Indian Institute of Technology Madras, Chennai, India Instructors: B. Ravindran, M. Khapra

SELECTED TALKS

- **Unifying Perspectives on Intelligence** [Slides]
  Summer School at the Science of Intelligence Institute, Berlin, Germany *Aug 2023*
- **Essentials of Reinforcement Learning** [Slides]
  3rd Nepal Winter School in AI, Virtual *Dec 2021*
- **Towards Reinforcement Learning in the Continuing Setting** [Slides]
  Never-Ending Reinforcement Learning (NERL) workshop at ICLR 2021, Virtual *May 2021*
- **Personalized Brain State Targeting via Reinforcement Learning** [Video, Slides]
  The 3rd Neuromatch Conference, Virtual *Oct 2020*
- **Learning and Planning in Average-Reward MDPs** [Video, Slides]
  Tea Time Talk, Virtual *Aug 2020*
- **On Intelligence: A Glimpse of the Diversity in Natural Intelligence** [Video, Slides]
  Amii AI Meetup, Edmonton, Canada *June 2020*
- **Figuring Out How the Mind Works** [Video, Slides]
  Cognitive Psychology Seminar, Dept. of Psychology, University of Alberta *March 2020*
- **Discounting – Does It Make Sense?** [Video, Slides]
  Tea Time Talk, RLAI lab and Amii, Edmonton, Canada *Aug 2019*

COMMUNITY SERVICE

- **Reviewer**, *Artificial Intelligence, ICLR 2020, AAAI 2021*, *RL4RL* at *ICML 2021* and *NeurIPS 2022*
- **Co-organizer**, *ICML 2021 Social* on Continuing (Non-episodic) RL Problems *July 2021*
- **Co-organizer**, *NeurIPS 2020 Tutorial* on Policy Optimization in RL *Dec 2020*
- **Organizer**, *Amii Tea Time Talks, Virtual* *June - Aug 2020*
- **Executive Member**, *Computing Science Graduate Students' Association, UofA* *Apr 2019 - Apr 2020*
- **Volunteer**, *Centre for Autism Services Alberta,* Edmonton *Jan 2019 - Mar 2020*
- **Mentor**, *Student Wellness Center*, IIT Madras *Aug 2015 - May 2017*

RECENT AWARDS

- **Winner**, natHACKS 2023 *hackathon with Khurram Javed. Using new advancements in RL, we showed we can learn to control on-screen objects via our brains' EEG signals* within seconds. [Video]