RegressionProject

Sebastián ZL

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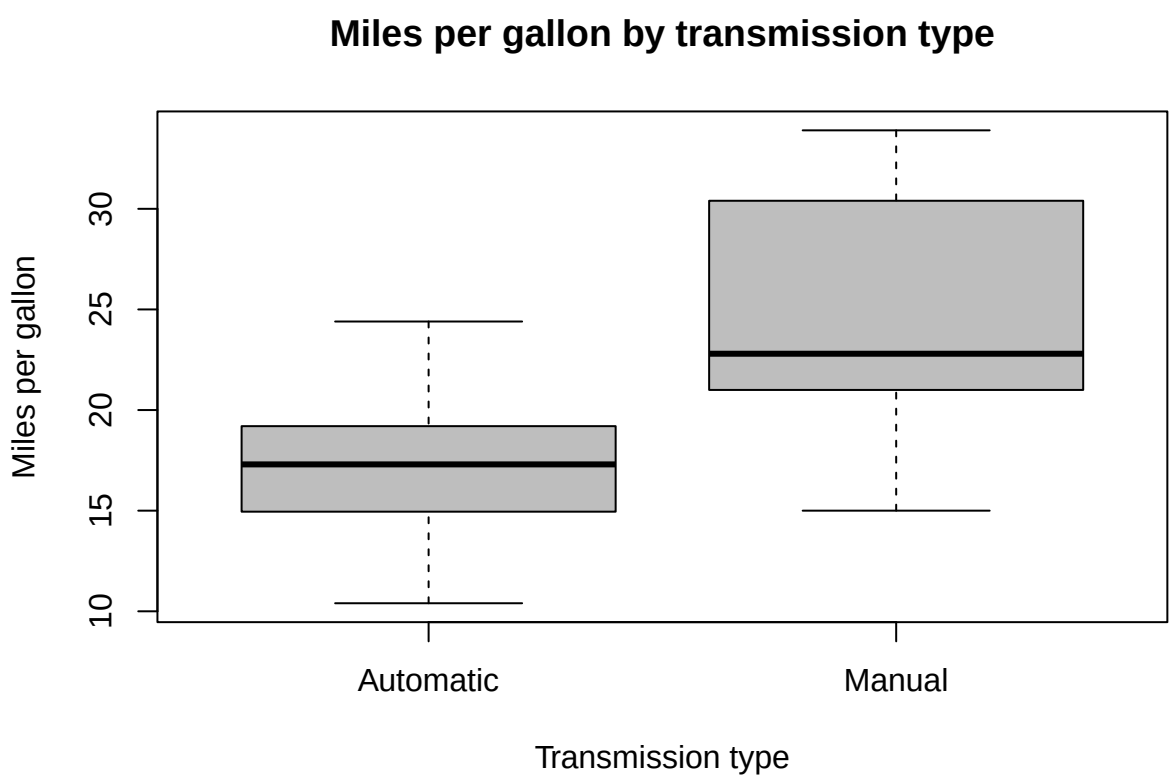
Executive summary

This project aims to explore some features that affect fuel consumption in miles per gallon (MPG) based on a collection of cars (mtcars - Motor Trend Car Road Tests) data set. This because Motor Trend Magazine is interested in exploring the relationship between a set of variables and miles per gallon (MPG). They are particularly interested in the following two questions: - Is an automatic or manual transmission better for MPG? - Quantifying how different is the MPG between automatic and manual transmissions?

Exploratory data analysis

```
## '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 ...
```



We proceed to see if theres a significant difference between average miles per galon beetwen the transmission type.

As we saw above, for a conventional significance level $\alpha = 0.05$ under the null hypothesis of true diffence in means equal to zero, we reject this hypothesis with a p-value of 0.0014. This is also confirmed by the 95% confidence interval of the means difference [-11.28,-3.20], which is not cointaining zero or near zero values. Now whe can proceed to calculate how different are the autonmyes.

```
##
## Call:
## lm(formula = mtcars$mpg ~ as.factor(mtcars$am))
##
## Residuals:
##     Min      1Q  Median      3Q     Max
## -9.3923 -3.0923 -0.2974  3.2439  9.5077
##
## Coefficients:
##                         Estimate Std. Error t value Pr(>|t|)
## (Intercept)               17.147      1.125  15.247 1.13e-15 ***
## as.factor(mtcars$am)1      7.245      1.764   4.106 0.000285 ***
## ---
## Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
##
## Residual standard error: 4.902 on 30 degrees of freedom
## Multiple R-squared:  0.3598, Adjusted R-squared:  0.3385
## F-statistic: 16.86 on 1 and 30 DF,  p-value: 0.000285
```

The regression coefficient of manual *"as.factor(mtcars$am)1"*