MRINMOY BANIK

ML Enthusiast|Statistician|Student Researcher

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INTERNSHIPS

JPMorgan&Chase Summer Internship
2 months at MRGR CCB

📅 May 2024 – July 2024   📍 JPMC Nirlon Knowledge Park,Mumbai

- Conducted comprehensive model governance activities within the Consumer and Community Banking division, covering the entire model lifecycle from review to retirement.
- Performed independent testing of a tier-3 customer complaint classification model utilizing a two-stage fine-tuned DistilBERT architecture.
- Validated model performance on out-of-time data, conducted cosine analysis for data quality assessment, and implemented explainability studies using SHAP and Integrated Gradients.
- Executed ongoing periodic monitoring (OPM) for a credit card fraud transaction resolution model based on XGBoost.
- Contributed to the retirement process of a liquidity allocation model that analyzed customer ATM activity.
- Gained in-depth exposure to risk mitigation strategies and model governance practices in an international corporate investment banking environment.

PROJECTS EXPERIENCES

Statistical Innovation: Multivariate Non-Parametric Tests
Advisor: Dr. Arijit Chakrabarti

📅 June 2023 – Present   📍 ISI, Kolkata

- Spearheaded research on multivariate generalizations of Wald-Wolfowitz and Smirnov two-sample tests, demonstrating advanced statistical knowledge.
- Engineered runs-tests, rank tests, and X deg 1 test implementations in R and Python for multivariate setups, showcasing versatile programming skills.
- Conducted rigorous statistical analysis, including rejection rate tabulation for normal and lognormal distributions, and successfully reproduced benchmark results.
- Developed and deployed an interactive data visualization dashboard using Python, Plotly, and Dash, highlighting data presentation skills.
- Extended research to distribution-free two-sample tests using shortest Hamiltonian paths, demonstrating adaptability in applying novel statistical methods.

Optimizing Electron Beam Lithography: Stitch-Aware Routing Algorithms
Advisor: Dr. Sushmita Sur Kolay

📅 July 2023 – Present   📍 ISI, Kolkata, WB

- Conducted comprehensive analysis of the Electron Beam Lithography (EBL) pipeline, encompassing placement, global-routing, local-routing perturbation studies, and fabrication processes.

ACHIEVEMENTS

🏛 CBSE Board Exams
- Scored 91.6% in AISSE(CBSE class 10)
- Scored 92.6% in AISSCE(CBSE class 12)

🎓 University Grades
- Scored 74.2% in B.Stat overall
- Scored 71.7% in M.Stat 1 year

🏆 Cracked Competitive National Level Exams
- Cracked JEE Mains with **99.3** percentile
- Cracked JEE Adv with AIR **4575**
- Cracked WEBJEE with State Rank **126**
- KVPY SX fellow with AIR **875**
- Cracked Pre-RMO,ZCO,ZIO,MTRP
- Cracked ISI and CMI Entrances

🎖 Competitions
- Global Rank 1 in Codechef May Long Challenge 2021
- Expert(max **1684**) in Codeforces & Master(max **2018**) in Codechef
- Scored **1680** in Google Kick Start 2021
- Qualified qualification round in Google Code Jam 2021 and scored **2390** in round 1
- Ranked **1082** in MetaHackerCup 2022 Qualification Round
- Qualified Madhava Mathematics Competition & attended Madhava Nurture Camp(MNC-2021).

SKILLS

Programming Languages:-

Python
(numpy,pandas,sklearn,dash) ●●●●●
C/C++
(STL,IO,pthreads,CMake) ●●●●●
R
(RStudio,rgl,MASS,igraph,RShiny) ●●●●○
Bash
(curl,grep,shell scripts,SSH) ●●●●○
HTML5/CSS ●●●◐○

- Implemented Cockyne and Dreyfus-Wagner algorithms in C++ to generate Rectilinear Steiner Minimum Trees (RSMT) for single nets, demonstrating strong algorithm design skills.
- Performed comparative analysis of wirelength efficiency between exact algorithms and approximate solutions using Geosteiner-5.3 and FLUTE, showcasing analytical and evaluation capabilities.
- Explored cutting-edge deep learning approaches to predict route congestion and routability at pre-Detailed routing levels, indicating foresight in applying AI to complex engineering problems.

Advanced Clustering Algorithm Analysis

Advisor: Dr. Swagatam Das

📅 February 2022 - October 2022   📍 Indian Statistical Institute, Kolkata

- Conducted in-depth analysis of mathematical models and distributional assumptions underlying various clustering approaches.
- Developed and implemented KMeans, Kernel, Spectral, and Multiview Clustering algorithms from scratch in Python, demonstrating strong programming and analytical skills.
- Performed comprehensive benchmark tests using Caltech-102, Flower17, and Flower102 datasets, showcasing data handling and evaluation capabilities.

TITAN - Large Scale Visual ObjecT DIscovery Through Text attention using StAble DiffusioN

Advisor: Prof. Amitabh Banerjee

📅 2022 - 2023 (Archived)   📍 University of South Carolina

- Proposed TITAN, a large-scale synthetic object detection dataset with 339K+ unique objects, addressing the limitation of existing datasets (max 21K objects).
- Generated synthetic dataset by prompting Stable Diffusion with image captions and transforming outputs to DAAM attention heat-maps.
- Hierarchically classified all objects using WordNet synsets, enhancing dataset organization and usability.
- Aimed to improve performance in downstream CV tasks that utilize object detection as their backbone.
- Empirically validated the impact, demonstrating significant improvement over state-of-the-art object detection methods.
- Leveraged deep learning techniques and large-scale datasets (LAION-5B, MSCOCO, Detic, VisualGenome) to advance the field of computer vision.

EDUCATION

Primary & Secondary Schooling

South Point School

📅 April 2008 – June 2020   📍 Ballygunge Place, Kolkata-700019

B.Stat (Bachelor of Statistics Hons.)

Indian Statistical Institute

📅 December 2020 – May 2023   📍 B.T road, Kolkata-700108,WB

CGPA: 7.42

M.Stat (Master of Statistics)

Indian Statistical Institute

📅 August 2023 – May 2025   📍 B.T road, Kolkata-700108,WB

CGPA: 7.17

Javascript ●●●◐○
(ES6,JSON,React,D3,jQuery,GraphQL,REST)

Android Dev ●●●○○
(Kotlin,Flet,Processing.io)

SQL ●●●○○
(MySQL,SQLite,Oracle)

Latex ●●●◐○
(Miktex,Katex)

Markdown ●●●○○

Operating Systems:-

Windows ●●●◐○
(chocolaty,psh,cmd,wsl2,Msvc)

Linux(Ubuntu/Debian) ●●●●○
(Vim,Regex,tracert,VFS,POSIX)

AI & ML:-

HuggingFace ●●●◐○
(transformer,datasets,gradio)

NLP ●●●●○
(NLTK,Spacy,neuralcoref,Wordnet,Stanza)

ML Frameworks ●●●●○
(pytorch,keras,Tensorflow)

Deep Learning Models ●●●●○
(Yolo,CNNs,LSTMs,VIT,SDV2,VAE,BERT)

Algorithms & Data Structures:-

Trees,Graphs& Flows ●●●●◐
(Planarity,Max-flow,LCA,SCC,MST)

Data Structures ●●●●○
(Linked List,dQueue,SegTree,Fibonacci Heap, Hash Map,Trie)

Optimisation ●●●◐○
(DP,LP/IP,EM,Simulated Annealing, Approximation,Randomization)

Computational Geometry ●●●○○
(Convex Hull,Triangulation,Voronoi Diagram)

Numerical Techniques ●●●●○
(Newton Raphson,FFT/DFT/NTT,MM,SGD,Splines)

Software & Tools:-

Unity 3D ●●●◐○
(Mirror,NetCode,UI)

Arduino ●●●●○
(ESP8266,I2C,UART,Stepper,BLDC)

Raspberry PI ●●●◐○
(MainSail,PiCam)

ChatGPT(GPT3.5/4.o) ●●●●○
3D Printing & PCB Design ●●●◐○
(Fusion 360,Prusa Slicer,EasyEDA)

DBMS & Spreadsheet ●●●◐○
(MS Excel,MySQL,MongoDB)

Others ●●●●○
(git,Docker,Jupyter,Anaconda,Octave,Postman)