Wilson Yan

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Education

University of California, Berkeley, B.A. in CS and Applied Math
August 2016 – (Expected) May 2020

GPA: 3.97 / 4.00

Relevant Coursework: Theoretical Statistics (IP), Information Theory (IP), Advanced Robotics (IP), Machine Learning (A), Artificial Intelligence (A+), Deep Unsupervised Learning (A), Convex Optimization (A)

WORK EXPERIENCE

Undergraduate Research Assistant, Robot Learning Lab (BAIR)
January 2018 – Present

- Worked on developing novel methods to speed-up big batch reinforcement learning using parameter noise for regional gradient estimates in parameter space
- Used PPO to create a control policy that optimizes job allocation on chips. Key challenge was to solve a long horizon problem with difficult credit assignment. Experimented with different attention mechanisms and architectures to improve credit assignment
- Worked on generative modelling and Fisher scores, and deformable object manipulation (more in publications)

Undergraduate Research Assistant, Berkeley Institute of Data Science
September 2016 – December 2017

- Trained word embedding models and constructed a deep learning CNN in order to classify product descriptions into individual binary cypes (medical, wellness, recreational, etc.). Achieved F-scores from 0.85-0.98 among different categories.
- Performed graph analysis and spectral clustering in analyzing relationships between producers and consumers

Data Science Intern, Percolata
May 2017 – August 2017

- Heavily contributed to re-designing the new backend of their application by recreating and reintegrating each of its main components
- Analyzed the quality of prediction of their machine learning model and identified bottlenecks in their pipeline
- Redesigned the machine learning pipeline to streamline training and test of new models

PUBLICATIONS

Natural Image Manipulation with Autoregressive Models using Fisher Scores
Wilson Yan, Jonathan Ho, Pieter Abbeel (under review for ICLR 2020)*
Deep autoregressive models are one of the most powerful models that exist today which achieve state-of-the-art bits per dimension. However, they lie at a strict disadvantage when it comes to controlled sample generation compared to latent variable models. Latent variable models such as VAEs and normalizing flows allow meaningful semantic manipulations in latent space, which autoregressive models do not have. In this paper, we propose using Fisher scores as a method to extract embeddings from an

autoregressive model to use for interpolation and show that our method provides more meaningful sample manipulation compared to alternate embeddings such as network activations.

Learning to Manipulate Deformable Objects without Demonstrations
Yilin Wu, Wilson Yan*, Thanard Kurutach, Lerrel Pinto, Pieter Abbeel (under review for ICRA 2020)*
In this paper we tackle the problem of deformable object manipulation through model-free visual reinforcement learning (RL). In order to circumvent the sample inefficiency of RL, we propose two key ideas that accelerate learning. First, we propose an iterative pick-place action space that encodes the conditional relationship between picking and placing on deformable objects. The explicit structural encoding enables faster learning under complex object dynamics. Second, instead of jointly learning both the pick and place locations, we only explicitly learn the placing policy conditioned on random pick points. Then, by selecting the pick point that has Maximal Value under Placing (MVP), we obtain our picking policy. Using this learning framework, we obtain an order of magnitude faster learning compared to independent action-spaces on our suite of deformable object manipulation tasks. Finally, using domain randomization, we transfer our policies to a real PR2 robot for challenging cloth and rope manipulation.

TEACHING

Research Mentor, Undergraduate Lab at Berkeley (ULAB)
January 2018 - May 2018

Teaching Assistant, CS 188: Introduction to Artificial Intelligence
August 2018 - December 2018

Teaching Assistant, CS 188: Introduction to Artificial Intelligence
January 2019 - May 2019

Head Teaching Assistant, CS 188: Introduction to Artificial Intelligence
August 2019 - Present

(Future Role) Co-Head Teaching Assistant, CS 294-158 Deep Unsupervised Learning
January 2020 - May 2020