Saket Kumar

Master of Business Analytics | | Indian Institute of Science, Bangalore

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Education

YEAR	DEGREE	INSTITUTE	RESULT
2024*	**M. Mgt**	**Indian Institute of Science, Bangalore**	**8.3/10***
2022	B. Tech	University of Agricultural Sciences| Bangalore	**8.47/10**
2017	12TH (C.B.S.E)	Indian Public School | Purnia Bihar	**84.6%**
2015	10th (C.B.S.E)	Millia Convent English School | Purnia Bihar	**10/10**

Internship

Bosch Private Limited *June '23-July '23*

Data Scientist Intern - Mobility Solutions

Project 1: EV Range Prediction System

- **Developed a range prediction system for electric vehicles (EVs). We proficiently handled real-world EV data from the BMW i3(60 ah), encompassing environmental, vehicle, battery, and heating circuit data.**
- **Data Analysis and Preprocessing:** Conducted **Exploratory Data Analysis (EDA)** to identify correlations and significant features affecting EV range. Employed data preprocessing techniques, including **feature selection** and normalization, to optimize model performance**.**
- **Model Selection and Evaluation:** Utilized M**ultiple Linear Regression, Random Forest**, and **Deep Neural Network** algorithms for EV range prediction and employed **Recursive Feature Elimination (RFE)** to identify crucial features for improved model accuracy**.**
- **Results and Model Performance:** Using the Random Forest algorithm, attaining an R-squared of up to **0.96**. Produced models with a **Mean Absolute Error (MAE)** of **0.006,** indicating precise range predictions.
- **Practical Deployment and Application**: Created a **Digital twin model** to simulate real-world EV range prediction scenarios and deployed the model on an **AWS EC2** instance.

Project 2: Compatibility-Based Vehicular Ad-Hoc Reliable Routing

- **Incorporated AI and ML techniques into vehicular networks to enhance proactive communication and predictive decision-making.**
- **Objective**: Developed a reliable routing mechanism addressing multi-hop ad hoc communications challenges and dynamic high-mobility environments**.**
- **Approach:** Implemented a proactive approach to **predicting connectivity duration using only the BSM location, velocity, and direction** between vehicles**.**
- **Evaluation:** Assessed **five machine-learning classification** techniques using the Open Street Map dataset to evaluate the effectiveness of the proposed scheme**.**
- **Comparison:** Conducted a comparative analysis of machine learning techniques based on established metrics such as **accuracy, computational time, misclassification rate**, and **F1 score.**

Achievements

- Secured **All India Rank 6** (AIR) in **Gate 2022**. *Mar '2022*
- Awarded **National Talent Scholarship** for the tenure of my **bachelor's degree**. *Aug '2018-Jul '2022*

Projects

Model Building - Auto dataset MPG:

- Initial visual analysis indicates relationships between **the independent variables and the dependent variable (mpg).**
- A Multiple linear regression model is built, considering **non-linear effects, interactions**, and **variable discretization**. Model selection methods like Forward selection identify the most suitable model with AIC criteria.
- A detailed **diagnostic check**, including residual analysis, is conducted to ensure the chosen model fits the data well and adheres to underlying model assumptions.

USD-INR Forecasting:

- **Analyze weekly Price series evolution via time series plot**.
- Select a suitable **ARIMA** model for **the log-Price series**, compare models, and **assess assumptions** of **White Noise**.
- Captured **Impulse Response Function [IRF], Auto Correlation Function [ACF]** and **PACF.**
- **Forecast USD-INR exchange rates** for early 2018 and evaluate forecast quality.

Statistical Test on Titanic Dataset

- **Analyzed Titanic passenger data** evaluating significant age distribution differences between survivors and non-survivors using hypothesis testing and also checking for normality such **KS test and other battery of tests.**
- Conducted a gender-controlled analysis to assess age distribution variances between survival groups.

Quora Question Pair Similarity

- Developed an NLP-driven model to assess **question pair similarity on Quora**, enhancing content relevance and user engagement through accurate duplicate detection.
- Extracted various text-based features, including **TF-IDF and word embeddings**, to represent the textual content of the questions.
  Implemented diverse machine learning and deep learning models, including **Logistic Regression,** and **Random Forest** predicting question pair similarity.
- Utilized evaluation metrics like **Accuracy, Precision, Recall, F1-score**, and **ROC-AUC** to assess model performance and fine-tune hyperparameters.

Portfolio Optimization:

- Picked 25 stocks that are listed in the **NSE** during the time of the last 20 years. Obtained the **efficient frontier**,
- the **minimum variance portfolio**, and the portfolio with the **highest Sharpe ratio**.
- Used **random weight portfolio allocation** method and **quadratic programming approach.**

Customer Behavior Analysis on E-Commerce Data:

- Conducted comprehensive data analysis for **Amazon's customer buying patterns**, cleaning, and correcting 4099 data points using Power BI and Python.
- Identified key trends in **categories, age groups,** and **payment modes**, informing strategic decisions such as promoting online payments and targeting weekend sales.

Skills and Coursework

- **Languages:** Python, R, SQL
- **Framework:** Flask, AWS, PyTorch, TensorFlow
- **Core Courses:** Applied Probability and Statistics, Corporate Finance, Managerial & Macroeconomics, Applied Operations Research, Regression and Time Series Analysis, Data Mining, Decision Models, and Operation Management.
- **Extras:** Machine Learning – Cornell University, Deep Learning – NPTEL (IIT Madras)

Position of Responsibility

- **Class Representative (COAE, UAS):** Acting as the point of contact between professors and students and representing the views.
- **Student Volunteer** for **National Service Scheme.** ***Aug '2018-Jul '2020***