SHIKHAR SRIVASTAVA

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EDUCATION

** in progress*

Qualification	Institute / Board	CGPA / Percentage	Year
M. Tech in Industrial and Management Engineering	IIT Kanpur	8.47*	2021 - Present
B. Tech in Civil Engineering	IIT (BHU)	8.78	2017 - 2021
Intermediate	CBSE	85.4%	2017
High School	CBSE	9.8	2015

PROFESSIONAL EXPERIENCE

Operations Research Intern | Ecom Express Limited, Gurgaon *May 22 – July 22*

Project - Determination of reverse route for vehicles to minimize the difference between utilization of forward and reverse run

- Analyzed dataset of **forward run** and combined data from it which was necessary to determine the optimal reverse route
- Built **business constraints** like node connections, path constraints, **vehicle constraints** like its capacity and maximum allowed distance
- Used **Networkx** library to make the graph containing nodes (hubs, delivery centre (DC)) and edges (connections) among hubs and DC
- For each new OD pair found utilization on each path from origin to destination which had path distance within the threshold distance
- Vehicles were allotted to the path from origin to destination which had maximum utilization
- Made **heuristic** algorithm to determine the route which has maximum reverse utilization considering various constraints

ACADEMICS PROJECTS

Prediction of Axis bank stock price using Hidden Markov Model | Stochastic Processes *Apr 22*

- Studied algorithms of Hidden Markov chain like **Forward**, **Backward**, **Viterbi** and **Baum Welch algorithm** and their applications
- **3 observed states** were extracted from company's stock price data: '**fracChange**', '**fracHigh**', '**fracLow**'
- **GaussianHMM** library was used to implement the **Hidden Markov Model** in python and to predict the prices in future
- The **prediction** of stock price of the company's stock was done with **mean error** in the price prediction being **Rs. 7.58**

Classification of feedbacks based on amazon customer reviews | Applied Machine Learning | NLP *Apr 22*

- Performed **sentiment analysis** on amazon Alexa customer reviews and done **EDA** with positive and negative reviews
- Created a word cloud for positive and negative reviews, performed data cleaning and removed punctuations and **stop words**
- Performed **count vectorization**, applied **naïve bayes** classifier and **logistic regression** method
- Accuracy obtained from Naïve bayes classifier model was 92.5% and that obtained from logistic regression method was 94.9%

Determining factors that affect world happiness index | SMBA | Linear regression *Aug 21*

- Created Co-relation matrix and drawing conclusions using scatter plots and simple linear regression.
- **Multiple linear regression** techniques to calculate $\mathbf{R^2}$ and **adjusted** $\mathbf{R^2}$ using p and t-stat values for hypothesis testing in python.
- R^2 and adjusted R^2 value for linear regression are found to be 0.844 and 0.843 respectively
- Identifying important target factors so that country government can target factors with multiple strategies to improve.

SELF PROJECTS

Formulation and solution of Capacitated Vehicle Routing Problem *Jul 22*

Problem – Given the set of **14 customers**, their demands and service time; **2 depots**; **4 vehicles**, their capacity, maximum allowed tour distance and time, make a route of vehicles that minimizes total distance with fulfilling demands of customers

- Formulated **Mixed Integer Linear Programming** using **docplex** library and generated graph for visualization using **Networkx**
- Solved MILP using **CPLEX** optimization solver and mapped the route on graph using Networkx

Solution of Capacitated Vehicle Routing Problem using cost saving heuristic *Jul 22*

Problem – Give the set of **62 customers**, their demands and service time; **4 depots** with fixed set of vehicles; vehicle capacity and maximum allowed distance and time, make a route that minimizes total distance with fulfilling demands of customers

- Reduced **4-depot VRP** to **4 one-depot VRP** by formulating objective and constraints to map exactly one depot to each customer
- Developed **Cost saving heuristic** for one depot VRP and found routes for each vehicle from depot to customers and back to depot

COURSEWORK AND SKILLS

** in progress*

Thesis*	Stochastic sequential assignment problem
Courses	**Probability and Statistics** | **Operations Research for Management** | Stochastic Processes | **Advanced Decision Models** | Applied Machine Learning | Statistical Modelling of Business Analytics
Certifications	C++ From beginner to expert | Introduction to data analysis using Excel | PowerBI Zero to Hero | Optimization with python – Operations Research problems | Go from SQL beginner to expert
Technical skills	Python | C++ | PowerBI | MS Excel | OOPS | Pandas, **Networkx**, Numpy, **Pyomo**, **Docplex** | **CPLEX** | ORTools
Interests	**Mathematics** | Operations Research | Network Optimization | Game theory | Framing mathematics and logic questions

ACHIEVEMENT & EXTRA CURRICULAR ACTIVITIES

- Secured **10th position** in **Regional Mathematical Olympiad** 2015 (IMO Stage – 2) at state level (Uttar Pradesh)
- Participated in **ROADEF challenge 2022** – Truck loading - to pack set of items to minimize the number of trucks and inventory
- Secured AIR 930 in GATE 2021 with mathematics paper
- Secured AIR 4680 in JEE Advanced 2017

POSITION OF RESPONSIBILITY

- Design Executive, Centenary Celebrations and Global Alumni Meet 2019, IIT(BHU)
- Events coordinator, Technex 2019, annual techno-management fest of IIT(BHU)
- Events Team Coordinator, Shilp '18, fest of Civil Department, IIT(BHU)
- Student Executive at Student Alumni Interaction Cell, IIT(BHU) for the session 2018-19