

TARUN GUPTA

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RESEARCH INTERESTS

Reinforcement Learning, Meta Learning, Transfer Learning, Multi-Agent Systems, Probabilistic Graphical Models, Sequential Decision-Making, Deep Learning

EDUCATION

Department of Computer Science, University of Oxford 2019 - 2023

PhD in Computer Science (Advisor: Shimon Whiteson)

International Institute of Information Technology, Hyderabad 2018

B.Tech (Honors) and MS by Research in Computer Science and Engineering CGPA - **9.32/10**

Batch Topper (Gold Medalist)

Thesis: Scalable Planning and Learning for Decentralized MDPs With Event Driven Rewards

PREPRINTS

Tarun Gupta, Anuj Mahajan, Bei Peng, Wendelin Bohmer, Shimon Whiteson. *UneVEn: Universal Value Exploration for Multi-Agent Reinforcement Learning*. Under Review. [PDF]

Tonghan Wang, **Tarun Gupta**, Anuj Mahajan, Bei Peng, Shimon Whiteson, Chongjie Zhang. *RODE: Learning Roles to Decompose Multi-Agent Tasks*. Under Review. [PDF]

PUBLICATIONS

Ling Jiajing, **Tarun Gupta** and Akshat Kumar. *Reinforcement Learning for Zone Based Multi-Agent Path Finding Under Uncertainty*. **ICAPS. 2020**. [PDF]

Tarun Gupta, Akshat Kumar, and Praveen Paruchuri. *Successor Features Based Multi-Agent RL for Event-Based Decentralized MDPs*. **AAAI. 2019, Poster Spotlight**. [PDF][Acceptance Rate: 16.2%]

Tarun Gupta, Akshat Kumar, and Praveen Paruchuri. *Planning and Learning For Decentralized MDPs With Event Driven Rewards*. **AAAI. 2018, Oral**. [PDF][Oral Acceptance Rate: 10.9%]

Tarun Gupta. *Scalable Planning and Learning For Decentralized MDPs With Event Driven Rewards*. **M.S. Thesis. 2018**. [PDF]

ACHIEVEMENTS & HONORS

- [2019] Awarded prestigious **Clarendon** scholarship for doctoral studies at University of Oxford.
- [2019] **Gold Medalist** for the highest cumulative GPA in the graduating batch at IIIT Hyderabad.
- [2019] SMU and AAI travel grant to attend **AAAI 2019**.
- [2018] Google India, Microsoft India and AAI travel grant to attend **AAAI 2018**.
- [2014-2018] Awarded Deans Academic Merit list that is awarded to **top 5% students** consistently.
- [2016] Selected for AAMAS 2016 summer school organized in Singapore.
- [2014] Team ranked 131st at the 2014 ACM ICPC Kharagpur online round out of over 600 teams.

WORK EXPERIENCE

Grab — Data Scientist *Singapore* Jul'19 - Oct'19

- Worked in the Trust, Identity and Safety team to detect fraud at various levels leveraging the data generated from approx. 7 million rides in a day!

Singapore Management University — Research Engineer *School of Information Systems, Singapore* Jul'18 - Jul'19

- Developed new multi-agent RL approach using successor features which achieves up to 50% better results than existing approaches and allows knowledge transfer to achieve generic learning.

Machine Learning Lab, IIIT Hyderabad — Research Assistant

Aug'17 - Jun'18

- Worked on improving scalability of multi-agent planning algorithms for applicability to real world domains through a synthesis of rigorous techniques from multiple sub-areas of artificial intelligence, machine learning and optimization methods.

IIIT Hyderabad — Teaching Assistant

Aug'15 - Jun'18

Conducting tutorial sessions and responsible for grading quizzes, assignments and examinations.

- Multi-Agent Systems — Prof. Praveen Paruchuri Monsoon'17
- Optimization Methods — Prof. Sujit Gujar Spring'17
- Statistical Methods in Artificial Intelligence — Prof. Avinash Sharma Monsoon'16
- Artificial Intelligence — Prof. Praveen Paruchuri Spring'16
- Structured System Analysis and Design — Prof. Raghu Reddy Monsoon'15

Google Summer of Code'17 — Software Engineering Intern · ·

May'17 - Aug'17

XMPP Standards Foundation

- Implemented client side experimental features for Swift IM (an open-source XMPP client for instant messaging (IM) and multi-user chat) such as querying MIX server for hosted chat rooms, joining and leaving chat rooms, querying for publish-subscribe nodes, syncing different clients of the same user, presence updates of users and sending/receiving messages to other participants in the chat room.
- Worked with people from 4 different countries at the same time resolving development and production issues. Tested developmental code thoroughly with unit and integration testing. Improved the test coverage of the C++ XMPP library (Swiften).

Google Summer of Code'15 — Software Engineering Intern · ·

May'15 - Aug'15

XMPP Standards Foundation

- Designed and implemented parts such as the elements, their parsers and serializers of XMPP protocol adding features for VCards, Internationalized Domain Name, Multi-User Chat.

SKILLS

Programming Languages: Java, Python, C++, C

Libraries & Frameworks: PyTorch, Tensorflow, Scikit-learn, Keras

Web Technologies: Web2py, Flask

Other Tools: Git, MongoDB, SQL, LATEX, Docker

SELECTED SOFTWARE PROJECTS

Cloud Orchestration Layer ·

Python, Flask, Ceph, Libvirt, MongoDB

- Built a framework similar to Amazon EC2 console that can coordinate the provisioning of compute and storage resources by negotiating with a set of hypervisors running across physical servers in the datacenter.

Mobile Security in Cloud ·

Java, Android, Maven, GWT, Jersey

- Designed a Cloud Framework that allows mobile phones to post images on a regular basis and also retrieve the images to the end user with minimal delay.

AI for Ultimate Tic Tac Toe ·

Artificial Intelligence, Python

- An Automated AI based Player for Ultimate Tic Toe implemented in Python using Greedy Heuristic based Alpha Beta Pruning and Depth Optimization.

Human Activity Recognition ·

Artificial Intelligence, Python

- Classify human actions into six different categories from smartphone sensor data using pre-processed data from a smartphone accelerometer and Support Vector Machine (SVM) to classify the actions.

Database Query Engine ·

Python

- Implemented a SQL query parser and executor to manipulate data in csv files that can run a subset of SQL queries (select, from, where, aggregate functions, join)