AYAN BANERJEE

M.Sc. in Big Data Analytics
Ramakrishna Mission Vivekananda Educational and Research Institute, Belur Math, West Bengal, India

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PROJECTS

- **Multi Scale Stock Price Forecasting:** *July.'25- Ongoing, RKMVERI*
  - Implemented Wavelet Transform–based multi-scale decomposition of stock price data to extract both short-term fluctuations and long-term trends for improved forecasting.
- **Quantitative-Portfolio-Optimization-Engine:** *June.'25 - Aug.'25, RKMVERI*
  - A Python-based engine that implements the Nobel Prize-winning Markowitz Mean-Variance Optimization theory to construct optimal investment portfolios.
  - This project fetches real-world stock data, applies modern optimization techniques to determine the ideal asset allocation, and validates the strategy's performance through out-of-sample backtesting.
- **Movie Recommendation System:** *Jan.'25 - Apr.'25, RKMVERI*
  - Recommending movies based on collaborative filtering using Graph Neural Networks (GNN).
  - Implemented and evaluated multiple GNN architectures including GCN, GAT, and LightGCN for user-item interaction modeling.
  - Achieved improved recommendation accuracy over traditional Matrix Factorization-based models by leveraging graph structures.
- **Music Segmentation:** *Jan.'25 - Apr.'25, RKMVERI*
  - Extracted drums, vocals, bass, and others from stereo music tracks using Deep Learning trained on the MUSDB18 dataset.
  - Designed and compared classical signal processing methods (Frequency Thresholding, Spectrogram Masking) with a U-Net based Deep Learning model for source separation.
- **Bengali OCR:** *Jan.'25 - Apr.'25, RKMVERI*
  - Developed an Optical Character Recognition (OCR) system for handwritten Bengali characters.
  - Built and evaluated CNN models LeNet-5, ResNet18
- **Heart Disease Prediction:** *Aug.'24 - Nov.'24, RKMVERI*
  - Predicted the presence of heart disease using classical Machine Learning algorithms on the UCI Heart Disease dataset.
  - Performed extensive data preprocessing, feature selection, and model comparison (Logistic Regression, Random Forest, SVM).
  - Achieved high accuracy and precision through hyperparameter tuning and cross-validation.

COURSEWORK

- Basic Statistics
- Multivariate Statistics
- Deep Learning & NLP
- Machine Learning
- Finance
- Econometrics
- Time Series & Survival Analysis
- Probability and Stochastic Process
- Data Structures and Algorithms

EDUCATION

- **Ramakrishna Mission Vivekananda Educational and Research Institute, Howrah**
  M.Sc. in Big Data Analytics
  (Rank: 1/27) (Sem-1) CGPA: 8.78
  2024 – Present
- **Serampore College**
  B.Sc.(H) in Mathematics
  2021 – 2024 CGPA: 9.032
- **Hooghly Branch Govt School**
  Class(10+2)
  2019 – 2021 Score: 95.8%
- **Elite Co-Ed School**
  Class(10)
  2008 – 2019 Score: 92.14%

TECHNICAL SKILLS

- **Programming Languages:** Python, R , LaTeX
- **Libraries & Frameworks:** Pytorch, NumPy Pytorch Geometric, Scikit-learn, Pandas,Matplotlib.
- **Operating System:**Windows, Linux (Ubuntu)

ACHIEVEMENTS & CERTIFICATIONS

- **Topper** in B.Sc. Mathematics,2021-24(***Serampore College***)
- Top 5% in NPTEL,Joy of Computing with Python

HOBBY

- Reading books on self-development.
- Playing Volleyball
- Games