Mtcars project

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2/25/2022

The purpose of this project is to once again use the data to see if there is a relationship between number of cylinders, mpg, horse power and engine displacement. This project was done to explore our interests and to get more practice using R.

Upload the libraries.

**library**(tidyverse)

## -- Attaching packages --------------------------------------- tidyverse 1.3.1 --

## v ggplot2 3.3.5 v purrr 0.3.4

## v tibble 3.1.6 v dplyr 1.0.8

## v tidyr 1.2.0 v stringr 1.4.0

## v readr 2.1.2 v forcats 0.5.1

## -- Conflicts ------------------------------------------ tidyverse\_conflicts() --

## x dplyr::filter() masks stats::filter()

## x dplyr::lag() masks stats::lag()

Upload the dataset.

data <- mtcars

head(data)

## mpg cyl disp hp drat wt qsec vs am gear carb

## Mazda RX4 21.0 6 160 110 3.90 2.620 16.46 0 1 4 4

## Mazda RX4 Wag 21.0 6 160 110 3.90 2.875 17.02 0 1 4 4

## Datsun 710 22.8 4 108 93 3.85 2.320 18.61 1 1 4 1

## Hornet 4 Drive 21.4 6 258 110 3.08 3.215 19.44 1 0 3 1

## Hornet Sportabout 18.7 8 360 175 3.15 3.440 17.02 0 0 3 2

## Valiant 18.1 6 225 105 2.76 3.460 20.22 1 0 3 1

check for null values.

data %>% is.na() %>% colMeans()

## mpg cyl disp hp drat wt qsec vs am gear carb

## 0 0 0 0 0 0 0 0 0 0 0

Lets take a look at cylinders in the engine to mpg. The mpg is decreased by an increase in number of cylinders. This matches our results from the mpg dataset I worked on days before.

data %>%

ggplot(aes(mpg, cyl)) +

geom\_point() +

geom\_smooth() +

labs(title = "mpg versus number of cyclinders")

## `geom\_smooth()` using method = 'loess' and formula 'y ~ x'

Chart, histogram

Description automatically generated

Now lets look at the correlation between number of cylinders and horse power. We see a general increase of horse power with increased number of cylinders. Combing results with our last graph would indicate that the greater the horse power, there would be a decrease in mpg since number of cylinders increased with increased horse power and an increase in horse power had a decrease in mpg.

data %>%

ggplot(aes(cyl,hp)) +

geom\_point() +

geom\_smooth() +

labs(title = " cylinders versus horse power")

## `geom\_smooth()` using method = 'loess' and formula 'y ~ x'

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =

## parametric, : pseudoinverse used at 3.98

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =

## parametric, : neighborhood radius 4.02

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =

## parametric, : reciprocal condition number 2.0055e-016

## Warning in simpleLoess(y, x, w, span, degree = degree, parametric =

## parametric, : There are other near singularities as well. 16.16

## Warning in predLoess(object$y, object$x, newx = if

## (is.null(newdata)) object$x else if (is.data.frame(newdata))

## as.matrix(model.frame(delete.response(terms(object)), : pseudoinverse used at

## 3.98

## Warning in predLoess(object$y, object$x, newx = if

## (is.null(newdata)) object$x else if (is.data.frame(newdata))

## as.matrix(model.frame(delete.response(terms(object)), : neighborhood radius 4.02

## Warning in predLoess(object$y, object$x, newx = if

## (is.null(newdata)) object$x else if (is.data.frame(newdata))

## as.matrix(model.frame(delete.response(terms(object)), : reciprocal condition

## number 2.0055e-016

## Warning in predLoess(object$y, object$x, newx = if

## (is.null(newdata)) object$x else if (is.data.frame(newdata))

## as.matrix(model.frame(delete.response(terms(object)), : There are other near

## singularities as well. 16.16

Chart, line chart

Description automatically generated

Lets see if there is a correlation between horse power and engine displacement. The graph shows that there is an increase in horse power as the displacement gets larger untill 225 horse power, then the displacement decreases after that point.

data %>%

ggplot(aes(hp,disp)) +

geom\_point() +

geom\_smooth() +

labs(title = "horsepower versus displacement")

## `geom\_smooth()` using method = 'loess' and formula 'y ~ x'

Chart

Description automatically generated

Conclusion:

We saw similarities between this project and the MPG project we did in R a few days ago. We saw an decrease in mpg as the number of cylinders increased. Number of cylinders had a direct correlation with horsepower; as number of cylinders increased the horsepower increased as well. There was an increase in horse power as the displacement got larger until about 225 horse power, then the displacement decreased after that point. Overall we got the results we expected to get.