Parikshit Bansal

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Education

The University of Texas at Austin Ph.D. in Computer Science Advisor: Prof. Sujay Sanghavi	Austin, Texas 2023 - Current
Indian Institute of Technology, Bombay B.Tech. (Hons.) in Computer Science and Engineering B.Tech. Project: Deep Learning Methods for Missing Value Imputation in Time Series Advisor: Prof. Sunita Sarawagi CPI : 9.4/10.0	Mumbai, India 2017 - 2021
Publications And Pre-Prints	
Large Language Models as Annotators: Enhancing Generalization of NLP Models at Minimal Cost ♂ Parikshit Bansal, Amit Sharma Under Review	
Controlling Learned Effects to Reduce Spurious Correlations in Text Classifiers	[ACL 2023]
Improving Out-of-Distribution Generalization of Text-Matching Recommendation Systems ☐ Parikshit Bansal, Yashoteja Prabhu, Emre Kiciman, Amit Sharma NeurIPS 2022 Workshop on Causality for Real-world Impact	[NeurIPS 2022]
Missing Value Imputation on Multidimensional Time Series ば <u>Parikshit Bansal</u> , Prathamesh Deshpande, Sunita Sarawagi Proceedings of the VLDB Endowment, Volume 14, 2020-2021	[VLDB 2021]
Work Experience	
Microsoft Research Research Fellow Advisor : Dr. Amit Sharma Worked on problems around OOD generalisation of NLP systems with application in recommendation systems. Also explored challenges in using Large Language Models as annotators for unlabeled data.	Bangalore, India 2021 - 2023
Agent Machine Learning Lab, Rutgers Univ Research Intern Advisor : Prof. Sungjin Ahn Worked on various problems around self-supervised representations, object centric, and model-based reinforcement lear	Remote Internship Summer 2021 ning.
D.E. Shaw & Co. Data Science Intern Programmed Auto-Cohort Recommender for bining defaulted loan based on optimal clustering on attributes	Hyderabad, India Summer 2020
Machine Learning and Genomics Lab, UCLA Visiting Researcher Advisor : Prof. Sriram Sankararaman Explored Sketching algorithms for scaling complex trait genetics algorithms to large scale genetic datasets	Los Angeles, USA Summer 2019
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Selected Research Projects

Large Language Models as Data Annotators

Dr. Amit Sharma

- Tackled the problem of annotating unlabeled data by leveraging Large Language Models (LLMs) as annotators. This LLM annotated data is augmented with the original ground truth labeled data to train a downstream task specific model.
- Showed that naively (uniform sampling/uncertainty sampling) selecting unlabeled inputs for annotation with LLMs is harmful to accuracy
- Constructed a heuristic measure to instead sample the most informative data samples for downstream task specific classifier.
- Led to improvements in both natural language and recommendation systems benchmarks.

Microsoft Research India

Dec 2022 - Aug 2023

Out-of-distribution Generalization for Text-Matching Recommender Systems

Dr. Amit Sharma, Dr. Emre Kiciman, Dr. Yashoteja Prabhu

- Showed that finetuned text-matching recommenders are worse than pretrained model they are finetuned on for out-of-distribution data
- Attributed the drop in out-of-distribution performance to model weighing certain spurious tokens disproportionately
- Modeled a causal graph and formed a mathematical framework to justify the observations
- Proposed a novel regularisation technique leveraging the base model for constructing augmented samples to regularise weighing of tokens

Missing Value Imputation on Multidimensional Time Series

Prof. Sunita Sarawagi

- Introduced novel convolution based transformer model for capturing long range patterns yielding a speedup of 10x
- Worked on efficient batching for samples for shared forward pass for multiple samples in a batch
- Formulated kernel regression module for aggregating signals from correlated time series.
- Got upto 60% reduction in MAE error with similar running time to Matrix completion technique s(e.g. SVD). Published in VLDB, 2021

Robust Automatic Speech Recognition (ASR) Systems

Prof. Preethi Jyothi

- Leveraged generative speech models to construct *imperceptible* and *robust* adversarial speech samples
- Experimented with attribution based masking techniques as an extension of targeted and efficient augmentations
- Developed an augmentation technique for ASR systems, based on randomly drops time frames. Got minor improvements in SOTA numbers

Other Projects

Self-Supervised Representation Learning for Dynamic Environments

Prof. Sungjin Ahn

- Implemented various self-supervised learning (SSL) algorithms image representation learning methods like BYOL and SwAV.
- Experimented with SSL algorithms for capturing structured information about environment dynamics in partially observed settings
- Extended them with object-centric module for disentangling object representations in dynamic environment (worked in bouncing balls)
- Leveraged SSL methods to extend model-based reinforcement learning methods. Achieved similar performance with lower memory footprint.

Sketching Matrices for Randomised HE Regression

Prof. Sriram Sankaraman

- Implemented algorithms to model genetic data as multi-component Linear Mixed Model, and compute the variance of various random effects
- Achieved sub-linear (in # of individuals) time complexity of the method by replacing MLE with MoM, using Hutchinson's trick
- Experimented with various sketching algorithms to approximate genotype matrix $(n \times m)$ by a smaller matrix $(n \times d)$
- Got a reduction the running time by factor of $(m/d)^3$, but with introduction of significant bias in estimator

Readmission Risk Modeling

Dr. Rajat Garg

- Surveyed relevant medical literature & modeled 30 day readmission risk for patients undergone mitraclip procedure using logisitic regression
- Formulated a linear score calculator to be used in clinical practice. Accepted in Current Problems in Cardiology. Publication can be found here

3D Face Reconstruction from 2D in-the-wild Images

ActionFace

- Implemented and trained a 3D morphable face model. Built an End-2-End pipeline for getting 3D face mesh from 2D images on top of it
- · Restricted training samples with pitch and yaw ranges to get better performance for profile images. Benchmarked our results

Achievements

2021	Undergraduate Research Award (URA02) , as recognition of truly exceptional work done in B.Tech. Project
2020	Undergraduate Research Award (URA01), as recognition of research/ developmental effort
2020	Institute Academic Prize, for academic excellence (top 3 students) during the term of 2019-20
2017	All India Rank 62, JEE Advanced, (among 1.5 million candidates in India)
2016	NSEP,NSEC, Ranked among top 1% nationwide in Physics and Chemistry Olympiads resp.
2015	KVPY Fellowship, Shortlisted for the fellowship, conducted by the Govt. of India for two consecutive years

Skills

Languages	Python, C++, C, Haskell, Prolog, Bash, MATLAB
Libraries & Frameworks	Pytorch, Tensorflow, Huggingface, Pandas
Tools	Git, Emacs, ੴ _E X, TikZ

Microsoft Research India Aug 2021 - Dec 2022

IIT Bombay Dec 2019 - Dec 2020

IIT Bombav

Aug 2020 - July 2021

UCLA

May 2019 - July 2019

Cleveland Clinic Feb 2020 - Jul 2020

May 2021 - Jul 2021

Rutgers University

Apr 2021 - Aug 2021