Applied Regression Course Project

Bohdan Horak

Friday, August 22, 2014

Executive Summary

The purpose of this paper is to examine the effects of a variety of car related features on the miles per gallon performance of a vehicle. In order to convincingly illustrate the effects of factors on the car's gaes mileage a variety of statistical tools will be employed, using the native "mtcars" data provided with R. This paper will examine all factors provided in the data set, however the focus will lie on the type of transmission the car has equiped. There are two types of transmissions Manual and Automatic, this paper will exame which is better or wether the differences between the two statistically insignificant given the provided data.

Exploratory Analysis

Data Description

The description of the variables, provided by the R help files.

```
##    Variable                                Description
## 1       mpg                          Miles/(US) gallon
## 2       cyl                         Number of cylinders
## 3      disp                       Displacement (cu.in.)
## 4        hp                            Gross horsepower
## 5      drat                             Rear axle ratio
## 6        wt                            Weight (lb/1000)
## 7      qsec                               1/4 mile time
## 8        vs                                        V/S
## 9        am Transmission (0 = automatic, 1 = manual)
## 10     gear                     Number of forward gears
## 11     carb                       Number of carburetors
```

In order to perform the exploratory analysis I split the variables into two camps, continous and discrete.

```
##   Continous Discrete
## 1       mpg      cyl
## 2      disp       vs
## 3        hp       am
## 4      drat     gear
## 5        wt     carb
## 6      qsec
```

For continous variables I used basic scatter plots with a fitted line to get a sense of the relationship. You can see the plots in figure 1. We can tell that as the weight(wt), the displacement(disp) and Horsepower(hp) increase the mpg tends to decrease. The opposite is true for the Rear axle ratio(drat) and quarter mile time(qsec).

For discrete variable I used a series of bar plots(figure 2). The bar plots show the mean mpg for each variable seperated by factors. I also, included an error range which corresponds to a one deviation shift in the standard error of the mean. Please note, the carb variable has very few observation inclduded therefore any comparative anylysis between the factors is sure to be unreliable, so it will be ignored from now on. From looking ath these plots it seems like a higher

Regressions

Conclusion

Appendix

Figure 1:

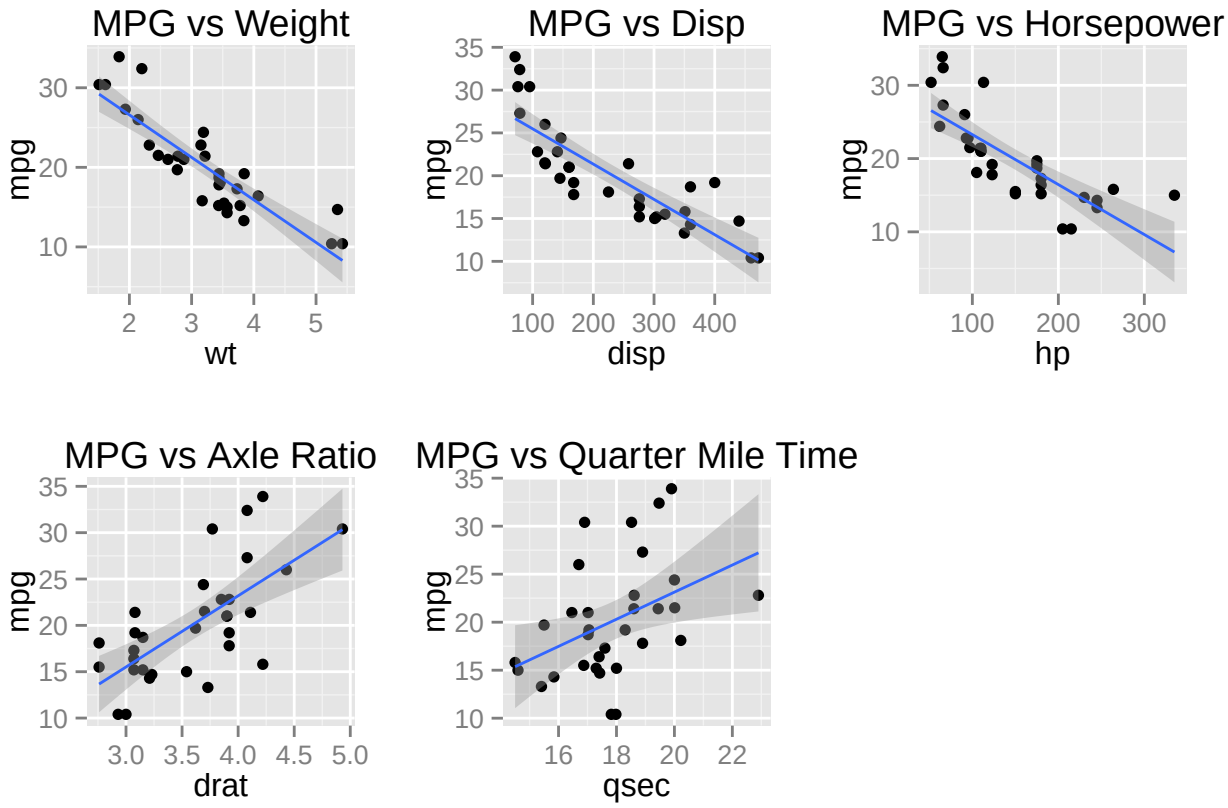

Figure 2:

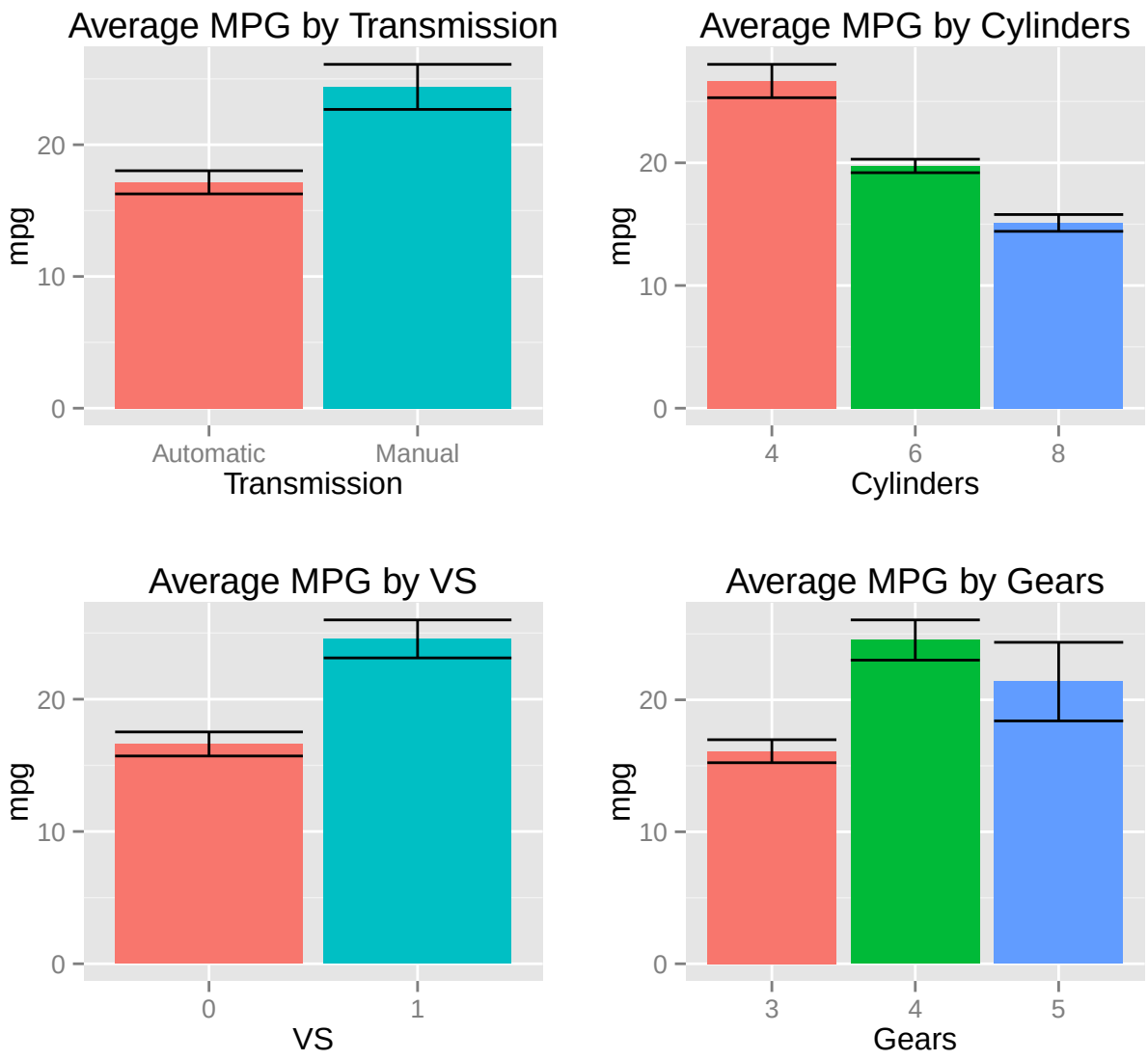

Figure 3: