

Motor Trend - Effects of transmission on MPG

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Executive Summary

This report is part of a course project within the **Regression Models** course on the **Data Science Specialization** by **Johns Hopkins University** on **Coursera**. On this report we will analyze the **mtcars** data set and explore the relationship between the type of transmission (manual or automatic), among other variables, and miles per gallon (MPG), which will be our outcome.

We are particularly interested in the following two questions:

- Is an automatic or manual transmission better for MPG.
- Quantify the MPG difference between automatic and manual transmissions.

Data Pre-Processing

In this section we load the data set and perform the necessary data transformations that are needed for a better analysis. Specifically for this data set we will transform the necessary variables into factors.

```
data(mtcars)
mtcars$cyl <- factor(mtcars$cyl)
mtcars$vs <- factor(mtcars$vs)
mtcars$gear <- factor(mtcars$gear)
mtcars$carb <- factor(mtcars$carb)
mtcars$am <- factor(mtcars$am, labels=c('Automatic', 'Manual'))
str(mtcars)
```

```
## '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 : Factor w/ 3 levels "4","6","8": 2 2 1 2 3 2 3 1 1 2 ...
## $ 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 : Factor w/ 2 levels "0","1": 1 1 2 2 1 2 1 2 2 2 ...
## $ am : Factor w/ 2 levels "Automatic","Manual": 2 2 2 1 1 1 1 1 1 1 ...
## $ gear: Factor w/ 3 levels "3","4","5": 2 2 2 1 1 1 1 2 2 2 ...
## $ carb: Factor w/ 6 levels "1","2","3","4",...: 4 4 1 1 2 1 4 2 2 4 ...
```