CIVE 202 Project 3 Summary & Findings

In Project 3, the task was to create a set of visual representations regarding the comparisons of varying categories from the data provided in the NHTS and NGSIM files. The NHTS file contains data regarding variables such as vehicle details, travel details, household characteristics, etc. On the other hand, the NGSIM file consists of data regarding the behaviors of specific drivers. The visuals presented in the following report contain relevant information to be presented for the transportation planning meeting. The information contains trends regarding transportation usage as well as driving behavior. Using python code, five graphs were created, including a bar graph, a histogram, a box plot, and two time-series plots.

Bar Graph:

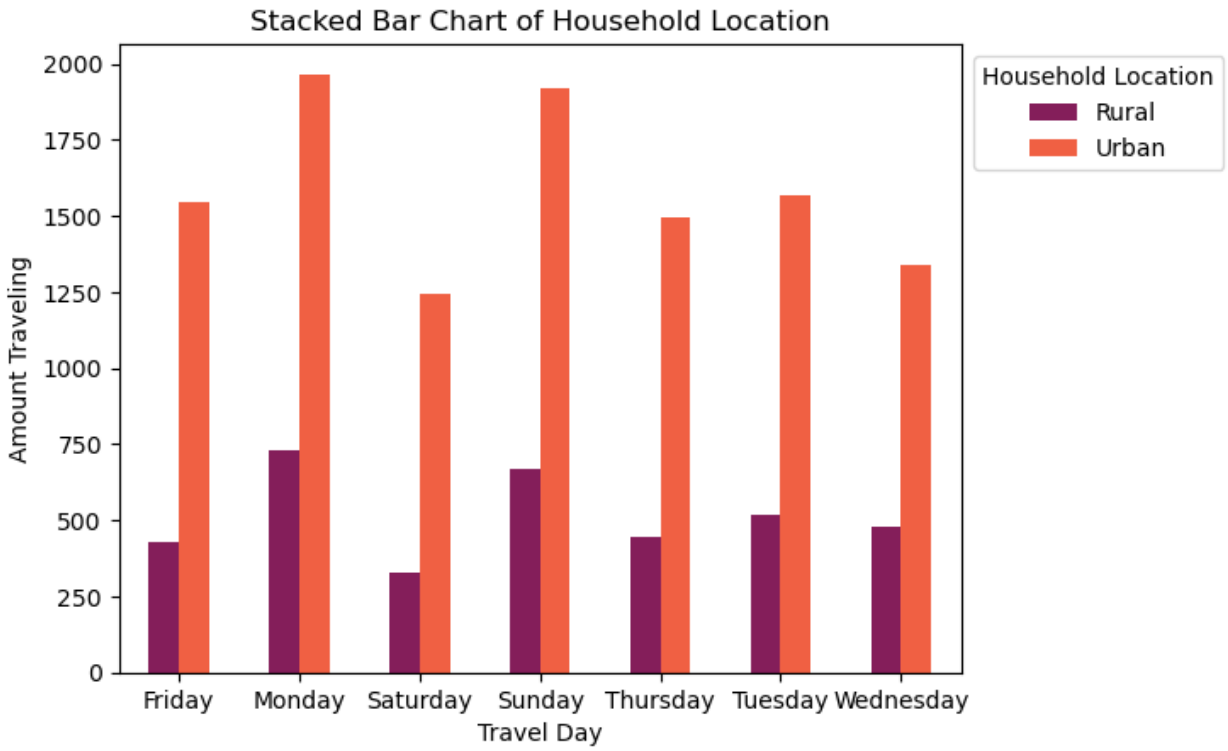

Figure 1: Bar Graph

Figure 1 above shows the visual representation of a bar graph showing the relationship between amount of travel per household location and a given day of the week. Here the data reveals that households in urban areas travel a significantly higher amount than the household in rural areas. The orange bars signify the urban households which reach significantly higher values of travel. The purple bars that signify the rural areas show the opposite in that there is significantly less travel. The x-axis contains the days of the week, whereas the y-axis contains the values in correspondence with the amount of traveling. This data is relevant as it shows the relationship

between distance and amount of traveling on a given day which is useful in understanding transportation systems.

Histogram:

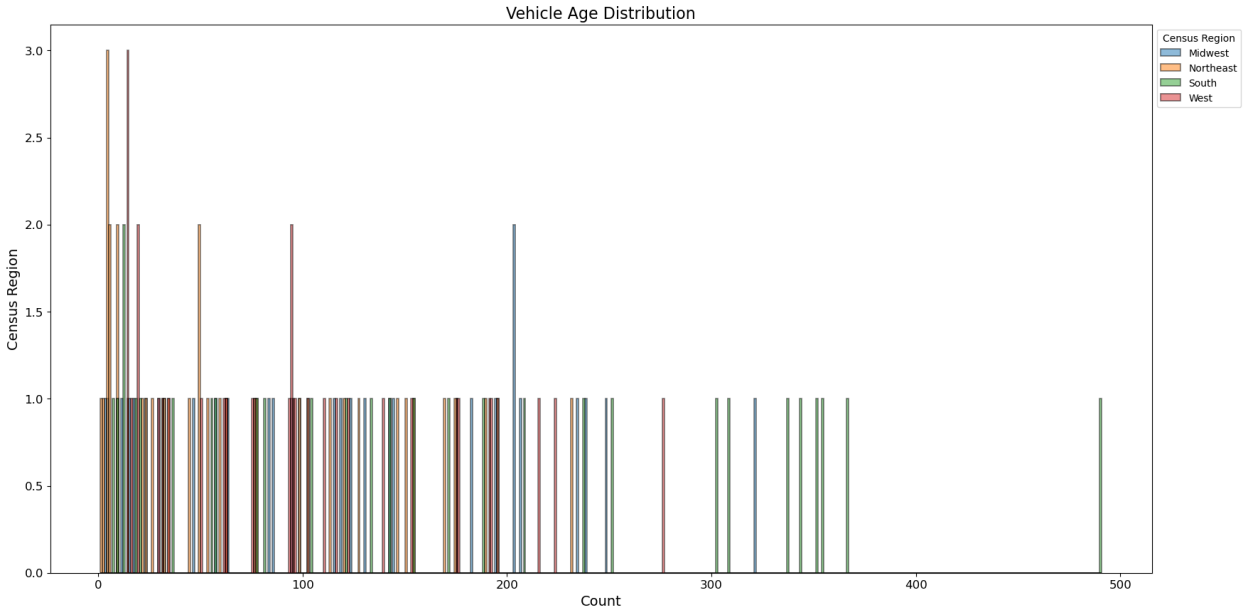

Figure 2: Histogram

Figure 2 above shows the histogram in which was produced using python code to show the vehicle age distribution by census region. The x-axis consists of the count variable and the y-axis consists of the vehicle age. The different colored lines are representative of the four regions, which are as follows: Midwest (blue), Northeast (yellow), South (green), and West (red). Although the histogram is somewhat detailed and hard to analyze, it is evident that the majority of the data falls under the count of 200. The data presented in the figure above is useful to visualize as it gives insight into the relationship between the age of vehicles in use and the regions in which the operate, which is beneficial when attempting to understand transportation systems further.

Boxplot:

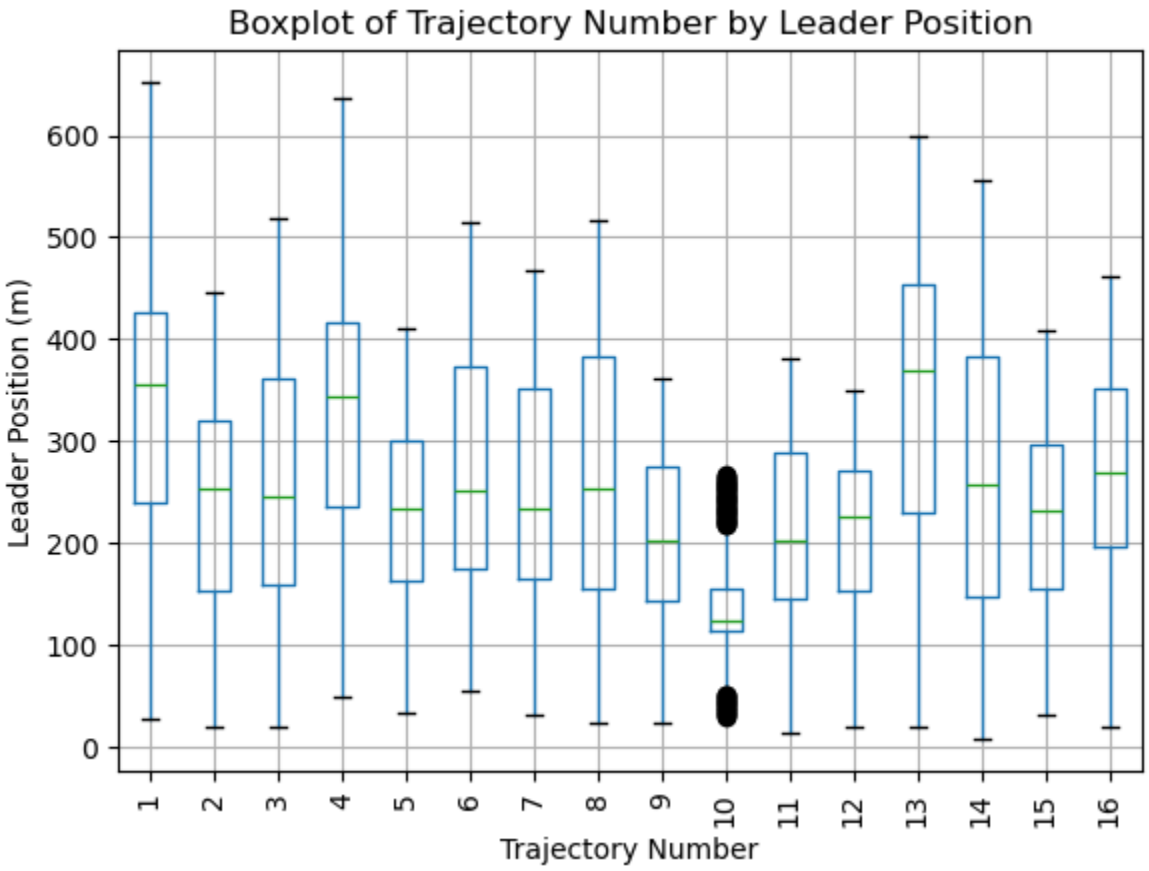

Figure 3: Boxplot

Figure 3 above shows the visual created using python code for the boxplot showing the distribution of trajectory number by leader position. The x-axis contains the trajectory number, whereas the y-axis shows the leader position in meters. The plot shows the median value for each trajectory number ranging within 100 to 400 meters, where most of the leader positions fall. The highest leader position value surpasses 600 meters, whereas the lowest leader position value is between 0 and 50 meters. The data shown in the figure above is relevant to analyzing transportation systems as it gives insight to the behavior of drivers on the road within a transportation system.

Time-Series:

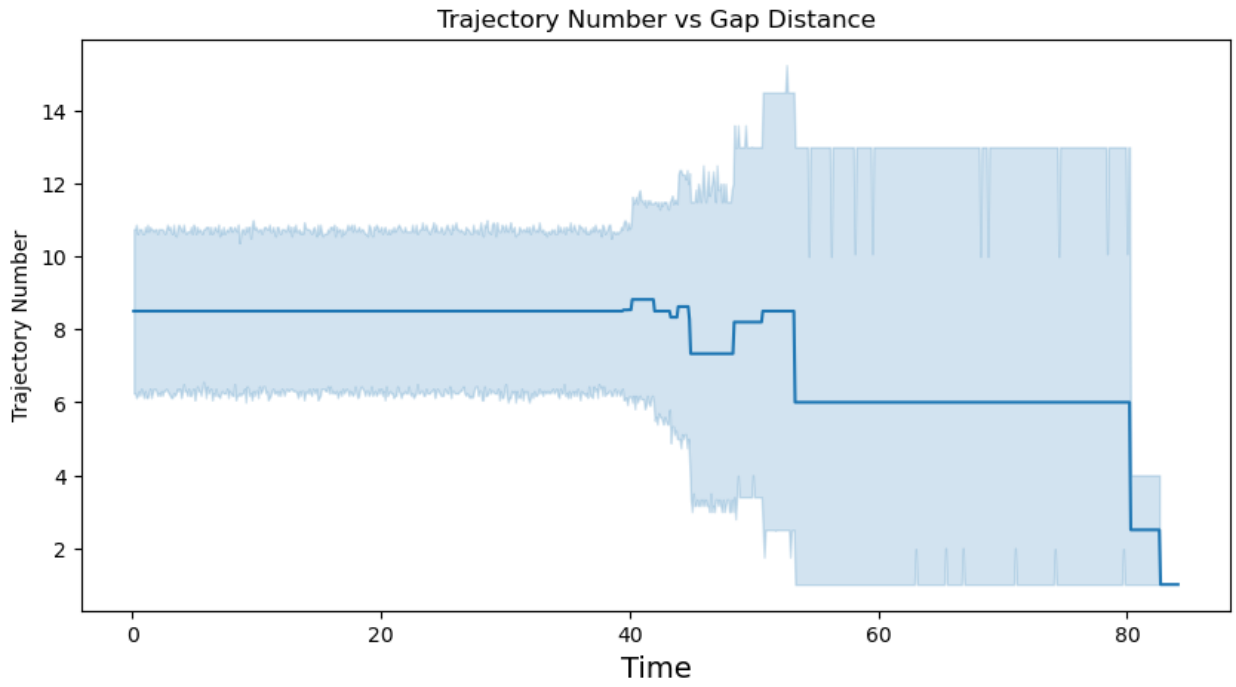

Figure 4: Time-Series Plot 1

Figure four above shows the visual representation using python code on the first time series plot that was created in order to show the distribution of the trajectory number versus the gap distance. On the x-axis the time is represented in seconds and on the y-axis the trajectory number is represented. As the data shows, there is somewhat of a negative relationship between the tractor number and the time. As time increases, the trajectory number decreases. This visual representation is useful as uses the leader and follower positions to show the relationship between the time and gap distance. Again analyzing this data is beneficial when looking at vehicle behavior within a transporation system.

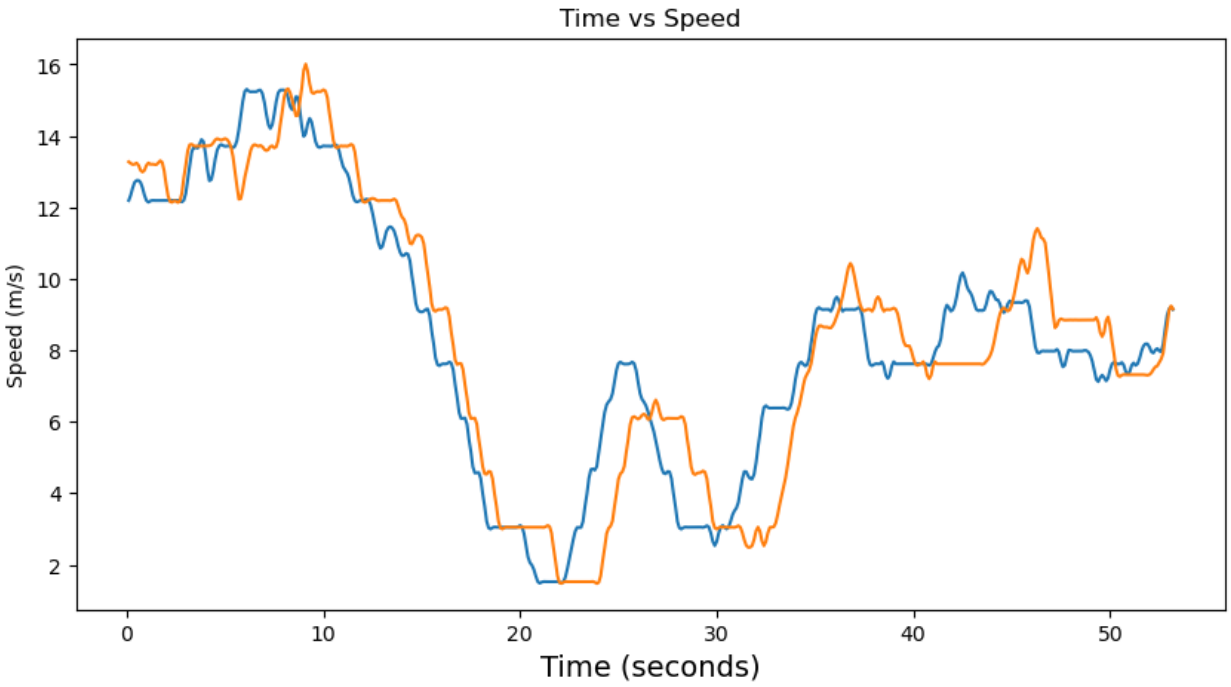

Figure 5: Time Series Plot 2

Figure 5 above shows the second time-series plot created using python code to visually represent the relationship between the speed and time of both the leader and follower vehicles. The x-axis shows the time in seconds and the y-axis shows the speed of the vehicles in meters per second. The orange and blue lines represent the leader and follower vehicles respectively. When analyzing the time versus speed graph it gives useful insight that can be critical when managing traffic flow within a transportation system.

Conclusion:

Project 3 was completed in order to give relevant visuals that give insightful details regarding vehicle behavior and characteristics in order to further plan within transportation systems. In using python code, five visuals were produced, as presented above. The graphs included a bar graph showing the relationship between household locations, amount of travel, and day of travel, a histogram showing the relationship between vehicle age and census region, a boxplot showing the distribution of trajectory number by leader position, and two time-series plots showing the analyzation of trajectory number vs. gap distance and time vs. speed. The information visually represented and analyzed gives insightful details that could be used to reveal patterns in transportation usage and vehicle behavior to better the efficiency within transportation systems throughout the United States.