Lab 2

This a brief text description of exercises 1 and 2 to test the functionality of Overleaf in generating pdf files.

1 Exercise 1 - Plotting

The code for this exercise can be found in the folder Exercise 1 - Plotting, in the file vehicles.py.

First, we created an histogram on the Current Fleet:

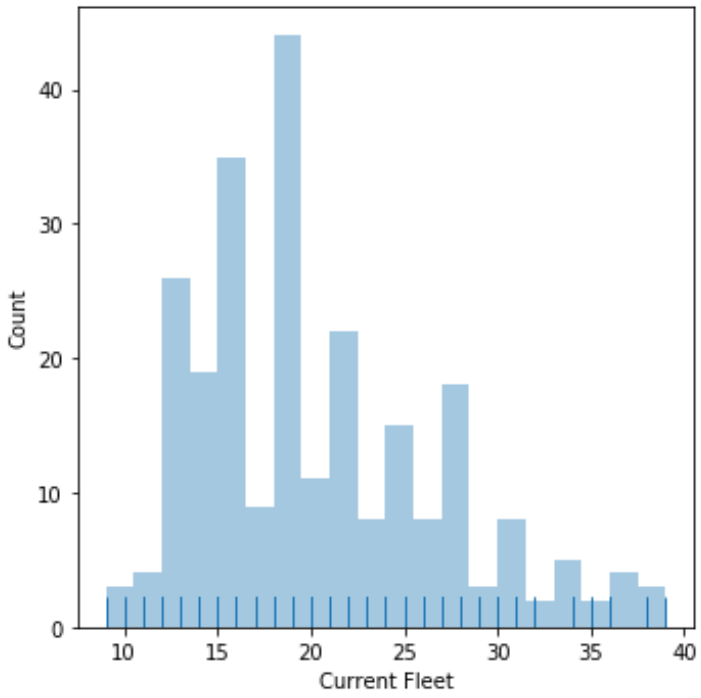

Figure 1: Histogram Current Fleet

The main statistics for the Current Fleet are:

- Mean: 20.14
- Median: 19.00
- Var: 40.98
- Std: 6.40
- MAD: 4.00

Second, we create an histogram on the New Fleet:

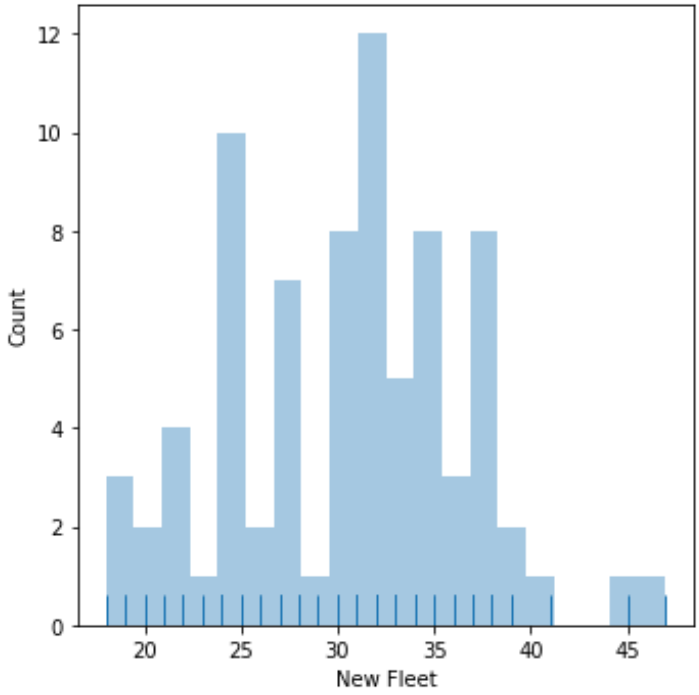

Figure 2: Histogram New Fleet

The main statistics for the New Fleet are:

- Mean: 30.48
- Median: 32.00
- Var: 36.83
- Std: 6.07
- MAD: 4.00

The histograms and descriptive statistics show that the New Fleet seems to have a better performance in terms of MPG than the Current Fleet. However to make this statement a statistical test has to be performed.

A scatterplot is also computed:

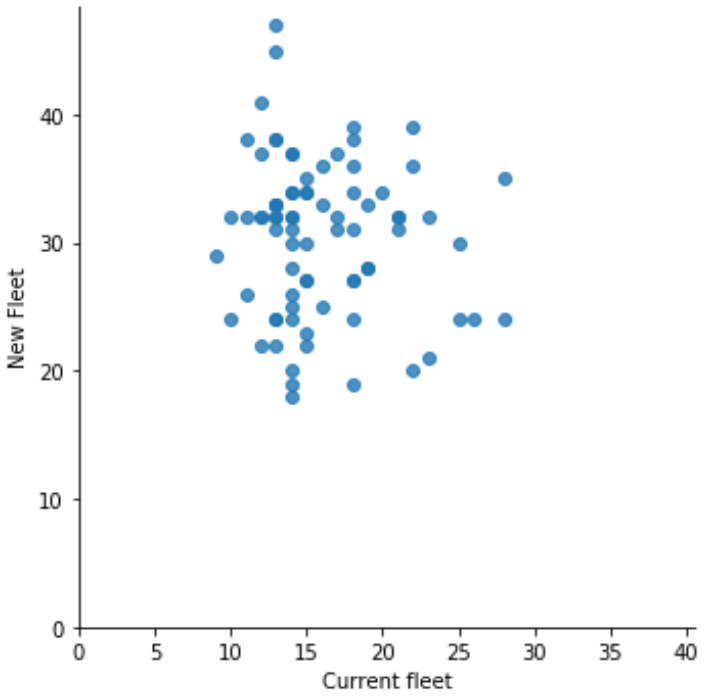

Figure 3: Scatterplot

2 Exercise 1 - Bootstrap

The code for this exercise can be found in the folder Exercise 2 - Bootstrap, in the file bootstrap.py.

First, the function boostrap() is created. Then this is used to compare the mean values of the MPG for each Fleet at a 95% CI.

The results of this analysis are:

- Current Fleet Mean: 20.16
- Current Fleet Lower: 19.32
- Current Fleet Upper: 20.96
- New Fleet Mean: 30.48

- New Fleet Lower: 29.18
- New Fleet Upper: 31.89

Using the results of the bootstrap, we can now say that withj a 95% confidence, the MPG performance of the New Fleet is superior to the one of the Current Fleet.