Viraj Agrawal

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Education

Indian Institute of Technology Delhi 2020 – 2024

- B.Tech. in Mechanical Engineering
- Minor in Computer Science

Preprints

- **Simple Linear Corrections for Compression in Late Interaction**
  Mihir Agarwal, Sabyasachi Basu, **Viraj Agrawal**
  arXiv:2610.14196, October 2026
- **Retrieval Needs Multivectors: An Exponential Separation**
  Mihir Agarwal, **Viraj Agrawal**, Sabyasachi Basu, Ankit Garg, Kirankumar Shiragur
  arXiv:2608.21494, August 2026

Research Experience

Research Fellow, Microsoft Research India – Bengaluru, India August 2025 – Present

- With Kirankumar Shiragur: proved approximation guarantees for adaptive beam search on α-reachable graphs; the analysis led to a learned beam-width predictor that cuts query latency at equal recall (under review).
- With Kirankumar Shiragur and Ankit Garg: built a family of retrieval tasks where ranking the relevant documents above the irrelevant ones requires exponentially large single-vector embeddings, while polynomial-size multi-vector embeddings suffice, and turned it into the ANDOR benchmark.
- With Ravishankar Krishnaswamy and Magdalen Dobson Manohar: improving search in Filtered-DiskANN, where each query carries attribute filters alongside its vector (ongoing).
- With Ankit Garg: approximating multi-vector representations with single vectors for use in first-stage retrieval (ongoing).

Industry Experience

Quantitative Researcher, Quantbox Research – Gurugram, India July 2024 – July 2025

- Researched short-horizon predictive signals for NIFTY50 components on NSE and Sensex index options on BSE, identifying features correlated with short-term returns; analysis in Python.
- Combined signals using constrained regression models and built the data pipelines feeding them.
- Implemented the resulting features in C++, deployed for live trading of equities and index options on NSE.

Software Engineer Intern, Uber – Bengaluru, India May 2023 – July 2023

- Built Java/Spring Boot APIs to create, retrieve and update Uber's WhatsApp Business Account templates, integrating Meta's API with Uber's internal database and keeping the two in sync.
- Automated template creation across languages by integrating Uber's internal translation service.

Contests and Problem Setting

- **Team rank 13**, ICPC Asia West Finals 2023-24
- Qualified for the Indian National Mathematical Olympiad **(INMO)** 2016-17, among the **top 35** in the Delhi region – regional list
- Profiles: Codeforces, CodeChef, AtCoder, ICPC
- Set and tested problems across Codeforces, CodeChef (as a member of the contest admin team), ICPC Regionals 2025-26, and the Algorithms and Coding Club at IIT Delhi – full list

Relevant Coursework

Analysis and Design of Algorithms; Algorithmic Graph Theory; Discrete Mathematical Structures; Advanced Operations Research