Task 3

Public Bike Sharing Ridership Analysis

INTRODUCTION

Public bike-sharing programs have revolutionized urban transportation by providing an affordable, convenient, and environmentally friendly alternative to traditional commuting methods. These systems, available in many cities worldwide, allow users to rent and return bikes at various docking stations, facilitating short, spontaneous trips across urban areas. The rise of bike-sharing services has contributed significantly to reducing traffic congestion, lowering emissions, and promoting healthier lifestyles. By analyzing ridership data, we can gain valuable insights into peak usage times, popular routes, and user demographics, informing improvements and expansions to better serve communities.

DATA CLEANING AND ANALYSIS

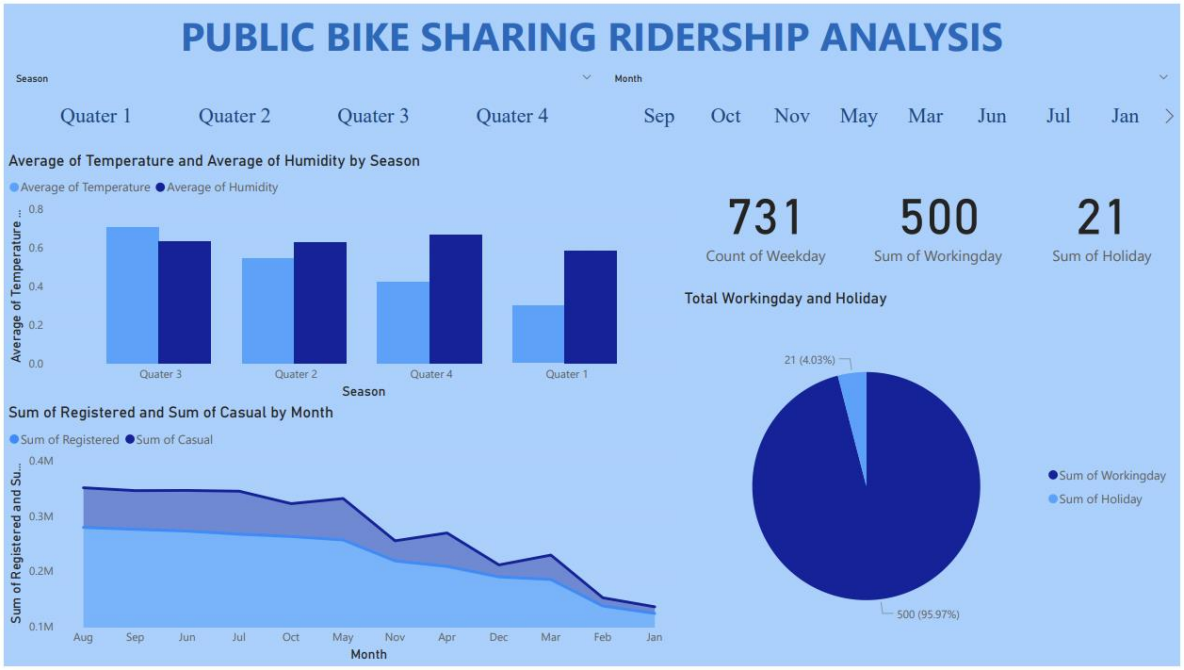
- **Data Cleaning**
  1. **Missing Values:** Handle missing values appropriately.
  2. **Data Types:** Ensure all columns have correct data types.
  3. **Date and Time Parsing:** Convert date and time columns to datetime objects.
  4. **Duplicate Records:** Remove duplicate records.
- **Data Analysis**
  1. **Peak Ridership Periods:** Identify hours, days, and months with the highest ridership.
  2. **Popular Stations:** Determine the most frequently used start and end stations.
  3. **User Type Variations:** Analyze ridership patterns across different user types (e.g. registered vs. casual users).
  4. **Weather Influences:** Investigate how different weather conditions impact ridership.

METHODOLOGY:

The analysis involved several key steps:

1. **Data Cleaning and Preparation:** We ensured the data was clean, handled missing values, and normalized variables for consistency.
2. **Exploratory Data Analysis (EDA):** We conducted EDA to identify trends, patterns, and relationships within the data.
3. **Visualization:** We created various visualizations to aid in understanding the data and to communicate findings effectively.
4. **Statistical Analysis:** We performed correlation and regression analyses to determine the impact of different factors on bike rentals.
5. **Predictive Modelling:** We developed a predictive model to forecast bike rentals based on significant variables.

DASHBOARD:



OVERVIEW

This dashboard provides a comprehensive analysis of bike ridership data, focusing on various temporal factors and user types. It uses visualizations to present insights into bike usage patterns over time, differentiating between casual and registered users, holidays versus working days, and monthly trends.

Slicers

- Months Selector: The top bar allows filtering the data by month (January to December), enabling a detailed view of bike rentals for a selected month.

- Quarter Selector: There is also an option to filter data by quarters (Q1 to Q4), facilitating seasonal analysis.

Total Working Days and Holidays

- Sum of Working Days: The number 500 represents the total count of working days in the dataset.

- Sum of Holidays: The number 21 represents the total count of holidays in the dataset.

- Insights: This highlights the dominance of working days over holidays in the dataset.

Holiday vs. Working Day Rentals

- Description: A donut chart visualizing the proportion of bike rentals on holidays versus working days.

- Insights: The chart shows that the majority (95.98%) of bike rentals occur on working days, while only a small fraction (4.02%) occurs on holidays.

CONCLUSION:

This analysis of the bike-sharing system reveals key insights into usage patterns and influencing factors. Seasonal trends show higher rentals in warmer months and lower rentals during colder periods, with registered users dominating rentals, particularly on working days. Weather conditions significantly affect rental activity, with clear and mild weather encouraging more usage. These findings highlight opportunities for targeted strategies such as seasonal promotions, weather-responsive incentives, and efforts to convert casual users to registered ones.