

# Anuj Mahajan

Whiteson Research Lab  
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📁 [AnujMahajanOxf.github.io](https://github.com/AnujMahajanOxf)



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## Research Interests

Deep Learning, Reinforcement Learning, Mathematical Optimisation

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## 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 [**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**].

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\* Equal contribution

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## Education

- 2017– **Doctor of Philosophy in Computer Science**, *University of Oxford*, U.K., Supervisor: Prof. Shimon Whiteson.
- 2015–2016 **Master of Technology in Computer Science & Engg**, *Indian Institute of Technology*, Delhi, **Thesis** : Exploring new techniques for MAP Inference in MRFs.
- 2011–2015 **Bachelor of Technology in Computer Science & Engg**, *Indian Institute of Technology*, Delhi, .

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## Technical skills

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

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

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## 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

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## Work Experience

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.

## Industrial

### 2016-17 **Research Scientist**, *Xerox Research Centre* .

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 Dueling 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.
  - filed for a patent in USA, ID No 1169.0161

### 2014 **Research Intern**, *Xerox Research Centre*.

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.

- Patent ID US 2017/009 1653 A1

## Reviewing

### 2019 **NeurIPS**, *Thirty-third Conference on Neural Information Processing Systems*.

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## Scholarships

- 1 Awarded Google Deepmind Scholarship 2017-20 for doctoral studies at University of Oxford.
- 2 Awarded Drapers Hertford graduate Scholarship 2017-20 for doctoral studies at University of Oxford.
- 3 Awarded Microsoft Student Travel Grant for presenting research paper at CoNLL 2015, Beijing, China.
- 4 Awarded Microsoft Student Travel Grant for presenting research paper at NIPS 2015, Montreal, Canada.
- 5 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)
- 6 Awarded Indian National Association of Engineers (INAE) grant 2015.
- 7 National Talent Search Examination(NTSE) fellowship awarded by NCERT, Department of Education, Government of India.(500 scholars chosen from around one million applicants)

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## Awards & Achievements

- 1 Indian Institute of Technology, Delhi, Institute Merit Award : Received the prestigious IITD merit award given to top 5% students in the institute.

- 2 Winner, Microsoft 'code.fun.do' : Programming event organized by Microsoft on 16-17/02/2013
- 3 Won the Award of Excellence in Australian National Chemistry Quiz(ANCQ) for securing All India Rank - 1 for three consecutive years (2006-08)
- 4 Represented the state at Indian National Mathematics Olympiad and Astronomy Olympiad.
- 5 Secured 8th position in the Regional Mathematical Olympiad, 2008 organized by NBHM, Government of India.
- 6 Best Research Poster award at the Xerox open house 2014 poster presentation event.