

Kunjal Panchal

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Skills

Programming Python [PyTorch, Flower (Federated Learning Framework), Hugging Face, PyTorch Mobile, ExecuTorch], C/C++.

Machine Learning Federated Learning, On-device Inference, Quantization, Distributed ML, Optimization, Natural Language Processing, Edge AI.

Education

University of Massachusetts Amherst

Amherst, MA

Doctor of Philosophy in Computer Science (3.7/4.0 GPA)

Sep 2021 - Expected May 2026

- Advisor: Dr. Hui Guan.
- Research Area: Personalization and Drift Adaptation in Federated Learning, Memory-Efficient LLM Finetuning, On-device Inference.
- James Kurose Scholar (scholarship given for systems in machine learning project, Spring 2022).
- Jumpstart Fellow (fellowship given to top 5 research proposals by new PhD students, Fall 2021).

University of Massachusetts Amherst

Amherst, MA

Master of Science in Computer Science Research Track (3.6/4.0 GPA)

Sep 2019 - May 2021

- Advisor: Dr. Adam O'Neill.
- Research Area: Relaxed Cryptography for Digital Signatures and Message Authentication Codes.
- **Courses:** Machine Learning, Computer Vision, Natural Language Processing, Reinforcement Learning, Robotics, Optimization in Computer Science, Advanced Algorithms, Modern Computer Architecture, Advanced Cryptography.

Work Experience

Adobe Research

San Jose, CA

Research Scientist/Engineer Intern

May 2024 - Aug 2024

- Developed an on-device (Android, Snapdragon 765G) inference pipeline for video processing and assembly using a visual-language model. Leveraged PyTorch Quantization and PyTorch Mobile to achieve approximately 3× lower peak memory consumption.
- Refactored the visual-language model to support statically-typed forward passes and data-dependent control flows, reducing inference latency by 16.67%. Additionally optimized memory consumption through operator fusion and parameter hoisting techniques.

Adobe Research

San Jose, CA

Research Scientist/Engineer Intern

May 2023 - Nov 2023

- Achieved an increase of 4.74 units for Rouge score and 3.60% for Accuracy@1 improvements for few-shot learning in Flan-T5 transformer, by expanding their capacity to be able to process more in-context example within the same context window length through sub-batching.
- Inched closer to finetuning-like performance through pure in-context learning (ICL) by 2.16 units of Rouge score and 3% for Accuracy@1 through mesa-optimization where the transformer acts like an optimizer itself during inference.
- Improved the cross-domain transfer capabilities of a transformer (Flan-T5) by 1.68 units for Rouge score and 1.3% for Accuracy@1 through incorporating both cross- and within domain question-answer samples within a limited context window length of 512 tokens.
- Evaluated and verified the effectiveness of both sub-batched ICL and mesa-optimization during inference on both Adobe and public datasets.

Research

Thinking Forward: Memory-Efficient Federated Finetuning of Language Models

Kunjal Panchal, Nisarg Parikh, Sunav Choudhary, Yuriy Brun, and Hui Guan

Published @ NeurIPS, 2024.

Flash: Concept Drift Adaptation in Federated Learning

Kunjal Panchal, Sunav Choudhary, Koyel Mukharjee, Subrata Mitra, Somdeb Sarkhel, Saayan Mitra, and Hui Guan

Published @ ICML, 2023.

Flow: Per-instance Personalized Federated Learning

Kunjal Panchal, Sunav Choudhary, Nisarg Parikh, Lijun Zhang, and Hui Guan

Published @ NeurIPS, 2023; Preliminary Presentation @ CrossFL, MLSys 2022.

CommunityBots: Creating and Evaluating A Multi-Agent Chatbot Platform for Public Input Elicitation

Zhiqiu Jiang, Mashrur Rashik, **Kunjal Panchal**, Mahmood Jasim, Ali Sarvghad, Pari Riahi, Erica DeWitt, Fey Thurber, and Narges Mahyar

Published @ ACM CSCW 2023.

Leadership / Volunteering

- 2024 - Present **Program Committee Member / Reviewer**, NeurIPS '25/'24, ICML '25, ICLR '25, AISTATS '25, AAAI '25/'24, ACM MM '25
- Oct 2024 **Poster Presenter**, UMass Amherst CS Department Undergrad Research Night
- Research Mentor for Undergraduates**, UMass Amherst CS department program to cultivate interest & understanding in research (Dec 2024, Jun 2024, Dec 2023, Jun 2023, Dec 2022)
- Applied Deep Learning Head Mentor**, Teaching applied deep learning to undergraduates at SureStart (Volunteer position) (Jun 2024, Jun 2023, Jan 2023, Jun 2022)
- Nov 2023 **Panelist and Poster Presenter**, UMass Amherst CS Department Undergrad Research Night
- Jan 2022 **Coding Gym Leader**, SureStart winter bootcamp to teach coding interview strategies
- Oct 2021 **PhD Applicant Support Program**, Mentoring prospective PhD applicants
- Mar 2021 **Machine Learning Mentor**, Virtual AI Learning Program hosted by SureStart
- Aug 2020 **Emotion AI Program Mentor**, EMPATH Program hosted by Affectiva
- Dec 2019 **Campus Leader**, Google Developer Students Club India

Achievements

- 2022 **James Kurose Scholarship**, Manning College of Info and Comp Sci, UMass Amherst
- 2021 **CICS Jumpstart Fellowship**, College of Info and Comp Sci, UMass Amherst
- 2019 **Gold Medalist**, The Maharaja Sayajirao University of Baroda, B.Engg. in Computer Science
- 2019 **Student of the Year**, The Maharaja Sayajirao University of Baroda, B.Engg. in Computer Science
- National Talent Search Examination**, Top 100 in Science and Mathematics in India
- All India Essay Writing Event**, Honorable Mention in a state-level essay competition
- Community Science Center**, Winner of Conmat Cosmopolitan Tree Garden Award at state-level

Presentations

- Career Pathways Seminar Speaker *Spring 2025*
- Delivered an introductory talk on privacy-preserving machine learning and on-device inference to second-year undergraduates, covering industry applications and open research challenges.
- Voices of Data Science Poster Presenter *Spring 2023*
- Showcased "Flash: Concept Drift Adaptation in Federated Learning" (ICML '23) in an interdisciplinary poster session hosted across computer science, engineering and social/behavioral science departments. Winner of the poster presentation competition.
- Computer Science Department Homecoming Poster Presenter *Fall 2022*
- Presented my research to the department alumni, faculty, dean, and current students, as one of the two presenters.
- Computer Science Research Night Poster Presenter *Fall 2022*
- Introduced my lab and research to undergraduate and graduate students looking to understand and participate in the ongoing research works.
- Cryptography Honors Seminar Speaker *Fall 2022*
- Discussed federated learning, differential privacy, applications, and why confidentiality of data is important in the world which is shifting towards data-rich artificial intelligence.
- AI4ALL Summer Program Speaker *Summer 2021*
- Presented detailed pointers on how to read, understand, write research papers in AI and ML.
 - Explained how to figure out unsolved yet solve-able problems, conduct research through creative solutions, evaluate results derived of the proposed approach, and discussed ethics and biases in AI.
 - Encouraged 20+ undergraduate students from Boston University, Columbia University, and University of California Berkeley to pursue artificial intelligence research.