

Manan Agarwal

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EDUCATION

- **M.S. in Machine Learning**, Carnegie Mellon University, **CGPA: 4.3/4.0** (Present)
- **B.Tech**, Computer Science and Engineering, IIT Bombay, **CGPA: 9.73/10** (2019 - 2023)
- **Honors**, Computer Science and Engineering, IIT Bombay (2019 - 2023)
- **Minor**, Artificial Intelligence and Data Science, IIT Bombay (2019 - 2023)

SCHOLASTIC ACHIEVEMENTS

- Secured All India Rank 14 in JEE Advanced amongst 170,000 aspirants (Haryana State Topper) (2019)
- Secured All India Rank 194 in JEE Main amongst 1.15 million aspirants (99.98 percentile) (2019)
- Qualified for Orientation cum Selection Camp (OCSC), for International Physics Olympiad (2019)
- Awarded Gold Medal in Indian National Physics Olympiad (INPhO) (among Top 46 candidates) (2019)
- Awarded Gold Medal in Indian National Astronomy Olympiad (INAO) (among Top 39 candidates) (2019)
- Recipient of the prestigious Kishore Vaigyanik Protsahan Yojana (KVPY) Fellowship (2018)
- Qualified National Standard Examination in Physics, Chemistry & Astronomy, conducted by IAPT (2018)
- Recipient of National Talent Search Examination (NTSE) Scholarship, Government of India (2017)
- Received Best Academic Performance Award (Haryana Region) by Science Olympiad Foundation (2017)

RESEARCH EXPERIENCE

Off-policy Generative Policy Optimization (OGPO)

Fall 2025

Prof. Max Simchowitz

- Developed OGPO, a framework for reliably finetuning Iterative Generative Policies for robotic manipulation by combining full-policy optimization with calibrated critic learning to improve robustness and sample efficiency on contact-rich tasks.
- Established a four-axis view of IGP finetuning (parametrization, verification, optimization, planning) and demonstrated state-of-the-art performance on challenging manipulation benchmarks, without restrictive latent-space steering.

Decoding Stability in Diffusion Language Models

Fall 2025

Prof. Aditi Raghunathan | Independent Study

- Investigating why Diffusion LM accuracy drops at high decoding parallelism, with a focus on how independent marginal token prediction fails to capture necessary joint structure.
- Developed a lightweight joint-probability-aware inference layer using top- K candidate sets and perplexity-based compatibility scoring, yielding strong accuracy gains at high parallelism and motivating more principled decoding methods.

Adaptation to Unseen Domain for NLU Tasks

Spring 2023

Prof. Preethi Jyothi | B.Tech Project

- Analyzed and compared various domain adaptation techniques in NLU, assessing their strengths and weaknesses, and conducted ablation studies on the PADA model to identify prompt generation shortcomings, particularly in few-shot settings.
- Designed the DICT model, a novel NLU approach that utilizes a dictionary-based method for prompt generation, addressing limitations of existing models and achieving improved accuracy with an Binary F1-score of 86% on PHEME dataset.

Partial Information Cop and Robbers Games

Spring 2023

Prof. Swaprava Nath | B.Tech Project

- Conducted a comprehensive literature review on security and pursuit game techniques, exploring game-theoretic frameworks like Stackelberg Security Games (SSG) with real-life defense applications, including Protect and Paws.
- Introduced a novel game model, the Concurrent-and-Partially-Visible Cop-and-Robbers game, to address challenges in visibility and movement dynamics, contributing to the understanding of strategic interactions in security contexts.

Decision Complexity in Multi-armed Bandits

Autumn 2022

Prof. Shivaaram Kalyanakrishnan | R&D Project

- Analyzed stopping rules (PPR, KL-UCB, LUCB) in a regret minimization setting for the multi-armed bandit problem, achieving up to 4000x speedup over traditional algorithms with sub-polynomial decision complexity and asymptotic optimality.
- Modified the original D-Tracking Algorithm for the PAC Mode Identification Problem, reducing decision complexity to logarithmic scale, while preserving the algorithm's asymptotic optimality.

WORK EXPERIENCE

Quantitative Researcher

Quadeye Securities

June 2023 - Present

- Developed an aggressive pair-trading strategy from scratch in the NSEFO market, achieving a Sharpe ratio of 11.8 and a simulation-production accuracy above 95%. Currently researching a new strategy for Synthetic Options in the same market.
- Optimized and maintained high-tick passive strategies in ASX and CHIX markets, resulting in a 30% and 55% increase in mean P&L, respectively. Expanded the strategy with horizontal scaling efforts in the BOVESPA market.
- Improved Order Book, Event Flow, and Market Alpha signals by addressing key limitations. Built tools for efficient simulation, visualization, and debugging to streamline strategy performance.

Quantitative Trading Intern

Quadeye Securities

Summer 2022

- Developed a hedging strategy for managing cryptocurrency portfolios across spot-futures pairs, maintaining risk-control.
- Designed order book alpha indicators, including MACD and EMA, to improve predictive accuracy and strategy performance.
- Conducted extensive backtesting on historical data by simulating the strategy with constraints on gross exposure, delta, volume, positions, and order limits, ensuring timely liquidation of positions upon expiry.

Data Science Intern

Franklin Templeton Investments

Summer 2021

- Developed and implemented multiple time-series forecasting models, including ARIMA, Random Forest, and LSTM, achieving Gross Sales predictions with a Mean Absolute Percentage Error (MAPE) within 20% and a correlation above 70%.
- Designed a robust web scraper to extract mandate information from FinSearches and Money Market Directories, performing text analysis on the retrieved data to map consultant names to their respective plans.

ML PROJECTS

Sentiment Detection

Prof. Preethi Jyothi | Automatic Speech Recognition

Spring 2023

- Developed a sentiment detection model by fine-tuning a pretrained CRDNN Librispeech encoder with an additional linear layer, achieving 75% accuracy on labeled utterances through cross-entropy training for sentiment classification.
- Presented an analysis of Meta-TTS, a meta-learning approach for rapid speaker adaptation in text-to-speech, and showcased a poster on GenerSpeech, a TTS model for high-fidelity zero-shot style transfer of out-of-domain custom voices.

Textual Entailment

Prof. Pushpak Bhattacharyya | Deep Learning for Natural Language Processing

Spring 2023

- Successfully fine-tuned Google's Multilingual T5 (mT5) and T5 small base models for Hindi-English textual entailment tasks, achieving an F1-score of 84% on the English model using the SNLI (English) dataset.
- Developed an NLI model for low-resource languages, evaluating performance with the XNLI (Hindi) dataset, achieving an F1-score of 54% on the Hindi model and 53% on the English model (post-translation using Google API).

Hindi Text-to-SQL

Prof. Pushpak Bhattacharyya | Speech and NLP and the Web

Autumn 2022

- Formulated the task of SQL query generation given a Hindi question as a combination of multiple classification tasks.
- Tackled the challenge of limited data availability by implementing synthetic data generation techniques.
- Developed a Hybrid Ranking Network for Text-to-SQL using Hindi embeddings, achieving over 80% accuracy.

RELEVANT COURSES

Logic & Mathematics

Cryptography & Network Security, Game Theory and Mechanism Design, Automata Theory, Logic for Computer Science, Discrete Structures, Calculus, Linear Algebra, Differential Equations

Machine Learning

Automatic Speech Recognition, Deep Learning for NLP, Speech and NLP and the Web, Advanced Image Processing, Foundations of Intelligent and Learning Agents, Artificial Intelligence and Machine Learning

Computer Science

Computer Networks, Operating Systems, Implementation of Programming Languages, Database and Information Systems, Computer Architecture, Data Structures and Algorithms, Software Systems Lab

EXTRACURRICULARS

- Completed a year-long Social Sustainable Development course through the National Service Scheme (NSS) at IIT Bombay, teaching environmental ethics to students at BMC schools and fostering awareness about ecological responsibility.
- Volunteered with Spread Smile Foundation to provide educational support to underprivileged middle school students.
- Represented my school in a science presentation on "Life Beyond Earth" at IIT Delhi's Tryst fest, achieving a top 50 ranking.
- Secured 2nd place in the Tower Research Limestone Data Challenge, a quantitative analysis competition at IIT Bombay.