

A. Rupam Mahmood

CURRICULUM VITAE

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Objective Developing a computational and scientific understanding of general-purpose goal-driven systems by building them with physical robots

Employment

- 2019 - Present **Assistant Professor**, *Computing Science, University of Alberta.*
- 2018 - 2019 **Lead, AI Research**, *Kindred Inc., www.kindred.ai*, Toronto, Canada.
- 2017 **Research Scientist**, *Kindred Inc., www.kindred.ai*, Toronto, Canada.
- 2009-2016 **Teaching & Research Assistant**, *University of Alberta*, Edmonton, Canada.
- 2006 - 2008 **Quantitative Software Developer**, *Stochastic Logic Ltd.*, Bangladesh.

Education

- 2017 **Ph.D. in Statistical Machine Learning**, *University of Alberta*, Canada.
Thesis Incremental Off-policy Reinforcement Learning Algorithms
Advisor Professor Richard S. Sutton
- 2010 **M.Sc. in Computing Science**, *University of Alberta*, Canada.
Thesis Automatic Step-size Adaptation in Incremental Supervised Learning
Advisor Professor Richard S. Sutton
- 2006 **B.Sc. in Computer Science & Engineering**, *Bangladesh University of Engineering and Technology*, Bangladesh.
Thesis Designing Neural Networks using Evolutionary Algorithms
Advisor Professor Md. Monirul Islam

Publications (19 total)

Refereed Journal Articles (3 total)

- JMLR-2018 Yu, H., **Mahmood, A. R.**, Sutton, R. S. (2018). On generalized Bellman equations and temporal-difference learning. *Journal of Machine Learning Research* 19(48):1–49.
- JMLR-2016 Sutton, R. S., **Mahmood, A. R.**, White, M. (2016). An emphatic approach to the problem of off-policy temporal-difference learning. *Journal of Machine Learning Research* 17(73):1–29.

- JMLR-2016 van Seijen, H., **Mahmood, A. R.**, Pilarski, P. M., Machado, M. C., Sutton, R. S. (2016). True online temporal-difference learning. *Journal of Machine Learning Research* 17(1):5057–5096.
- [Refereed Conference Articles \(9 total\)](#)
- IJCAI-2019 Korenkevych, D., **Mahmood, A. R.**, Vasan, G., Bergstra, J. (2019). Autoregressive policies for continuous control deep reinforcement learning. In *Proceedings of the 28th International Joint Conference on Artificial Intelligence*.
- CoRL-2018 **Mahmood, A. R.**, Korenkevych, D., Vasan, G., Ma, W., Bergstra, J. (2018). Benchmarking reinforcement learning algorithms on real-world robots. In *Proceedings of the 2nd Annual Conference on Robot Learning*.
- IROS-2018 **Mahmood A. R.**, Korenkevych, D., Komer, B. J., Bergstra, J. (2018). Setting up a reinforcement learning task with a real-world robot. In *IEEE/RSJ International Conference on Intelligent Robots and Systems*.
- CAI-2017 Yu, H., **Mahmood, A. R.**, Sutton, R. S. (2017). On Generalized Bellman Equations and Temporal-Difference Learning. In *Proceedings of the 30th Canadian Conference on Artificial Intelligence*, Edmonton, Canada.
- UAI-2015 **Mahmood, A. R.**, Sutton, R. S. (2015). Off-policy learning based on weighted importance sampling with linear computational complexity. In *Proceedings of the 31st Conference on Uncertainty in Artificial Intelligence*, Amsterdam, Netherlands.
- NeurIPS-2014 **Mahmood, A. R.**, van Hasselt, H., Sutton, R. S. (2014). Weighted importance sampling for off-policy learning with linear function approximation. *Advances in Neural Information Processing Systems 27*, Montreal, Canada.
- UAI-2014 van Hasselt, H., **Mahmood, A. R.**, Sutton, R. S. (2014). Off-policy TD(λ) with a true online equivalence. In *Proceedings of the 30th Conference on Uncertainty in Artificial Intelligence*, Quebec City, Canada.
- ICML-2014 Sutton, R. S., **Mahmood, A. R.**, Precup, D., van Hasselt, H. (2014). A new Q(λ) with interim forward view and Monte Carlo equivalence. In *Proceedings of the 31st International Conference on Machine Learning*, Beijing, China.
- ICASSP-2012 **Mahmood, A. R.**, Sutton, R. S., Degris, T., Pilarski, P. M. (2012). Tuning-free step-size adaptation. In *Proceedings of the IEEE International Conference on Acoustics, Speech, and Signal Processing*, Kyoto, Japan.
- [Refereed Workshop Articles \(3 total\)](#)
- EWRL-2015 **Mahmood, A. R.**, Yu, H., White, M., Sutton, R. S. (2015). Emphatic temporal-difference learning. In *Proceedings of the 2015 European Workshop on Reinforcement Learning*, Lille, France.
- EWRL-2015 van Seijen, H., **Mahmood, A. R.**, Pilarski, P. M., Sutton, R. S. (2015). An empirical evaluation of true online TD(λ). In *Proceedings of the 2015 European Workshop on Reinforcement Learning*, Lille, France.

- AAAI-2013 **Mahmood, A. R.**, Sutton, R. S. (2013). Representation search through generate and test. In *Proceedings of the AAAI Workshop on Learning Rich Representations from Low-Level Sensors*, Bellevue, Washington, USA.
- [Non-Refereed Articles \(4 total\)](#)
- Ph.D. Thesis **Mahmood, A. R.** (2017). *Incremental Off-policy Reinforcement Learning Algorithms*. Ph.D. thesis, Department of Computing Science, University of Alberta, Edmonton, AB T6G 2E8.
- arXiv Preprint **Mahmood, A. R.**, Yu, H., Sutton, R. S. (2017). Multi-step off-policy learning without importance sampling ratios. *arXiv preprint arXiv:1702.03006*.
- Technical Report **Mahmood, A. R.** (2011). Structure learning of causal bayesian networks: A survey. *Technical report TR11-01*, Department of Computing Science, University of Alberta, Edmonton, AB, Canada T6G 2E8.
- M.Sc. Thesis **Mahmood, A. R.** (2010). *Automatic Step-size Adaptation in Incremental Supervised Learning*. Master's thesis, Department of Computing Science, University of Alberta, Edmonton, AB T6G 2E8.

Honors and Awards

- 2014 Computing Science GPA Award, University of Alberta
- 2010 Provost Doctoral Entrance Award, University of Alberta
- 2009 M.Sc. Academic Achievement Award, University of Alberta
- 2004 University Dean's List Scholarship, Bangladesh University of Engg. and Tech.
- 2001 University Merit Scholarship, Bangladesh University of Engg. and Tech.

Reviewing

- IJCAI International Joint Conference of Artificial Intelligence, 2016, (SPC) 2019
- NeurIPS Neural Information Processing Systems, 2015 - 2019
- ICML International Conference on Machine Learning, 2013 - 2019
- AAAI AAAI Conference on Artificial Intelligence, 2015, 2017-2019
- AISTATS International Conference on Artificial Intelligence and Statistics, 2017-2019
- CoRL The Conference on Robot Learning, 2017
- AC IEEE Transaction on Automatic Control, 2011, 2013
- SMC IEEE Transactions on Systems, Man and Cybernetics: Systems, 2015
- JCSS Journal of Computer and System Sciences, 2014
- JMLR Journal of Machine Learning Research, 2010
- IEEE Proceedings of the IEEE, 2013

Research and Professional Experience

- 2017 - Present **AI Research Lead & Research Scientist**, *Kindred Inc.*, Toronto, Canada.
- Led the AI Research team's research and publication efforts at Kindred.
 - Designed a software framework called *SenseAct* for efficient reinforcement learning with physical robots.
 - Developed reinforcement learning algorithms for Kindred's robotic product.
- 2009 - 2016 **Research Assistant**, *the Reinforcement Learning and Artificial Intelligence Laboratory*, University of Alberta, Canada.
- Developed a step-size adaptation method that requires no tuning.
 - Developed an incremental method for identifying useful features to retain them for continual learning.
 - Produced solutions to the variance and stability issues in off-policy learning.
- 2006 - 2008 **Quantitative Software Developer**, *Stochastic Logic Ltd.*, Bangladesh.
- Developed a web application providing quantitative financial solutions. Hosted at www.stochasticlogic.com.

Teaching Assistant Experience

- 2010 - 2015 **CMPUT 366: Intelligent Systems**, University of Alberta.
Instructor: Richard S. Sutton
- Lectured 3-hour long tutorials on the basics of probabilities and expectations.
 - Assisted in preparing programming assignments, conducted laboratory sessions, assisted students during laboratory hours and marked assignments.
- 2008 - 2009 **CMPUT 101: Introduction to Computing**, University of Alberta.
Instructor: Nafeesa Mohamed
- Conducted laboratory sessions, assisted students during laboratory hours, and marked assignments.

Invited Talks

- Queen's Univ. *Overcoming the Challenges of Learning with Physical Robots*, February 2019.
Smith School
- Vector *The Challenges of Real-World Robot Learning*, December 2018.
Institute
- Tor. DL *Setting up a Reinforcement Learning Task with a Real-World Robot*, May
Seminar 2018.
- Tor. Synth. *Making Minds for Robots with Reinforcement Learning*, April 2018.
Intel. Forum

Personal Information

- Residency Citizen of Canada & Bangladesh
- Hobbies Cycling; hiking; conversing passionately about the future of AI and humanity