

# Viral Chitlangia

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## Education

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| <b>BS</b>  | <b>Indian Institute of Technology Kanpur</b> , Statistics & Data Science   | 2022 - 2026 |
|            | <ul style="list-style-type: none"><li>• <b>CPI</b> : 9.0/10.0</li><li>• <b>Minor</b> : Dept. of Computer Science - Machine Learning &amp; Applications</li></ul> |             |
| <b>XII</b> | <b>Delhi Public School Bangalore East</b>  | 2022        |
|            | <ul style="list-style-type: none"><li>• <b>Grade</b> : 96%</li></ul>   |             |

## Scholastic Achievements

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- **Academic Excellence Award, IIT Kanpur** - For exceptional performance in Academic Session 2022-23 and 2023-24.
- Was part of the team that represented **IIT Kanpur** in **Mimamsa 2024** hosted by **IISER Pune**, and secured **4th place** among more than **1500** participating teams.
- Achieved All India Rank **646** in **JEE-ADVANCED 2022**
- Achieved All India Rank **1030** in **JEE-MAINS 2022**

## Publications & Pre Prints

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- Viral Chitlangia, Mosuk Chow, Sharmishta Mitra. "Swap Regression Methodology for Predicting Relationship with Historical Bivariate Data." *arXiv preprint arXiv:2508.15479* ↗, August 2025.

## Projects

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| <b>SWAP Regression   Prof. Sharmishta Mitra   IIT Kanpur</b>   | Nov '23 - Aug '25 |
| <ul style="list-style-type: none"><li>Analyzed the paper written by <b>Mosuk Chow, Bing Li</b> and <b>Jackie Q. Xue</b>, on <b>ON REGRESSION FOR SAMPLES WITH ALTERNATING PREDICTORS AND ITS APPLICATION TO PSYCHROMETRIC CHARTS</b> ↗ and developed models with alternating predictors on Bivariate Data using the method of SWAP Regression.</li><li>Defined a new loss function for the <b>Swap Regression</b> model.</li><li>Implemented ALT-OPT to solve the loss function.</li><li>Implemented the model to test on real data as <b>US Public Debt and GDP</b>.</li><li>Applied the model to predict the causality direction of <b>US Public Debt and GDP</b> without prior knowledge.</li></ul> |                   |

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|--|-------------------|
| <b>Digital Intervention for Loneliness   Prof. Suncica Hadzidadic   Durham University</b>  | May '24 - Ongoing |
| <ul style="list-style-type: none"><li>Explored <b>Reddit</b> and <b>Google</b> to find relevant subreddits and apps which target <b>loneliness</b>.</li><li>Scraped <b>Reddit</b>, <b>Google Play</b>, <b>Apple Play</b> and <b>A Lonely Life</b>(a loneliness forum), using relevant Python libraries, and Rvest(R), to collect text data on <b>loneliness</b>.</li><li>Used <b>Topic Modelling</b> on the data collected to <b>cluster</b> the data into relevant topics, to realise what people are talking about online, to find out which areas of apps people would like to see an improvement in.</li></ul> |                   |

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|---|-------------------|
| <b>Deep Generative Models for Spatial-Temporal Data   Prof. Swapnil Mishra   NUS</b>  | May '25 - Ongoing |
| <ul style="list-style-type: none"><li>Implementing and analyzing the paper on <b>AggVAE</b> ↗ written by <b>Swapnil Mishra et al.</b></li><li>Working on using the technique to incorporate <b>AggVAE</b> with <b>Population Disag-</b></li></ul> |                   |

**gregation** techniques to get good predictions using Low Resolutions data points.

- Implemented the model on **US Covid Data**, segregated by 9 Regions of the country.

### Developing Techniques for Importance Sampling in MCMC | Prof. Dootika Vats | IIT Kanpur

Aug '25 - Ongoing

- Understood the paper by **Apartim Shukla, Dootika Vats and Eric C. Chi** on **MCMC Importance Sampling via Moreau-Yosida Envelopes**.
- Reading about various enveloping techniques in **optimization**.
- Understanding the properties of various envelopes, and their usability in sampling, especially **Importance Sampling**.

### MCMC Machine Unlearning | Course Project | Prof. Dootika Vats | IIT Kanpur

Jan '25 - Apr '25

- Understood and Implemented the paper on **Markov chain monte carlo-based machine unlearning: Unlearning what needs to be forgotten** by QP Nguyen et al.
- Implemented a novel algorithm for the purpose of Machine Unlearning Sampling by MCMC using the idea of **Newton's Method Update** proposed in **Certified data removal from machine learning models** by C Guo Et al.
- Compared the algorithm with other prominent MCMC sampling algorithms with **Logistic** and **Negative Binomial** Regression data.

## Other Experiences

### Teaching Assistant | MTH 208 | Prof. Dootika Vats | IIT Kanpur

Aug '24 - Nov'24

- Assisted Professor Dootika Vats in teaching the Undergraduate and Postgraduate students enrolled in MTH 208 the basics of the R language.
- Got a hands on experience of teaching a class of enthusiastic students.

## Technical Skills

**Languages:** Python, R, C, C++,  $\text{\LaTeX}$

**Softwares and Libraries:** Matplotlib, Seaborn, Numpy, Pandas, Tensorflow, Librosa, NumPyro, Rvest, Tidyverse, GG-Plot2, Quarto, Shiny App

## Relevant Courses

|                                       |                                      |
|---------------------------------------|--------------------------------------|
| An Introduction to Bayesian Analysis* | Markov Chain Monte Carlo*            |
| Probability Theory                    | Time Series Analysis                 |
| Introduction to Machine Learning*     | Probabilistic Machine Learning       |
| Data Structures & Algorithms          | Theory of Statistics*                |
| Elementary Stochastic Processes - I*  | Elementary Stochastic Processes - II |
| Linear Regression & ANOVA*            | Techniques in AI & Data Mining*      |
| Multivariate Analysis                 | Real Analysis*                       |

\* : Excellent Performance

## Positions of Responsibilities

Coordinator, Stamatics Club

Oct '24 - Aug '25

Executive, Stamatics Club

Nov '23 - Oct '24