



Anikait Singh

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Education

University of California, Berkeley

Berkeley, CA

Bachelor of Arts in Computer Science

Aug. 2019 - May. 2023

GPA: 3.984, **Technical GPA:** 4.0

Selected Coursework: Machine Learning, Deep Learning, Deep Reinforcement Learning, Probability/Random Processes, Convex Optimization, Natural Language Processing, Information Theory, Graduate Probability Theory, Statistical Speech Recognition, Databases, Algorithms, Computer Architecture, Robotics, AI

Organizations: UPE, UCB Sikh Student Association, Berkeley Legends

Publications

- [1] **A Workflow for Offline Model-Free Robotic Reinforcement Learning**
Aviral Kumar*, **Anikait Singh***, Stephen Tian, Chelsea Finn, Sergey Levine [Paper] [Talk]
Conference on Robot Learning (CoRL), 2021 (*Oral* Presentation). (*Acceptance rate: 6.5%*)
- [2] **Offline Reinforcement Learning from Heterogeneous Data: Fine-Grained Stitching and Support Constraints**
Anikait Singh, Aviral Kumar, Quan Vuong, Yevgen Chebotar, Sergey Levine
Under submission to Conference and Workshop on Neural Information Processing Systems (NeurIPS), 2022.
- [3] **Pre-Training for Robots: Offline RL on Diverse Data Supports Flexible and Efficient Fine-Tuning**
Aviral Kumar, Frederik Ebert, **Anikait Singh**, Yanlai Yang, Chelsea Finn, Sergey Levine
Under submission to International Conference on Learning Representations (ICLR), 2022.
- [4] **Should I Run Offline Reinforcement Learning or Behavioral Cloning?** [Paper] [Blog]
Aviral Kumar, Joey Hong, **Anikait Singh**, Sergey Levine
International Conference on Learning Representations (ICLR), 2022. (*Acceptance rate: 32.2%*)
- [5] **A Mobile Application for Keyword Search in Real-World Scenes** [Paper]
Shrinivas Pundlik, **Anikait Singh**, Gautam Baghel, Vilte Baliutaviciute, Gang Luo
IEEE Journal of Translational Engineering in Health and Medicine (IEEE), 2018.

Experience

Robotics AI & Learning Lab

Berkeley AI Research

Advisors: Prof. Sergey Levine, Prof. Chelsea Finn, Aviral Kumar

Feb. 2020 - Present

- Research is focused on learning good representations on data from large diverse data sources that show good generalization on tasks not seen before and enable rapid learning
- Another large focus is developing methods/frameworks that allow Offline RL to be practically used by ML Practitioners to tackle challenging sequential decision problems
- Fortunate to work with Professor Sergey Levine, Professor Chelsea Finn and Aviral Kumar in this research and publish in several conference venues

Silver Visual Neuroscience Lab

Helen Wills Neuroscience Institute

Advisors: Prof. Michael Silver, Liz Lawler

Sep. 2019 - Feb. 2020

- This work focused on analyzing CNN activations on Stimuli Images to model how patients with Binocular Rivalry construct representations of their environment.
- We utilized stimuli images from a subset of ImageNet with various augmentations to construct these stimuli.
- Research was focused on understanding how the brain constructs representations of the environment and how these representations are modified by cognitive processes such as attention, expectation, and learning

Teaching Experience

CS 285: Deep Reinforcement Learning

Teaching Assistant: Fall 2022, Fall 2023

CS 188: Intro to AI

Teaching Assistant: Spring 2022

CS 61B: Data Structures and Algorithms

Deep Dive Instructor: Fall 2022

CS 61A: Intro to Python

Tutor: Spring 2021

CS 70: Discrete Mathematics and Probability

Reader: Spring 2021

Awards and Honors

2019 - Present	Dean's List: UC Berkeley
2020 - Present	UPE: UC Berkeley CS Honors Society
2019-2020	SkyDeck Hotdesk Incubator: Berkeley SkyDeck Fund
2019	CalHacks 6.0 Fellowship: UC Berkeley CS Honors Society
Jan. 2020	Apriorit Computer Science Scholarship

Technical Skills

Programming	Python, Java, C/C++, MySQL, MongoDB
Frameworks	PyTorch, JAX, TensorFlow/Keras, Docker, React, Flask, Cuda, NumPy
Languages	English(Native), Hindi, Punjabi, Spanish
Misc	Office, \LaTeX

Projects

Offline RL Workflow

RAIL

- Developing a practical workflow for using offline RL analogous to the relatively well-understood workflows for supervised learning problems
- Devised a set of metrics and conditions that can be tracked over the course of offline training, and can inform the practitioner about how the algorithm and model architecture should be adjusted to improve final performance
- Showed usefulness of this workflow in several simulated robotic learning scenarios and for three tasks on two distinct real robots, focusing on learning manipulation skills with raw image observations with sparse binary rewards

Fine-Grained Stitching for Heterogeneous Data

RAIL

- Proposed a method ReDS that modifies a typical distribution constraint into a support-level constraint via re-weighting to enable learning from heterogeneous data.
- Motivation: Heterogeneous data is commonplace in the world today due to the multi-modality of behavior found in many tasks today (such as self driving). It is thus vital for a good offline RL algorithm to identify the best in-distribution behaviors at different states and then stitch them together to attain good performance.
- Empirically validated that existing approaches are unable to stitch reasonable behaviors in tasks with heterogeneous data

Pre-Training for Robots

RAIL

- Proposed a system for Robotic Reinforcement Learning that enables fast generalization on new tasks and domains
- Empirically present a set of crucial design decisions that make it possible to scale existing offline RL algorithms to leverage diverse Offline datasets to get a significant performance increase of up to 4x over existing baselines
- Describe some empirical observations such as the scaling laws of Robotic Offline RL methods

Offline RL vs BC

RAIL

- Paper explores which properties of environments allow offline RL methods to perform better than BC methods even when only provided with expert data
- Showed that policies trained on suboptimal data that is sufficiently noisy can attain better performance than even BC algorithms with expert data, especially on long-horizon problems
- My main contribution was to the empirical validation for the paper.

Deep Criminalize Sketch Artist

Skydeck/CalHacks

- Designed Sketch-Artist application using React-Native that allows police to instantly render a realistic, searchable image based on a witness description in any language using a Generative Adversarial Neural Net.
- Winners of CalHacks 6.0 Fellowship and recieved opportunity to work in the SkyDeck HotDesk Incubator
- Initial Adoption by UC Berkeley Police Department

Supervision Search

Schepens Eye Research Institute

- Created a mobile application to help visually-impaired patients localize where words are present in a cluttered environment
- Utilizes OCR + Levenshtein Distance to enable efficient and intuitive search in crowded, diverse environments
- Added specialized audio cues and additional assistive features for aiding with with localization

Peer Walk

Meta SF Hackathon

- PeerWalk is a React-Native app to allow verified college students to schedule walks with peers to safely walk on campus.
- Invited to the Facebook SF hackathon and collaborated with professionals there to design this app