Parth Laturia

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Education

Indian Institute of Technology Bombay 2018-2022
- **Bachelor of Technology (with Honors)** in Computer Science and Engineering, CPI: 9.59/10.00
- **Minor** in Artificial Intelligence and Data Science

Disha Delphi Public School 2016-2017
- CBSE Intermediate/+2, Percentage: 95.2 %

Gyan Mata Vidya Vihar 2006-2015
- CBSE Matriculation, CPI: 10.00 / 10.00

Patents and Publications

- **Patent**: "Method to auto-generate a video to illustrate a procedural document" filed in the US (US17/661,614)
- **Publication**: Recipe2Video: Synthesizing Personalized Videos from Recipe Texts published at IEEE Winter Conference on Applications of Computer Vision (WACV), Waikoloa, Hawaii, 2023
- **Publication**: SPEAR : Semi-supervised Data Programming in Python published at the Conference on Empirical Methods in Natural Language Processing (EMNLP), Abu Dhabi, 2022
- **Publication**: How to play Notakto: Can Reinforcement Learning achieve optimal play on combinatorial games? published at the Association for the Advancement of Artificial Intelligence (AAAI), Virtual, 2021

Research Experience

Semi Supervised Data Programming in Python (SPEAR) —Deep Learning Spring 2021
Guide: Prof. Ganesh Ramakrishnan — RnD Project IIT BOMBAY
- Developed a Labeling Function based module to reduce **Annotation efforts** and improve the correctness metrics
- Trained a High level Supervision encompassing **4** algorithms to learn from Rules generalizing Labeled **Exemplars**
- Implemented a **rule denoising** algorithm based on **Implication loss** targetting F1 Score, thus publishing paper at EMNLP

Winning Notakto with Reinforcement Learning —Reinforcement Learning Summer 2020
Research Intern under Prof. David Crandall, Prof. Saul Blanco Indiana University, U.S.A
- Co-Authored a paper titled "How to play Notakto?" published in **AAAI**-Reinforcement Learning & Games, '**21**
- Trained **UCB** based RL model from scratch using **1 Million** games of self-play to maximize win in Notakto
- Incorporated **Monte Carlo** Policy using Every Visit Approach and NN binarization for **space-time optimization**

Professional Experience

Morgan Stanley July 2022 - Present
Quantitative Research Strategist Mumbai, India
- Responsible for **eFX** Internalization framework, facing a daily flow of $9-10 **Billion**, generating $120-130K daily
- Inspecting Algo and Voice traders' orders using backtest and prod data in **Q** to improve **principal** Volume and PnL
- Designed event-based mid predictor for US Treasuries **market-maker** using microstructural data and **LOB** features
- Abstracted codebase in VSCode to handle 11 instruments generating daily PnL of $\sim$ **$2K**; tuned sources, amount of training data, and prediction horizon using **ROC-AUC** and F1 Score to predict **5Y UST** Futures' prices
- Improvised a **mean reversal** alpha using Volatility, Open Interest Skew around out of the money call, put **yield**; secured an annualized sharpe of 1.22 and total trading PnL of **$12M** over a backtest period of 5 years
- Designed robust infrastructure to fetch and process **Futures** data of 6-7 asset classes for **end-of-day** alpha trading
- Structured an **execution** algorithm in Python using UST Futures **top-of-book** fields to fill orders at right prices

Doc2Video for Personalized Consumption —Computer Vision Summer 2021
ML Intern under Balaji Vasan Srinivasan Adobe Research Lab, Bangalore
- Earned a **patent** and co-published a paper titled "Recipe2Video" at **WACV** 2023; open access at CVF
- Automated conversion of instructional **document** to illustrative **video** tailored to user **expertize** and choices
- Embodied Clustering, **Weak Supervision** and Question Answering Modules to automate the **modality** selection
- Utilized GTTS to generate voice over and ffmpeg, moviepy to stitch the **coherent** clip pieces into final video

ATM's Predictive Maintenance —Process Development Winter 2020
Data Science Intern under Prof. Siuli Mukhopadhyay Bank of Baroda
- Built a "**Smart ATM**", warning prior to failures to reduce service downtime using Logistic Regression and Cross Validation
- Studied classification based **Failure Prediction** to extract **2**-sized Pattern based Features for data from **6 zones**

Noise Filtering by Stethoscope —Machine Learning Winter 2019
ML Intern under Adarsha K Ayudevices, now Ayusynk (supported in Shark Tank, India)
- Conducted literature survey and tested algorithms for **canceling noise** from the Developed Digital stethoscope
- Executed **Recursive** Least Square and Least Mean Square Algorithm to filter out noises from the heart sound
- Collectively Implemented **Deep learning RNN** model for classifying Heart sounds as Normal or Abnormal

Olympiads and Academic Achievements

- Cleared Chartered **Financial** Analyst (CFA) Level 1 scoring **90+** percentile (2023)
- A Life Time Member of the **Mensa** High IQ Society, India Chapter (2022)
- Awarded **AP Grade** (top 1%) for stellar performance in **Optimization** Course (2022)
- Accomplished a perfect **10.0/10.0** performance index (SPI) in the **spring** semester of the **3rd** year (2021)
- Secured All India Rank **3** in **JEE Mains** out of **1.2 Million** candidates (2018)
- Achieved All India Rank **29** in **JEE Advanced** out of **163K** candidates (2018)
- Awarded **Gold Medal** for being amongst the top 35 in **India** in **INChO**, HBCSE; Completed 12 day OCSC (2018)
- Recipient of the Kishore Vaigyanik Protsahan Yojana (**KVPY**) fellowship with All India Rank **103** (2017)
- Earned the National Talent Search Examination (**NTSE**) fellowship by NCERT, Government of India (2016)
- Amongst the **top 12** in **India** to get selected for 20-day Orientation-Cum-Selection Camp for **IAO**, HBCSE (2015)

Key Projects

Developing Adversarially Robust Attacks
Spring 2021

Guide: Prof. Sunita Sarawagi | Course Project — Advanced Machine Learning

- Analyzed FGSM and PGD based **Attacks** by pruning and varying **models** and norms to discern their severity
- Modified **TRADES defense** by changing the perturbation algorithm to secure **98.1%** accuracy on MNIST

SCLP Based Compiler
Spring 2021

Guide: Prof. Uday Khedker | Course Project — Implementation of Programming Languages Lab

- Implemented scanning, **parsing**, AST, TAC and RTL stages with visibility of output at each intermediate stage
- Ensured that illegal tokens, syntax errors and **semantic errors** in the **C-like** compiler are robustly flagged

Restaurant Management System
Spring 2021

Guide: Prof. Umesh Bellur | Course Project — Database and Information Systems Lab

- Established a Robust System using **ER Diagram** and BCNF Normalization involving employees, customers and an owner
- Employed **PostgreSQL** with **PgAdmin4** to maintain Dynamic Database and **NodeJS** to link it with the frontend
- Validated Atomicity, **Time Series** Analytics and Automated Dish **Recommender** to enhance the user experience

Buffer Overflow Attacks and Defenses
Autumn 2020

Guide: Prof. Bernard Menezes | Course Project — Computer Architecture

- Demonstrated the Stack and Heap based **buffer overflow** exploits along with **defenses** against them
- Performed a case study on the **Code Red Worm** exploit paired with the ways of **protection** against it

Low-Dose Tomographic Reconstruction
Spring 2020

Guide: Prof. Ajit Rajwade | Course Project — Advanced Image Processing

- Reconstructed test images from **low dose** projections and **Re-irradiation** in regions of significant changes
- Formulated Weights map using Filtered **Back Projection**, Z-test to quantify influence of prior templates on reconstruction
- Implemented the modified **FISTA** package; tuned regularization parameters to achieve **RMSE** as low as **0.0749**

Other Projects

◇ **Causal Intervention on Time Series** (Prof. Sunita Sarawagi | Sequence Modelling) - Predicted telemetry **anomalies** and their confounders based on **multivariate time series** data using counterfactual explanations

◇ **XV6 System Development** (Prof. Mythili Vutukuru | Operating Systems) - Developed the Synchronization, Scheduling and Memory Management of Processes in XV6 OS entirely in C & X86 Assembly Language

Leadership Positions

Teaching Assistant

- Numerical Analysis from Jan 2022 to May 2022; Statistical Inference (Minor) from Aug 2021 to Nov 2021; Logic for Computer Science from Mar 2021 to May 2021; Computer Programming and Utilization from Nov 2020 to Feb 2021

Department General Secretary—Computer Science and Engineering
April 2021 - April 2022

- Spearheaded a council of **15** members, committed to serve socio-academic and sportive interests of the students
- Appointed **6** Placement Coordinators and a CyberSecurity Club Manager for the execution of student activities
- An active member of the Department **Policy** Formation Committee to ensure student participation in the same
- Organized Department Traditional Day; Department Valedictory Function each gathering more than **600** students

Department Academic Mentor— Department Academic Mentorship Programme
May 2021 - April 2022

- Guided 2 sophomores on how to ace curriculum, projects and research opportunities through regular catchups
- Part of a team of **34** mentors from **70**+ applicants after interviews and peer reviews to mentor sophomores

Extracurriculars

- Core Member of the Well Being Committee at FID, Morgan Stanley, organizing cultural events on festivals (2023)
- Member of the Contingency for Inter IIT Tech Meet; Contributed to the Bosch Model Interaction Statement (2022)
- Served as a **Volunteer** at Lions **Eye** Hospital to help poor and needy patients in the **COVID** Pandemic (2021)
- Co-Founder of **Femeal**: An initiative aiming to heal PCOS; Won the On-Campus Round of **Hult Prize** (2020)