UNDERSTANDING THE POSSIBLE FACTORS INFLUENCING THE DEMAND OF CYCLES

Riddhiman Munshi
MBA Business Analytics

"Data-Driven Analysis and Strategic Optimization for Micro-Mobility Service Providers"

Tools Used:

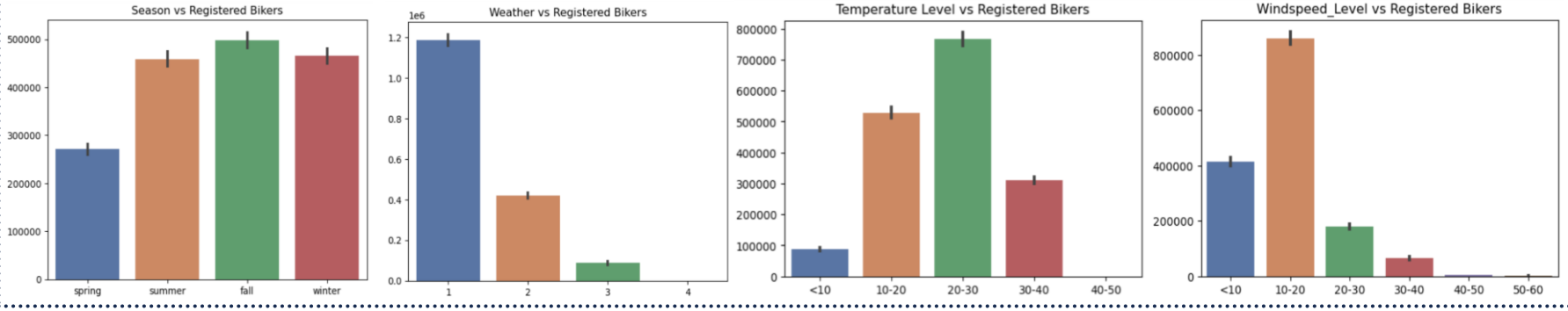
PROBLEM → BikeSCM, a micro-mobility service provider in India has recently suffered considerable dips in its revenues.

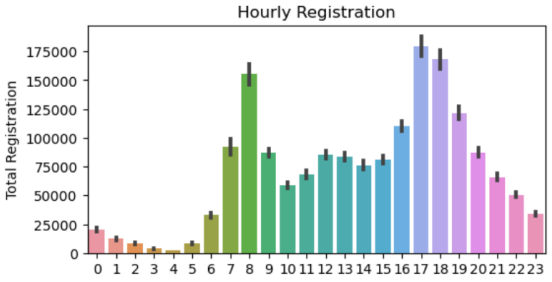
OBJECTIVE → To identify and understand the key factors that influence the demand for shared cycles in the Indian market.

This understanding will help BikeSCM in making informed decisions to improve their business strategy, optimize resource allocation, and potentially increase revenues.

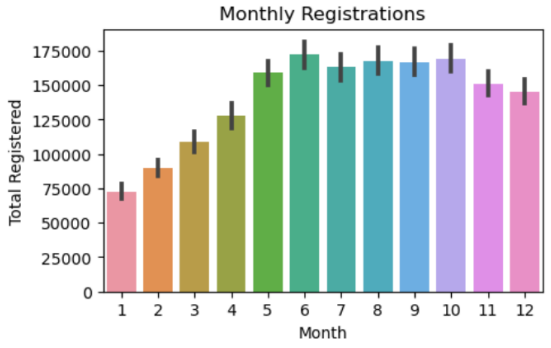
METHODOLOGY → Performed Data Cleaning and Feature Engineering → Performed Exploratory Data Analysis → Developed and Evaluated Machine Learning Models → Provided Actionable Insights and Recommendations.

Conducted EDA to visualize relationships between variables and identified potential factors influencing cycle demand.





8 AM and 5 PM are the peak hours of demand.



From June to October, there is a consistent and notable level of demand.

Cycle demand tends to be **lowest during the spring** but **peaks during the fall**, with winter and summer seasons following closely in terms of maximum demand.

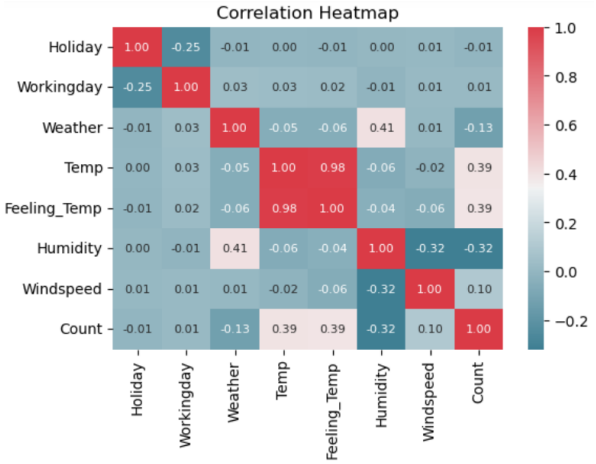
The highest demand for cycles was observed during clear or partly cloudy weather conditions, with a decrease in demand as weather conditions worsened.

The demand for cycles reaches its peak within the temperature range of 20-30 degrees Celsius, whereas demand declines during periods of extreme temperatures.

The peak demand for cycles occurred when wind speeds ranged between 10-20m/s, whereas demand was lowest during periods of high wind speeds.

Possible causes of the dip in demand for cycles may be environmental changes, specifically extreme temperatures which have been shown to impact the demand for cycles.

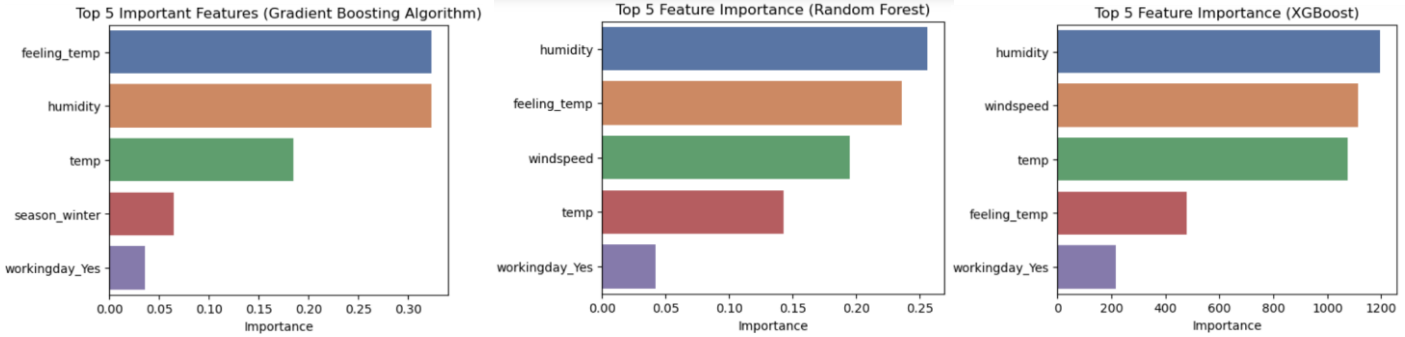
EVALUATING WHICH FACTORS EFFECTIVELY DESCRIBE THE DEMAND FOR CYCLES



Weather, Temperature, Humidity and Windspeed have a good chance of influencing the Demand for Cycles.

We built multiple Predictive Machine Learning Models to find the importance of features in influencing the demand for cycles.

The top 5 influential features identified by our various machine learning models, impacting the demand for bicycles, are as follows:



After comparing various Machine Learning models, we can confidently conclude that **Temperature, Humidity, Windspeed and Working Day** influence the cycle demand.

NOTE: We have selected 3 Machine Learning Models out of various others based on various parameters like R-squared, MAPE, MSE etc to understand which factors are playing a strong role in determining the demand for cycles. Also we have assumed than no other factor apart from the given ones have any impact on the demand for cycles.

Business Strategy to boost sales and increase revenue of BikeSCM.

1. **DATA ANALYSIS AND SEGMENTATION** → **Segment customers** based on their **usage patterns, demographics, and preferences** and **identify peak hours/days** of demand based on weather conditions and working days.
2. **SERVICE EXPANSION AND OPTIMIZATION** → **Increase the availability of bicycles during peak demand hours and days**, especially on working days with favourable weather conditions and optimize the distribution of bicycles across stations based on historical demand data and current weather forecasts.
3. **WEATHER-BASED PROMOTIONS** → Launch targeted marketing campaigns and promotions based on weather forecasts. For example, **offer discounts or incentives when the weather is favourable for cycling.**
4. **CUSTOMER ENGAGEMENT PROGRAM** → **Collect feedback from customers regarding their experience and preferences to improve services continuously** and engage with customers through social media platforms and community events to build a strong brand presence.
5. **CONTINUOUS MONITORING AND EVALUATION** → **Monitor key performance indicators** such as **revenue, usage rates, customer satisfaction, and environmental factors** regularly and analyze the effectiveness of strategies and make adjustments based on feedback and market trends to ensure long-term success.