www.marvinzhang.com
zhangmarvin@berkeley.edu

Marvin Zhang

EDUCATION

University of California, Berkeley (GPA: 4.0)
Computer Science Major & Music Minor, 2012 - 2016 (expected)

AWARDS & HONORS

UC Berkeley Letters and Science Dean's Honor List	December 2012 - present
UC Berkeley Kraft Award for Freshman	December 2012
Upsilon Pi Epsilon, Computer Science Honor Society	December 2013 - present
UC Berkeley EECS Honors Degree Program	August 2014 - present
Undergraduate Research Apprentice Program Summer Stipend Award	May 2015 - August 2015
CRA Outstanding Undergraduate Researchers Award Honorable Mention	December 2015

RESEARCH

Research Assistant, UC Berkeley Robot Learning Lab (January 2014 - present)
Working under the mentorship of Professor Pieter Abbeel and post-doctoral researcher Sergey Levine. Currently working on several projects focused on improving deep learning for robotic control, through incorporating memory capabilities into control policies and exploring new robotic domains. Previously investigated methods of parallelization for reinforcement learning algorithms.

Research Projects

Learning Deep Neural Network Policies with Continuous Memory States
In this project, we investigated how to best incorporate memory capabilities into deep learning methods for robotic tasks. We devised an approach of appending memory states to the physical state of the system, and allowing the policy to directly read from and write to these memory states. By combining this approach with the guided policy search algorithm, we were able to acquire policies with effective memorization and recall strategies.
Highlights: This work has been written into a paper, currently under review at ICRA 2016 and also available on arXiv. The full listing for the paper can be found below.

Training Recurrent Neural Networks using Trajectory Optimization (in progress)
In this project, we are exploring the possibility of training recurrent neural networks on supervised learning tasks using various trajectory optimization approaches, rather than backpropagation through time. This approach could in principle be more effective at training networks that perform complex reasoning over temporally extended intervals, such as speech processing and state estimation tasks, because many of the issues with these tasks stem from training difficulties associated with backpropagation through time.

Applying Guided Policy Search to Learning SUPERball Locomotion (in progress)
In this project, we are applying guided policy search to the SUPERball, a tensegrity robot that is being developed by NASA for planetary exploration missions. We hope to address the challenge of SUPERball locomotion by using guided policy search to allow the SUPERball to automatically identify and learn gaits for novel situations, for example over rocky terrains or in different gravities. Learning these behaviors would be more robust and generalizable to new situations, and would allow for more autonomous locomotion for the SUPERball in new and unfamiliar environments.

Software Projects

Guided Policy Search (in progress)
Codebase for guided policy search that is currently being developed by myself and several others. We are hoping to open source this code soon, to allow researchers to have a standardized implementation of guided policy search.

parRL (github.com/zhangmarvin/parRL)
Framework for parallelizing reinforcement learning algorithms. Developed with PhD student John Schulman and Professor Pieter Abbeel in the UC Berkeley RLL.

PUBLICATIONS

Marvin Zhang, Zoe McCarthy, Chelsea Finn, Sergey Levine, Pieter Abbeel.
Learning Deep Neural Network Policies with Continuous Memory States.
Under review at the IEEE International Conference on Robotics and Automation (ICRA), 2016. arXiv 1507.01273.
Presented at the NIPS Reasoning, Attention, Memory (RAM) Workshop, 2015.
Presented at the NIPS Deep Reinforcement Learning Workshop, 2015.

TEACHING

CS 188 Teaching Assistant, UC Berkeley (Fall 2015)
Currently a Teaching Assistant for CS 188, Introduction to Artificial Intelligence. Duties include teaching sections, holding office hours, and writing and developing course materials.
Highlights: Helped design, develop, and lead supplementary probability sections, which were new to this semester. Also spearheaded the overhaul of a project centered around probabilistic inference, HMMs, and particle filtering.

CS 61A Teaching Assistant, UC Berkeley (Spring 2014, Fall 2014, Spring 2015)
Formerly a Teaching Assistant for CS 61A, Structure and Interpretation of Computer Programs, for three semesters, and attained an average rating of 4.83/5.0.
Highlights: Taught several guest lectures on topics such as object-oriented programming and reinforcement learning. Also developed a new project, with another TA, centered around introductory ideas in machine learning.

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 (backend and frontend) of one of their web apps, the iDashboard. Useful in picking up programming tools and skills including Django, PyCharm, and PostgreSQL.