Scatter plots in R Language

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- A scatter plot is a set of dotted points representing individual data pieces on the horizontal and vertical axis. In a graph in which the values of two variables are plotted along the X-axis and Y-axis, the pattern of the resulting points reveals a correlation between them.

R – Scatter plots

We can create a **scatter plot in R Programming Language** using the **plot()** function.

Syntax: *plot(x, y, main, xlab, ylab, xlim, ylim, axes)*

Parameters:

- ***x:*** *This parameter sets the horizontal coordinates.*
- ***y:*** *This parameter sets the vertical coordinates.*
- ***xlab:*** *This parameter is the label for horizontal axis.*
- ***ylab:*** *This parameter is the label for vertical axis.*
- ***main:*** *This parameter main is the title of the chart.*
- ***xlim:*** *This parameter is used for plotting values of x.*
- ***ylim:*** *This parameter is used for plotting values of y.*
- ***axes:*** *This parameter indicates whether both axes should be drawn on the plot.*

Simple Scatterplot Chart

In order to create Scatterplot Chart:

1. We use the data set “mtcars”.
2. Use the columns “wt” and “mpg” in mtcars.

Example:

- R

```
input <- mtcars[, c('wt', 'mpg')]

print(head(input))
```

Output:

```
                   wt  mpg
Mazda RX4         2.620 21.0
Mazda RX4 Wag     2.875 21.0
Datsun 710        2.320 22.8
Hornet 4 Drive    3.215 21.4
Hornet Sportabout 3.440 18.7
Valiant           3.460 18.1
```

Creating a Scatterplot Graph

In order to create an R Scatterplot graph:

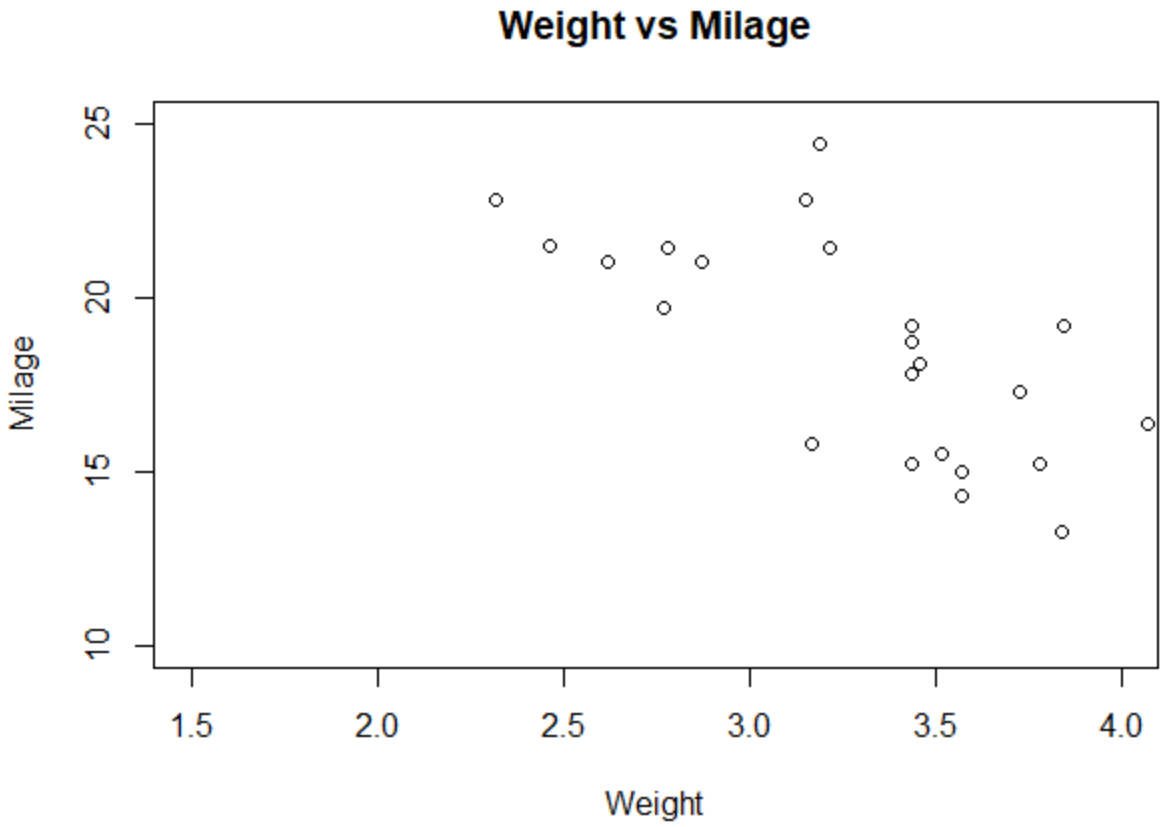
1. We are using the required parameters to plot the graph.
2. In this ‘xlab’ describes the X-axis and ‘ylab’ describes the Y-axis.

Example:

- R

```
# Get the input values.

input <- mtcars[, c('wt', 'mpg')]



# Plot the chart for cars with

# weight between 1.5 to 4 and

# mileage between 10 and 25.

plot(x = input$wt, y = input$mpg,

    xlab = "Weight",

    ylab = "Milage",

    xlim = c(1.5, 4),

    ylim = c(10, 25),

    main = "Weight vs Milage"

)
```

Output:



Scatter plots in R Language

Scatterplot Matrices

When we have two or more variables and we want to correlate between one variable and others so we use a R scatterplot matrix.

pairs() function is used to createR matrices of scatterplots.
Syntax: *pairs(formula, data)*
Parameters:

- ***formula:*** *This parameter represents the series of variables used in pairs.*
- ***data:*** *This parameter represents the data set from which the variables will be taken.*

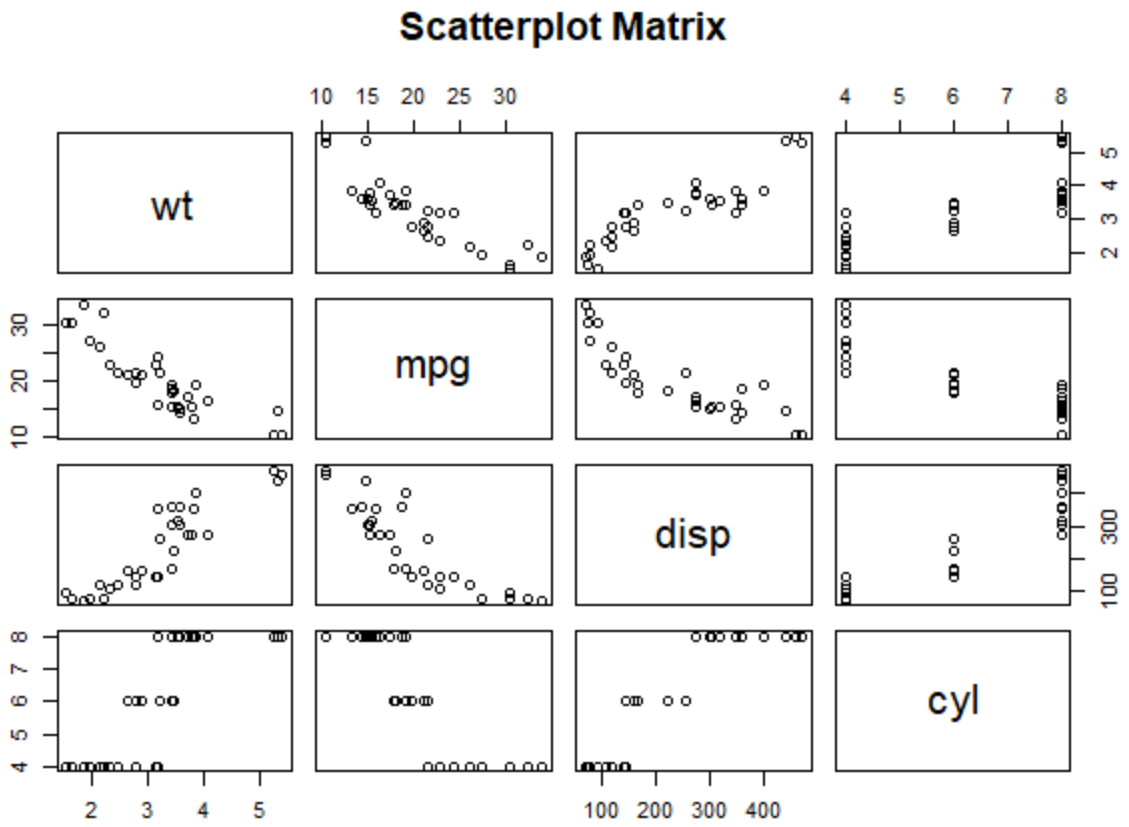
Example:

- R

```
# Plot the matrices between

# 4 variables giving 12 plots.
```

```
# One variable with 3 others

# and total 4 variables.

pairs(~wt + mpg + disp + cyl, data = mtcars,

    main = "Scatterplot Matrix")
```

Output:



Scatter plots in R Language

Scatterplot with fitted values

In order to create R Scatterplot Chart:

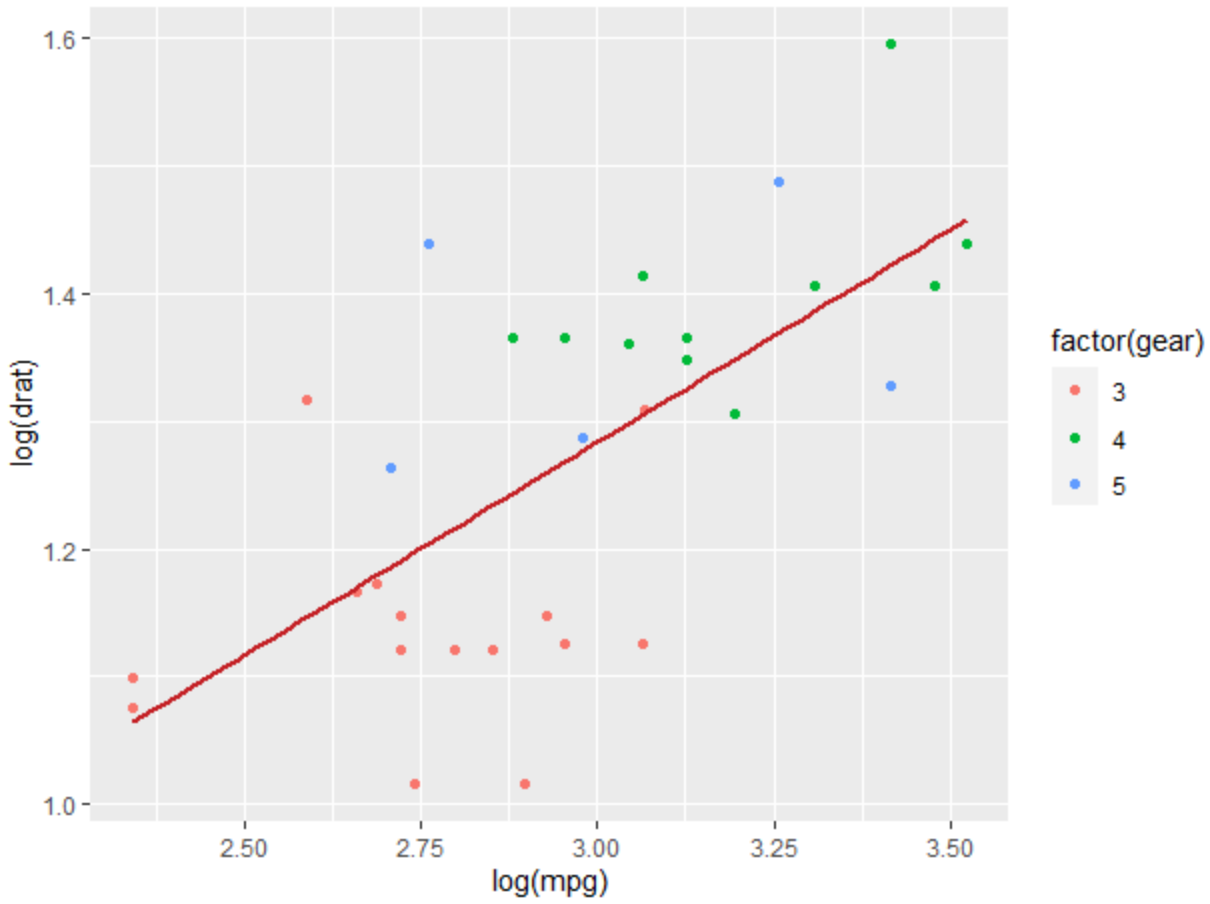
1. We are using the ggplot2 package provides ggplot() and geom_point() function for creating a scatterplot.
2. Also we are using the columns “wt” and “mpg” in mtcars.

Example:

- R

```
# Loading ggplot2 package

library(ggplot2)



# Creating scatterplot with fitted values.

# An additional function stst_smooth

# is used for linear regression.

ggplot(mtcars, aes(x = log(mpg), y = log(drat))) +

        geom_point(aes(color = factor(gear))) +

        stat_smooth(method = "lm",

        col = "#C42126", se = FALSE, size = 1

)
```

Output:



Scatter plots in R Language

Adding title with dynamic name

To create R Scatterplot Chart, Add a sub-title:

1. We use the additional function, In ggplot we add the data set “mtcars” with this adding ‘aes’, ‘geom_point’.
2. Use the Title, Caption, Subtitle.

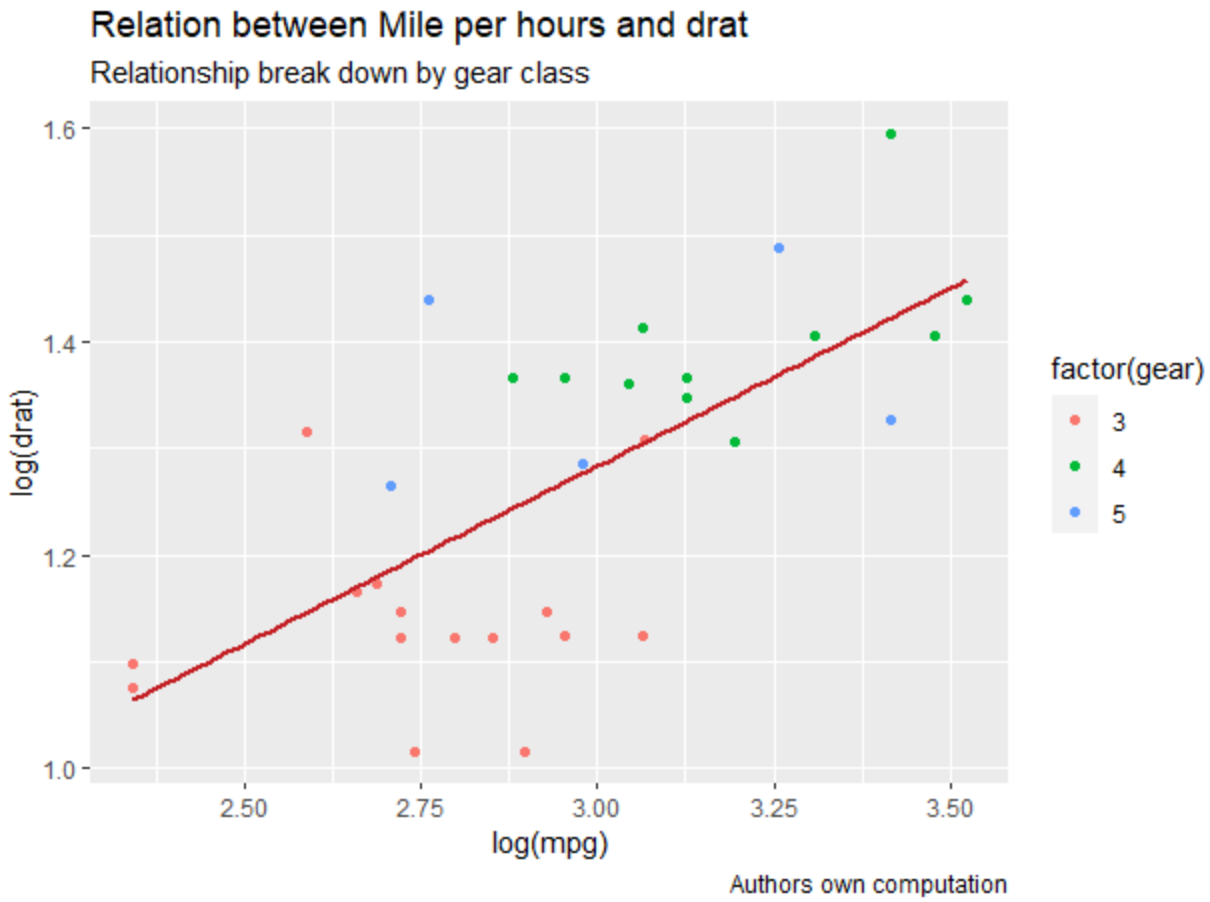
Example:

- R

```
# Loading ggplot2 package

library(ggplot2)



# Creating scatterplot with fitted values.
```

```
# An additional function stst_smooth

# is used for linear regression.

new_graph<-ggplot(mtcars, aes(x = log(mpg),

                              y = log(drat))) +

                    geom_point(aes(color = factor(gear))) +

                    stat_smooth(method = "lm",

                                col = "#C42126",

                    se = FALSE, size = 1)



# in above example lm is used for linear regression

# and se stands for standard error.

# Adding title with dynamic name

new_graph + labs(

        title = "Relation between Mile per hours and drat",

        subtitle = "Relationship break down by gear class",

        caption = "Authors own computation"

)
```

Output:



Scatter plots in R Language

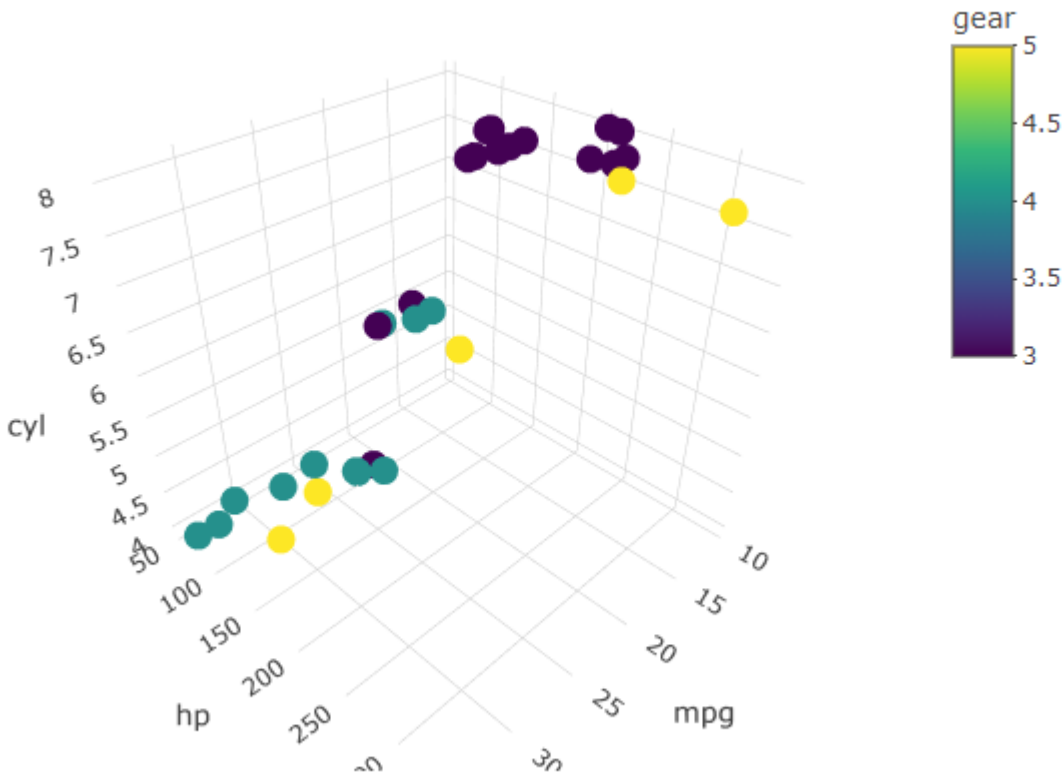
3D Scatterplots

Here we will use R scatterplot3D package to create 3D scatterplots, this package can plot R scatterplots in 3D using scatterplot3d() methods.

- R

```
# 3D Scatterplot

library(plotly)

attach(mtcars)

plot_ly(data=mtcars,x=~mpg,y=~hp,z=~cyl,color=~gear)
```

Output:



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