Fahim Tajwar

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EDUCATION

Carnegie Mellon University — **Pittsburgh, PA**
Doctor of Philosophy (PhD), Machine Learning — 2023 -- Current

Stanford University — **Stanford, CA**
Master of Science (MS), Computer Science (AI/ML) — 2022 -- 2023
Bachelor of Science (BS) with Distinction, Mathematics — 2017 -- 2022

PUBLICATIONS (* Equal Contribution)

Offline Retraining for Online RL: Decoupled Policy Learning to Mitigate Exploration Bias — 2023
Max Sobol Mark*, Archit Sharma*, Fahim Tajwar, Rafael Rafailov, Sergey Levine, Chelsea Finn
Preprint, 2023

Conservative Prediction via Data-Driven Confidence Minimization — 2023
Caroline Choi*, Fahim Tajwar*, Yoonho Lee*, Huaxiu Yao, Ananya Kumar, Chelsea Finn
ICLR workshops: TrustML, ME-FoMo, 2023

Surgical Fine-Tuning Improves Adaptation to Distribution Shifts — 2023
Yoonho Lee*, Annie S Chen*, Fahim Tajwar, Ananya Kumar, Huaxiu Yao, Percy Liang, Chelsea Finn
International Conference on Learning Representations (ICLR), 2023

When to Ask for Help: Proactive Interventions in Autonomous Reinforcement Learning — 2022
Annie Xie*, Fahim Tajwar*, Archit Sharma*, Chelsea Finn
Conference on Neural Information Processing Systems (NeurIPS), 2022

Do Deep Networks Transfer Invariances Across Classes? — 2022
Allan Zhou*, Fahim Tajwar*, Alexander Robey, Tom Knowles, George J. Pappas, Hamed Hassani, Chelsea Finn
International Conference on Learning Representations (ICLR), 2022

No True State-of-the-Art? OOD Detection Methods are Inconsistent across Datasets — 2021
Fahim Tajwar, Ananya Kumar*, Sang Michael Xie*, Percy Liang
ICML Workshop on Uncertainty & Robustness in Deep Learning (UDL), 2021

Scalable deep learning to identify brick kilns and aid regulatory capacity — 2021
Jihyeon Lee*, Nina R. Brooks*, Fahim Tajwar, Marshall Burke, Stefano Ermon, David B. Lobell, Debashish Biswas, Stephen P. Luby
Proceedings of the National Academy of Sciences, Apr 2021, 118 (17)

RESEARCH EXPERIENCE

Research Intern, Stanford Artificial Intelligence Laboratory — March 2020 – June 2023

- (Prof. Chelsea Finn and Percy Liang) Relationship between distribution shifts and the layer of a neural network that should be fine-tuned (surgical fine-tuning) on the unsupervised (test-time) adaptation setting, specifically adapting earlier layers outperform adapting later/all layers for corruption datasets like CIFAR-10-C and ImageNet-C (*Under review in ICLR, 2023*)
- (Prof. Chelsea Finn) Deep reinforcement learning for irreversible environments with applications to episodic, autonomous, and continuous learning setups (*NeurIPS, 2022*)
- (Prof. Chelsea Finn) Generative model-based algorithm that produces performance boost of 1-2% when combined with other state-of-the-art methods on long-tailed versions of datasets like CIFAR, GTSRB, etc. (*ICLR, 2022*)
- (Prof. Percy Liang) Demonstration of out-of-distribution (OOD) detection problem being too broad by showing that many well-known methods don't perform consistently on a comprehensive suite of benchmark datasets (*ICML UDL Workshop, 2021*)

Computer Vision Research Intern, Stanford University — March 2019 – June 2020

- (Prof. Steve Luby and Stefano Ermon) Built a system using convolutional neural networks (CNNs), that detects environmental regulation violations in the form of brick kilns and produces their co-ordinates from satellite imagery in South Asia (*PNAS, 2021)*
- Detected nearly 10,000 brick kilns in Bangladesh which directly affect the lives of at least 1 million people using the trained CNN in *TensorFlow,* with the possibility of extending the project over to India (with 100,000 kilns) and other developing countries
- Created a classifier to distinguish between environment-friendly (Zigzag) and unfriendly (FCK) type of brick kilns

TEACHING EXPERIENCE

Teaching Assistant, Math 20 (Calculus), Stanford University — Jan 2023 – March 2023
Teaching Assistant, CS 330 (Deep Multi-Task and Meta Learning), Stanford University — Sept 2022 – Dec 2022
Academic Tutor, Athletic Academic Resource Center (AARC), Stanford University — Sept 2021 – June 2022
Academic Tutor, Stanford University Mathematical Organization (SUMO) — Sept 2019 – June 2020
Trainer, National Physics Olympiad Team, Bangladesh (BdPhO) — Feb 2017 – June 2018

INDUSTRY EXPERIENCE

Software Engineer Intern, Meta Platforms (formerly Facebook) — June 2022 – September 2022

- As part of the Ads Core ML Eng team, designed and implemented components for state-of-the-art ML recommendation systems in *Python*
- Experimented with various knowledge distillation techniques to improve performance of computationally cheaper ML networks
- Designed new modules with scalability in mind to make sure they work well with extremely large datasets and can also be trained efficiently

Software Engineering Intern, Cadence Design Systems — June 2020 – September 2020

- Using *C++,* designed efficient data storage systems for graph neural networks (GNN), which reduced memory usage by 86%
- Using *Python* (*NumPy*), designed and implemented efficient data pre-processing modules
- Designed time and memory efficient data-loader classes in *Keras* and *TensorFlow;* researched memory-time tradeoff to find the optimal design

SKILLS

Programming Languages: Python, C, C++, Java, Matlab
Frameworks: Unix, PyTorch, Caffe2, TensorFlow

TALKS & PRESENTATION

- Neural Information Processing Systems (NeurIPS) — November 2022
- International Conference on Learning Representations (ICLR) — April 2022
- ICML Workshop on Uncertainty & Robustness in Deep Learning (UDL) — July 2021
- Stanford Earth Summer Undergraduate Research (SESUR) — August 2019
- Stanford EE Research Experience for Undergraduates (REU) — August 2018

AWARDS

Top Reviewer, Conference on Neural Information Processing Systems (NeurIPS) — 2023
University Distinction, top 15% of the graduating class, Stanford University — 2022
Tau Beta Pi Engineering Honor Society — 2020
Bronze Medal, 48th International Physics Olympiad, Indonesia — 2017
Bronze Medal, 47th International Physics Olympiad, Switzerland Liechtenstein — 2016

SERVICE

- Reviewer, Conference on Neural Information Processing Systems (NeurIPS) (**Top Reviewer, 2023**) — 2023
- Reviewer, NeurIPS Workshop on Distribution Shifts (DistShift) — 2023
- Reviewer, International Conference on Learning Representations (ICLR) — 2024

SELECTED COURSEWORK

Mathematics: Real Analysis, Functional Analysis, Differential Topology, Measure Theory, Probability Theory, Graph Theory, Abstract Algebra, Linear Algebra & Matrix Theory, Statistical Inference, Numerical Computing

Computer Science: Machine Learning, Reinforcement Learning, Convex Optimization, Deep Learning for Computer Vision, Artificial Intelligence: Principles and Techniques