

Kunjai Panchal

📞 (413) 210 9198 | ✉ kpanchal@umass.edu | 🏠 astuary.github.io/Kunjai/ | 📄 github.com/astuary | 🌐 linkedin.com/in/kunjai-panchal

Skills

Programming Python [PyTorch, Tensorflow, 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 3x 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

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

Published @ NeurIPS, 2024.

Flash: Concept Drift Adaptation in Federated Learning

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

Published @ ICML, 2023.

Flow: Per-instance Personalized Federated Learning

Kunjai 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, **Kunjai Panchal**, Mahmood Jasim, Ali Sarvghad, Pari Riahi, Erica DeWitt, Fey Thurber, and Narges Mahyar

Published @ ACM CSCW 2023.

Leadership / Volunteering

Program Committee Member / Reviewer, ICLR '25, AAAI '25, AAAI '24, NeurIPS '24

Nov 2023 **Panelist and Poster Presenter**, UMass Amherst CS Department Undergrad Research Night

Jun 2023 **Research Mentor for Undergraduates**, UMass Amherst CS department program to cultivate interest & understanding in research

Jan 2023 **Applied Deep Learning Head Mentor**, Teaching applied deep learning to undergraduates at SureStart

Dec 2022 **Research Mentor for Undergraduates**, UMass Amherst CS department program to cultivate interest & understanding in research

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

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.