

Vansh Bansal

DOCTORAL STUDENT · STATISTICS AND DATA SCIENCES

The University of Texas at Austin

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EDUCATIONAL QUALIFICATIONS

The University of Texas at Austin

PH. D. IN STATISTICS AND DATA SCIENCES

4.0/4

Aug 2023 - present

Relevant Coursework: Convex Optimization, Theoretical Statistics, Learning Theory, Probability Theory, Advanced Probability, Monte Carlo Methods, Mathematical Statistics, Statistical Modelling I and II, Linear Models

Indian Institute of Technology Kanpur

B. TECH IN COMPUTER SCIENCE AND ENGINEERING

9.0/10

Jul 2019 - Dec 2022

Relevant Coursework: Introduction to Machine Learning, Probabilistic Machine Learning, Time Series Analysis, Statistical Simulation and Data Analysis, Stochastic Processes, Econometrics, Probability Theory, Discrete Mathematics, Data Structures and Algorithms, Advanced Algorithms

PUBLICATIONS

Straightness of Rectified Flow: A theoretical insight into Wasserstein convergence

Submitted to ICLR 2025

BANSAL V., ROY S., SARKAR P., RINALDO A.

Conditional diffusions for neural posterior estimation

Submitted to AISTATS 2025

CHEN T., BANSAL V., SCOTT J.G.

Parturition Hindi Speech Dataset for Automatic Speech Recognition

NCC 2023

BANSAL V., RAJ T., RAVI N., KORDE S., KALRA J., MURUGESAN S., B R., GORE A., ARORA V.

RESEARCH EXPERIENCES

NimbleEdge

ML RESEARCH CONSULTANT

Bangalore, India

Jan 2023 - Jun 2023

- Researched reward-based client-sampling strategies and algorithms for training multi-agent stochastic contextual bandits in federated learning
- Created a simulator (based on the Flower framework) to benchmark client-sampling strategies under distribution shift and quantity skew
- Implemented various SyncFL and AsyncFL strategies in the simulator, actively influencing the company's product direction in federated learning

Causally Regularized Probabilistic Models

IIT Hyderabad, India

RESEARCH ASSOCIATE (FUNDED BY FUJITSU AI), PROF. J. SAKETHA NATH

Dec 2022 - Aug 2023

- Developed a regularization technique to assess conditional independence among random variables using joint samples exclusively
- Proposed a novel approach to estimate conditional expectations (using kernel methods) without explicitly estimating conditional densities
- Demonstrated the versatility of this technique in robust learning, self-supervised learning, and the enhancement of implicit generative models

Google AI for Social Good

IIT Kanpur, Google Research India

SR. RESEARCH ASSOCIATE, PROF. VIPUL ARORA

Jun 2021 - Nov 2022

Bagged **total funding of \$30,000** from Google AI to work with CARE India (NGO) for Digitizing and AI-fying Maternity Care in Rural India

- Prepared a voice-assisted AI system to fill up medical record sheets to help identify anomalies in the delivery process and send alerts
- Successfully deployed the pilot version at 4 district-level hospital facilities in Rural Bihar by visiting them
- Led the project team of 7 members and presented the impact generated by our project at the program workshop organised by Google AI

Graph Attention-based Categorization of Wikipedia Articles

IIT Kanpur, India

MENTORS: PROF. ASHUTOSH MODI, PROF. PIYUSH RAI

May 2022 - Dec 2022

Categorization is currently entirely manual, leading to issues like creating similar categories and wrong/incomplete categorization.

- Built extreme multi-label classification models that leverage the available taxonomy of categories for prediction
- Used GNNs with attention mechanisms for category prediction with 2.1M+ labels for 56M+ documents, improving the SOTA accuracy by $\sim 3\%$

Bernoulli Factories in MCMC

IIT Kanpur, India

MENTOR: PROF. DOOTIKA VATS

Dec 2021 - Aug 2022

- Worked on researching multiple-proposal Bernoulli Factory MCMC algorithms to sample when even the form of likelihood is unknown
- Utilized ABC-based (Approximate Bayesian Computation) techniques to propose a multiple-proposal Bernoulli Factory MCMC algorithm

SKILLS

C/C++, Python, R, PyTorch, TensorFlow, Jax, Docker, MySQL, Kaldi

SCHOLASTIC ACHIEVEMENTS

- Received the **Academic Excellence Award** for exceptional academic performance at IIT Kanpur
- Awarded the prestigious Batch of 1965 scholarship at IIT Kanpur
- All India Rank **2***, JEE Main, 2019 (amongst 935,000 candidates)
- All India Rank **4***, JEE Advanced, 2019 (amongst 160,000 candidates)
- All India Rank **4***, KVPY SX Scholar, 2019

*: PwD category

MENTORSHIP AND TALKS

StatML @ UT

ORGANIZED BY ALESSANDRO RINALDO, PURNA SARKAR, NHAT HO

SDS, UT Austin

Oct 2023 - present

Led two discussions on theoretical derivations of diffusion models and rectified flow models

Research Week with Google 2023

Google Research India

ML FOUNDATIONS TRACK

Jan 2023

Attended a series of lectures and research discussion sessions led by research leaders in the area of ML foundations

Conformal Prediction Reading Group

SDS, UT Austin

ORGANIZED BY PROF. ALESSANDRO RINALDO

Sep 2023 - Dec 2023

Participated in various discussions on the conformal prediction literature and led two discussions on Bayesian methods for conformal prediction

Markov Chain Monte Carlo Methods in Julia



PROJECT MENTOR, STAMATICS, 2022

March 2022-June 2022

- Mentored 65+ students and taught Monte Carlo simulation and sampling techniques like Accept-Reject and Importance Sampling
- Students also implemented various MCMC algorithms in Julia for Bayesian Linear Regression and sampling from intractable posteriors

SOCIAL WORK

IIT Kanpur Consulting Group

IIT Kanpur

LEADER

Aug 2021 - June 2022

- Managed a team of 25 secretaries and organised talks on Introduction to Data Science and Introduction to Consulting
- Responsible for managing several projects which help the **non-profit organisations** like **Navjyoti**, **CRY**, **Atma Consulting**, etc. and startups like **Zivov** (user base of more than **25,000** people), **RTIwala** (inducted by **Stanford Seed Spark Program**), etc., leverage insights from their data and bringing significant growth in their respective domains
 - **Zivov**: Used various data augmentation techniques to improve the quality of dataset and Experimented with various models for multi-label classification of food images, to capture food items and estimate their volume
 - **RTIwala**: Wire-framed and analysed the potential user industries of their product "RTI-bot" which makes the process of filing RTI smooth
 - **Navjyoti**: Impacted 27000+ pupils through LMS selection & integration for **Dr Kiran Bedi** founded organization

Prayas, Community Welfare Cell

IIT Kanpur

VOLUNTEER

Aug 2019 - Dec 2022

- an endeavour of IIT Kanpur students, mainly focused on providing education to the marginalized kids in and around the college campus
- Helped children of Class 11 and 12 by teaching them Mathematics and motivating them through frequent counselling sessions