Kevin Lu

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Education

May 2027 / Aug 2023 — **Stanford University**
Doctorate of Philosophy (PhD) in Computer Science (CS)
Deferred admission to Fall 2023.

Aug 2021 / Aug 2018 — **University of California, Berkeley**
Bachelor of Science (BS) in Electrical Engineering and Computer Sciences (EECS)
GPA: 3.95/4.00

Experience

Present / Aug 2022 — **Hudson River Trading**
Algorithm Developer
Applied artificial intelligence research for high-frequency trading as part of HRT AI Labs (HAIL). We train competitive deep learning models for large-scale problems.

Mar 2022 / Aug 2021 — **Facebook Artificial Intelligence Research (Meta AI)**
AI Resident (Advisors: Amy Zhang, Yuandong Tian)
Research on better generalization in sequence modeling for reinforcement learning.

Aug 2021 / Jun 2019 — **Robot Learning Lab (UC Berkeley)**
Undergraduate Researcher (Advisors: Igor Mordatch, Pieter Abbeel)
Research on reinforcement learning and sequence modeling. Studied general sequence modeling techniques for reinforcement learning (Decision Transformer) and cross-modal transfer (Pretrained Transformers as Universal Computation Engines). I gave a talk on my Berkeley research here.

May 2021 / Jan 2019 — **University of California, Berkeley**
Head Teaching Assistant for Probability and Random Processes (EECS 126) (Sp21, Fa20)
Head TA for upperclassman-level probability course EECS 126. Responsible for organizing course, managing staff, creating content, and communicating with students. Wrote a course study guide.
Teaching Assistant for Probability and Random Processes (EECS 126) (Sp20, Fa19)
Reader for Discrete Math and Probability (CS 70) (Sp19)

Highlighted Publications

Jun 2021 — **Decision Transformer: Reinforcement Learning via Sequence Modeling**
L. Chen* and K. Lu* (equal contribution), ..., P. Abbeel, A. Srinivas†, I. Mordatch†
Summary: simple language modeling can do offline RL, matching traditional dynamic programming (temporal difference learning) methods on recent benchmarks. We argue reinforcement learning should use the tools of supervised and unsupervised deep learning.

Presented at Neural Information Processing Systems (NeurIPS) 2021, independently covered on YouTube, and by assorted press (The Batch, The Gradient, SyncedReview). Models can be found on HuggingFace. A variety of works and projects now study transformers for actions [1, 2, 3, 4, 5, 6, 7, 8].

Mar 2021 — **Pretrained Transformers as Universal Computation Engines**
K. Lu, A. Grover, P. Abbeel, I. Mordatch
Summary: pretrained language sequence models can exhibit cross-modal transfer to distinct non-language modalities, improving performance on random initialization.

Presented at the AAAI Conference on Artificial Intelligence 2022 as an oral presentation, independently covered on YouTube, and by assorted press (The Batch, VentureBeat).

All Publications

Dec 2021 **Pretraining for Language-Conditioned Imitation with Transformers**
A. Putterman, K. Lu, I. Mordatch, P. Abbeel.
NeurIPS Offline Reinforcement Learning Workshop, 2021.
Summary: unsupervised sequence pretraining improves language-conditioned behavior policies.

Oct 2021 **URLB: Unsupervised Reinforcement Learning Benchmark**
M. Laskin* and D. Yarats*, H. Liu, K. Lee, A. Zhan, K. Lu, C. Cang, L. Pinto, P. Abbeel.
Neural Information Processing Systems (NeurIPS), 2021.
Summary: we benchmark unsupervised RL algorithms on downstream finetuning performance.

Jun 2021 **Decision Transformer: Reinforcement Learning via Sequence Modeling**
L. Chen*, K. Lu*, A. Rajeswaran, K. Lee, A. Grover, M. Laskin, P. Abbeel, A. Srinivas†, I. Mordatch†.
Neural Information Processing Systems (NeurIPS), 2021.
Summary: simple language modeling can do offline RL, matching traditional dynamic programming.

Mar 2021 **Pretrained Transformers as Universal Computation Engines**
K. Lu, A. Grover, P. Abbeel, I. Mordatch.
AAAI Conference on Artificial Intelligence (Oral Presentation), 2022.
Summary: pretrained language models can exhibit cross-modal transfer to non-language modalities.

Jan 2021 **Efficient Empowerment Estimation for Unsupervised Stabilization**
R. Zhao, K. Lu, P. Abbeel, S. Tiomkin.
International Conference on Learning Representations (ICLR), 2021.
Summary: new unbiased empowerment estimator improving stability over variational methods.

Dec 2020 **Reset-Free Lifelong Learning with Skill-Space Planning**
K. Lu, A. Grover, P. Abbeel, I. Mordatch.
International Conference on Learning Representations (ICLR), 2021.
Summary: model-based planning over a space of model-free skills improves reset-free performance.

Dec 2019 **Adaptive Online Planning for Continual Lifelong Learning**
K. Lu, I. Mordatch, P. Abbeel.
NeurIPS Deep Reinforcement Learning Workshop, 2019.
Summary: model-based planning outperforms model-free acting in dangerous reset-free settings.

Invited Talks

Jun 2022 CLEAR Ventures: "Advances in Robotic and Reinforcement Learning Research"

Jan 2022 Adept AI: "Towards a Universal Paradigm for Decision Making"

Jan 2022 Google: "Pretrained Transformers as Universal Computation Engines"

Jan 2022 Facebook AI Research: "Towards a Universal Paradigm for Decision Making"

Jul 2021 Intel AI Labs: "Decision Transformer: Reinforcement Learning via Sequence Modeling"

Jul 2021 Eindhoven RL: "Decision Transformer: Reinforcement Learning via Sequence Modeling"

Apr 2021 IBM: "Pretrained Transformers as Universal Computation Engines"

Apr 2021 Facebook AI Research: "Pretrained Transformers as Universal Computation Engines"

Apr 2021 Berkeley Vision Group: "Pretrained Transformers as Universal Computation Engines"

Mar 2021 Cohere AI: "Pretrained Transformers as Universal Computation Engines"

Coursework and Activities

Undergraduate Coursework:

GPA: EECS 4.00/4.00; Overall 3.95/4.00

Graduate-level courses: Unsupervised Learning (CS 294-158), Natural Language Processing (CS 288), Advanced Robotics (CS 287), Theory of Bandits & Reinforcement Learning (EE 290), Population Games (EE 290), Robust and Nonparametric Statistics (Stat 240), Theoretical Statistics (Stat 210A)

Undergraduate-level courses: Machine Learning (CS 189), Artificial Intelligence (CS 188), Convex Optimization (EECS 127), Probability and Random Processes (EECS 126), Efficient Algorithms (CS 170), Discrete Math (CS 70), Machine Structures (CS 61C), Mathematical Economics (Econ C103), Biological Psychology (Psych 110)

Conference Reviewer:

Neural Information Processing Systems (NeurIPS)
International Conference on Learning Representations (ICLR)
International Conference on Machine Learning (ICML)

Miscellaneous Affiliations:

I was a Venture Fellow in the summer 2022 cohort of venture capital firm CLEAR Ventures (VC).

In spring 2022, I was awarded a National Science Foundation (NSF) Graduate Research Fellowship (GFRP).

On my Github, I used to maintain a reinforcement learning codebase (lifelong_rl), and I once trained an elo model on League of Legends eSports data.

In undergrad, I was a part of the honors society Eta Kappa Nu (HKN); the club Computer Science Undergraduate Association (CSUA); a tutoring group Computer Science Mentors (CSM); and I spent a brief time with the Berkeley Tennis Association (BTA).

In high school, I used to do competitive programming, where I was rated Platinum in the USA Computing Olympiad (USACO) and Expert on Codeforces.