Shivam Garg

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EDUCATION

University of Alberta, Canada
Master of Science (Thes.) in Computing Science 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

Artificial Intelligence, Reinforcement Learning, Robotics

PUBLICATIONS

[**1**] Shivam Garg and Rajeev Srivastava, **Object Sequences: Encoding Categorical and Spatial Information for a Yes/No Visual Question Answering Task**, *IET Computer Vision*, 2018, 12, (8), pg. 1141-1150, DOI: 10.1049/iet-cvi.2018.5226.
[**2**] Shivam Garg, **Mirror Descent for Robust Reinforcement Learning**, *Indian Workshop on Machine Learning (iWML)*, 2018. [Poster]

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.

TEACHING

TA for CMPUT 397 – Reinforcement Learning Jan'20–Apr'20

TA for CMPUT 366 – Intelligent Systems Sep'19–Dec'19

TA for CSE 205 – IT Workshop 2 Aug'18–Dec'18

TA for CSE 241N – Artificial Intelligence Jan'18–May'18

TA for CSO 101 – Computer Programming Jan'19–May'19, Jan'18–May'18, Aug'17–Dec'17, Jan'17–May'17, Aug'16–Dec'16

SKILLS

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

PROJECTS

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

MTech Project | 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.

Mirror Descent based Robust Reinforcement Learning Algorithm Jan'18–Jul'18
Supervisor: Prof. Lakshmanan K.
- Worked on creating a novel reinforcement learning algorithm for robust setting using the mirror descent algorithm.

Visual Question Answering: A machine learning approach to Multi–modal dialogue
BTech (Hons.) Project | Supervisor: Prof. Rajeev Srivastava Aug'17–Mar'18

– Proposed object sequences, a novel method of encoding visual information for neural architectures, for use in multi-modal dialogue (Visual Question Answering).
– The neural network implementations were done in deep learning framework PyTorch on the dataset GuessWhat!.

Image Classification and Segmentation Aug'16–May'17
Supervisor: Prof. Rajeev Srivastava
– Studied hand-crafted features and implemented SIFT in Matlab.
– Experimented with CNN architectures, using class taxonomy based pooling, using Caffe for image classification on the dataset CIFAR-10.
– Implemented neural network models on PyTorch for semantic segmentation using the dataset ADE20K.

Multi–document text summarizer Jan–May'16
Supervisor: Prof. R. Chowdary C
– Proposed an incremental, query specific, graph based, extractive summarizer.
– Implementation was done in Python using the Natural Language Toolkit (NLTK).

COURSES

Graduate at UAlberta
– RL with Robots (Grade: A+)
– Intro. to Machine Learning (Grade: A+)
– Reinforcement Learning 2 *

Undergradute at IIT (BHU)
– Stochastic Process
– Probability and Statistics
– Optimization Techniques
– ConvNets for Computer Vision+
– Natural Language Processing
– Computer Vision
– Linear Algebra+
– Intelligent Computing (Neural Networks and Genetic Algorithms)
– Artificial Intelligence

+Online, *Ongoing

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
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
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

Table Tennis · Cycling · Harmonica · Go (the strategic board game)
Organized ML workshops under the Computer Programming Club, IIT(BHU)
Member, Machine Learning Reading Group, CSE Dept. IIT(BHU)