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Marvin Zhang

Education

University of California, Berkeley — 2016 - present
Ph.D., Computer Science

University of California, Berkeley — 2012 - 2016
B.A., Computer Science — GPA: 4.00

Awards & Honors

NDSEG Fellowship	Beginning September 2017
NSF Graduate Research Fellowship	*Declined*
UC Berkeley EECS Departmental Fellowship	August - December 2016
UC Berkeley Outstanding Graduate Student Instructor Award	May 2016
UC Berkeley EECS Warren Dere Design Award	April 2016
CRA Outstanding Undergraduate Researchers Award Honorable Mention	December 2015
UC Berkeley EECS Honors Degree Program	August 2014 - May 2016

Publications

Yevgen Chebotar*, Karol Hausman*, Marvin Zhang*, Gaurav Sukhatme, Stefan Schaal, Sergey Levine.
Combining Model-Based and Model-Free Updates for Trajectory-Centric Reinforcement Learning.
ICML, 2017. arXiv 1703.03078.

Marvin Zhang*, Xinyang Geng*, Jonathan Bruce*, Ken Caluwaerts, Massimo Vespignani, Vytas SunSpiral, Pieter Abbeel, Sergey Levine.
Deep Reinforcement Learning for Tensegrity Robot Locomotion.
ICRA, 2017. Presented at the NIPS Deep Reinforcement Learning Workshop, 2016. arXiv 1609.09049.

Marvin Zhang, Zoe McCarthy, Chelsea Finn, Sergey Levine, Pieter Abbeel.
Learning Deep Neural Network Policies with Continuous Memory States.
ICRA, 2016. Presented at the NIPS Reasoning, Attention, Memory Workshop, 2015. Presented at the NIPS Deep Reinforcement Learning Workshop, 2015. arXiv 1507.01273.

Research

Researcher, UC Berkeley Artificial Intelligence Research (BAIR) Lab (January 2014 - present)
Working under the mentorship of Professor Pieter Abbeel and Professor Sergey Levine.

Research Projects

Combining Model-Based and Model-Free Updates for Trajectory-Centric Reinforcement Learning
(https://sites.google.com/site/icml17pilqr)
In this project, we developed a novel reinforcement learning algorithm that utilizes both model-based and model-free updates. This method demonstrated gains in final performance and sample efficiency on several simulated and real-world robotics tasks, including controlling a robotic arm to open a simulated door and hit a hockey puck into a goal. We further integrated this method with guided policy search to train deep neural network policies.
Highlights: This work has been written into a paper, to be presented at ICML 2017 and available on arXiv.

Deep Reinforcement Learning for Tensegrity Robot Locomotion (rll.berkeley.edu/drl_tensegrity)
In this project, we collaborated with NASA Ames to explore the challenges associated with learning locomotion strategies for tensegrity robots, a class of compliant robots that hold promise for future planetary exploration missions. We used a novel extension of mirror descent guided policy search to learn locomotion gaits for the SUPERball tensegrity robot, both in simulation under various terrain and gravity settings and on the physical robot.
Highlights: This work has been written into a paper, to be presented at ICRA 2017 and available on arXiv.

Learning Deep Neural Network Policies with Continuous Memory States (rll.berkeley.edu/gpsrnn)
In this project, we incorporated memory capabilities into policies for robotic tasks by appending memory states to the state of the system, and allowing the policy to read from and write to these memory states. By combining this approach with guided policy search, we acquired policies with effective memorization and recall strategies.
Highlights: This work has been written into a paper, presented at ICRA 2016 and available on arXiv.

Software Projects

Guided Policy Search (rll.berkeley.edu/gps)
A standardized, open-source implementation of the guided policy search algorithm, developed by myself and several colleagues in BAIR. This project is continually updated with the latest results and methods. Full citation:

Chelsea Finn, Marvin Zhang, Justin Fu, Xin Yu Tan, Zoe McCarthy, Emily Scharff, Sergey Levine.
Guided Policy Search Code Implementation. *2016. Software available from rll.berkeley.edu/gps.*

parRL (github.com/zhangmarvin/parRL)
Framework for parallelizing reinforcement learning experiments across Google Compute Engine machine clusters. Developed by myself, PhD student John Schulman, and Professor Pieter Abbeel.

Teaching

CS 61A Instructor, UC Berkeley (Summer 2016)
Formerly the lead instructor, alongside Brian Hou, for CS 61A, Structure and Interpretation of Computer Programs. Duties included mentoring and supervising the course staff, writing assignments and exams, and lecturing.
Highlights: Managed 12 TAs and over 400 students, and implemented several successful changes to the course organization and material based on experiences as a TA.

Teaching Assistant, UC Berkeley (Spring 2016)
Formerly an Undergraduate Student Instructor (UGSI, or TA) for CS 189/289A, Introduction to Machine Learning, with Professor Jonathan Shewchuk, CS 188, Introduction to Artificial Intelligence, with Professor Stuart Russell, and CS 61A for three semesters with Professors John DeNero and Paul Hilfinger.
Highlights: Obtained a teaching rating of 4.88/5.0, which is significantly higher than the department average. Taught several guest lectures in CS 61A and developed new projects and course materials for all classes.

Software Projects

Yelp Maps (cs61a.org/proj/maps)
Project written for CS 61A to introduce students to introductory topics in machine learning, such as k-means clustering and linear regression. Developed with fellow Teaching Assistant Brian Hou and Professor John DeNero.

Industry

Engineering Intern, Prism Skylabs (June - August 2013)
Interned at Prism Skylabs, an SF-based startup working on computer vision and video imagery analysis. Primary project was complete overhaul, both backend and frontend, of one of their web apps, the iDashboard. Useful in picking up new programming tools and skills including Django, PyCharm, and PostgreSQL.