Task 3

Public Bike Sharing Ridership Analysis

INTRODUCTION

Public bike-sharing schemes have transformed urban mobility by offering a practical, economical, and eco-friendly substitute for conventional modes of transit. These systems, which are available in many cities across the world, let users hire and return bikes at different docking stations, making quick, impromptu travels within cities possible. Growing numbers of people are using bike-sharing systems, which has greatly helped to cut emissions, ease traffic, and encourage healthier living. We may learn a great deal about peak usage periods, well-travelled routes, and user demographics by examining ridership statistics. This information will help us make enhancements and expansions that will 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.

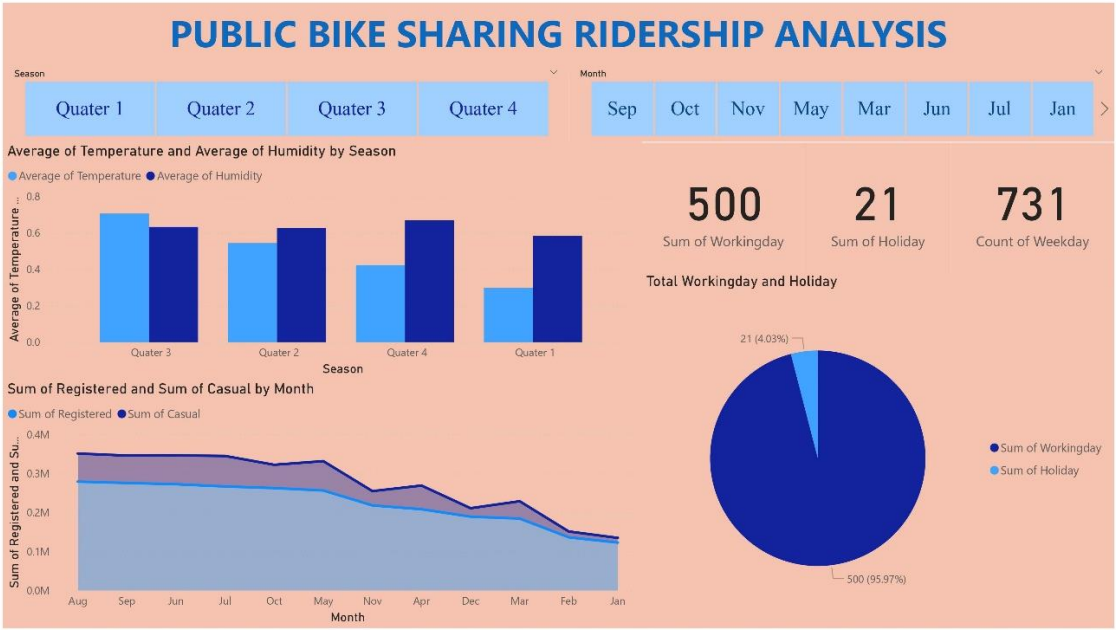
3. **User Type Variations:** Analyse ridership patterns across different user types (e.g. registered vs. casual users).
4. **Weather Influences:** Investigate how different weather conditions impact ridership.

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 offers a thorough examination of bike ridership data with a focus on different user types and temporal aspects. Through the use of visualizations, it provides insights on the patterns of bike usage over time, highlighting differences between registered and casual riders, working days and holidays, 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:

The examination of the bike-sharing system provides important information on usage trends and motivating elements. Seasonal patterns indicate that rentals are higher during the warmer months and lower during the colder ones, with registered users accounting for the majority of rentals, especially during workdays. Weather has a big impact on rental activities; clear, comfortable weather encourages increased use. These results point to potential for focused tactics like rewards that adjust based on the weather, seasonal promotions, and campaigns to turn non-registered users into registered ones.