Parth Verma

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Education

Indian Institute of Technology, Delhi, B.Tech in Computer Science and Engineering — Nov 2022 – May 2026 (Exp.)
- CGPA: 9.42/10

Delhi Public School, Rewari, India, CBSE 12th Grade — Apr 2021 – Jun 2022
- Score: 96.8%

Delhi Public School, Rewari, India, CBSE 10th Grade — Apr 2019 – Jun 2020
- Score: 96%

Experience

WorldQuant, LLC | Quantitative Research Intern, Mumbai, India — May'25 - Jul'25
- Built masks across global financial datasets to capture dates of key financial events, **improving coverage** beyond U.S. markets
- Developed ML models, predicting **future returns** using **prior returns**, **sentiment**, and **volatility** around captured event dates
- Crafted a **Numba-powered signal processing** library implementing **more than 60 core functions** tailored for **intraday data**
- Received **full-time return offer** based on the internship performance

University College London | Research Intern, Prof. Philip Treleaven — May'24 - Jul'24
- Collected and pre-processed **financial tweets**, building a **TF-IDF–based sentiment dictionary** to quantify word importance
- Enhanced **sentiment classification accuracy to 78%** by integrating the **custom dictionary** with **VADER** (vs. **70% baseline**)
- **Co-authored** a **review paper** on stock price prediction using sentiment analysis, uploaded as a working paper on **SSRN** (link)

Publications

GFFMERGE: Efficient Merging of Graph Neural Force Fields and Beyond — ICML 2026

Parth Verma *(First Author)*, Parv Pratap Singh, Vipul Garg, Ishita Thakre, N M Anoop Krishnan, Sayan Ranu

Accepted at the **International Conference on Machine Learning (ICML)**, 2026.
- Developed **GFFMerge**, a framework for efficiently merging specialized **graph neural force fields** without full joint retraining
- Proposed an **embedding-alignment** method for merging linear blocks, followed by lightweight targeted fine-tuning
- Achieved performance close to **jointly fine-tuned gold-standard models** across molecular and materials benchmarks, with up to **5–27× training speedups**

Scholastic Achievements

Letter of Recommendation: Awarded by Prof. Philip Treleaven (UCL) for outstanding research internship performance [2024]
IIT Delhi Merit Award: Ranked in the top 7% institute-wide (1st year) and the top 7% in the CS Department (5th sem.) [2024]
Joint Entrance Examination Mains: Secured an All India Rank **382** amongst more than **1 million students** nationwide [2022]
Joint Entrance Examination Advanced: Secured an All India Rank **746** amongst **200 thousand students** nationwide [2022]
KVPY Fellow: Awarded Fellowship (SX) by **IISC Bangalore** for securing **All India Rank 407** in the national examination [2022]
NTSE: Stage 1 Qualifier in the National Talent Search Examination conducted by **Gov. of India (NCERT)**, State Rank 56 [2019]
ANTHE: Secured an **All India Rank 1** in the renowned National Talent Hunt Examination conducted by Aakash Institute [2019]

Projects

Multimodal Model Systems | Prof. Parag Singla — Mar'26 - May'26
- Implemented **CLIP-style image-text learning** with ViT backbones for retrieval, linear probing, and representation analysis
- Evaluated retrieval through visual t-SNE diagnostics, reaching **90.12% image-to-text** and **91.20% text-to-image Recall@1**
- Built **Qwen-based VQA** with **88.74% exact match** and generative VAE + latent diffusion pipelines with **3.96/9.62 FID**

Deep Learning Systems: Vision and Neural Machine Translation | Prof. Parag Singla — Jan'26 - Mar'26
- Built **ResNet-18** classifier with BN/IN/BIN/LN/GN, augmentation tuning, **Grad-CAM**, and **76.80% to 83.20%** accuracy gain
- Developed **English-to-Indic NMT** with GloVe/BERT encoders, attention decoding, BPE tokenization, and beam search
- Added scheduled teacher forcing and cross-lingual **Hindi-to-Marathi transfer** for robust local Indic language translation

Multimodal Transformer for Visual Question Answering | Prof. Parag Singla — Feb'25 - Mar'25
- Built a multimodal VQA model with ResNet101, **text encoder**, and **cross-attention**, achieving **78.7% accuracy on CLEVR**
- Enhanced model accuracy via backbone **fine-tuning**, **Focal Loss**, and BERT-based embeddings with differential learning rates

Frequent Pattern and Graph Mining for Classification | Prof. Sayan Ranu — Jan'25 - Feb'25
- Compared runtimes of Apriori and FP-tree algorithms for frequent itemset mining under varying minimum support thresholds
- Implemented gSpan, FSG, and Gaston for frequent subgraph mining, designing a pipeline for discriminative feature extraction

Representation Learning and CNN-Based Image Classification | Prof. Rohan Paul — Oct'24 - Nov'24
- Built a CNN for **bird species classification**, achieving **97.3% validation accuracy** with augmentation and **regularization**
- Applied **optimized CNN methods**, using class **activation maps** to interpret & visualize model's focus on key visual features

Technical Skills

Programming Languages: C, C++, Python, HTML, Prolog, Ocaml, LaTeX, VHDL (Hardware Design Language)
Tools and Libraries: Git/GitHub, NumPy, Polars, Matplotlib, TensorFlow, PyTorch, Numba, scikit-learn, Flask

Courses Undertaken

Computer Science: Machine Learning, Data Mining, Principles of Artificial Intelligence, Data Structures and Algorithms, Operating Systems, Computer Architecture, Digital Logic and System Design, Programming Languages, Computer Networks, Analysis and Design of Algorithms, Theory of Computation
Mathematics: Financial Mathematics, Statistical Methods, Probability and Stochastic Processes, Calculus, Linear Algebra and Differential Equations, Linear Algebra and its Applications, Discrete Mathematical Structures
Miscellaneous: Microeconomics, Macroeconomics, Introduction to Electrical Engineering, Signals and Systems