

# 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

### Context-Free Synthetic Data Mitigates Forgetting [↗](#)

[Parikshit Bansal](#), Sujay Sanghavi

Preprint

### Understanding Self-Supervised Learning via Gaussian Mixture Models [↗](#)

[Parikshit Bansal](#), Ali Kavis, Sujay Sanghavi

Preprint

### Understanding the Training Speedup from Sampling with Approximate Losses [↗](#)

Rudrajit Das, Xi Chen, Bertram Ieong, [Parikshit Bansal](#), Sujay Sanghavi

Proceedings of the 41st International Conference on Machine Learning, PMLR 235:10127-10147, 2024

ICML 2024

### Large Language Models as Annotators: Enhancing Generalization of NLP Models at Minimal Cost [↗](#)

[Parikshit Bansal](#), Amit Sharma

Preprint

### Controlling Learned Effects to Reduce Spurious Correlations in Text Classifiers [↗](#)

[Parikshit Bansal](#), Amit Sharma

Proceedings of the 61st Annual Meeting of the Association for Computational Linguistics (Volume 1: Long Papers)

[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 [↗](#)

[Parikshit Bansal](#), Prathamesh Deshpande, Sunita Sarawagi

Proceedings of the VLDB Endowment, Volume 14, 2020-2021

[VLDB 2021]

## Work Experience

### Amazon Web Services

Applied Scientist Intern | Manager : Ashish Khetan

Worked on reducing the inference latency of Large Language Models, specifically via Speculative Decoding.

Designed alternate loss functions and tested different architectural changes for developing an accurate and efficient "speculator".

Santa Clara

Summer 2024

### 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 learning.

Remote Internship

Summer 2021

**D.E. Shaw & Co.**

Data Science Intern

Programmed Auto-Cohort Recommender for binning 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

## Selected Research Projects

**Large Language Models as Data Annotators**

Microsoft Research India

Dr. Amit Sharma

Dec 2022 - Aug 2023

- 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.

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

Microsoft Research India

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

Aug 2021 - Dec 2022

- 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**

IIT Bombay

Prof. Sunita Sarawagi

Aug 2020 - July 2021

- 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 techniques (e.g. SVD). Published in VLDB, 2021

## Achievements

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

## Skills

<b>Languages</b>	Python, C++, C, Haskell, Prolog, Bash, MATLAB
<b>Libraries &amp; Frameworks</b>	Pytorch, Tensorflow, Huggingface, Pandas
<b>Tools</b>	Git, Emacs, $\text{\LaTeX}$ , TikZ

## Courses

<b>Probability</b>	Stochastic Processes, Online Learning, Advanced Probability
<b>Optimization/Linear Algebra</b>	Convex Optimization, Large Scale Optimization, Continuous Algorithms, Numerical Linear Algebra
<b>Computer Science</b>	Generative Models, Grad. Algorithms

## Reviewer Services

<b>Natural Language Processing</b>	EMNLP 2023
<b>Machine Learning</b>	NeurIPS 2024, ICLR 2025, AISTATS 2025

## Talks

<b>UT Austin, 2023</b>	Parameter-Efficient Fine-Tuning of Large Language Models
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