

WELCOMEBIKE

Bike Rental Analysis

Nov. 1th, 2021

Presented By:

Brandon W

Nathan W

Alex B

Avery R

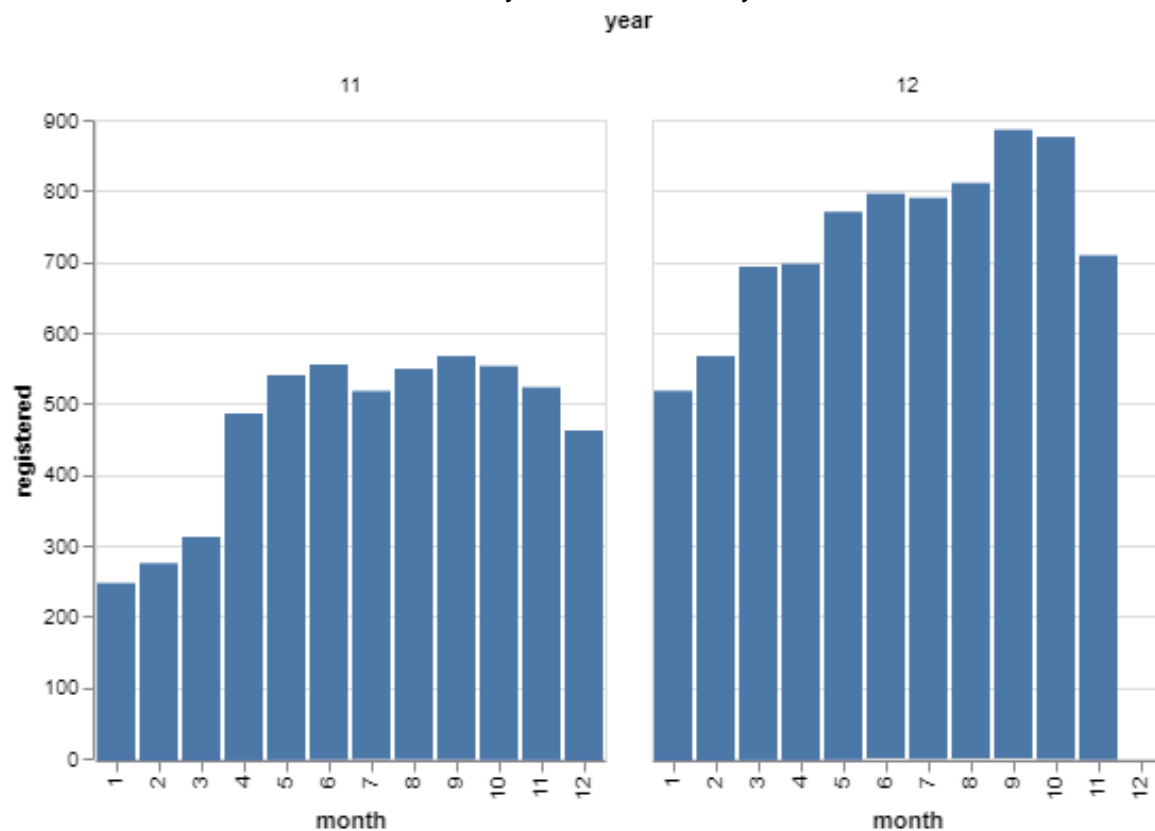
Problem and Objectives

We were hired by WelcomeBike Bike Rentals to use machine learning to predict the number of bike rentals in a given day in Washington DC. This information will be useful to WelcomeBike as they use the data to make better business decisions and avoid failure in a competitive market.

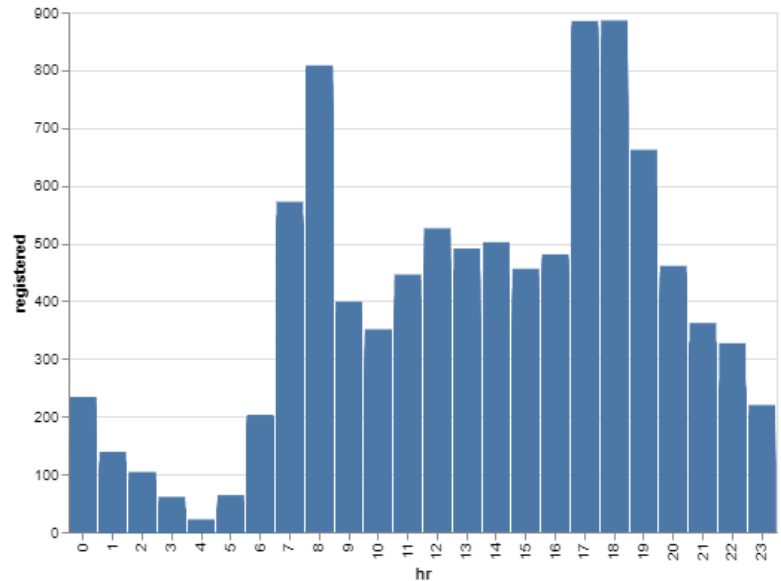
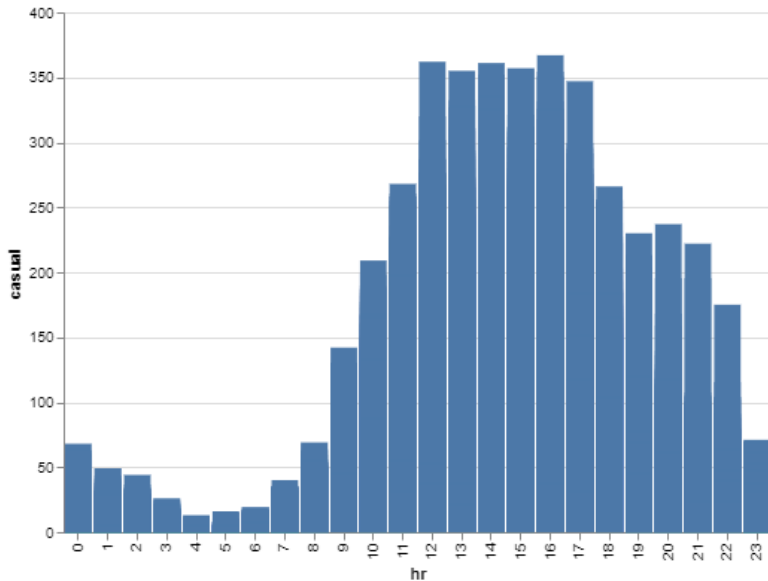
Research and Correlated Features

Before creating any neural nets, we asked basic questions about the individual features in the data and how it affected the number of users and we found that some clear correlations can be seen. Many of the features also affect casual and registered users differently, as you'll see in the charts below.

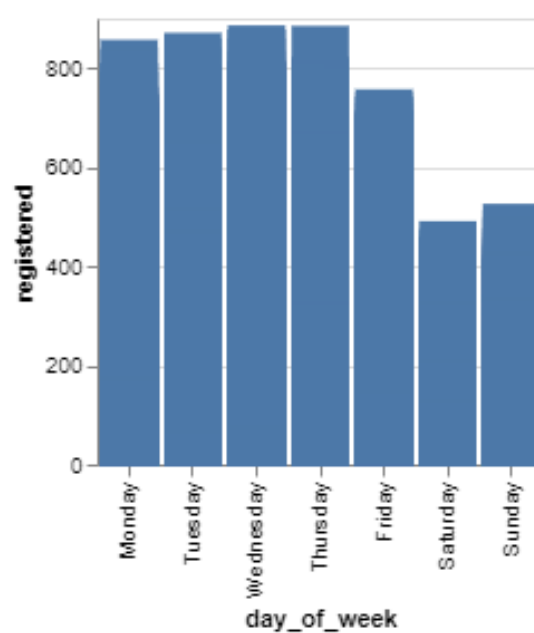
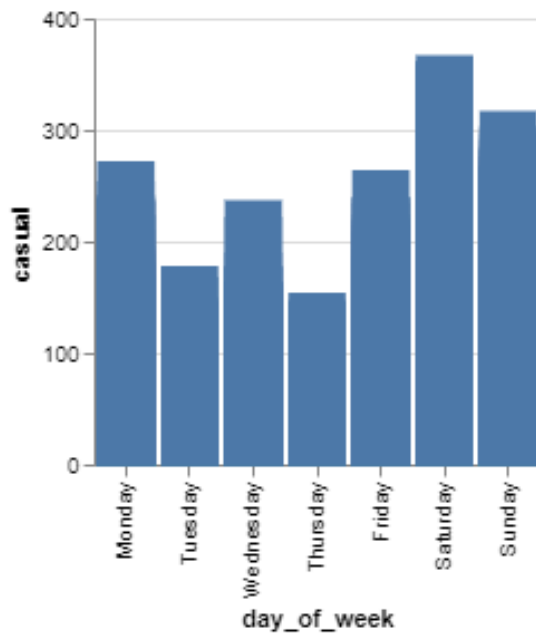
How did the total users change over time? We see from the graph below that the bike renting business is gaining popularity, even from one year to the next. In this graph we can also see that some of the colder months of the year sees relatively less users.



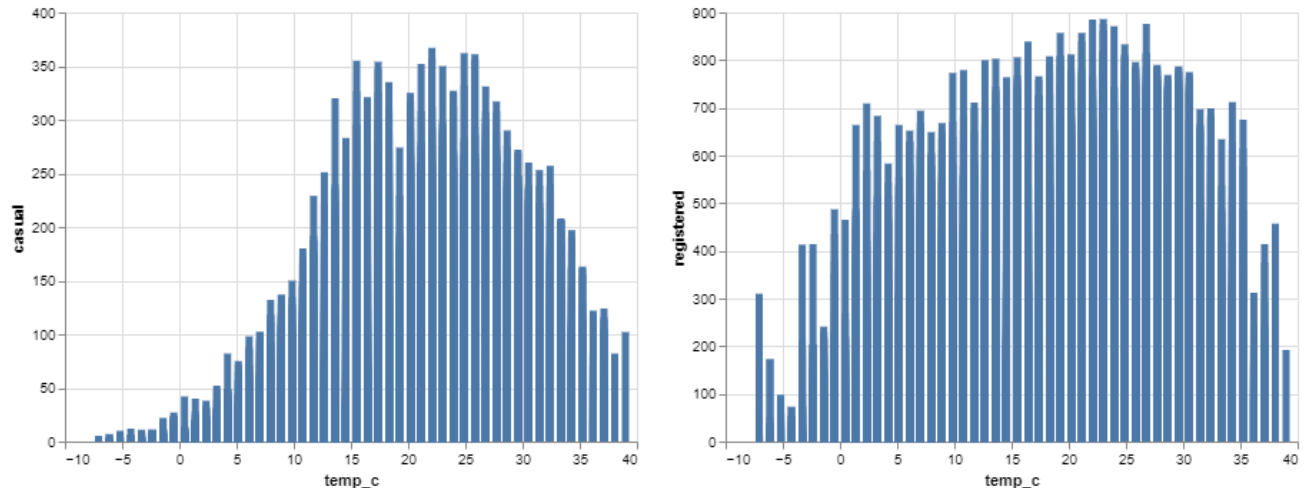
What hours are the most popular for users? From the graph below you can see that there is a spike in registered users at 7-8am and 5-7pm, suggesting clearly that many of the registered users use the bikes to commute to and from work. Casual users, on the other hand, pick up and steadies from 11am to 6pm and slowly tapers off the into the night.



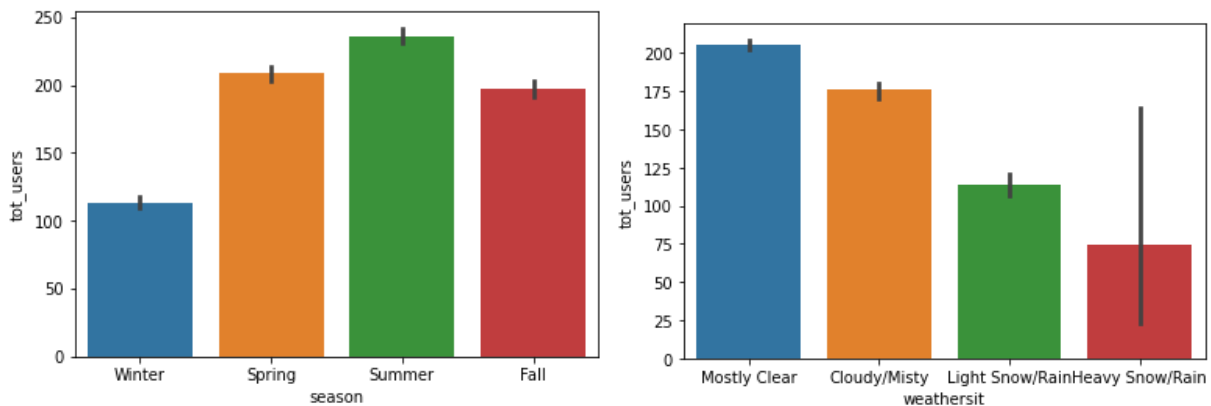
We can also see a similar correlation in the graph below. The number of registered users is up on the typical weekdays and lower on the weekends. With the casual users, we can see the opposite, where the weekends are more popular.



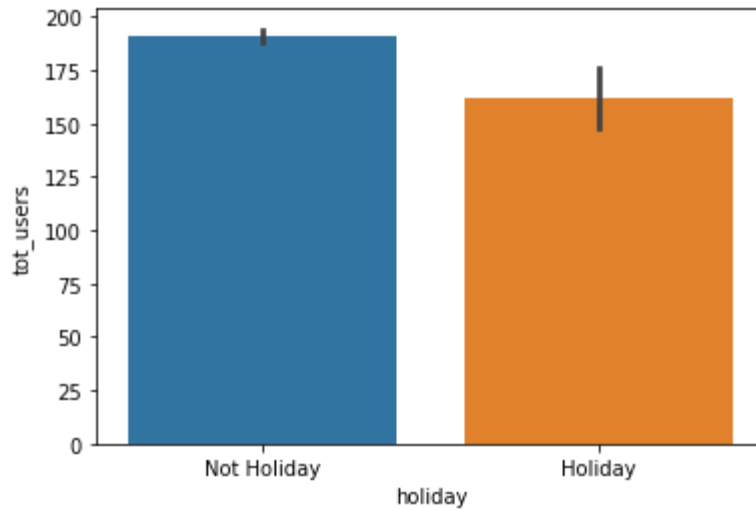
How does the temperature, season, and weather conditions affect the amount of users? Looking at the charts below, you can see some clear and obvious correlations between these features. The temperature and the weather heavily impacts the amount of casual users, whereas the registered users are less affected, likely due to their daily schedule and dependence on the bikes.



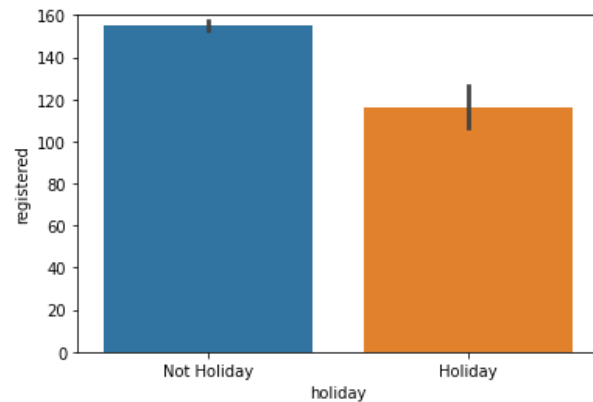
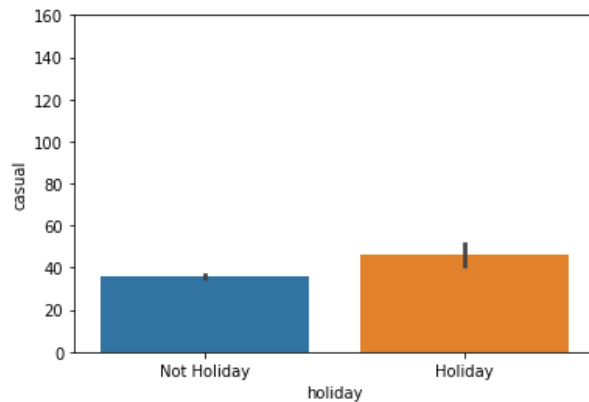
How does the season and weather situation affect total users? There is a correlation between the season and the total users. There are fewest users in winter, and the most users in the summer. This is what I would expect since the cold or weather associated with winter can make bike riding more difficult. The weather situation showed a similar picture with most users riding when it is mostly clear, and the least amount of user riding in heavy snow or rain.



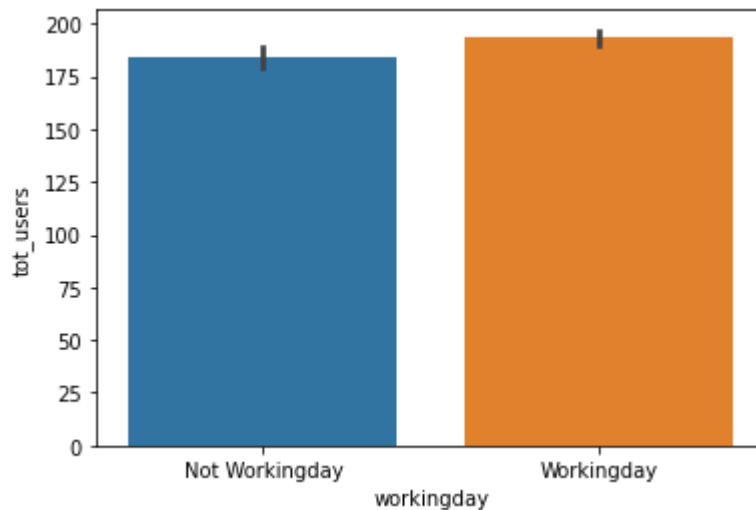
Does a day being a holiday affect total users? There is a small difference in that there are fewer users during a holiday. This makes sense since there is also an uptick in users before and after the regular 9-5, therefore users who ride to work will not do so on a holiday.



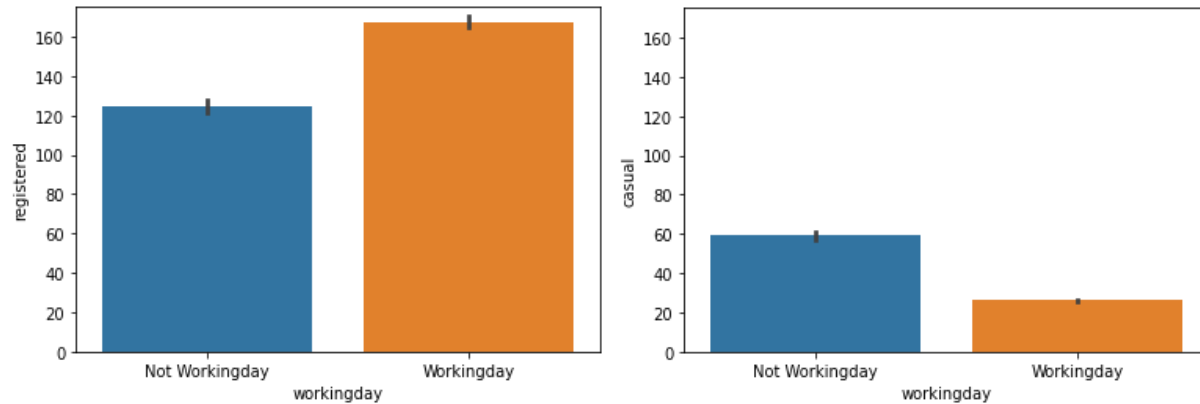
If we split total users into casual and registered users, we see that casual users favor holidays, and registered users favor non-holidays.



Does a workday affect total users? Just like above, a working day increases the riders slightly.



If we break up total users into casual and registered users, we see that registered users favor the working day, while casual users favor a non working day. Working days are still used more because of the larger number of registered users.



Solutions Value and Conclusion

Based on the data there is a clear difference in the casual and registered riders. Registered riders are more likely to rent bikes to get to and from work. Casual riders on the other hand do not seem to ride bikes based on their work schedules, but rather ride leaserly. Based on this information, WelcomeBike should target their advertising on leisurely users since there are significantly fewer leisurely users and they tend to use bikes when the registered users are not using them. This means that WelcomeBike can make more profits without having to purchase more bikes to accommodate the peak hours of the day.

Using the correlations we've found and explained above, we've developed and trained two neural networks, one that can predict generally any time of the year, and another to predict December's values with additional accuracy. The neural network to predict the values in December can predict the number of users in any given hour with 75% confidence. We can predict the number of users to within 50 on average.

Links

Final: Nathan W

Brandon W:

https://colab.research.google.com/gist/bwareing/ed9644e037dddb5f0023b7c8947259b6/copy-of-starter_bikes.ipynb

Nathan W:

https://colab.research.google.com/gist/Natosphere/348e7367d2dc4c046159272747b2ad33/nathanwheelwright_module4_bikerental.ipynb#scrollTo=mA0HPVmlBT4C

Alex B:

https://colab.research.google.com/gist/desertalex/43c14f513015132cc56553965cb4e47a/copy-of-starter_bikes.ipynb

Avery R:

https://github.com/jarreed0/school_stuff/blob/main/starter_bikes.ipynb