Abir Sarkar

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Education

Masters of Statistics (M.Stat) — *Indian Statistical Institute, Kolkata*
Specialization : Finance — *August 2021 - June 2023*
Grade: 84 %

Bachelor of Statistics (B.Stat) — *Indian Statistical Institute, Kolkata*
Mathematics & Statistics — *July 2018 - August 2021*
Grade: 82 %

Higher Secondary Education, Class XII *Ramakrishna Mission Boys' Home High School, Rahara*
Grade: 93 % — *June 2016- April 2018*

Secondary Education, Class X — *Ramakrishna Mission Boys' Home High School, Rahara*
Grade: 93 % — *2010 - 2016*

Industry Experience

Capital One — *June 2023 onwards*
Business Analyst, Model Validation

- Full scope initial validation of Commercial & Industrial (CNI) and Commercial & Real Estate (CRE) Collateral Loss Given Default (LGD), All Assets & Unsecured LGD, CRE Construction PD (Probability of Default) models covering more than 80$B portfolio exposure, benchmarking and deployment of the models.

- Full scope revalidation of Municipal LGD model (7$B portfolio exposure), writing independent prototype, API code and deployment validation. Awarded 'Statistically Significant Award' from Divisional Model Risk Officer for exceptional contribution in this project.

- Peer review, formal Q&A of TDRR PD, Commercial Finance Notes LGD model along with quarterly monitoring of Municipal Tax PD (Probability of Default), and LGD models.

- Replatforming and Deployment validation of Commercial & Consumer Finance Notes LGD models. Actively involved in Loss Forecasting, stress testing (CCAR, CECL) models.

JPMorgan Chase & Co. — *June 2022 - August 2022*
Intern, Market Risk Analyst

During this internship I was mainly involved in examining performance of different CIB (Corporate Investment Banking) Trading models actively used in FX and Commmodities. I learnt stochastic calculus and its use in statistical trading models. Another focus of this internship was having a deep insight into model validation, and defining a new measure for rating models for OPM (Ongoing Performance Monitoring).
Link: Certificate

Big Data Summer Institute, University of Michigan — *June 2021 - July 2021*
Intern, Team Lead

Our primary focus during this internship was imputation of missing data (of Michigan Medicine) through Regression, Multiple Imputation, Regression Tree, Random Forest, XGBoost and other machine learning techniques. The imputed data was used in statistical modelling for predicting hospitalization outcome for the patients recorded in the Michigan Medicine data.
Link: Certificate

Publications

Breakdown Point Analysis of the Minimum S-Divergence Estimator *April 2023*
arXiv preprint, S.Roy, A.Sarkar, A.Ghosh, A.Basu

In this paper, we develop the results concerning the asymptotic breakdown point for the minimum
S-divergence estimators (in particular the minimum DPD estimator) under general model setups.
The primary result of this paper provides lower bounds to the asymptotic breakdown point of
these estimators which are independent of the dimension of the data, in turn corroborating their
usefulness in robust inference under high dimensional data.
Link: Paper

Ongoing Projects for Upskilling

LTP Direction Prediction *December 2023 onwards*
Individual Project

Developing a time series model in conjunction with fibonacci retracement financial methods for
predicting the direction of option price movement using Index data from Indian stock market.

Butterfly Strategy *July 2023 - December 2023*
Individual Project

Successfully developed a pattern recognition algorithm for trading on the Expiry Date of any index
using Butterfly Strategy, applied my algorithm for backtesting on BankNifty data of Indian stock
market. Predictive accuracy more than 85%, and return on each expiry around 43%.

Pair Trading - Statistical Arbitrage *August 2023*
Individual Project

Developed a statistical and financial model for trading on 2 or more highly correlated commodities,
using data of Indian stock market. Improved the methods already present in literature incorporating the Bayesian approach.

Academic Projects

A Robust Testing procedure *January 2023 - May 2023*
M.Stat Final Year Project, Indian Statistical Institute, Kolkata

Developing a robust testing procedure for removing unwanted variation in gene expression and
identifying correct set of differentially expressed genes via Density Power Divergence

Link: Project Report

Boosting Algorithms and applications *October 2021 - January 2022*
Indian Statistical Institute, Kolkata

Worked on how Boosting Algorithms (mainly Adaboost & XGBoost) can be used for classification
of fraudulent transactions.
Link: Project Report

A new Measure of Precdiction Accuracy of Exit Polls *January 2021 - June 2022*
B.Stat Final Year Project, Indian Statistical Institute, Kolkata

Defined a new measure for prediction accuracy of exit polls using Logistic Regression and supervised
learning methods and implemented this method on different Legislative Election Datasets of India.
Link: Project Report

Time Series Analysis & **forecasting of Alcohol Sales data** *March 2020 - June 2020*
Indian Statistical Institute, Kolkata

Exploratory data (1992-2011) analysis, plotting, de-trending, fitting models (ARIMA, SARIMA) and forecasting with measuring error.
Link: [Project Report](#)

Finding Global Coordinates of My HomeTown – Khardaha *September 2020 - Jan 2021*
Indian Statistical Institute, Kolkata

Detecting outliers, Regression Diagnostics, constructing maps and assigning a global coordinate using Satellite images.
Link: [Project Report](#)

Measuring Frame-Rate of Video-Camera *September 2020 - Jan 2021*
Indian Statistical Institute, Kolkata

Dropped a tiny particle and made a video measuring distance covered in each frame. Model the distance covered with the frame no. and used laws of motion, estimated Frame-rates and errors.
Link: [Project Report](#)

Industry Achievements

- Awarded 'Achievers Award' twice for the best contribution among all the new joiners in Collateral CNI LGD model, and Municipal LGD model validations.

- Awarded 'Statistically Significant Award' from Divisional Model Risk Officer for exceptional contribution in several validations in a very tight timeline.

Academic Achievements

- Rank 3 holder in B.Stat Batch, 2018-2021

- Summer Intern in BDSI, University of Michigan, 2021

- Secured rank 7 (1st year, 2018) and rank 5 (2nd year, 2019) in Simon Maraias Mathematical Competition (SMMC). Qualified CMI Entrance, 2018

- Topper in Senior JBNSTS (Jagadish Bose National Science Talent Search), 2018

- AIR 7843 in JEE ADVANCED, AIR 10758 in JEE MAINS, 196 Rank in WBJEE (2018), 10th Rank in Regional Mathematical Olympiad (RMO), 2015

- Voluntary Faculty in Ramanujan School of Mathematics for JEE, ISI, CMI Entrance (2018-2023)

Technical skills

Programming Languages/Tools	C, R, Python, LaTeX
Strength	Numerical Reasoning, Critical Thinking, Innovation, Data Analysis, Perseverance, Communication

Interests

Applied Statistics	Market and Credit Risk	Model Review	Model Validation	Machine Learning
Statistical Inference	Probability Puzzles	High Frequency Trading		

Science Camps

MTRP	Indian Statistical Institute, Kolkata
JBNSTS Summer Camp	Jagadish Bose National Institute, Kolkata
INMO Training Camp	Indian Statistical Institute, Kolkata