



Manan Sharma
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EDUCATION

Bachelor of Technology | IIT Bombay

GPA: 9.24 (major) | 9.80 (minor)

2017 - 2021
Mumbai, India

- **Ranked 4th** in outgoing department.
- Major in Civil Engineering; Dual Minors in Computer Science & Artificial Intelligence

INDUSTRY EXPERIENCE

Data & Applied Scientist 2 | Microsoft R&D India

Bing Ads Organization

December 2023 - Present
Bangalore, India

- Working on solving problems related to ad creation, matching, filtration and ranking.

Senior Manager - AI & Cross Sell | Piramal Finance India

Business Intelligence Unit

August - December 2023
Bangalore, India

- Initiated & spearheaded AI micro-services and products' development across variety of use-cases in financial workflows.
- Built infrastructure to support large-scale data processing and massively parallelized model training.

Pre-doctoral Researcher | Google Research India

Earth Observation Sciences Group

August 2022 - May 2023
Bangalore, India

- Worked on multi-modal models, for soil-moisture estimation on multi-spectral imagery & time-series modalities.
- Built Earth Engine pipelines for large-scale time-series and satellite imagery extraction for spatiotemporal modelling.

Pre-doctoral Research Fellow | Microsoft Research India

Machine Learning and Applied Sciences Group

July 2021 - July 2022
Bangalore, India

- Proposed a novel piecewise-polynomial filtering algorithm for node classification over graphs and provided rigorous theoretical analysis. Gains of 12% absolute over SoTA. Work accepted at **ECML'22** and **ICLR-GTRL'22**.
- Worked on recommendation algorithms, Bayesian methods for uncertainty quantification for heterogeneous graphs.

Research SWE Intern | Amazon India

Automated Advertising Team

April - June 2020
Bangalore, India

- Built anomaly detection system, for email recommendation engine to improve reliability of pricing algorithms.
- Created a custom ARIMA, Gaussian Processes, DeepAR ensemble; reported 82% improvement on reliability metrics.

PUBLICATIONS

V. Lingam*, C. Ekbote*, M. Sharma*, R. Ragesh, A. Iyer, S. Sellamanickam; **A Piece-wise Polynomial Filtering Approach for Graph Neural Networks** (* denotes equal contribution)

- *Proceedings of ECML-PKDD '22; Geometrical & Topological Representation Learning Workshop (spotlight), ICLR'22.*

RESEARCH EXPERIENCE

Cross-lingual Zero-shot Task Transfer in MLLMs

Prof. Preethi Jyothi, CSE

Ongoing
IIT Bombay

- Proposed sparse-subnetwork extraction approach for task transfer across languages in multilingual-LLMs.
- Experimenting on de-biasing models via self-supervised contrastive task disentanglement.

Zero-shot Cross-task Domain Adaptation with Instructions

Prof. Nanyun Peng, CSE | Research Intern

May 2021 - March 2022
University of California LA

- Improved cross-task adaptation on unseen tasks of large language models by instance filtering to improve predictions
- Strengthened BART based models, filtering using RoBERTa classifiers.
- Working on a novel GAN-based data augmentation technique to enhance few-shot QA performance.

Deep Sequential Models and Sensitivity Analysis in Hydrological Modelling

Prof. Riddhi Singh, Civil Engineering Dept | **Bachelors' Thesis**

August 2020 - July 2021
IIT Bombay

- Designed **LSTM** based Bayesian sequential models for rainfall-runoff prediction in ungauged basins, across the USA.
- Implemented **Bayesian Neural Network**, evaluated model sensitivity via **variational inference** over parameters

Deep Bayesian Active Learning on Graph Data

Prof. Abir De, CSE Dept | R&D Project

Autumn 2020

IIT Bombay

- Worked on active learning on graph data, obtaining mutual information among **Bayesian Graph Convolution Network's** parameters & label as acquisition function
- Used **MMSBM** for parametric random graph generation and ran **MCMC inference** for approximating the posterior

Multi-label Image Classification using Graph Neural & Attention Networks

Prof. Biplab Banerjee, CSRE Dept | Research Project

Summer 2019

IIT Bombay

- Trained multi-layered **graph convolution network**, by formulating convolution, pooling and attention operations as aggregating feature information spatially; achieving a SoTA accuracy of **64%**.

Data Engineering Intern | Praktice AI

December 2018

- Built **near-real-time web-analytics platform**, to analyse user engagement via capturing raw events
- Structured scalable, efficient **NoSQL** format & improvised queries to analyse effectiveness and performance of product

SELECTED PROJECTS

Shortest Path in a maze via a Markov Decision Processes

Prof. Shivaram Kalyankrishnan, CSE Dept | Course Project

Autumn 2020

IIT Bombay

- Modelled 2D maze as MDP using **Howard's Policy Iteration & Linear Programming**

Blind Super-Resolution Kernel Estimation using Internal-GAN

Prof. Suyash Awate, CSE Dept | Course Project

Spring 2020

IIT Bombay

- Implemented a **GAN** variant that predicts the blurring **kernel** of a low-resolution image in a single-shot setting.
- Formulated custom L1 loss & designed **patch regularizer** to efficiently learn implicit kernels.

A Generative Adversarial Approach for Zero-shot Learning for Noisy Texts

Prof. Biplab Banerjee, CSRE Dept | Course Project

Autumn 2019

IIT Bombay

- Leveraged GAN generator to additionally generate visual hallucinations from text descriptions.
- Added **visual pivot regularization** for preserving inter-class discrimination, improving accuracy by 6.5% relative.

SCHOLASTIC ACHIEVEMENTS

- Ranked **4th** in the department, in the batch of 102 students [2021]
- Obtained SPI of **perfect 10** in 6th semester; ≥ 9.8 SPI in three semesters.
- Among top **99.7 percentile** in JEE-Mains 2017 and top **98.9 percentile** in JEE-Advanced 2017 [2017]
- Qualified aptitude test for Kishore Vaigyanik Protsahan Yojana (**KVPY**) scholarship [2015]
- Achieved National Rank **75** in National Level Science Talent Search Examination (NSTSE) in 2016 [2016]

TEACHING AND MENTORING EXPERIENCES

Teaching Assistantships

Autumn 2018 - Summer 2021

- MA108, Differential Equations, Spring 2021 & 2019
- MA106, Linear Algebra, Spring 2021
- MA111, Multidimensional Vector Calculus, Autumn 2020
- CS101, Computer Programming and Utilization, Autumn & Summer 2019
- BB101, Physical Biology and Biomedical Engineering, Autumn 2018

Mentor | Summer of Science

Summer 2020

- Mentored 3 students on their transition to DSA and Machine Learning.

TECHNICAL SKILLS

Programming

C/C++, Python, R, Julia, SQL, HTML, XML, CSS

Software/Frameworks

MATLAB, OpenCV, Tensorflow, Keras, Pytorch, L^AT_EX, Git, AWS, OpenGL

KEY COURSES UNDERTAKEN

Machine Learning

Automatic Speech Recognition, Optimization in Machine Learning, Introduction to Stochastic Control, Foundations of Intelligent & Learning Agents, Theoretical Machine Learning, Advanced Machine Learning (Probabilistic Graphical Models), Machine Learning for Remote Sensing 1 & 2, Medical Image Computing, Reinforcement Learning (edX), Deep Learning Specialization (Coursera)

Computer Science

Data Structures & Algorithms, Computer Networks, Operating Systems, Design & Analysis of Algorithms, Cryptography and Number theory, Computer and Network Security

Maths & Statistics

Calculus, Linear Algebra, Differential Equations (ODE; Partial), Probability and Statistics

Note: Unless stated, all the above courses mentioned were done as coursework requirements in IIT Bombay

EXTRACURRICULAR

- Trained in level-2 **carnatic Violin** (South Indian classical).
- Tutored high-school math to under-privileged children around the IIT area in Powai under Abhyasika.
- Served as a coordinator in **Techfest** and **E-Cell**, helping in planning,organizing and conducting of the events [2018]
- Trained in **Abacus** and **Mental arithmetic** for 3 continuous years by UCMAS.