

Aheer Sravon

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Research Interests

- Price Setting under Uncertainty
- Stochastic Programming
- RL & SVRP in Healthcare
- Reinforcement Learning in Healthcare
- 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

- Created train/val/test splits using time based partitioning in IEEE-CIS dataset. Handled missing values and normalized features.
- Built a heterogeneous graph (HeteroData) with transaction nodes. Implemented HeteroTxnGNN using heterogeneous graph convolution. Used SAGEConv layers for message passing across different edge types.
- Performed adversarial training with generator and discriminator steps. Added regularization losses (diversity, sparsity, consistency). Conducted edge importance analysis to identify critical edge types. Trained GNN classifier to with Focal Loss to handle class imbalance.
- Developed Attention-Guided Adaptive Edge Perturbation (AGAEP). Computed metrics: Accuracy, AUC-ROC, Average Precision, Recall, Precision, F1-score.

Journal Publications

Sravon, A., Ibrahim, M., Mazumder, D., & Aziz, R. (2025). Price Setting Competition Under Uncertainty with Reinforcement Learning: Q, PSO, DQN, DDPG. (Under Review)

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

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

Conference Publications

[1] Sravon, S., 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. & 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.

- Created reinforcement learning agent classes – QLearningAgent, PSOAgent, DQNAgent, DDPGAgent responsible for setting the price.
- Constructed the environment class – MarketEnv – responsible for the simulation. Defined and implemented four types of shock conditions.
- Prepared Bash Scripts to run under shock and no shock conditions.

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

(Link)

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

- Created reusable forecasting classes for each of the forecasting methods.
- Incorporated plotting functionality in each of the forecasting classes.
- Using the classes, predicted cups_sold on weather data, and weekly_sales on walmart dataset.
- Generated qqplots, residual time series plots, KDE plots, autocorrelation function (ACF) plots.

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.

CATIA V5 Project: Concrete Mixer

(Link)

A 3D design project comprising part creation and assembly of the final model.

- Developed key components (base, floor, front wheel) and created the final assembly.
- Applied geometric constraints, symmetry operations, and assembly features to construct parts and assembly.

SolidWorks Project: Adjustable Hospital Bed

(Link)

A 3D design project consisting of part planning, part creation, and assembly of the parts to construct the final model.

- Modeled key components and assembled the final product.
- Conducted a basic motion study to verify wheel movement and overall kinematic alignment.

Product Design Project: Smart Speed Breaker

(Link)

A product design project where we developed a smart speed breaker.

- Developed and assembled key parts, performed motion analysis, created animation and exploded view.
- Performed the models stress, strain and rigidity analysis in ANSYS.
- Fully constructed and demonstrated the final product.

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.

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 for feature importance.
- Performed cohort flagging, chi-square test to test null hypothesis against alternate hypothesis.
- Use Kaplan-Meier estimator to determine the percentage of customers that are still active after a certain number of months.

Industrial Experience

Industrial Attachment

June 2024 – July 2024

Akij Textile & Mills Ltd., Golara, 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.

Skills

Programming: Python, C & C++, R & RStudio for EDA, Bash Scripting, Lua Programming (Neovim), MATLAB

Simulation / Modeling: SolidWorks, DS CATIA V5, Arena, AutoCAD

Productivity: \LaTeX , MS Word, MS PowerPoint

Education

BSc in Industrial and Production Engineering

March 2025

Bangladesh University of Engineering and Technology (BUET), Dhaka

CGPA: 3.15 (In a scale of 4.00)

Higher Secondary Certificate

July 2019

Munsi Manik Mia Degree College, Narail, Khulna

GPA: 5.00 (In a scale of 5.00)

Core Courses

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

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

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