Anurag Ajay

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Education

Massachusetts Institute of Technology September 2019 - Present
Ph.D. in Electrical Engineering and Computer Science GPA: 5.00/5.00
MIT Presidential fellowship

Massachusetts Institute of Technology September 2017 - September 2019
S.M. in Electrical Engineering and Computer Science GPA: 5.00/5.00
MIT Presidential fellowship

University of California, Berkeley August 2013 - May 2017
B.S. in Electrical Engineering and Computer Science GPA: 3.95/4.00
Graduated with Highest Honors (top 3%)

Experience

Improbable AI Lab September 2019 - Present
(Adviser: Pulkit Agarwal)

- Flexibly composing foundation models, each pretrained on different modality of internet data (such as vision-language model, video diffusion and action model), for decision-making in embodied agents
- Building deep RL algorithms that leverages past offline interactions for faster online learning

Meta FAIR Research Internship June 2023 - Present
(Advisers: Aravind Rajeswaran)

- Curated an evaluation dataset for Embodied Question Answering consisting of high-quality human generated questions representative of real-world use cases for Embodied AI agents
- The evaluation dataset is accompanied by strong baselines demonstrating the capabilities of publicly available VLMs and fine-tuned multi-frame VLMs, and highlighting the gap between state-of-the-art VLMs (GPT4V) and humans.

Google Brain Research Internship June 2020 - August 2020
(Advisers: Ofir Nachum and Sergey Levine)

- Worked on leveraging (unlabelled) offline data to extract skills which allows for improved offline reinforcement learning, online reinforcement learning and few-shot imitation learning.

Learning and Intelligent Systems Group September 2017 - September 2019
(Advisers: Leslie Kaelbling and Josh Tenenbaum)

- Worked on leveraging physics engine for dynamics model learning and control
- Worked on curiosity driven exploration for reinforcement learning in environment with sparse rewards

Madry Lab (with Aleksander Madry) March 2019 - September 2019

- Worked on robust style transfer for images and videos

Berkeley Artificial Intelligence Research Lab October 2014 - May 2017
(Advisers: Pieter Abbeel and Sergey Levine)

- Worked on deep learning for state estimation
- Developed model-based sample efficient reinforcement learning algorithm

Publications

OpenEQA: Embodied Question Answering in the Era of Foundation Models
Arjun Majumdar*, **Anurag Ajay***, Xiaohan Zhang*, Pranav Putta, Sriram Yenamandra, Mikael Henaff, Sneha Silwal, Paul Mcvay, Oleksandr Maksymets, Sergio Arnaud, Karmesh Yadav, Qiyang Li, Ben Newman, Mohit Sharma, Vincent Berges, Shiqi Zhang, Pulkit Agrawal, Yonatan Bisk, Dhruv Batra, Mrinal Kalakrishnan, Franziska Meier, Chris Paxton, Sasha Sax, Aravind Rajeswaran.
Preprint, 2023.

Compositional Foundation Models for Hierarchical Planning
Anurag Ajay*, Seungwook Han*, Yilun Du*, Shuang Li, Abhi Gupta, Tommi Jaakkola, Joshua B. Tenenbaum, Leslie Kaelbling, Akash Srivastava, Pulkit Agrawal.
Neural Information Processing Systems (NeurIPS), New Orleans, USA, December 2023.

Statistical Learning under Heterogenous Distribution Shift
Max Simchowitz*, **Anurag Ajay***, Pulkit Agrawal, Akshay Krishnamurthy.
International Conference on Machine Learning (ICML), Hawaii, USA, July 2023.

Parallel-Q-Learning: Scaling Off-policy Reinforcement Learning
Zechu Li, Tao Chen, Zhang-Wei Hong, **Anurag Ajay**, Pulkit Agrawal.
International Conference on Machine Learning (ICML), Hawaii, USA, July 2023.

Is Conditional Generative Modeling all you need for Decision Making?
Anurag Ajay*, Yilun Du*, Abhi Gupta*, Josh Tenenbaum, Tommi Jaakkola, Pulkit Agrawal.
International Conference on Learning Representations (ICLR), Kigali, Rwanda, May 2023.
Oral Talk

Distributionally Adaptive Meta Reinforcement Learning
Anurag Ajay*, Abhishek Gupta*, Dibya Ghosh, Sergey Levine, Pulkit Agrawal.
Neural Information Processing Systems (NeurIPS), New Orleans, USA, December 2022.

Offline RL Policies should be trained to be Adaptive
Dibya Ghosh, **Anurag Ajay**, Pulkit Agrawal, Sergey Levine.
International Conference on Machine Learning (ICML), Baltimore, USA, July 2022.
Oral Talk

Overcoming The Spectral Bias of Neural Value Approximation
Ge Yang*, **Anurag Ajay***, Pulkit Agrawal.
International Conference on Learning Representations (ICLR), Virtual, May 2022.

Understanding the Generalization Gap in Visual Reinforcement Learning
Anurag Ajay*, Ge Yang*, Ofir Nachum, Pulkit Agrawal.
ICML Reinforcement Learning for Real Life Workshop, July 2021.

OPAL: Offline Primitive Discovery for Accelerating Offline Reinforcement Learning
Anurag Ajay, Aviral Kumar, Pulkit Agrawal, Sergey Levine, Ofir Nachum.
International Conference on Learning Representations (ICLR), Vienna, Austria, May 2021.

Learning Action Priors for Visuomotor transfer
Anurag Ajay, Pulkit Agrawal.
ICML Inductive biases, invariances and generalization in RL workshop, July 2020.

Long-Horizon Prediction and Uncertainty Propagation with Residual Point Contact Learners
Nima Fazeli, **Anurag Ajay**, Alberto Rodriguez.
IEEE International Conference on Robotics and Automation (ICRA), Paris, France, May 2020.

Learning Skill Hierarchies from Predicate Descriptions and Self-Supervision
Tom Silver*, Rohan Chitnis*, **Anurag Ajay**, Josh Tenenbaum, Leslie Pack Kaelbling.
AAAI Workshop on Generalization in Planning (GenPlan), 2020.

Learning to Navigate Endoscopic Capsule Robots
Mehmet Turan, Yasin Almalioglu, Hunter B Gilbert, Faisal Mahmood, Nicholas J Durr, Helder Araujo, Alp Eren Sar,**Anurag Ajay**, Metin Sitti.
Robotics and Automation Letters (RA-L), 2019.

Combining Physical Simulators and Object-Based Networks for Control
Anurag Ajay, Maria Bauza, Jiajun Wu, Nima Fazeli, Joshua B. Tenenbaum, Alberto Rodriguez, Leslie P. Kaelbling.
IEEE International Conference on Robotics and Automation (ICRA), Montreal, Canada, May 2019.

Augmenting Physical Simulators with Stochastic Neural Networks: Case Study of Planar Pushing and Bouncing
Anurag Ajay, Jiajun Wu, Nima Fazeli, Maria Bauza, Leslie P. Kaelbling, Joshua B. Tenenbaum, Alberto Rodriguez.
IEEE International Conference on Intelligent Robots and Systems (IROS), Madrid, Spain, October 2018.
Best Paper for Cognitive Robotics

Reset-Free Guided Policy Search: Efficient Deep Reinforcement Learning with Stochastic Initial States
Anurag Ajay*, William Montgomery*, Chelsea Finn, Pieter Abbeel, Sergey Levine. IEEE International Conference on Robotics and Automation (ICRA), Singapore, May 2017.

Backprop KF: Learning Discriminative Deterministic State Estimators
Tuomas Haarnoja, **Anurag Ajay**, Sergey Levine, Pieter Abbeel.
Neural Information Processing Systems (NIPS), Barcelona, Spain, December 2016.