Matthew Hausknecht

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https://mhauskn.github.io/

RESEARCH FOCUS I work at the intersection of Deep Learning and Reinforcement Learning to develop autonomy capable of adapting and learning in complex environments.

CITIZENSHIP USA

EMPLOYMENT

Argo AI 2022
Staff Scientist improving autonomy of self-driving vehicles.

Microsoft Research 2017 - 2022
Redmond, WA
Senior Researcher and founder of the reinforcement learning group.

Google 2014
Research Intern
Developed recurrent deep neural network architectures for large scale video classification. Advised by George Toderici.

EDUCATION

The University of Texas at Austin, Austin, TX 2009 - 2016
Ph.D., Department of Computer Sciences
Advised by Peter Stone
Thesis: *Cooperation and communication in multiagent deep reinforcement learning*

Emory University, Atlanta, GA 2005 - 2009
B.S. Computer Science, Summa Cum Laude
Advised by Li Xiong, Eugene Agichtein, and Phillip Wolff

PUBLICATIONS

Uni[Mask]: Unified Inference in Sequential Decision Problems
M Carroll, O Paradise, J Lin, R Georgescu, M Sun, D Bignell, S Milani, K Hofmann, M Hausknecht, A Dragan, S Devlin
Conference on Neural Information Processing Systems (NeurIPS Oral) 2022

MoCapAct: A Multi-Task Dataset for Simulated Humanoid Control
N Wagener, A Kolobov, F Frujeri, R Loynd, C Cheng, M Hausknecht
Conference on Neural Information Processing Systems: Datasets and Benchmarks Track (NeurIPS) 2022

Reading and Acting while Blindfolded: The Need for Semantics in Text Game Agents
S Yao, K Narasimhan, M Hausknecht
Annual Conference of the North American Chapter of the Association for Computational Linguistics (NAACL) 2021

ALFWorld: Aligning Text and Embodied Environments for Interactive Learning
M Shridhar, X Yuan, M Côté, Y Bisk, A Trischler, M Hausknecht
International Conference on Learning Representations (ICLR) 2021

Keep CALM and Explore: Language Models for Action Generation in Text-based Games
S Yao, R Rao, M Hausknecht, K Narasimhan
Empirical Methods in Natural Language Processing (EMNLP) 2020

Working Memory Graphs 2020
R Loynd, R Fernandez, A Celikyilmaz, A Swaminathan, M Hausknecht
International Conference on Machine Learning (ICML)

Learning Calibratable Policies using Programmatic Style-Consistency 2020
E Zhan, A Tseng, Y Yue, A Swaminathan, M Hausknecht
International Conference on Machine Learning (ICML)

Graph constrained reinforcement learning for natural language action spaces 2020
P Ammanabrolu, M Hausknecht
International Conference on Learning Representations (ICLR)

Interactive Fiction Games: A Colossal Adventure 2020
MJ Hausknecht, P Ammanabrolu, MA Côté, X Yuan
Association for the Advancement of Artificial Intelligence (AAAI)

Scriptnet: Neural static analysis for malicious javascript detection 2019
JW Stokes, R Agrawal, G McDonald, M Hausknecht
IEEE Military Communications Conference (MILCOM)

Nail: A general interactive fiction agent 2018
M Hausknecht, R Loynd, G Yang, A Swaminathan, JD Williams
Technical Report

Counting to Explore and Generalize in Text-based Games 2018
Xingdi Yuan, Marc-Alexandre Côté, Alessandro Sordoni, Romain Laroche, Remi Tachet des Combes, Matthew Hausknecht, Adam Trischler
European Workshop on Reinforcement Learning (EWRL)

TextWorld: A Learning Environment for Text-based Games 2018
Marc-Alexandre Côté, Ákos Kádár, Xingdi Yuan, Ben Kybartas, Tavian Barnes, Emery Fine, James Moore, Matthew Hausknecht, Layla El Asri, Mahmoud Adada, Wendy Tay, Adam Trischler
IJCAI/ICML Computer Games Workshop

Leveraging grammar and reinforcement learning for neural program synthesis 2018
Rudy Bunel, Matthew Hausknecht, Jacob Devlin, Rishabh Singh, Pushmeet Kohli
International Conference on Learning Representations (ICLR)

Revisiting the arcade learning environment: Evaluation protocols and open problems for general agents 2017
MC Machado, MG Bellemare, E Talvitie, J Veness, M Hausknecht, Michael Bowling
International Joint Conferences on Artificial Intelligence (IJCAI)

Neural Program Meta-Induction 2017
J Devlin, RR Bunel, R Singh, M Hausknecht, P Kohli
Advances in Neural Information Processing Systems (NIPS)

Cooperation and communication in multiagent deep reinforcement learning 2017
Matthew Hausknecht

Ph.D. Thesis

Half field offense: An environment for multiagent learning and ad hoc teamwork 2016
Matthew Hausknecht, P Mupparaju, S Subramanian, S Kalyanakrishnan, P Stone
AAMAS Adaptive Learning Agents (ALA) Workshop

On-policy vs. off-policy updates for deep reinforcement learning 2016
Matthew Hausknecht, Peter Stone
Deep Reinforcement Learning: Frontiers and Challenges, IJCAI 2016 Workshop

Deep Reinforcement Learning in Parameterized Action Space 2016
Matthew Hausknecht, Peter Stone
Proceedings of the International Conference on Learning Representations (ICLR)

Machine Learning Capabilities of a Simulated Cerebellum 2016
Matthew Hausknecht, Wen-Ke Li, Michael Mauk, and Peter Stone
IEEE Transactions on Neural Networks and Learning Systems

Deep Recurrent Q-Learning for Partially Observable MDPs 2015
Matthew Hausknecht, Peter Stone
AAAI Fall Symposium on Sequential Decision Making for Intelligent Agents

Beyond Short Snippets: Deep Networks for Video Classification 2015
Joe Yue-Hei Ng, Matthew Hausknecht, Sudheendra Vijayanarasimhan, Oriol Vinyals, Rajat Monga, George Toderici
CVPR 2015

A Neuroevolution Approach to General Atari Game Playing 2013
Matthew Hausknecht, Joel Lehman, Risto Miikkulainen, and Peter Stone
IEEE Transactions on Computational Intelligence and AI in Games

Using a million cell simulation of the cerebellum: Network scaling and task generality 2012
Wen-Ke Li, Matthew J. Hausknecht, Peter Stone, and Michael D. Mauk
Neural Networks

HyperNEAT-GGP: A HyperNEAT-based Atari General Game Player 2012
Matthew Hausknecht, Piyush Khandelwal, Risto Miikkulainen, and Peter Stone
Proceedings of Genetic and Evolutionary Computation Conference

Dynamic Lane Reversal in Traffic Management 2011
Matthew Hausknecht, Tsz-Chiu Au, Peter Stone, David Fajardo, and Travis Waller
Proceedings of IEEE Intelligent Transportation Systems Conference

Autonomous Intersection Management: Multi-Intersection Optimization 2011
Matthew Hausknecht, Tsz-Chiu Au, and Peter Stone
Proceedings of IROS 2011-IEEE/RSJ International Conference on Intelligent Robots and Systems

Vision Calibration and Processing on a Humanoid Soccer Robot 2010
Piyush Khandelwal, Matthew Hausknecht, Juhyun Lee, Aibo Tian and Peter Stone
Fifth Workshop on Humanoid Soccer Robots

Learning Powerful Kicks on the Aibo ERS-7: The Quest for a Striker. 2010

Hausknecht, M. and Stone, P.
Proceedings of the RoboCup International Symposium

For want of a nail: How absences cause events. 2009
Wolff, P., Barbey, A., Hausknecht, M.
Journal of Experimental Psychology: General

Heuristic Based Extraction of Causal Relations from Annotated Causal Cue Phrases 2009
Hausknecht, M.
Undergraduate Dissertation

Additional Experience

University of Texas at Austin
Teaching Assistant Discrete Math for Computer Science: Honors Fall 2013

Emory University
Teaching Assistant Introduction to Computer Science Fall 2007

Open Source Software

Jericho (Python, C) - A lightweight python-based interface connecting learning agents with interactive fiction games. Additional text-based reinforcement agent implementations using Pytorch.

Half-field Offense (Python, C++) - Simulator to interface learning agents with the RoboCup 2D soccer simulator. Continuous action agent implementation using Caffe.

Arcade Learning Environment (Python, C++) - Created the first interfaces which allowed external agents to use ALE as a library. Additionally investigated the first uses of recurrent networks for deep reinforcement learning.

Languages

Python, C/C++, Pytorch

Honors & Awards

Phi Kappa Phi, 2010
NSF Graduate Research Fellowship, 2009
MCD Fellowship, The University of Texas at Austin, 2009
Trevor Evans Award, Emory University, 2009
Dean's List, Emory University, 2005-2008
Phi Beta Kappa, 2007