

# 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-Authoring 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 **~ \$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 Vasani 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 **expertise** 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 **canceled 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

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- 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

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### 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

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- ◇ **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

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### 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

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- Member of the **FID Well Being** Core Committee at 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)
- Volunteered **80+** hours in [National Service Scheme](#) to maintain Greenery at **IIT Bombay Nursery** (2018)