

Anuj Mahajan

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📄 [AnujMahajanOxf.github.io](https://github.com/AnujMahajanOxf)



Research Interests

Deep Learning, Reinforcement Learning, Mathematical Optimisation

Publications

Anuj Mahajan, Tabish Rashid, Mikayel Samvelyan, and Shimon Whiteson. MAVEN: Multi-agent variational exploration. In *Thirty-third Conference on Neural Information Processing Systems*. 2019 [**NeurIPS**].

Matthew Fellows*, Anuj Mahajan*, Tim GJ Rudner, and Shimon Whiteson. VIREL: A variational inference framework for reinforcement learning. In *Thirty-third Conference on Neural Information Processing Systems*. 2019 [**Spotlight, NeurIPS**].

Matthew Fellows*, Anuj Mahajan*, Tim GJ Rudner, and Shimon Whiteson. VIREL: A variational inference framework for reinforcement learning. In *infer2control workshop, Thirty-second Conference on Neural Information Processing Systems*. 2018 [**NeurIPS**].

Anuj Mahajan and Theja Tulabandhula. Symmetry detection and exploitation for function approximation in deep RL. In *Proceedings of the 16th Conference on Autonomous Agents and MultiAgent Systems*. International Foundation for Autonomous Agents and Multiagent Systems, 2017 [**AAMAS**].

Anuj Mahajan and Theja Tulabandhula. Discovering symmetries for sample efficient reinforcement learning. In *3rd Multidisciplinary Conference on Reinforcement Learning and Decision Making*. 2017 [**RLDM**].

Happy Mittal, Anuj Mahajan, Vibhav G Gogate, and Parag Singla. Lifted inference rules with constraints. In *Advances in Neural Information Processing Systems 28*, pages 3501–3509. Curran Associates, Inc., 2015 [**NeurIPS**].

Anuj Mahajan, Sharmistha Jat, and Shourya Roy. Feature selection for short text classification using wavelet packet transform. In *Proceedings of the Nineteenth Conference on Computational Natural Language Learning*, pages 321–326. Association for Computational Linguistics, 2015 [**CoNLL**].

Education

2017–Current **Doctor of Philosophy in Computer Science**, *University of Oxford*, U.K., Supervisor: Prof. Shimon Whiteson.

2011–2016 **Master of Technology in Computer Science & Engg (Dual degree)**, *Indian Institute of Technology, Delhi*, **Thesis** : Exploring new techniques for MAP Inference in MRFs.

2011–2016 **Bachelor of Technology in Computer Science & Engg (Dual degree)**, *Indian Institute of Technology, Delhi*.

* Equal contribution

Work Experience

Industrial

- 2020-Current **Research Intern, J.P. Morgan Chase.**
Working in Multi-Agent Reinforcement Learning.
- 2019-2020 **Research Intern, NVIDIA.**
Working in Multi-Agent Reinforcement Learning.
- 2016-17 **Budding Scientist, Conduent Labs India (erstwhile Xerox Research Centre India) .**
Worked in the Machine Learning and Statistics Group in the following areas:
- Deep Learning with Prof.Theja Tulabandhula
 - Learning symmetries for sample efficient Reinforcement learning.
 - Probabilistic Graphical Models with Dr.Narayanan Unny
 - Finding a boosting framework for training Restricted Boltzmann Machines.
 - Analyzing dynamic pricing policy for public transport systems.
 - Ranking for Duelling Bandits with Dr.Arun Rajkumar
 - Using structural properties of the tournament graph of preference matrices having low rank under link transformations for efficient ranking.
 - Personalizing applications based on usage with Saurabh Shrivastava
 - Using deep learning for modeling disease dynamics and care from user behavior collected from mobile application.
- 2014 **Research Intern, Xerox Research Centre India.**
Worked on developing feature selection methods and improving the accuracies of machine learning algorithms for short text data like tweets. Developed new method "IADWPT" for feature selection.

Teaching

- 2019 **Tutor.**
Tutor for Machine learning for Computer Science & Philosophy undergrads, Trinity term, Hertford College, University of Oxford.
- 2019 **Teaching Assistant.**
TA for Reinforcement Learning course floated in Hilary term for Doctoral students in Autonomous Intelligent Machines and Systems(AIMS), University of Oxford.
- 2015-16 **Teaching Assistant.**
TA for undergrad and graduate bridge courses, IIT Delhi. The work included taking demos for assignments, conducting help sessions and grading answer sheets. TA-ship courses:
- Machine Learning (COL774) Spring semester 2015-16.
 - Computer Networks (COL334) Fall semester 2015-16.

Reviewing

- 2020 **NeurIPS, Thirty-fourth Conference on Neural Information Processing Systems.**
- 2020 **JMLR, Journal of Machine Learning Research, Volume 20.**
- 2019 **NeurIPS, Thirty-third Conference on Neural Information Processing Systems.**

Technical skills

Python, Java, C/C++, Prolog, SQL, Ocaml, Assembly

Pytorch, Tensor Flow, Docker, Matlab, Mathematica, Knime, Android, web2py, Eigen, OpenAI Gym

Relevant Courses

Advanced Machine Learning, Computational Learning theory, Machine Learning, Probabilistic Graphical Models, Adv. Algorithms, Data Mining, Computer Vision, Theory of Computation, Computational Biology, Numeric & Scientific Computing

Scholarships

- Awarded J.P. Morgan AI fellowship 2020.
- Awarded IBM PhD fellowship 2020 (declined).

- Awarded Google Deepmind Scholarship 2017-20 for doctoral studies at University of Oxford.
- Awarded Drapers Hertford graduate Scholarship 2017-20 for doctoral studies at University of Oxford.
- Awarded Microsoft Student Travel Grant for presenting research paper at CoNLL 2015, Beijing, China.
- Awarded Microsoft Student Travel Grant for presenting research paper at NeurIPS 2015, Montreal, Canada.
- Kishore Vaigyanic Protsahan Yojana(KVPY) fellowship awarded by the Department of Science and Technology, Government of India. (**Given to 200 fellows chosen from around one million applicants**)
- Awarded Indian National Association of Engineers (INAE) grant 2015.
- National Talent Search Examination(NTSE) fellowship awarded by NCERT, Department of Education, Government of India. (**500 scholars chosen from around one million applicants**)

Awards & Achievements

- Uber AI resident 2020 (Program rescinded due to covid19)
- Indian Institute of Technology, Delhi, Institute Merit Award : Received the prestigious IITD merit award given to **top 5% students in the institute**.
- Winner, Microsoft 'code.fun.do' : Programming event organized by Microsoft on 16-17/02/2013
- Won the Award of Excellence in Australian National Chemistry Quiz(ANCQ) for securing **All India Rank - 1** for three consecutive years (2006-08)
- Represented the state at Indian National Mathematics Olympiad and Astronomy Olympiad.
- Secured 8th position in the Regional Mathematical Olympiad, 2008 organized by NBHM, Government of India.
- Best Research Poster award at the Xerox open house 2014 poster presentation event.