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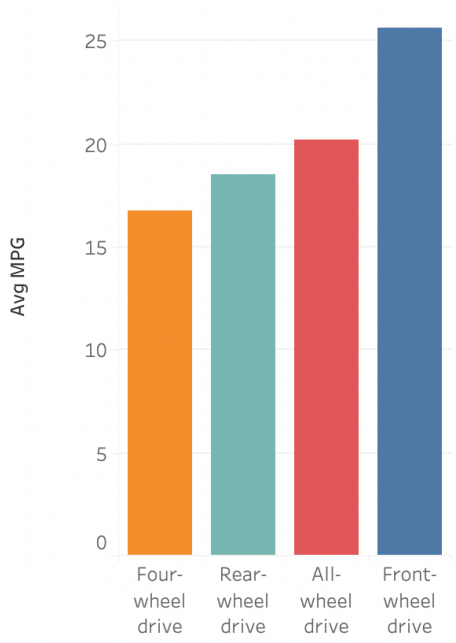
Data Set: Cars

Intro

I chose to do my Data Exploration using the data set Cars. This data set tracks the fuel consumption of different vehicles with a variety of different characteristics. In this report, I will be exploring how the different factors of vehicles, such as weight, drivetrain, etc, affect gas consumption. The Data Set tracks gas consumption in miles per gallon(MPG) and has both a city and highway rating for each vehicle. For the majority of this report, I will be averaging these two values to give each car a total MPG.



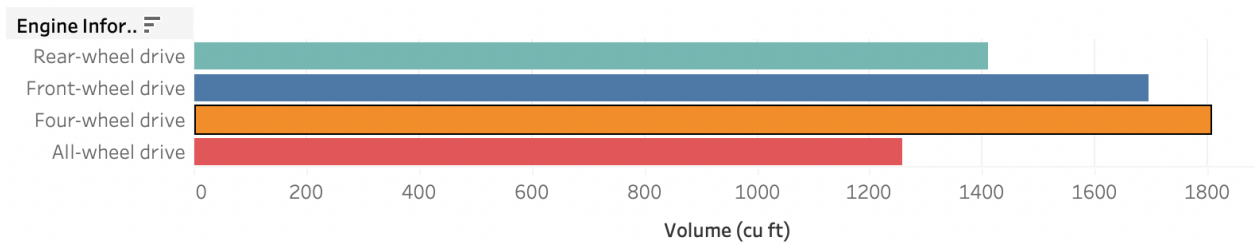
Driveline

The first characteristic I analyzed was how the driveline type impacted a car's MPG. The driveline type references how the engine of a vehicle applies its power to the ground. The data set contains four different types of drivelines, including Front-Wheel, All-Wheel, Rear-Wheel, and Four-Wheel drive.

Front-Wheel Drive vehicles are clearly the most gas efficient averaging just over 25mpg. This is due to the simplicity of the front-wheel-drive system. Unlike the 4 and all-wheel drive systems the two-wheel only needs to drive the front two wheels meaning its mechanical system is much lighter. Similarly, because most vehicles have the engine in the front the rear-wheel driveline requires additional mechanics making it less efficient.

Volume/Weight

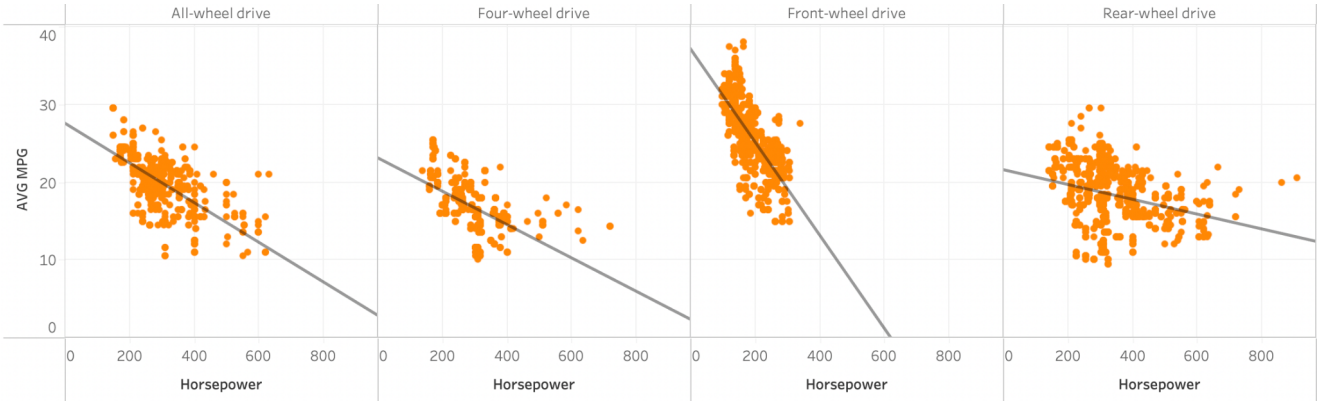
After researching the advantages of the lighter two-wheel drive system, I wanted to see if that would translate to the recorded dataset. The set doesn't include a specific weight value so I had to use the measured dimensions to calculate the average volume of each of the driveline types.



By looking at the graph we can see that the Four-Wheel drive vehicles average the highest volume. This means that vehicles equipped with Four-Wheel drive systems are on average larger and probably heavier than the other types. This matches our previous Driveline graph where we saw that the Four-Wheel driveline type averaged the lowest MPG. Surprisingly the Front-Wheel drive type was the second-largest illustrating that size isn't the only factor influencing gas consumption.

Horsepower

Ultimately the engine of a vehicle is the deciding factor when measuring its fuel consumption. A large vehicle can still achieve good gas mileage if it has a conservative engine. Similarly, a tiny lightweight race car can burn through fuel to get the most out of its high-performance engine. To confirm this I plotted scatterplots comparing a vehicle's horsepower to its average MPG.



By looking at the trend lines of the data its clear that horsepower and mpg have a negative correlation. I also noticed that front-wheel drive vehicles have the least amount of horsepower with a majority of its data sitting below the 300 horsepower mark. This explains how front-wheel drive type had such good gas milage despite it's larger volume. On the other hand we see the opposite occurring with the rear wheel drive type where they achieved a much lower gas milage while having a smaller average volume.

Engine Information...	
6 Speed Automatic	18.523
5 Speed Automatic	18.722
4 Speed Automatic	19.237
7 Speed Automatic Select ..	19.685
6 Speed Automatic Select ..	20.595
7 Speed Automatic	21.024
8 Speed Automatic Select ..	21.110
5 Speed Automatic Select ..	21.203
6 Speed Manual	22.902
4 Speed Automatic Select ..	23.041
5 Speed Manual	26.188

Transmission

Attached to the the cars engine is its transmission. Modern cars use either a manual or automatic transmission with a varriaying amount of gears. The gearing in the transmission decides how the engine preforms and thus plays a role in the gas mileage. Due to the similarity between the names of the transmission types I chose to graph them in a simple table.

Looking at the data we can see that the manual transmission provide better gas milages on average compared to those of the automatic transmissions. This came as a surprise to me because I figured the transmissions with the larger number of gears would allow for better cruising RPM on the highway. That being

siad the increased number of gears means more weight and consequently increased gas consumption.