Analyzing Men and Women's City Bike Trip Duration

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Abstract

City Bike's user behavior has been a popular topic since the City Bike data is released. This research focuses on the trip duration based on gender differences used data from January 2015. After removing outliers, the distributions of men and women's trip duration are revealed. By conducting a Mann Whitney U test, men and women are verified having different trip duration distributions. Citi Bike group can then rearrange the bike distribution in the city based on gender differences of users.

Introduction

Citi Bike is a bike-sharing system operated in New York City and Jersey City. Users register their information then are able to borrow and return bikes at fixed bike stations(cit). The idea of this system was brought up by the New York City Department of Transportation in 2008 and implemented by Citigroup in May 2013(pro). By October 2017, the number of stations has increased from 332 to 706, while the number of bikes has increased from 6000 to 12000. The annual subscribers has reached 115,000. In 2016, riders took more than 14 million trips(Kaufman and O'Connell, 2017). To make sure the number of bikes in stations accords with the user's demand, the user's behavior is crucial for rearranging bike distribution, designing bike station size and other issue related to citi bike maintainance services. This research analyzes whether trip duration differs from male riders to female riders using a Mann Whitney U test. Based on the result, male and female riders' trip duration follow different distributions, which provides a valuable aspect for Citigroup to inspect the user behavior and customize regulations based on gender differences.

Data

Citi Bike's data set contains users' information, trip describtion such as trip duration, start station, end station for each trip. This research uses data in January 2015.

To show the majority records, extreme values (trip durations above 3000 seconds) are removed.

Methodology

To figure out whether male and female riders have different trip durations, this research test whether the trip durations of the two genders follows the same distribution. Based on the shape of the two histograms, the two distributions do not follows normal distribution. Thus, techniques that require data follow normal distribution such as anova analysis should not be used. This research uses Mann Whitney U test, which does

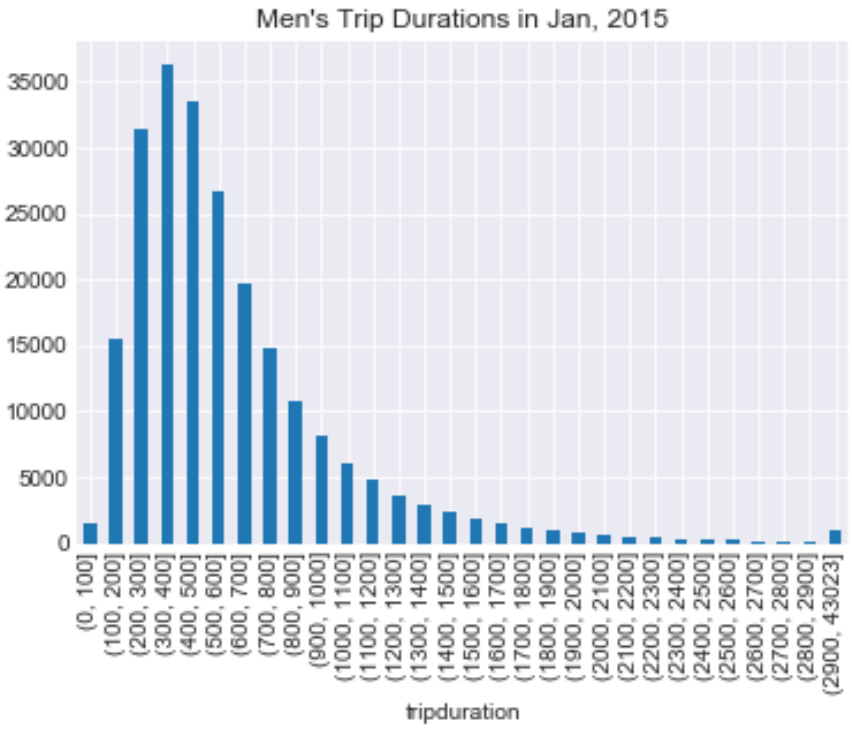

Figure 1: Trip duration (in seconds) of male riders in January 2015

not need data follow normal distribution. Mann Whitney U test's null hypothesis is the two distribution follow the same distribution.

Conclusion

The Mann Whitney U test returns a statistics of -433265838094.5 with a p-value of 0, which rejects the null hypothesis. Thus, male and female's trip duration follow different distributions. There are differences between male users and females users regarding the trip durations.

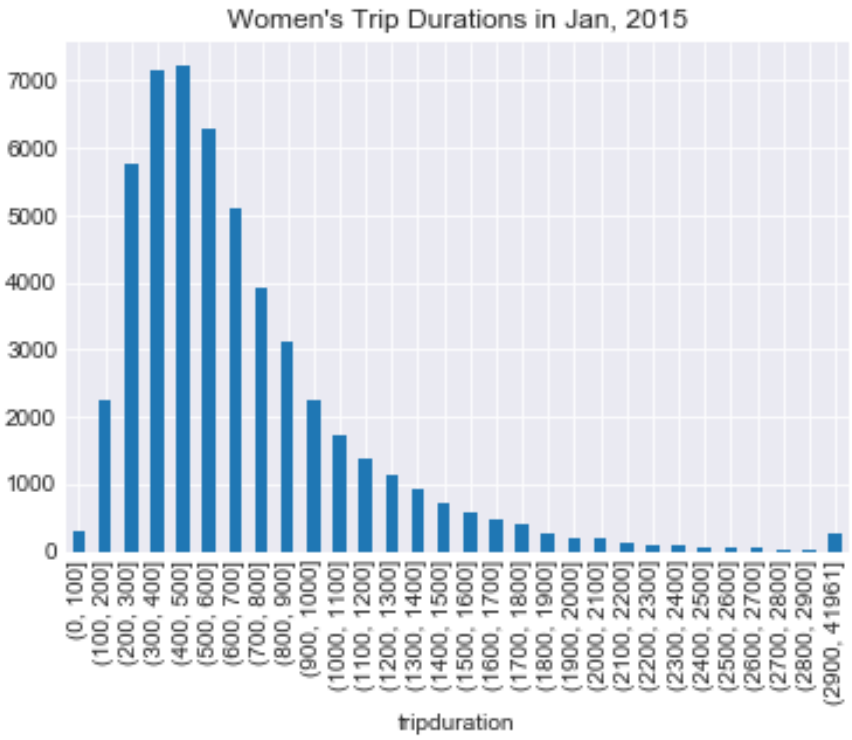

Figure 2: Trip duration (in seconds) of female riders in January 2015

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