Pranav Jangir

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Education

NYU Courant Institute of Mathematical Sciences

*Masters in Computer Science with GPA - **3.94/4*** *August 2022 – Present*

- Key Courses: Deep Learning, Algorithmic Game Theory, Programming Languages, Operating Systems, Honors Analysis of Algorithms

Indian Institute of Technology, Guwahati

*Bachelor of Technology in Mathematics and Computing with GPA - **9.12/10*** *July 2016 – July 2020*

- Key Courses: Discrete Mathematics, Modern Algebra, Data Structures and Algorithms, Game Theory, Optimization, Theory of Computation, Matrix Computations, Advanced Probability & Random Processes, OS, Networks, Databases, Computer Architecture

Industry Experience

Google - Ads Quality **August 2020 – March 2022**

Software Engineer

- Worked on improving ads quality and coverage for low resource languages like Hindi and Polish that had significantly high query traffic but low ads coverage. Collaborated with Google research team to develop an efficient translation quality scorer, resulting in improved translation assessment and evaluation capabilities. Project Impact: +$300 Million per year in revenue
- Implemented translated signals into the ads serving flow, leveraging modified ads retrieval and scoring models to filter irrelevant ads in the translated space. Wrote efficient **multi-threaded C++** code to ensure latency increase below 0.3 ms.

Tower Research Capital - Post Trade Division **May 2019 – July 2019**

Software Engineer Intern

- Developed a semi-automated Machine Learning pipeline for extracting tabular data out of PDF/text files.
- Utilized Self-organizing maps to cluster similar looking pdf lines. The clusters help in visualizing and quickly soft labelling the data for training model. Used XGBoost to attain precision and recall of 88% and 96% respectively.

Research Experience and Publications

Fast Filter Subset Scan for Anomalous Pattern Detection **March 2023 – Present**

Prof. Daniel Neill, Associate Professor, Computer Science, Machine Learning for good lab *NYU Courant*

- Designing new methods for fast and scalable detection of anomalous patterns in massive, multivariate datasets.
- Focusing on real-world application domains where one must detect complex, subtle, and probabilistic patterns that are difficult to spot with existing techniques, such as an emerging disease outbreak or a pattern of smuggling activity. [GitHub]

Algorithmic Game Theory **Jan 2023 – Present**

Prof. Richard Cole, Professor, Computer Science *NYU Courant*

- Designing Learning-Augmented mechanisms to solve problems with applications in recommender systems.
- Researching auction mechanisms to design efficient and fair mechanisms for allocating goods or services among self-interested agents.

Secure Machine Learning and Data Analysis **December 2021 – August 2022**

Dr. Arpita Patra, Associate Professor, Department of CSA *Indian Institute of Science*

- Designed an algorithm that solves Private Heavy Hitters problem and beats the current state of the art Poplar in running time by 10x. Poster Titled "Vogue: Faster Computation of Private Heavy Hitters" accepted at ACM CCS'22 [Paper] [GitHub]
- Implemented State of the art multiplication triples verification using Distributed Zero Knowledge proofs, privacy-preserving Tensor operations and activation functions in **C++**. All implementations leverage **SIMD** operations to enhance performance. [GitHub]

Selected Projects

Future video frames prediction | *Deep Learning* | GitHub | Presentation **Spring 2023**

- Developed a video prediction model using semi-supervised learning techniques and decision trees-based heuristics that predicts the segmentation mask of next 11 frames of a video given the first 11 frames.
- Achieved a 44% Jaccard similarity, improving over the 23% similarity score obtained by using a non fine tuned video predictor model.

Verkle Trees benchmarking | *Cryptocurrencies and Decentralized ledgers* | GitHub | Report **Fall 2022**

- Implemented Verkle, Patricia-Merkle, and Binary-Merkle in **C++**. Compared the proof sizes, proof generation time, and proof verification time for varying key sizes for all the three trees.
- Compared two vector commitment schemes KZG and IPA in our Verkle Trees across different widths.

Real time Bus Routing Algorithm | *Inter IIT Tech Meet 2019* | GitHub **Oct. 2019 – Dec. 2019**

- Developed a heuristic algorithm for the NP-Hard School Bus Routing Problem (SBRP) in dynamic edge weight graphs
- Implemented metaheuristic Tabu search algorithm along with genetic algorithm to ensure that the solution converges quickly.

PintOS | *Operating Systems Lab, IIT Guwahati* **Sep. 2018 – Nov. 2018**

- Implemented a multi-level feedback queue scheduler, system calls for user programs and virtual memory management module for an instructional operating system framework - PintOS

Achievements and Leadership

Google: Awarded 2 spot bonuses & 3 peer bonuses for leading the project and helping engineers onboard. Consistently rated "Strongly Exceeds Expectations" in performance reviews

ACM ICPC 2022: Team ranked 25thth in Greater New York Region, Team name : NYU-Oorike

Topcoder / Codeforces: Div.1 in Topcoder and Codeforces with ELO rating of 1624 (yellow) and 2023 resp.

Google Kick Start: Ranked 36th globally in Google Kick Start Round F 2019 and 58th globally in round G 2019