**London Bike Rides Analysis Dashboard**

**Introduction**

In this project, we leverage Tableau for data visualisation to gain insights into bike sharing patterns in London. By analysing various factors such as weather conditions, time of day, and bike usage trends, we aim to uncover meaningful insights that can inform decision-making processes.

**Overview**

This project aims to analyze data from London's bike-sharing system to uncover trends and patterns in bike rides. The process involves programmatically gathering the necessary data, followed by a thorough exploration, assessment, and manipulation using Python and the pandas library. The final phase involves creating impactful visualizations in Tableau to effectively communicate the findings. These visualizations provide insights into various aspects of bike-sharing usage, such as peak usage times, popular routes, and demographic patterns of riders.

**Project Structure**

This project analyzes London bike-sharing data to identify trends and patterns in bike rides. The analysis involves three main steps:

1. Programmatically gathering data.
2. Exploring, assessing, and manipulating the data using Python and the pandas library.
3. Creating impactful visualizations in Tableau.

**Step-by-Step Process**

**1. Data Acquisition**

* **Data Source:** Kaggle "London bike sharing dataset".
* **Data Import:** Import the dataset into a Python Jupyter notebook using the Kaggle API or from the local machine.

**2. Data Preparation and Cleaning**

* **Column Renaming:** Rename columns for clarity and consistency.
* **Humidity Transformation:** Convert humidity values to percentages.
* **Season and Weather Mapping:**
  + Create dictionaries for seasons and weather conditions.
  + Convert the 'seasons' column data type to string and map numeric values (0-3) to written season names.
  + Convert the 'weather' column data type to string and map numeric values to descriptive weather conditions.
* **Validation:** Check the dataframe to ensure the mappings are accurate.
* **Data Export:** Save the cleaned and transformed dataframe to an Excel file named london\_bikes\_final.xlsx for use in Tableau visualizations.

**3. Data Visualization in Tableau**

* **Data Import:** Import the london\_bikes\_final.xlsx file into Tableau and ensure the data types are correctly set.
* **Parameter Creation:**
  + **"Moving Average Period":** String datatype with options for day, week, and month.
  + **"Moving Average Duration":** Integer datatype with a default value of 10.
  + **Display Parameters:** Show both parameters in the Tableau dashboard for user interaction.
* **Calculated Fields:**
  + **Moving Average Period Measure**
  + **Min Month and Max Month**
* **Line Chart:** Create a line chart that dynamically updates based on the selected parameters and calculated fields.
* **Worksheet Actions:**
  + Enable "Update moving average period set".
  + Add a reference band in the line chart to highlight selected periods.
* **Additional Calculated Fields:**
  + **"In Range":** Attribute field for filtering data within the selected date range.
  + **"Moving Average Rides"**
  + **"In Range Rides":** Used to filter total rides within the selected range.
* **Wind Bins and Highlight Table:**
  + Create wind speed bins (wind kph) and generate a highlight table with rows as temperature (temp C) and columns as wind (wind kph).
* **Bar Charts for Tooltips:**
  + **Weather vs. Count of Rides**
  + **Hour of Time vs. Count of Rides**

**4. Dashboard Design**

* **Sheets and Layout:** Combine all sheets into a cohesive dashboard.
* **Tooltips:** Edit tooltips to include the two bar charts (weather and hour).
* **Parameters and Filters:** Add user-defined parameters and filters for interactive analysis.

**Conclusion**

The analysis successfully revealed significant trends and patterns in London’s bike-sharing data. Key findings included the identification of peak usage periods, commonly used routes, and demographic factors influencing bike usage. The Tableau visualizations provided a clear and accessible way to understand these insights, offering valuable information for city planners and bike-sharing program managers. The project demonstrated the potential of data analysis and visualization tools in extracting actionable insights from raw data.

**Recommendations**

1. **Optimizing Bike Availability:** The analysis suggests the need for a strategic redistribution of bikes during peak hours and in high-demand areas. Implementing real-time tracking and dynamic redistribution can improve service efficiency.
2. **Expanding Infrastructure:** Data indicates certain areas with high demand but limited infrastructure. Expanding docking stations and bike lanes in these areas could accommodate more riders and enhance safety.
3. **Targeted Marketing Campaigns:** The demographic analysis suggests potential for targeted marketing campaigns to increase ridership among underrepresented groups, encouraging a broader demographic to use the service.

**Reflection**

This project highlighted the importance of data-driven decision-making in managing urban transportation systems. The combination of Python for data manipulation and Tableau for visualization proved effective in transforming raw data into meaningful insights. The process underscored the value of thorough data cleaning and preparation, which are crucial steps in ensuring the accuracy and relevance of the analysis. Moving forward, integrating real-time data analysis could provide even more dynamic and actionable insights, helping to continuously improve the efficiency and accessibility of the bike-sharing system in London.