Matthew Hausknecht

CONTACT matthew.hausknecht@gmail.com (512) 703-0857
https://github.com/mhauskn/

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

CITIZENSHIP USA

EMPLOYMENT **Microsoft Research** 2017 - Present
Redmond, WA
Researcher and founder of the reinforcement learning group

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 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 2012

task generality
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

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

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 al-

lowed 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