Joey Hejna
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Education

University of California, Berkeley *August 2017 - Present*
B.S. Electrical Engineering and Computer Science **GPA: 4.0/4.0**
Selected Coursework: Combinatorial Algorithms* (IP), NLP* (IP), Information Theory* (A+), Linear System Theory* (A+), Deep Reinforcement Learning*, Deep Unsupervised Learning* (A+), Machine Learning, Artificial Intelligence (A+), Designing Neural Networks (A+), Probability and Random Processes (A+), Optimization Models, Signals and Systems, Algorithms, Discrete Math and Probability Theory, Operating Systems, Computer Architecture (A+), Data Structures & Algorithms, Real Analysis, Information Systems. * = graduate level, IP = in progress, No marking = A.

Publications & Projects

Hierarchically Decoupled Imitation for Morphological Transfer *Published at ICML 2020*
Donald Joseph Hejna III, Pieter Abbeel, Lerrel Pinto. https://arxiv.org/abs/2003.01709

- We show that transferring high-level knowledge across agents offers large improvements in sample efficiency.
- We overcome different input/output spaces of agents using a hierarchical structure and contribute two key algorithmic improvements motivated by information theory to overcome the domain shift induced in transfer.
- Quantitatively we assess our method on a suite of custom locomotion and manipulation agents.

Task-Agnostic Morphology Evolution *Published at ICLR 2021*
Donald Joseph Hejna III, Pieter Abbeel, Lerrel Pinto. https://openreview.net/pdf?id=CGQ6ENUMX6

- Learning an agent's form holds the promise of better performance. We introduce the first unsupervised algorithm for agent design optimization using unsupervised objectives, discovering viable agents without rewards.
- Empirically, we outperform task-supervised algorithms in multi-task settings while being 4x as fast by estimating agent fitness using randomly sampled action primitives instead of policy learning.
- Project has received positive reviews from the research community.

Improving Latent Representations via Explicit Disentanglement *Course Project – Unsupervised Learning*
Donald Joseph Hejna III*, Ashwin Vangipuram*, Kara Liu*. http://joeyhejna.com/files/disentanglement.pdf

- We introduce three novel methods for disentangling latent representations in VAEs: cycle loss, divergence penalty, and factor prediction. I proposed and coded all approaches and ran all the MNIST-like experiments.
- We outperform baselines quantitatively on downstream classification and qualitatively on the 3D Chairs dataset.

Experience

Robot Learning Lab, Undergraduate Researcher *November 2019 – Present*

- Working under the supervision of Professors Pieter Abbeel and Lerrel Pinto (NYU) on problems relating to efficient reinforcement learning and robotics. First-authored two papers in nine-months (see above).

Citadel Global Quantitative Strategies, Intern *June 2019 – August 2019*

- Developed C++ proxy and API to improve job monitoring, KDB testing scripts for multi-server trading systems.
- Created APIs for trade messages, unified with query systems under a central platform for easy use by traders.
- Explored techniques for reducing RAM usage of decision tree training libraries. Achieved 75% load reduction.

Intel AI Products Group, Intern *May 2018 –August 2018*

- Produced demo-products for Intel OpenVino Model Optimizer. Computer vision project featured on intel's blog that classified types of recycling with 85+% accuracy and provided real-time visual explanations.
- Documented workflows for AWS model training, explored gradient based explanations for CV and NLP models.

Auto Lab, Undergraduate Researcher *January2019 – June 2019*

- Worked on integrating object detection models (SSD) with grasp quality networks for robot manipulation using DexNet under the supervision of post-doc Ajay Tanwani.

- Modified DexNet simulator to produce bounding boxes and TF object detection codebase for grasp prediction.

Clipper Model Zoo, Head of Model Team *January 2019 – June 2019*

- Worked in UC Berkeley's RISE lab on a public model serving site based on the Clipper inference platform.
- Led the model curation team in building and deploying models. Project since deprecated.

Switchboard, Contracted Android Developer *Jan 2018 – August 2018*

- Programmed a multi-user voice-communication android app for Berkeley Skydeck Startup via TokBox API.
- Routed user events using SocketIO, guaranteed delivery with ack messages. Custom API for feed, notifications.

Teaching & Outreach

EECS 127: Optimization Models, Teaching Assistant *Fall 2020*

- Taught sections on linear alg, duality, convex models. Hosting office hours, running website & exam logistics.

CS 189: Machine Learning, Teaching Assistant *Spring 2020*

- Taught sections on classic ML methods. Hosted office hours, created exam questions and discussion sheets.
- Earned overall rating of 4.61/5.00 from students in comparison to department average of 4.41

CS 70: Discrete Math and Probability Theory, Teaching Assistant *Fall 2019*

- Taught two weekly discussions, held office hours. Earned overall 4.68/5.00 rating in comparison to 4.33 average.

Hack:Now – UC Berkeley CalHacks, Workshop Instructor *April 2020*

- Gave an introductory machine learning tutorial for an online version of Cal Hacks, the largest collegiate hackathon. Prepared all materials and presented. https://github.com/jhejna/mlworkshop

Mobile Developers of Berkeley, Workshop Instructor *January 2019 – June 2020*

- Deliver Bi-annual workshop on ML technologies to student led app-based startup incubator.
- Advised and helped student teams incorporate Tensorflow models into their projects.

UC Berkeley Launchpad, Education Committee *January 2019 – October 2020*

- Developed introductory ML curriculum for students in Berkeley AI interest group: http://joeyhejna.com/mlbook.
- Delivered workshops on topics from ML fundamentals to advanced reinforcement and unsupervised learning.
- Led students in a project on self-play in reinforcement learning, having an agent learn pong by playing itself.
- Contributed to student projects reimplementing notable papers, including World Models (Ha, Schmidhuber 2018)

Silicon Valley AI Frontiers Meetup, Presenter *May 2020*

- Presented research work to AI Frontiers, a group of post-education tech employees interested in AI.

Awards

CRA Undergraduate Research Honorable Mention. Awarded to top undergraduate CS researchers in the US.

Regents and Chancellors Scholar. Awarded to <2% of top entering undergraduate students at UC Berkeley

CS 189 Kaggle Competition – 6th place of 574. Computer vision competition on classifying human movements from images in Berkeley's Machine Learning course. Approach leveraged ResNets, data augmentations, parameter tuning.

EECS Honors Program. Program for high achieving students in academics and research.

Dean's List. Awarded for maintaining academic position in top <10% of engineering students at UC Berkeley.

Rambus Innovator of the Future 2017. Scholarship awarded for exceptional academics and research.

Kraft Award for Freshmen. Awarded to ~4% of freshmen UC Berkeley students for academic standing.

Eta Kappa Nu (EECS Honors Society). Top students in EECS with junior standing or above, joined sophomore year.

Skills

Programming: Python, Pytorch, Tensorflow, Java, C++ (Intermediate), C, AWS, Docker, Unix