BIKE DEMAND EDA AND LINEAR REGRESSION MODEL

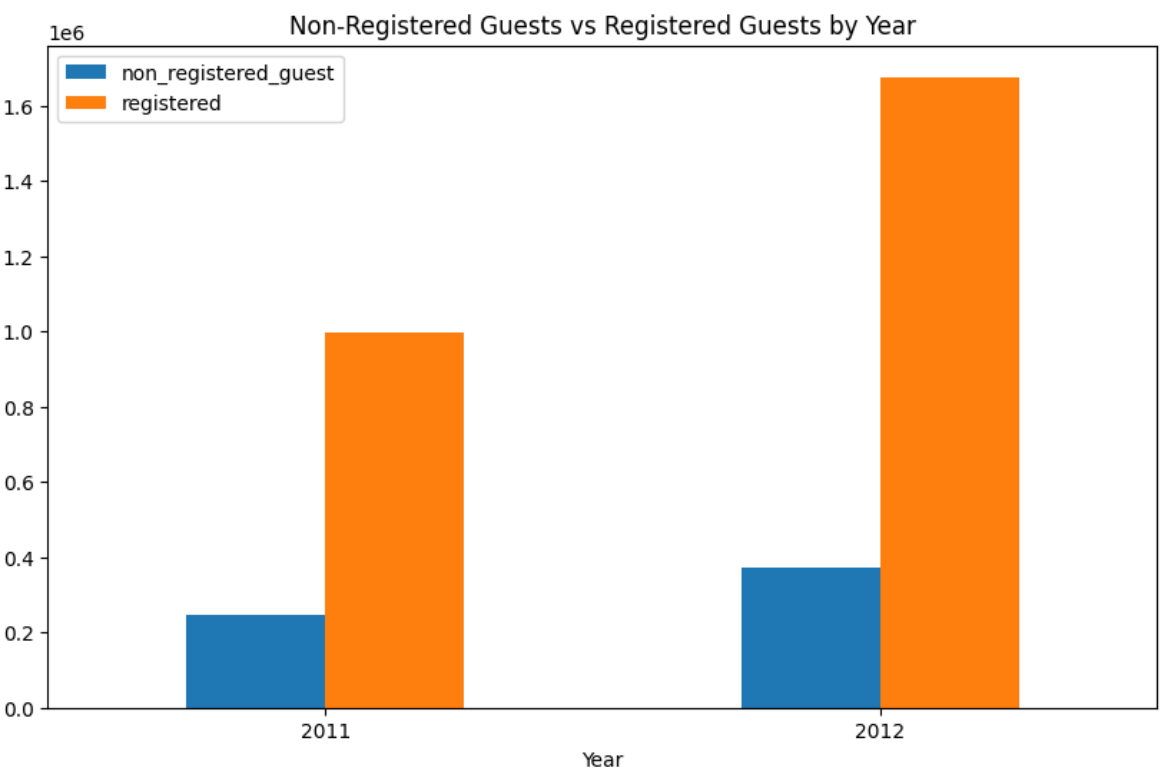
Executive Summary

- Overview:

This analysis explores the factors influencing bike rental demand, focusing on time-based patterns, weather conditions, seasonality, holidays, and working days.

Key Findings

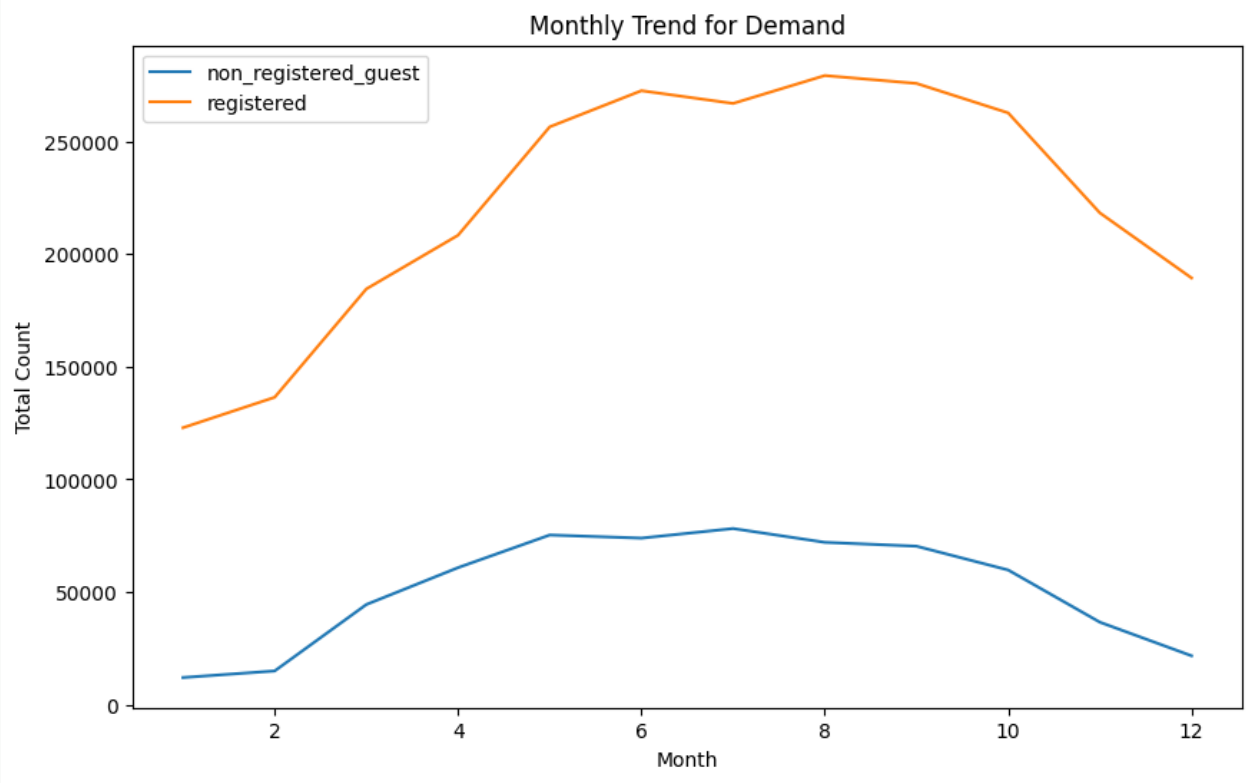
- **Seasonality**: Fall and Summer show the highest demand, with Spring being the lowest.
- **Daily Patterns**: Peak demand for registered users occurs during commuting hours (8-9 AM, 5-6 PM); non-registered users show steady demand throughout the day, peaking midday.
- **Weather Impact**: Moderate temperatures (around 0.6 on the scale) and mid-range humidity levels correlate with higher demand. Extremely low or high temperatures and humidity reduce demand.
- **Non-Registered Guests vs. Registered Users**: Registered users account for the majority of bike rental demand compared to non-registered guests.
- **Linear Regression Score:** R-squared: 1.0 and Mean Squared Error: 4



KEY FINDINGS

The number of registered guests is significantly higher than non-registered guests in both 2011 and 2012.

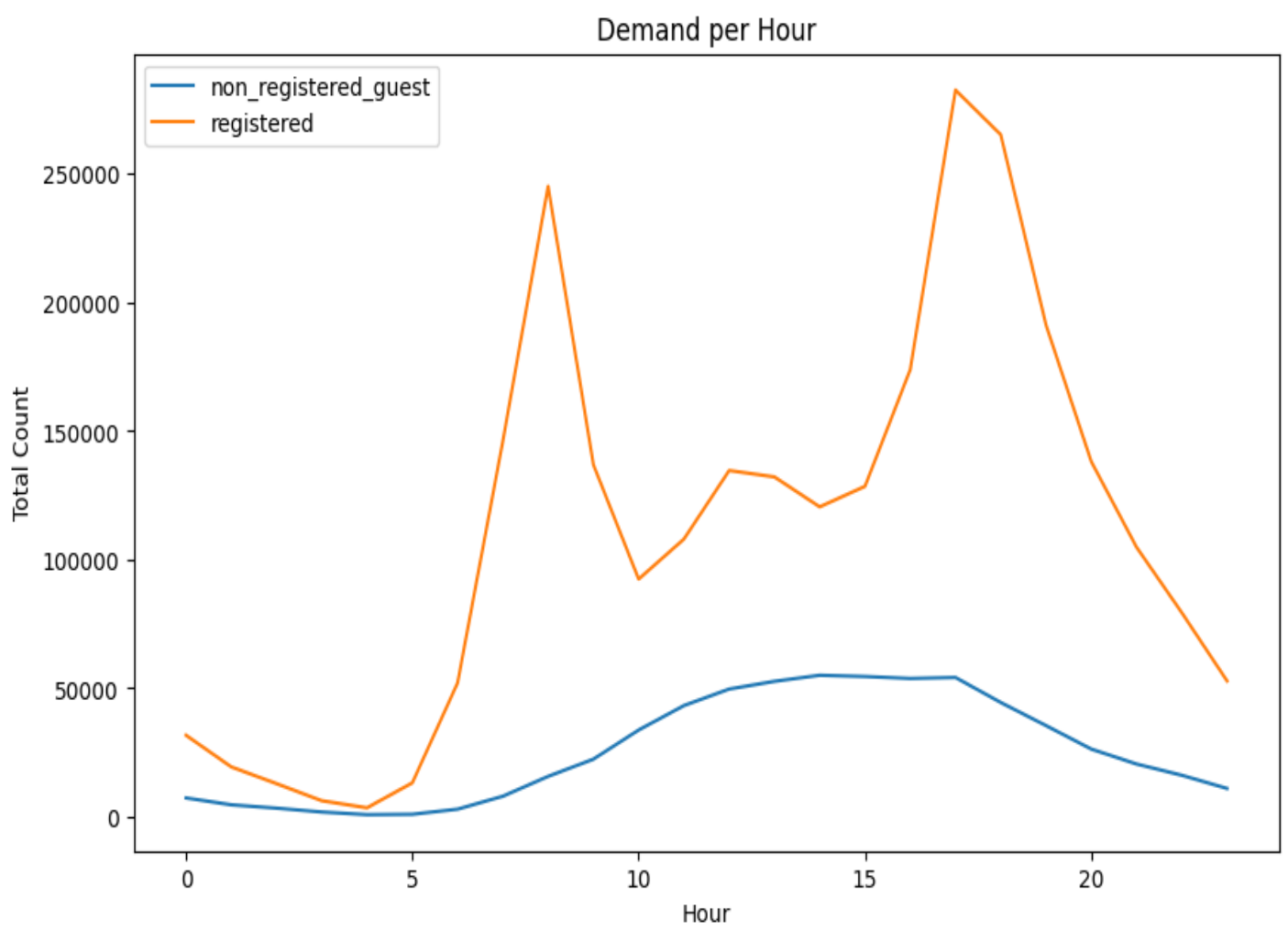
Additionally, there is a noticeable increase in the count of registered guests from 2011 to 2012, while the count of non-registered guests remains relatively stable. This suggests a growing trend in the number of registered guests over the years.



KEY FINDINGS

The line chart shows a consistent monthly trend where both registered and non-registered guest counts increase steadily from January, peaking around mid-year (July-August), and then gradually declining towards the end of the year.

Registered guests consistently have a much higher count than non-registered guests throughout the year.



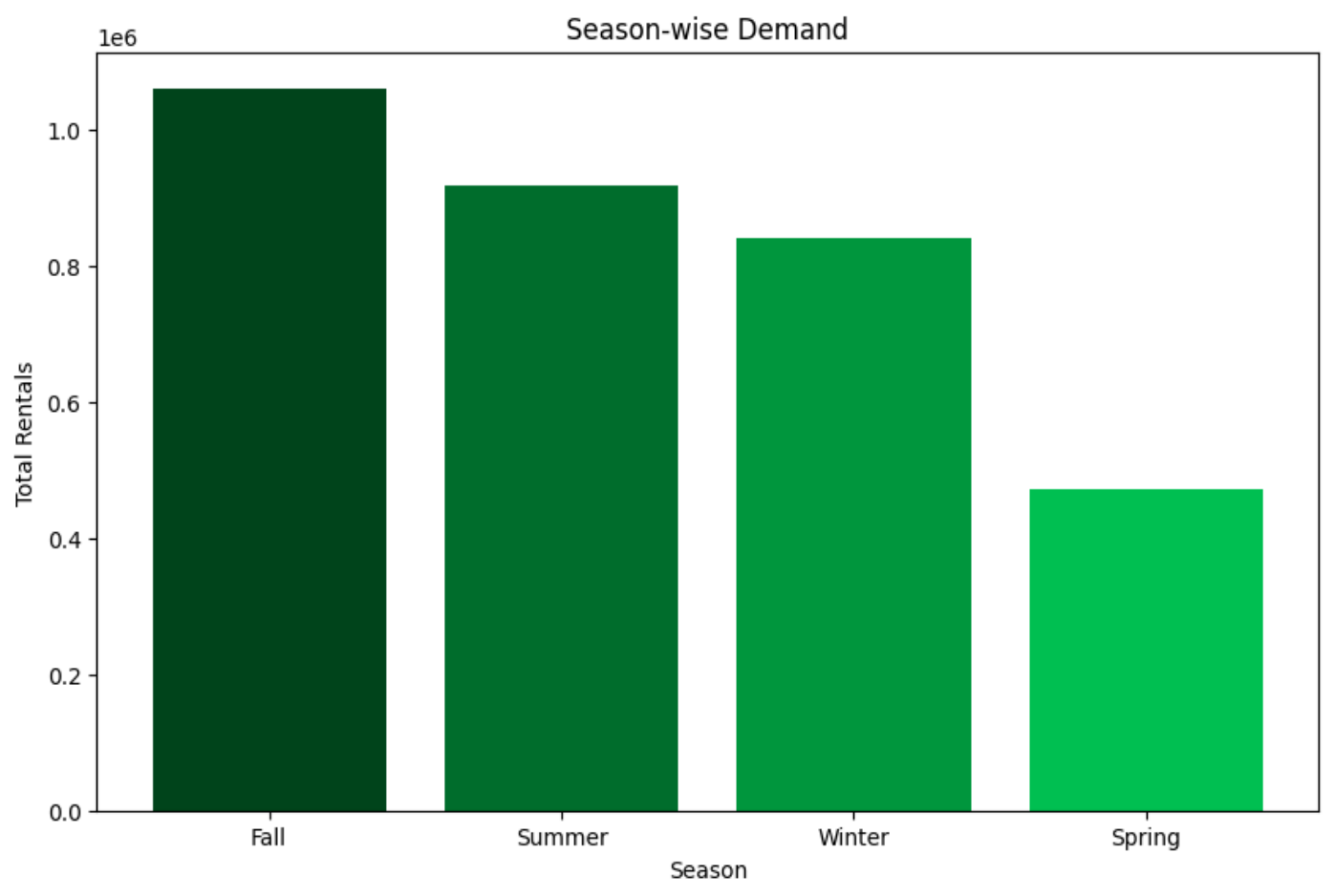
KEY FINDINGS

Registered Guests:

There is a sharp increase in demand starting early morning (around 6 AM), peaking significantly at around 8-9 AM. Demand then decreases, followed by another peak in the late afternoon (around 5-6 PM), before steadily declining through the evening and night.

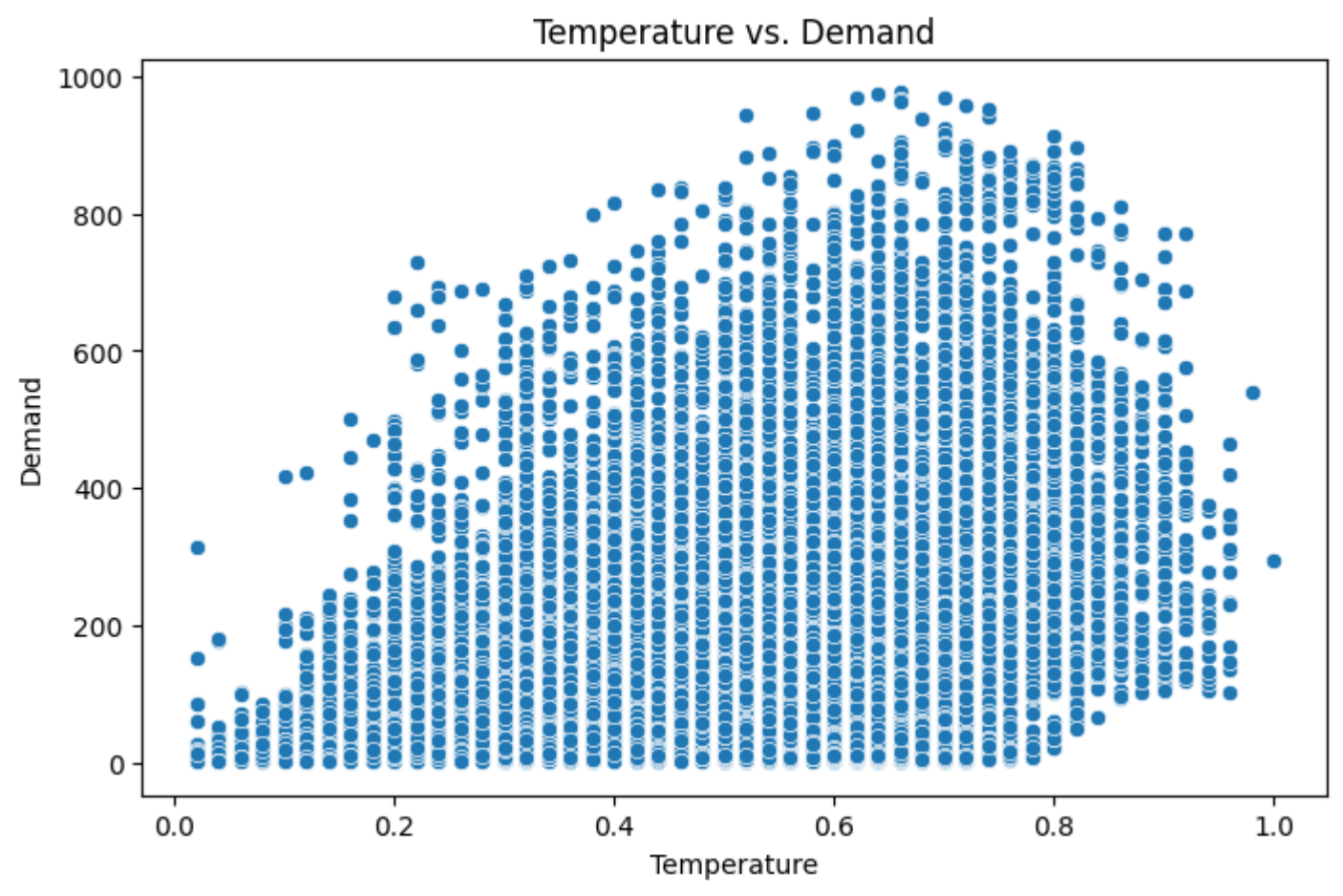
Non-Registered Guests:

Demand gradually rises throughout the morning, reaching a moderate peak around noon (12 PM to 1 PM). After this, the demand remains relatively steady through the afternoon and starts to decrease slowly into the evening



KEY FINDINGS

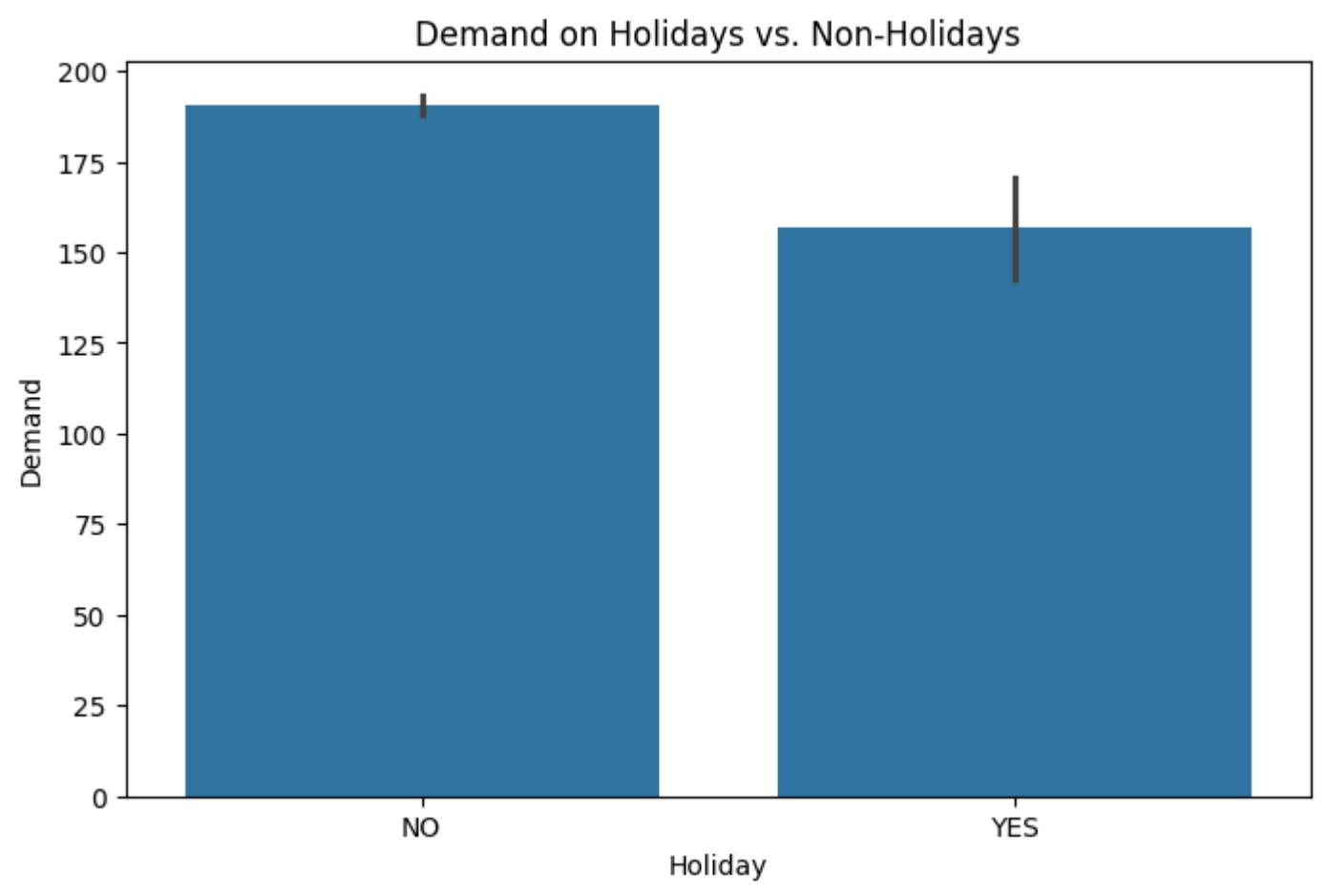
- Fall and Summer has the highest demand among the 4 seasons.
- Interesting, Spring has the lowest demand of bike riders compared to winter.



KEY FINDINGS

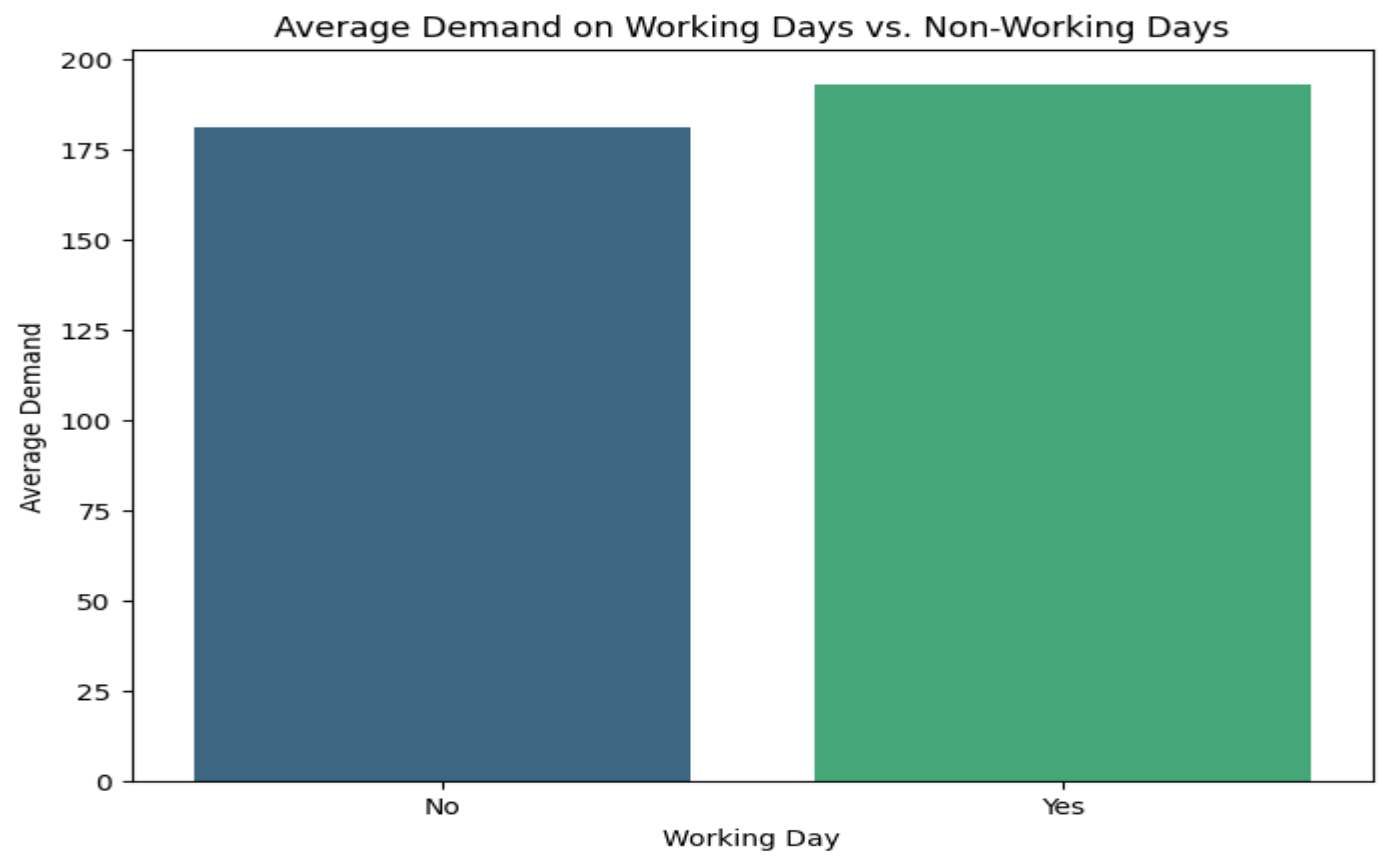
There is a positive relationship between temperature and demand up to a certain point. As the temperature increases from 0.0 to around 0.6, the demand generally rises, suggesting that warmer temperatures may increase demand.

However, beyond a temperature value of about 0.8, the demand begins to level off and even slightly decline, indicating a possible optimal temperature range for peak demand, after which demand may decrease as temperatures continue to rise.



KEY FINDINGS

- Non-Holidays slightly has a higher demand vs Holidays.



KEY FINDINGS

- Working Days has a slightly higher demand vs non-working days.
- The difference between the two is very minor.

Summary of Insights

- Demand is highly influenced by temperature and seasonality, with significant peaks during favorable weather.
- Commuting patterns drive higher demand during morning and evening hours for registered users.
- Slightly lower demand on holidays and slightly higher demand on non-working days suggest consistent, predictable patterns.
- Working days vs non-working days: does not have much impact.
- Register Users use the bike system more than guest users.

Recommendations

- Optimize bike availability during peak months and hours.

i) Morning and Evening Bike Placement Strategy:

- Morning (Before 9 AM): Place bikes around residential areas and apartments to accommodate commuters heading to work.
- Evening (After 5 PM): Position bikes near popular companies and business districts to facilitate the commute home.
- Night (Around 8 PM Peak): Distribute bikes around popular evening destinations, such as restaurants, entertainment venues, and social hotspots, to meet the late evening demand.
- Plan promotions or incentives for low-demand periods like holidays and spring season.
- Consider additional capacity or services targeting commuters.
- Offer a discount for new members to attract the guest users.

THANK YOU

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Portfolio: