Aheer Sravon

E-Mail | LinkedIn | (+880) 1750497649 | Website

Research Interests

- Price Setting under Uncertainty
- Stochastic Programming with RL
- Convex Approximation
- Reinforcement Learning in Pricing Competition
- Reinforcement Learning in SVRP
- Mixed Integer Programming

Research Experience

Undergraduate Researcher, Department of IPE, BUET January 2024 – March 2025
Project Title: Fraud Detection: A GNN-GAN Approach (Link)
Supervisor: Prof. Dr. Ferdous Sarwar, Dept. of IPE, BUET

- Designed a time-aware experimental pipeline for the IEEE-CIS dataset, constructing train/validation/test splits via temporal partitioning and performing principled missing-value handling and feature normalization.
- Formulated a heterogeneous transaction graph with multiple node and edge types and designed a HeteroTxnGNN architecture using heterogeneous graph convolution; implemented SAGEConv-based message passing across relation types.
- Led adversarial training with alternating generator–discriminator updates, incorporating diversity, sparsity, and consistency regularization; conducted edge-importance analysis to identify influential relational structures and trained the classifier with Focal Loss to address class imbalance.
- Proposed and implemented **Attention-Guided Adaptive Edge Perturbation (AGAEP)** to improve robustness under adversarial edge noise; evaluated performance using Accuracy, AUC-ROC, Average Precision, Recall, Precision, and F1-score.

Reviewer in 8th Industrial & Operations Management Conference - Bangladesh December 2025
Reviewed two conference papers.

- Reviewed and accepted conference paper titled - "Initialization-Free Non-Linear Constrained Optimization Using A Bayesian Self-Supervised MLP."
- Reviewed and accepted conference paper titled - "The Systematic Design and Manufacturing of 'Mr. Money Manager'- An Advanced Money Management Device."

Journal Publications

Sravon, A. (first author), Ibrahim, M., Mazumder, D., & Aziz, R. (2025). "How Market Volatility Shapes Algorithmic Collusion: A Comparative Analysis of Learning-Based Pricing Algorithms." (Under Review - Preprint Link)

Sengupta, S., Sravon, A. (co-author), & Sarwar, F. (2025). "Transforming Retail Supply Chain Management: SARIMA vs LSTM vs FB-Prophet for Demand Forecasting." (Under Review - Manuscript Link)

Ibrahim, M., Sravon, S. (co-author), & Aziz, R. (2025). "A Multi-Echelon Simulation Model for Multi-Product Perishable Supply Chain using VMI." (Under Preparation)

Conference Publications

[1] Sravon, S. (first author), Mazumder, M., Ibrahim M., "Adaptive Sample-Level Framework Motivated by Distributionally Robust Optimization with Variance-Based Radius Assignment for Enhanced Neural Network Generalization Under Distribution Shift," Accepted in *8th IEOM Bangladesh International Conference on Industrial Engineering and Operations Management Dhaka, Bangladesh, December 20-21, 2025.* (Preprint Link)

[2] Sravon, S. (first author) & Sarwar, F., "Fraud Detection: A Graph Theoretical Approach Using Graph Neural Network," *7th IEOM Bangladesh International Conference on Industrial Engineering and Operations Management, 2024.* (DOI)

Projects

Simulating Price Setting using RL Agents Under Demand Shock (Link)

A simulation of price setting competition between reinforcement learning agents.

- Designed and implemented a multi-agent reinforcement learning framework for price-setting competition, developing `QLearningAgent`, `PSOAgent`, `DQNAgent`, and `DDPGAgent` to study strategic pricing behavior.
- Formulated a customizable market simulation environment (`MarketEnv`), explicitly modeling demand dynamics and defining four classes of exogenous demand shocks to analyze learning stability and convergence under uncertainty.
- Designed reproducible experimental pipelines using Bash scripts to systematically evaluate agent performance under shock and no-shock regimes.

Comparison of Forecast Models: SARIMA, SARIMAX, LSTM, CNN-LSTM, FB-Prophet (Link)

A comparison between the forecast models on two different types of datasets.

- Designed a modular forecasting framework implementing classical and deep learning models (SARIMA, SARIMAX, LSTM, CNN–LSTM, FB-Prophet) to enable controlled methodological comparison across time-series settings.
- Developed a unified evaluation and visualization pipeline, integrating diagnostic plotting within each model class to support systematic residual and distributional analysis.
- Conducted empirical forecasting studies on heterogeneous datasets, predicting `cups_sold` from weather data and `weekly_sales` from the Walmart sales dataset to assess model generalization across domains.
- Performed comprehensive error and diagnostic analyses using Q–Q plots, residual time-series analysis, kernel density estimation, and autocorrelation function (ACF) diagnostics.

OR Project: Optimizing India's Coal Supply Chain: A Transportation Modeling Approach (Link)

A transportation problem to minimize coal shipping cost from seven coal mines to ten power plants.

- Formulated the mathematical transportation model, objective function, and constraints.
- Calculated a solution to the problem using the R package `lpSolve`.

Customer Churn Analysis (Link)

A statistical analysis and exploratory data analysis of customer churn data which aims to decipher the reason behind customer churn.

- Performed uni-variate, bi-variate, & distributional analysis of churn data.
- Performed feature engineering for exploratory data analysis, handled missing data. Performed logistic regression, and random forest models for feature importance.
- Performed cohort flagging, chi-square test to test null hypothesis against alternate hypothesis.
- Use the Kaplan-Meier estimator to determine the percentage of customers that are still active after a certain number of months.

Implementation of Game of Life (Link)

Implementation of a zero-player cellular automation invented by British mathematician John Horton Conway in 1970.

- Implemented the four rules of Game of Life – Underpopulation, Survival, Overpopulation, and Reproduction.
- Constructed 3 initial conditions for the simulation – F-Pentomino, Acorn, and Glider.

Industrial Experience

Industrial Attachment June 2024 – July 2024

Akij Textile & Mills Ltd., Golora, Manikganj

- Gained hands-on experience in manufacturing operations, process optimization, and quality assurance.
- Calculated and assessed: loom efficiency, pick cost analysis, risk assessment worksheets, Pareto charts for daily fabric rejects.

Industrial Visits

Bangladesh Industrial Technical Assistance Centre - BITAC — November 2024

- Observed advanced manufacturing technologies: gear hobbing, CNC machining, EDM.

British American Tobacco Bangladesh — July 2023

- Explored primary and secondary leaf processing; observed logistics handling.

Oral Presentation

7th IEOM Bangladesh Conference (2024):

- Fraud Detection: A GNN Approach.

8th IEOM Bangladesh Conference (2025):

- Adaptive Sample-Level Framework Motivated by Distributionally Robust Optimization with Variance-Based Radius Assignment for Enhanced Neural Network Generalization Under Distribution Shift (*First Runner-Up*).

Skills

Programming: Python (OR-Tools, cvxpy, PyTorch), R & RStudio for EDA, Bash Scripting, Lua Programming (Neovim)
Simulation / Modeling: MATLAB, SolidWorks, DS CATIA V5, Arena, AutoCAD
Productivity: LaTeX, MS Excel, MS Word, MS PowerPoint

Education

BSc in Industrial and Production Engineering — March 2025
Bangladesh University of Engineering and Technology (BUET), Dhaka
CGPA: 3.15 (On a scale of 4.00)

Higher Secondary Certificate — July 2019
Munsi Manik Mia Degree College, Narail, Khulna
GPA: 5.00 (On a scale of 5.00)

Core Courses

- Probability and Statistics
- Manufacturing Processes
- Supply Chain Management
- Operations Management
- Numerical Analysis
- Quality Management
- Machine Tools
- Operations Research
- Engineering Economy

Standardized Test Scores

IELTS: 7.00 (Reading: 7.0, Listening: 7.5, Speaking: 6.5, Writing: 7.5)
GRE: Quantitative Reasoning: 163, Verbal Reasoning: 154

References

Dr. Ferdous Sarwar
Professor, Dept. of IPE, BUET
Email: ferdoussarwar@ipe.buet.ac.bd

Dr. Syed Mithun Ali
Professor, Dept of IPE, BUET
Email: mithun@ipe.buet.ac.bd