

# Shivam Garg

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EDUCATION	<b>University of Alberta, Canada</b>	2022–present
	Doctor of Philosophy in Computing Science Supervisor: Prof. Dale Schuurmans	
	<b>University of Alberta, Canada</b>	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)	
	<b>Indian Institute of Technology (BHU) Varanasi, India</b>	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	<b>Research Assistant, University of Alberta</b>	Sept 2021–Aug 2022
	– Worked with Prof. Csaba Szepesvári on reinforcement learning theory (mainly policy gradient methods).	
	<b>Internship at Samsung R&amp;D Institute India, Bangalore</b>	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] <b>An Alternate Policy Gradient Estimator for Softmax Policies.</b> [PDF] Shivam Garg, Samuele Tosatto, Yangchen Pan, Martha White, A. Rupam Mahmood. <i>International Conference on Artificial Intelligence and Statistics (AISTATS)</i> , 2022.	
	[P3] <b>A General Class of Surrogate Functions for Stable and Efficient Reinforcement Learning.</b> [PDF] Sharan Vaswani, Olivier Bachem, Simone Totaro, Robert Müller, Shivam Garg, Matthieu Geist, Marlos C. Machado, Pablo Samuel Castro, Nicolas Le Roux. <i>International Conference on Artificial Intelligence and Statistics (AISTATS)</i> , 2022. (Oral)	
	[P2] <b>Gradient Temporal-Difference Learning with Regularized Corrections.</b> [PDF] Sina Ghiassian, Andrew Patterson, Shivam Garg, Dhawal Gupta, Adam White, Martha White. <i>International Conference on Machine Learning (ICML)</i> , 2020.	
	[P1] <b>Object Sequences: Encoding Categorical and Spatial Information for a Yes/No Visual Question Answering Task.</b> [PDF] [DOI] Shivam Garg and Rajeev Srivastava. <i>IET Computer Vision</i> , 2018.	
	[W3] <b>Making Policy Gradient Estimators for Softmax Policies More Robust to Non-stationarities.</b> [PDF] Shivam Garg, Samuele Tosatto, Yangchen Pan, Martha White, A. Rupam Mahmood. <i>The Multi-disciplinary Conference on Reinforcement Learning and Decision Making (RLDM)</i> , 2022. (an extended abstract based on [P4])	
WORK-SHOP PAPERS	[W2] <b>Enabling Safe Exploration of Action Space in Real-World Robots.</b> [PDF] Shivam Garg, Homayoon Farrahi, A. Rupam Mahmood. <i>Virtual Conference on Reinforcement Learning for Real Life (RL4RealLife)</i> , 2020.	
	[W1] <b>Mirror Descent for Robust Reinforcement Learning.</b> [PDF] Shivam Garg. <i>Indian Workshop on Machine Learning (iWML)</i> , 2018.	

THESES	<p>[T2] <b>Analysis of an Alternate Policy Gradient Estimator for Softmax Policies.</b> <a href="#">[PDF]</a>  Shivam Garg.  <i>M.Sc. Thesis, University of Alberta</i>, 2021. (based on <a href="#">[P4]</a>)</p> <p>[T1] <b>Coordinated Exploration for Concurrent Reinforcement Learning.</b> <a href="#">[PDF]</a>  Shivam Garg.  <i>M.Tech. Thesis, Indian Institute of Technology (BHU) Varanasi</i>, 2019.</p>
AWARDS AND HONORS	<p><b>Nominated for the WAGS/ProQuest Distinguished Master’s Thesis Award</b> 2022  For the thesis <a href="#">[T2]</a> 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)</p> <p><b>Co-winner of the Best Master’s Thesis Award, CAIAC</b> 2022  For the thesis <a href="#">[T2]</a> 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) <a href="#">[Link]</a></p> <p><b>Nomination for the Best Paper Award, AISTATS</b> 2022  For the paper <a href="#">[P3]</a> 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) <a href="#">[Link]</a></p> <p><b>Gold Medal, IIT (BHU) Varanasi</b> 2019  For being ranked first in the Computer Science &amp; Engineering batch of 2014–19</p> <p><b>Awarded CBSE certificate of merit</b> 2014  For being amongst the top 0.1% candidates in Physics (class XII)</p> <p><b>Successfully qualified Regional Mathematical Olympiad, UP</b> 2012  State level for the International Mathematical Olympiad (about 300 students selected nationally)</p> <p><b>National Talent Search Scholarship recipient</b> 2010  Awarded by NCERT, Government of India (about 1000 students selected nationally)</p>
TEACHING ASSISTANT	<p><b>University of Alberta</b></p> <p>CMPUT 653 – Theoretical Foundations of RL (Grad) <a href="#">[Link]</a> Winter 2021  CMPUT 655 – Reinforcement Learning 1 (Grad) <a href="#">[Link]</a> Fall 2020  CMPUT 365/397 – Reinforcement Learning <a href="#">[Link]</a> Fall 2022, Winter 2020  CMPUT 366 – Intelligent Systems Fall 2019</p> <p><b>IIT (BHU) Varanasi</b></p> <p>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</p>
SERVICE	<p>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 <a href="#">[Link]</a> • 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).</p>
SKILLS	<p>Python · PyTorch · C · <math>\text{\LaTeX}</math> · Emacs</p>
COURSES	<p>Graduate at UAlberta</p> <ul style="list-style-type: none"> <li>– Stochastic Analysis (ongoing)</li> <li>– Probabilistic Graphical Models (ongoing)</li> <li>– Statistical Inference (ongoing)</li> <li>– RL with Robots (Grade: A+)</li> <li>– Intro. to Machine Learning (Grade: A+)</li> <li>– Reinforcement Learning 2 (Grade: A+)*</li> </ul>

Undergraduate at IIT (BHU)

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

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

OTHER PROJECTS	Utility of Traces in Online Value Prediction with $TD(\lambda)$ <a href="#">[Link]</a>	April'20
	Policy Learning using Function Approximators	Aug–Nov'17
	Emerging and Rare Entity Recognition (NLP)	Dec'17
	Cryptography Schemes for Secure Money Transfer <a href="#">[Link]</a>	Nov'17
	Zoutendijk's Method for Constrained Optimization	Nov'17
	Image Classification and Segmentation	Aug'16–May'17
	Functional Projective Synchronization of Chaotic Systems <a href="#">[Link]</a>	Nov'16
	In-memory Relational Algebra System <a href="#">[Link]</a>	Aug–Nov'16
	Feedback Portal (a Django web application) <a href="#">[Link]</a>	Aug–Nov'16
	Multi-document Text Summarizer	Jan–May'16
EXTRA– CURRICULAR	8-bit CPU simulation on Logisim	Oct'15
	I enjoy going for long walks, rock climbing, and cycling; and playing harmonica, table tennis, and Go (the board game).	