Banashree Ghosh

CONTACT INFORMATION

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LinkedIn, Git

Portfolio

EDUCATIONAL QUALIFICATIONS

Indian Statistical Institute, Kolkata, India *(July'23)*
Master of Technology (M.Tech) in Computer Science
Specialization: Data Science
Thesis: Change-point Analysis of high-dimensional data based on clustering
Percentage: **75.4%**, First Division with Distinction

University of Calcutta, India *(July'19)*
Master of Computer Application (MCA)
Thesis: Hardware Trojan Aware Controller Design for System-On-Chip platform
Percentage: **74.4%**, First Division

University of North Bengal, India *(July'14)*
B.Sc(Hons.) Mathematics, Minor: Chemistry,Physics
Percentage: **61%**, Batch Rank: **1st/48** (1st & 2nd year).

PUBLICATION / CONFERENCE

Banashree Ghosh, Dr.Raj Abhijit Dandekar, Dr.Rajat Dandekar, Dr.Sreedath Panat *A Comparative Study of Neural ODE and Universal ODE Approaches to Solving SIQRDV Epidemiological Model*, International Conference on Advanced Scientific Computing & Machine Learning (ASCML 2026).[Git]

- Compared Scientific ML approaches including Neural ODEs and Universal Differential Equations on a comprehensive 6-compartment SIRQDV epidemic model with quarantine and vaccination features, addressing gaps beyond basic SIR models.
- Introduced the "forecasting breakdown point" metric to measure prediction reliability over time. Found Neural ODEs failed at **60%** data while UDEs worked accurately down to **40%** and reached 10% in ideal conditions.
- Showed UDEs are **3-6** times more data efficient than Neural ODEs, making reliable epidemic predictions possible with limited training data, which is crucial for early outbreak situations with incomplete information.
- Validated UDEs' noise resilience: accurate forecasts at **7%** noise with **40%** data, robust up to **35%** noise, with realistic predictions throughout.
- Built a detailed hyperparameter optimization framework testing various architectures, activation functions, and optimizers across 6 data scenarios ranging from **100%** to **10%** and 3 noise levels of **0%**, **7%**, and **35%**.

M.TECH THESIS

Change-point Analysis of high-dimensional data based on clustering [Git]
Supervisor: Prof. Anil K. Ghosh, Theoretical Statistics and Mathematics Unit, ISI Kolkata.

- Developed a novel clustering-based change-point detection algorithm for high-dimensional data using modified Agglomerative Hierarchical Clustering methodology with single linkage based on ℓ_1-Mean Absolute Difference of Distances dissimilarity measure.
- Addressed the critical limitation of Euclidean distance failing in high-dimensional settings by proposing MADD dissimilarity measure enabling robust detection of simultaneous changes in both location and scale parameters.
- Established rigorous theoretical convergence guarantees by mathematically proving the Penalized Dunn index converges in probability to true number of change-points as dimensionality increases approaching infinity.
- Validated algorithm performance through comprehensive simulation studies across **13** diverse scenarios and real-world application to MIT Reality Mining dataset containing **48** weeks of high-dimensional network data.
- Demonstrated superior performance outperforming existing methods including E-divisive Kernel MST NNG and MDP approaches achieving accuracy rates of **90-100%** in detecting both location and scale change-points.

Work Experience

Analytics Specialist, Razorpay Payments Private Limited [Link] *(July'23 - Present)*

- Led end-to-end analytics for Partnerships, Rize, Checkout, and POS verticals, delivering insights that shaped product and business strategies.
- Collaborated with product managers, engineers, designers, and marketing teams on new feature releases, defining key metrics during the concept notes phase and building self-serve dashboards to track adoption in real-time.
- Automated daily reporting processes, saving **10-15** hours weekly while improving accuracy and reducing turnaround time for critical business metrics.
- Presented actionable insights in weekly and monthly leadership reviews, directly influencing product roadmaps, go-to-market strategies, and organizational growth initiatives.
- Developed ML models, including revamped Partnerships Lead Scoring and Churn Prediction systems, successfully achieving **18-20%** improvement in partner engagement and **8-10%** increase in retention rates.

Computer Skills

Programming languages : SQL, Python, R, C
Other Software : Julia, MATLAB, Latex

Industry Key Projects

Partner Lead Scoring Model *(Nov'24 - March'25)*

- Revamped the partner lead-scoring ML model, boosting targeting accuracy and lead conversions, and achieving an impressive **18–20%** increase in partner engagement.
- Enhanced model by adding key features (conversion days, merchant team ownership), removing low-value predictors, and optimizing feature binning to boost accuracy.
- Achieved substantial model performance improvement elevating the *F1* score from **0.15** to **0.81** on real-world data, demonstrating remarkable increases in both precision and recall metrics across all evaluation criteria.

Partner Churn Prediction *(March'25 - October'25)*

- Designed and deployed a robust end-to-end partner churn prediction model for business growth, strengthening proactive retention strategies and achieving an **8–10%** improvement in overall partner retention.
- Enabled Marketing and Sales teams to identify high-risk, high-value partners **30–45** days before churn, enabling them to plan targeted retention campaigns accordingly.
- Built predictive model with **0.72** *F1 score*, identifying **70%** of churning partners while optimizing resource allocation.

Latency Analysis for UPI Payment Method *(July'25 - September'25)*

- Analyzed transaction latency before and after Ezetap to Single Stack migration to diagnose service degradation impacting merchant experience.
- Identified that post-migration, **60%** of transactions had latency exceeding **5** seconds compared to only **14%** pre-migration, revealing critical technical failures causing increased decline rates.
- Led bug resolution and system optimization efforts, achieving a **10%** improvement in payment success rate, which directly increased transaction volume and recovered substantial revenue.
- Provided clear data-driven evidence that halted further merchant migrations until technical issues were resolved, protecting platform reliability and merchant trust.

Proactive Success Rate Monitoring System for Payment Platform Reliability *(October'25 - Present)*

- Developed multi-model anomaly detection system to identify daily Success Rate drops, starting with rule-based approach and progressing to AI-based ensemble methods combining ARIMA/Prophet for time-series forecasting and Isolation Forest for outlier detection.
- Built framework defining Success Rate(SR) drop thresholds (>**2%**) with severity levels (minor: **0.5-2%**, moderate: **3-5%**, critical: >**5%**) and compared rule-based versus AI-based models for automated alerting.
- Demonstrated AI-based ensemble approach outperformed rule-based methods by capturing both gradual trends and sudden anomalies, achieving better detection accuracy and reduced false positive rates across different severity levels.
- Developed an automated feature attribution system that identifies contributing factors (payment

method, bank acquirer, payment gateway, merchant category, bank terminal, etc) when anomalies are detected, reducing root cause identification time by **50%** compared to manual analysis.

DataGaaru - AI-Powered Analytics Chatbot Platform *(June'25 - September'25)*

- Architected intelligent AI chatbot using LLM APIs and advanced prompt engineering to interpret natural language queries and deliver real-time business metrics across diverse analytical use cases with **95%** accuracy.
- Built automated data pipeline integrating SQL databases APIs and data warehouses for seamless metric retrieval and complex analytical computations enabling faster insights.
- Deployed a comprehensive self-service analytics platform that significantly reduced data team dependencies and accelerated decision-making through instant query processing capabilities.

Scholastic Achievements

- Awarded Bravo Award for demonstrating outstanding, impactful performance and exceptional contributions to company objectives. [Link]
- Maintained consistent academic excellence across multiple institutions.
- Graduated with First Division with Distinction in M.Tech from ISI.
- Secured a position in the top **3.9% (96th percentile)** among over 100,000 candidates in the highly competitive GATE Computer Science 2021 examination.
- Admitted to the Indian Institute of Technology (IIT) Bombay for M.Sc in Applied Statistics and Informatics program.
- Ranked AIR 76 in ISI M.Tech Computer Science entrance examination
- Received merit scholarship for securing first division in Semester 1 of undergraduate program

Course Work

M.Tech in Computer Science: Probability and Stochastic Processes • Statistical Inference • Linear Algebra • Data Structures & Algorithms • Computer Networks • Computational Biology • Database Management Systems • Theory of Computation • Machine Learning • Computer Graphics

MCA: Digital Logic • Operating Systems • Computer Architecture • Database • Computer Graphics • Cryptography & Network Security • Compiler Design • Artificial Intelligence • ERP & E-Commerce • Financial Accounting & Management • Engineering Mathematics

B.Sc. in Mathematics: Classical Algebra • Linear Algebra • C Programming • Real Analysis I • Linear Programming • Real Analysis II • Probability & Statistics • Abstract Algebra

Others: Time-Series Modeling and Forecasting with Applications in R

Workshops & Training

Advanced Statistical Learning: Attended 15-day Advanced Statistical Learning Program at ISI Kolkata covering Machine Learning, Deep Learning, Computer Vision, Time Series, and Categorical Data Analysis (2022).
WSDL: Attended comprehensive Winter School on Deep Learning covering advanced neural architectures and deep learning frameworks organized by ISI Kolkata.
Technical Labs: Completed practical hands-on training in Java Programming C Programming Database Management Systems Digital Logic Design Electronics Lab and Computer Graphics Lab.

Co-Curricular Activities

- Volunteer with the Milap organization to support underserved communities and create positive social impact.
- Practice mindful living and maintain a balanced lifestyle that promotes physical, mental, and spiritual well-being.
- Enjoy cooking and experimenting with different cuisines as a creative way to relax and explore new flavors.