KUNJAL PANCHAL

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SKILLS

Programming Python (PyTorch, Tensorflow, Tensorflow Federated, scikit-learn, Numpy, Pandas, matplotlib), Matlab, C/C++, LaTex, Git, ReactJS
Machine Learning Statistics, Computer Vision, Natural Language Processing, Distributed Machine Learning, Hypothesis Testing, Data Analysis, Data Visualization

EDUCATION

University of Massachusetts Amherst Sep 2021 – Expected May 2026
Doctor of Philosophy in Computer Science, 3.63 / 4.00 GPA
- Advised by Dr. Hui Guan and Dr. Adam O'Neill
- Research in Federated Learning, Personalization, Privacy-preserving Machine Learning
- Jumpstart Fellow (fellowship given to top 5 research proposals by new PhD students, Fall 2021)
- James Kurose Scholar (scholarship given for systems in machine learning project, Spring 2022)
- Adobe Fellow (fellowship given by Adobe to fund federated learning research, Fall 2022)

University of Massachusetts Amherst Sep 2019 – May 2021
Master of Science in Computer Science Research Track, 3.63 / 4.00 GPA
- Advised by Dr. Adam O'Neill
- Research in Relaxed Cryptography
- Relevant Coursework – Machine Learning, Computer Vision, Natural Language Processing, Reinforcement Learning, Robotics, Optimization in Computer Science, Advanced Algorithms, Modern Computer Architecture, Advanced Cryptography

The Maharaja Sayajirao University of Baroda, India Aug 2015 – Apr 2019
Bachelor's in Engineering in Computer Science and Engineering, 4.00 / 4.00 GPA
- Gold medalist in Computer Science and Engineering (2019)
- Student of the Year (class of 2019)

RESEARCH PROJECTS

[1] Flash: Federated Personalization with Drift Adaptation Current
Kunjal Panchal, Sunav Choudhary, Koyel Mukharjee, Subrata Mitra, and Hui Guan
To be submitted @ ICML, 2023

[2] Robust Indistinguishability Current
Monica Moniot, **Kunjal Panchal**, Amir Houmansadr, and Adam O'Neill

[3] Flow: Fine-grained Personalized Federated Learning through Dynamic Routing Oct 2022
Kunjal Panchal, Sunav Choudhary, and Hui Guan
In submission @ AAAI, 2023

WORK EXPERIENCE

Research PhD Intern May 2022 - Aug 2022

Adobe Research, Bangalore, India

- Built a federated solution of personalized recommender systems for real-time learning
- Designed a client-side optimization strategy for personalized federated learning in concept drift settings specific to a data streaming environment
- Evaluated the proposed algorithm on benchmark computer vision and natural language processing tasks, achieving state-of-the-art personalized and generalized performance

Research Assistant Sep 2021 - Current

Manning College of Information and Computer Sciences, UMass Amherst

- Working on solving open issues of personalization and privacy in federated learning
- Researching relation between individual client heterogeneity and global distribution changes
- Formulated a per-instance and per-client personalization strategy in federated learning, increasing the personalized performance of the participating clients in the distributed training
- Explored a more robust notion of differential privacy based on conditional statistical distance

AI and Machine Learning Head Mentor of MIT FutureMakers 2022 July 2022 - Aug 2022
AI and Machine Learning Head Mentor of MIT FutureMakers 2021 Jun 2021 - Aug 2021
Machine Learning Mentor - Virtual AI Learning Program Feb 2021 - Mar 2021

SureStart, New York City, NY (Remote)

- Led a 6 weeks workshop program on applied deep learning as a head mentor
- Conducted daily sessions where I discussed the nuances of applied deep learning concepts like optimization, generative networks, algorithmic biases, regularization
- Managed a team of 5 and guided the team to build a deep learning based capstone project addressing real-world challenges like marine pollution, automotive safety, and climate change

Teaching Assistant and Grader Sep 2020 – May 2021

College of Information and Computer Sciences, UMass Amherst

- Held office hours, resolved student queries, walked through homework problems for the classes CS 690C Foundations of Applied Cryptography and CS 466 Applied Cryptography
- Graded homeworks, quizzes, assignments, exams for CS 690C, and CS 466

Emotion AI Program Mentor Jul 2020 – Aug 2020

Affectiva, Boston, MA (Remote)

- Mentored 3 undergraduate students in the fields of Machine Learning and Affective Computing
- Trained the VGG-16 food classifier on Freiburg Grocery dataset with the accuracy of 76.16% to build a food inventory management system
- Learned market analysis, idea pitching, patent creation and the technical aspects of data acquisition, data synthesis, and affect analysis

SERVICE & LEADERSHIP

Coding Gym Leader SureStart winter bootcamp to teach coding interview strategies Jan 2022

PhD Applicant Support Program Mentoring prospective PhD applicants Oct 2021

Campus Leader Google Developer Students Club India Dec 2018 – Dec 2019

PROJECTS

SoundCluch – *https://github.com/Astuary/BoseSoundTouchAPI* Feb 2020

- Winner of "Best use of Bose SoundTouch API" and "Best Hack for Home Accessibility sponsored by Wayfair" at Hack(h)er413 2020 at UMass Amherst
- Enhanced Bose SoundTouch API in Python to get the motion sensor inputs within 150 cm with a Raspberry Pi, to sound off a custom audio notification through the Bose speakers

LSTM Variants for Time-Series Data Prediction Dec 2019

- Utilized the human activity recognition ExtraSensory dataset, containing data from 60 individuals, for the task of probabilistic activity forecasting
- Experimented efficacies of models like GRUs, LSTMs, CNN LSTMs, Separable CNN LSTMs

ACHIEVEMENTS

James Kurose Scholarship Manning College of Info and Comp Sci, UMass Amherst 2022

CICS Jumpstart Fellowship College of Info and Comp Sci, UMass Amherst 2021

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 CS 2019

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

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 problems, conduct research through unique 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