Shivam Garg

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EDUCATION

University of Alberta, Canada
Master of Science (Thesis) in Computing Science
Supervisors: Prof. Rupam Mahmood and Prof. Martha White
GPA: 4.0/4.0 2019–21

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

INTERESTS

Reinforcement Learning (in particular, policy gradient methods and temporal difference learning)

PUBLICATIONS

[**1**] Sina Ghiassian*, Andrew Patterson*, Shivam Garg, Dhawal Gupta, Adam White, Martha White, **Gradient Temporal-Difference Learning with Regularized Corrections**, *International Conference on Machine Learning (ICML)*, 2020.
[**2**] Shivam Garg and Rajeev Srivastava, **Object Sequences: Encoding Categorical and Spatial Information for a Yes/No Visual Question Answering Task**, *IET Computer Vision*, 2018.

WORKSHOP PAPERS

[**3**] Shivam Garg*, Homayoon Farrahi*, A. Rupam Mahmood, **Enabling Safe Exploration of Action Space in Real–World Robots**, *Virtual Conference on Reinforcement Learning for Real Life (RL4RealLife)*, 2020.
[**4**] Shivam Garg, **Mirror Descent for Robust Reinforcement Learning**, *Indian Workshop on Machine Learning (iWML)*, 2018.

TEACHING ASSISTANT

University of Alberta

CMPUT 655 – Reinforcement Learning 1 (Grad)	Sept'20–Dec'20
CMPUT 397 – Reinforcement Learning	Jan'20–Apr'20
CMPUT 366 – Intelligent Systems	Sept'19–Dec'19

IIT (BHU) Varanasi

CSE 205 – IT Workshop 2	Aug'18–Dec'18
CSE 241N – Artificial Intelligence	Jan'18–May'18
CSO 101 – Computer Programming	Jan'19–May'19 Jan'18–May'18 Aug'17–Dec'17 Jan'17–May'17 Aug'16–Dec'16

EXPERIENCE

Internship at Samsung R&D Institute India, Bangalore May–Jul'17
- Intern in the Android Platform team.
- Worked on inducing traces in Linux Kernel for data logging.
- Investigated machine learning based techniques for handling above data.

SKILLS

Python · PyTorch · C · C++ · Matlab · LaTeX · Emacs

PROJECTS

Log–likelihood Baseline for Policy Gradient May'20–Present

Supervisors: Prof. Rupam Mahmood and Prof. Martha White

- Policy gradient methods have a critic baseline to reduce the variance of their estimate. In this project, we are investigating an analogous baseline for the log-likelihood part of the policy gradient. We have some encouraging preliminary results which show that a log-likelihood baseline can improve the agent's control performance by reducing its variance further and can especially help in changing ('non-stationary') environments.

Coordinated Exploration for Concurrent Reinforcement Learning Aug'18–Jun'19

MTech Thesis, IIT (BHU) Varanasi | Supervisor: Prof. Lakshmanan K.

- Extended prior work on seed sampling for Concurrent RL by proposing (1) A model based; and (2) A policy gradient based seed sampling coordinated exploration algorithm (Seed–PG).
- Implemented Seed–PG algorithm: basically this involved implementing on–policy and off–policy versions of Policy Gradient methods (PPO, Off-PAC, Simple PG) with MC and TD value functions (using importance sampling), for multiple parallel agents (running on separate processes) which share experience amongst them.
- Performed experimentation on the CartPole environment using neural networks as function approximators.

COURSES

Graduate at UAlberta

- 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

OTHER PROJECTS

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 (Django Webapp) [Link] Aug–Nov'16
Multi–document Text Summarizer Jan–May'16
8–bit CPU simulation on Logisim Oct'15

ACHIEV–EMENTS

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 International Mathematical Olympiad ($\sim$ 300 students selected nationally)

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

EXTRA–CURRICULAR

I serve as the Vice President of the Computing Science Graduate Student Association, University of Alberta (2020–21). I also enjoy going for long walks, cycling, and playing Harmonica, Table Tennis, and Go (board game).