

Peer-graded Assignment: Regression Models Course Project

Alejandro Osorio

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Choosing the Model

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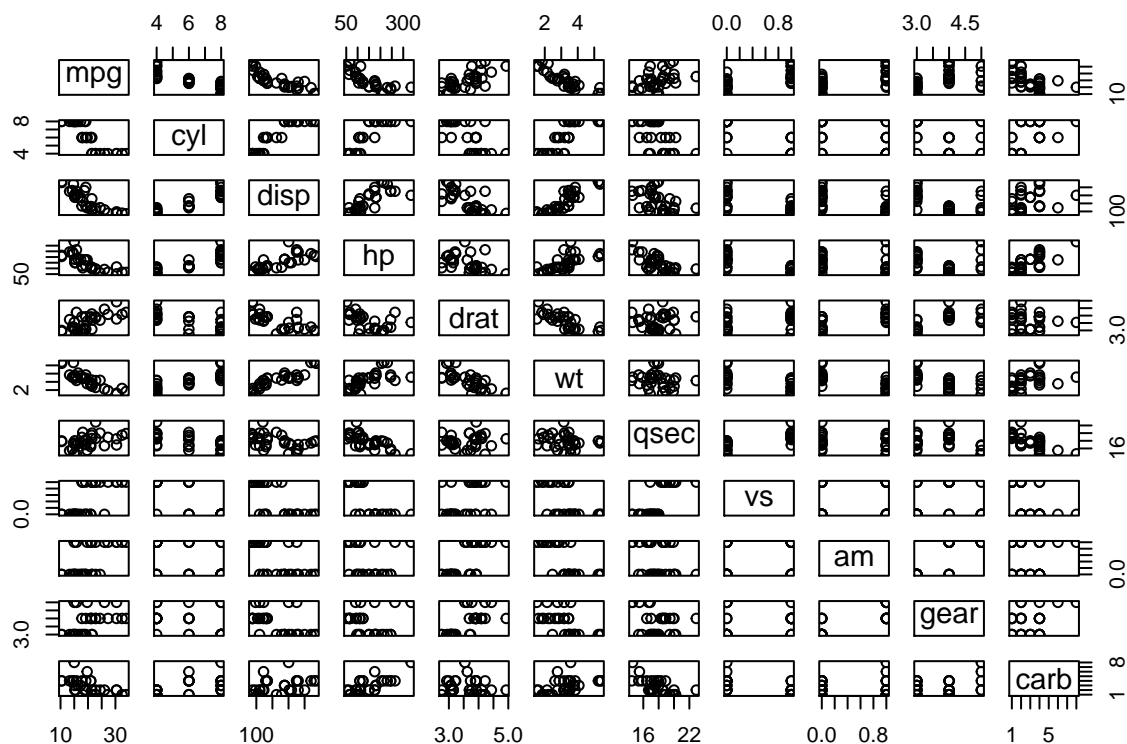
Appendix 1: Preliminary Data Analysis

Basic properties of the ‘mtcars’ dataset:

```
## 'data.frame':   32 obs. of  11 variables:
##  $ mpg : num  21 21 22.8 21.4 18.7 18.1 14.3 24.4 22.8 19.2 ...
##  $ cyl : num  6 6 4 6 8 6 8 4 4 6 ...
##  $ disp: num  160 160 108 258 360 ...
##  $ hp  : num  110 110 93 110 175 105 245 62 95 123 ...
##  $ drat: num  3.9 3.9 3.85 3.08 3.15 2.76 3.21 3.69 3.92 3.92 ...
##  $ wt  : num  2.62 2.88 2.32 3.21 3.44 ...
##  $ qsec: num  16.5 17 18.6 19.4 17 ...
##  $ vs  : num  0 0 1 1 0 1 0 1 1 1 ...
##  $ am  : num  1 1 1 0 0 0 0 0 0 0 ...
##  $ gear: num  4 4 4 3 3 3 3 4 4 4 ...
##  $ carb: num  4 4 1 1 2 1 4 2 2 4 ...
```

So, we’re talking of a small sample of only 32 observations.

Additionally, visual correlations among pairs of potential variables can be seen as follows:



Appendix 2: Model Selection

Given the nature of the analysis (continuous outcome, obtained from discrete and continuous regressors), the size of the dataset (only 32 observations), plus the visual correlations observed between ‘mpg’ (the outcome) and its potential regressors, the model to be used will be linear (lm type), with ‘am’ as a not-so-dummy binary-factor variable.

Appendix 3: Choosing Preliminary Regressors

After some web research (such as http://www.driverside.com/auto-library/top_10_factors_contributing_to_fuel_economy-317 and <https://www.quora.com/On-what-factors-does-mileage-of-a-vehicle-depend>), the main variables (and therefore candidates for main regressors), are: displacement, power, aerodynamics, weight and number of forward gears.

Besides aerodynamics (not available in the dataset), the visual correlations between them and ‘mpg’ are pretty clear, as seen in Appendix 1 (such as the inverse relation between ‘mpg’ and ‘hp’ or ‘wt’, among others). Therefore, they were the first candidates for regression modeling in the next appendix.

Appendix 4: Regression Modeling