Shivam Garg

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EDUCATION

University of Alberta, Canada 2022–present
Doctor of Philosophy in Computing Science
Supervisor: Prof. Dale Schuurmans

University of Alberta, Canada 2019–21
Master of Science in Computing Science
Supervisors: Prof. Rupam Mahmood and Prof. Martha White
GPA: 4.0/4.0 (awarded CAIAC Best Master's Thesis Award 2022)

Indian Institute of Technology (BHU) Varanasi, India 2014–19
Integrated Dual Degree [BTech (Hons.) + MTech] in Computer Science and Engineering
GPA: 9.77/10.0 (ranked 1/82 in my class)

EXPERIENCE

Research Assistant, University of Alberta Sept 2021–Aug 2022
– Worked with Prof. Csaba Szepesvári on reinforcement learning theory (mainly policy gradient methods).

Internship at Samsung R&D Institute India, Bangalore May–Jul 2017
– Intern in the Android Platform team.
– Worked on inducing traces in the Linux kernel for data logging.
– Investigated various machine learning techniques for handling the above data.

PAPERS

[P4] **An Alternate Policy Gradient Estimator for Softmax Policies.** [PDF]
Shivam Garg, Samuele Tosatto, Yangchen Pan, Martha White, A. Rupam Mahmood.
International Conference on Artificial Intelligence and Statistics (AISTATS), 2022.

[P3] **A General Class of Surrogate Functions for Stable and Efficient Reinforcement Learning.** [PDF]
Sharan Vaswani, Olivier Bachem, Simone Totaro, Robert Müller, Shivam Garg, Matthieu Geist, Marlos C. Machado, Pablo Samuel Castro, Nicolas Le Roux.
International Conference on Artificial Intelligence and Statistics (AISTATS), 2022. **(Oral)**

[P2] **Gradient Temporal-Difference Learning with Regularized Corrections.** [PDF]
Sina Ghiassian, Andrew Patterson, Shivam Garg, Dhawal Gupta, Adam White, Martha White.
International Conference on Machine Learning (ICML), 2020.

[P1] **Object Sequences: Encoding Categorical and Spatial Information for a Yes/No Visual Question Answering Task.** [PDF] [DOI]
Shivam Garg and Rajeev Srivastava.
IET Computer Vision, 2018.

WORKSHOP PAPERS

[W3] **Making Policy Gradient Estimators for Softmax Policies More Robust to Non-stationarities.** [PDF]
Shivam Garg, Samuele Tosatto, Yangchen Pan, Martha White, A. Rupam Mahmood.
The Multi-disciplinary Conference on Reinforcement Learning and Decision Making (RLDM), 2022. (an extended abstract based on [P4])

[W2] **Enabling Safe Exploration of Action Space in Real–World Robots.** [PDF]
Shivam Garg, Homayoon Farrahi, A. Rupam Mahmood.
Virtual Conference on Reinforcement Learning for Real Life (RL4RealLife), 2020.

[W1] **Mirror Descent for Robust Reinforcement Learning.** [PDF]
Shivam Garg.
Indian Workshop on Machine Learning (iWML), 2018.

THESES

[T2] **Analysis of an Alternate Policy Gradient Estimator for Softmax Policies.** [PDF]
Shivam Garg.
M.Sc. Thesis, University of Alberta, 2021. (based on [P4])

[T1] **Coordinated Exploration for Concurrent Reinforcement Learning.** [PDF]
Shivam Garg.
M.Tech. Thesis, Indian Institute of Technology (BHU) Varanasi, 2019.

AWARDS AND HONORS

Nominated for the WAGS/ProQuest Distinguished Master's Thesis Award 2022
For the thesis [T2] titled "Analysis of an Alternate Policy Gradient Estimator for Softmax Policies" (each "Western Association of Graduate Schools" member institution may submit one nomination for this award)

Co-winner of the Best Master's Thesis Award, CAIAC 2022
For the thesis [T2] titled "Analysis of an Alternate Policy Gradient Estimator for Softmax Policies" (every academic unit within a Canadian university nominates one master's thesis in the field of AI to the Canadian Artificial Intelligence Association) [Link]

Nomination for the Best Paper Award, AISTATS 2022
For the paper [P3] titled "A General Class of Surrogate Functions for Stable and Efficient Reinforcement Learning" (top four out of the 492 papers at the International Conference on Artificial Intelligence and Statistics) [Link]

Gold Medal, IIT (BHU) Varanasi 2019
For being ranked first in the Computer Science & Engineering batch of 2014–19

Awarded CBSE certificate of merit 2014
For being amongst the top 0.1% candidates in Physics (class XII)

Successfully qualified Regional Mathematical Olympiad, UP 2012
State level for the International Mathematical Olympiad (about 300 students selected nationally)

National Talent Search Scholarship recipient 2010
Awarded by NCERT, Government of India (about 1000 students selected nationally)

TEACHING ASSISTANT

University of Alberta

CMPUT 653 – Theoretical Foundations of RL (Grad) [Link]	Winter 2021
CMPUT 655 – Reinforcement Learning 1 (Grad) [Link]	Fall 2020
CMPUT 397 – Reinforcement Learning [Link]	Fall 2022, Winter 2020
CMPUT 366 – Intelligent Systems	Fall 2019

IIT (BHU) Varanasi

CSE 205 – IT Workshop 2	Aug–Dec 2018
CSE 241N – Artificial Intelligence	Jan–May 2018
CSO 101 – Computer Programming	Jan–May 2019, Jan–May 2018, Aug–Dec 2017, Jan–May 2017, Aug–Dec 2016

SERVICE

Participating as an early career professional for the UA-WISE/WISER mentorship program 2022 • Reviewer for AISTATS 2022 (a top 10% reviewer) • Reviewer for SSL-RL (ICLR Workshop) 2021 • Helped create Python notebooks for the "Policy Optimization in RL" tutorial at NeurIPS 2020 [Link] • Student reporter for CIFAR Deep Learning and Reinforcement Learning Summer School 2020 • Sub-reviewer for one paper at ICML 2020 • Served as the Vice President of the Computing Science Graduate Student Association, University of Alberta (2020–21).

SKILLS

Python · PyTorch · C · LaTeX · Emacs

COURSES

Graduate at UAlberta

- Stochastic Analysis (ongoing)
- Probabilitic Graphical Models (ongoing)
- Statistical Inference (ongoing)
- RL with Robots (Grade: A+)
- Intro. to Machine Learning (Grade: A+)
- Reinforcement Learning 2 (Grade: A+)*

Undergraduate at IIT (BHU)

- Stochastic Process
- Probability and Statistics
- Optimization Techniques
- Natural Language Processing
- Computer Vision
- Linear Algebra (Online)
- Intelligent Computing (Neural Networks and Genetic Algorithms)
- Artificial Intelligence

* Unofficial grade. No official grades awarded that semester due to COVID-19.

OTHER PROJECTS

Utility of Traces in Online Value Prediction with TD(λ) [Link]	April'20
Policy Learning using Function Approximators	Aug–Nov'17
Emerging and Rare Entity Recognition (NLP)	Dec'17
Cryptography Schemes for Secure Money Transfer [Link]	Nov'17
Zoutendijk's Method for Constrained Optimization	Nov'17
Image Classification and Segmentation	Aug'16–May'17
Functional Projective Synchronization of Chaotic Systems [Link]	Nov'16
In-memory Relational Algebra System [Link]	Aug–Nov'16
Feedback Portal (a Django web application) [Link]	Aug–Nov'16
Multi–document Text Summarizer	Jan–May'16
8–bit CPU simulation on Logisim	Oct'15

EXTRA–CURRICULAR

I enjoy going for long walks, rock climbing, and cycling; and playing harmonica, table tennis, and Go (the board game).