Analysis of the Capital Bike Share Program

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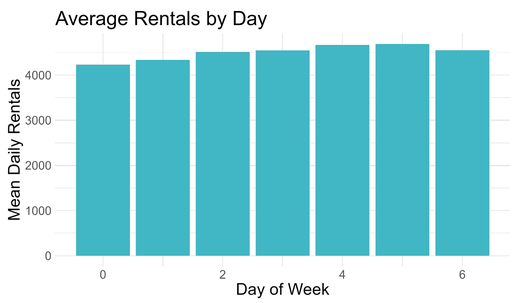
SC326: Statistical Graphics and Principles of Data Visualization

Background

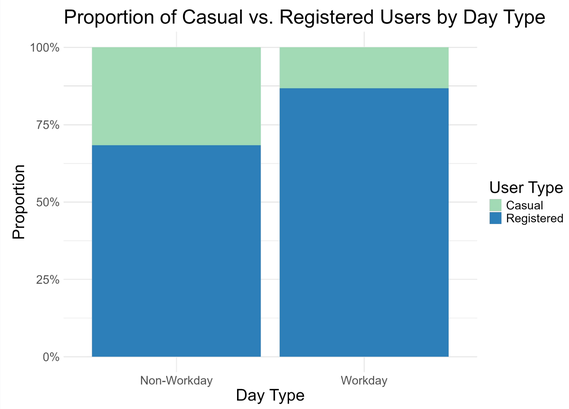
This dataset was put together by Hadi Fanaee-T and Joao Gama using data from Capital Bike Sharing and historical weather data. The dataset contains daily and hourly count of bikes rented through the Capital Bike Share program between 2011 and 2012 as well as weather, and seasonal data. As of 2013, there were over 500 bike sharing programs worldwide. Understanding trends in bike use across temporal and weather patterns can inform how bike share programs operate.

Days of the Week



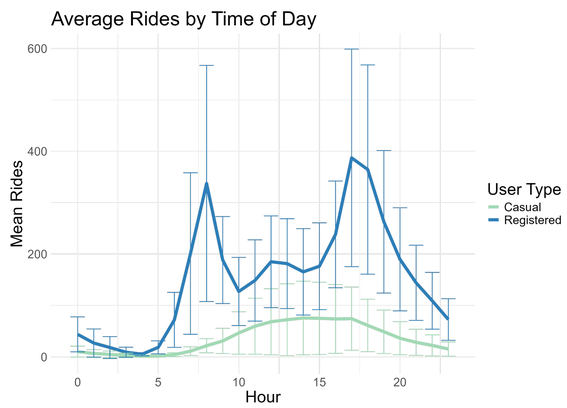
- The number of overall rentals stays relatively consistent across all days of the week. There are slightly more users towards the end of the week (Thursday - Saturday) but no drastic differences.

When Do People Ride?

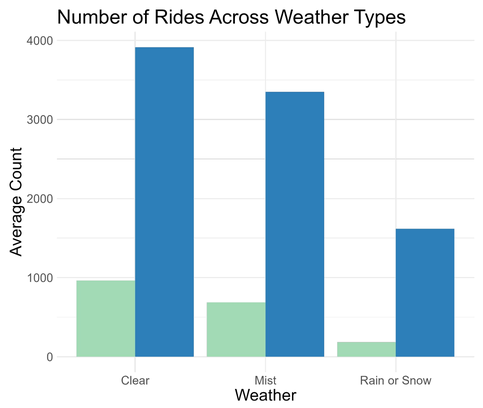


- Proportionally, there are more casual riders on weekends(about 35%) than there are on weekdays(about 15%).
- A casual rider is more likely to utilize the bikeshare program on the weekend than on a weekday.

- The mean number of casual rides is greatest in the afternoon, between 12pm and 5pm.
- The mean number of registered riders is greatest at 5pm, with another peak at 8am. This suggests that registered riders may be using the bike share program to commute.

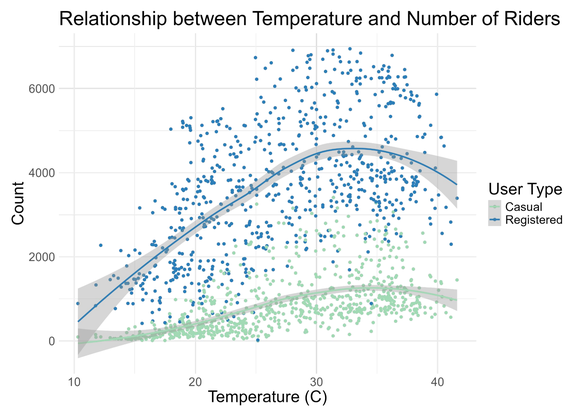


Rain or Shine

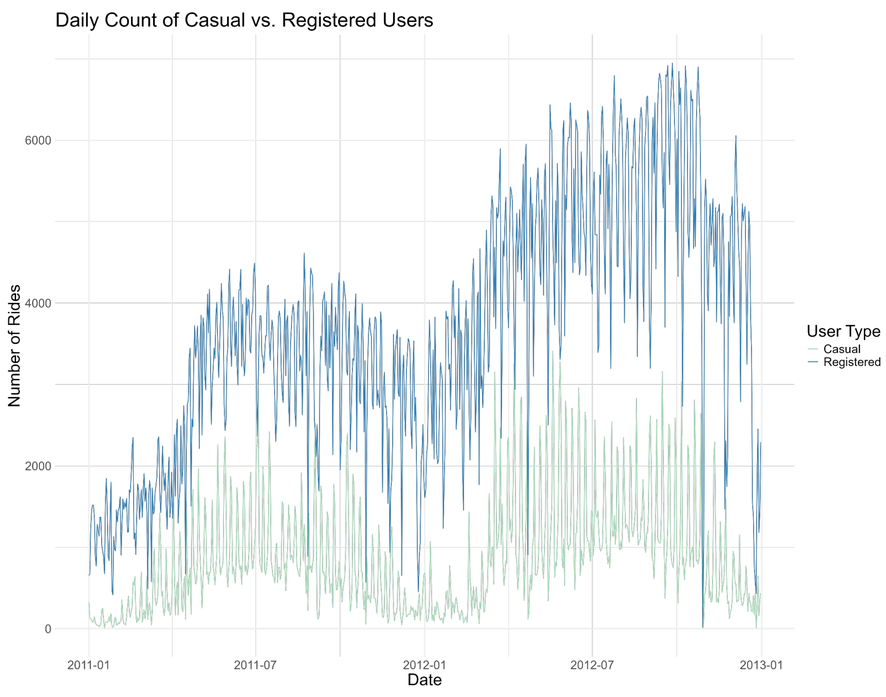


- Days with clear conditions have the greatest customer turnout.
- There is a significant drop off between each level of weather for each group (clear-misty-rain or snow).
- The biggest drop comes from Misty weather to Rain or Snow.

- As temperature increases, the number of casual and registered riders tends to increase. However, there is a negative trend for temperatures above 35 C.
- While there is greater use of bikes in warmer weather, in extreme heat there are fewer rides. Bike share companies may need to adjust the number of available bikes throughout the year.

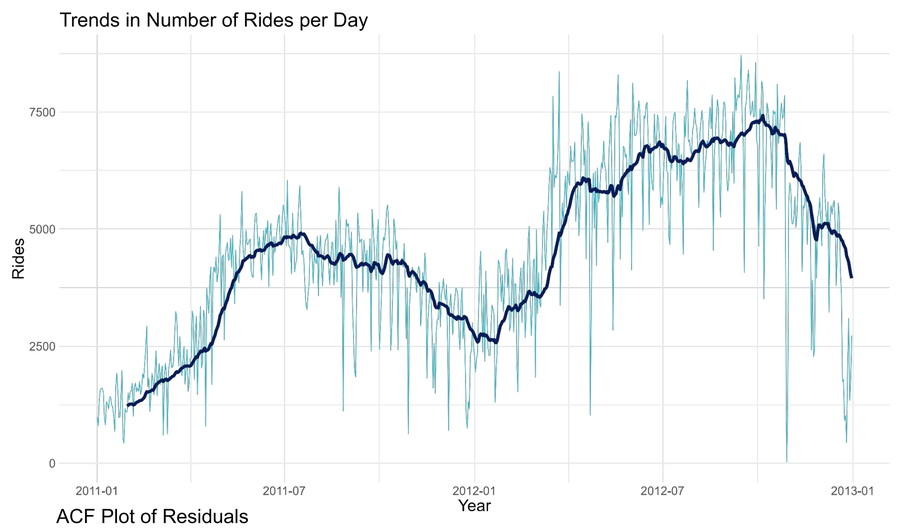


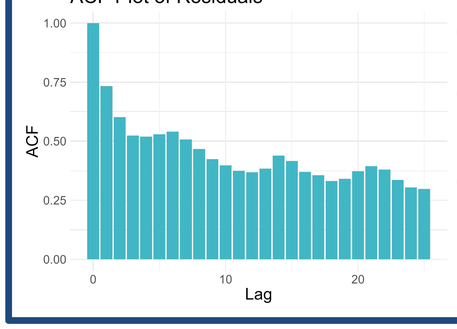
Casual and Registered



- The number of riders increased from the year 2011 to the year 2012
- The curvature in the graph shows that over the course of both years the number of riders is lower in the winter months (January) than in the summer months (July).
- This means that overall there are typically more riders in the summer than the winter.

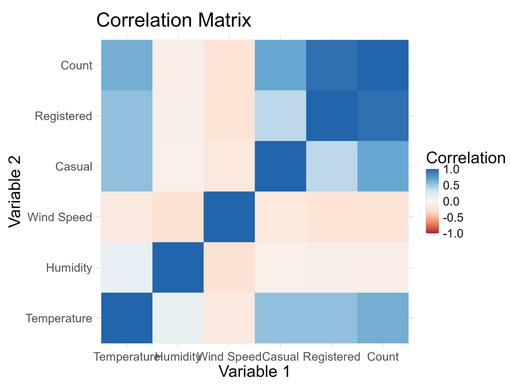
Trends through Time





- There is an increase in the customer base from the start of 2011 to the start of 2013.
- There are local maximums in the summer months and local minimums in the winter months.
- The ACF plot shows the correlation at different lags with the global trend removed. Correlation is higher at 7 day intervals, indicating patterns across days of the week.

Correlations



- There is a strong positive correlation between the number of registered rides and the total count. There is a moderate positive correlation between temperature and total count.
- There is a weak negative correlation between wind speed and temperature, as well as with ride counts.

Acknowledgements

We would like to thank Professor Jerzy Wieczorek for all of his support in this class. Our data was found in the UC Irvine Machine Learning Repository: https://archive.ics.uci.edu/dataset/275/bike+sharing+dataset .