3D Plot

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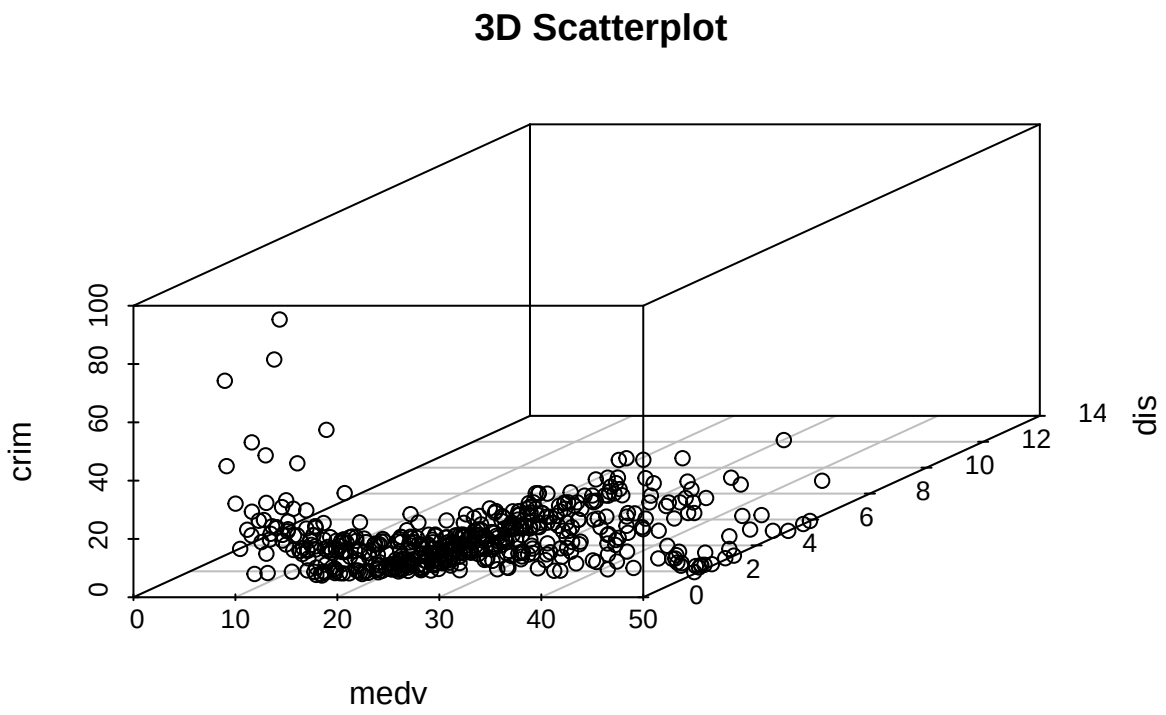
Data : Boston Housing from MASS package

link: http://www.clemson.edu/economics/faculty/wilson/R-tutorial/analyzing_data.html The Boston data frame has 506 rows and 14 columns.This data frame contains the following columns: 1. crim: per capita crime rate by town 2. zn: proportion of residential land zoned for lots over 25,000 sq.ft. 3. indus: proportion of non-retail business acres per town 4. chas: Charles River dummy variable (= 1 if tract bounds river; 0 otherwise) 5. nox: nitrogen oxides concentration (parts per 10 million) 6. rm: average number of rooms per dwelling 7. age: proportion of owner-occupied units built prior to 1940 8. dis: weighted mean of distances to five Boston employment centres 9. rad: index of accessibility to radial highways 10. tax: full-value property-tax rate per $10,000 11. ptratio: pupil-teacher ratio by town 12. black: 1000(Bk - 0.63)ˆ2 where Bk is the proportion of blacks by town 13. lstat: lower status of the population (percent) 14. medv: median value of owner-occupied homes in $1000

3D Scatterplots

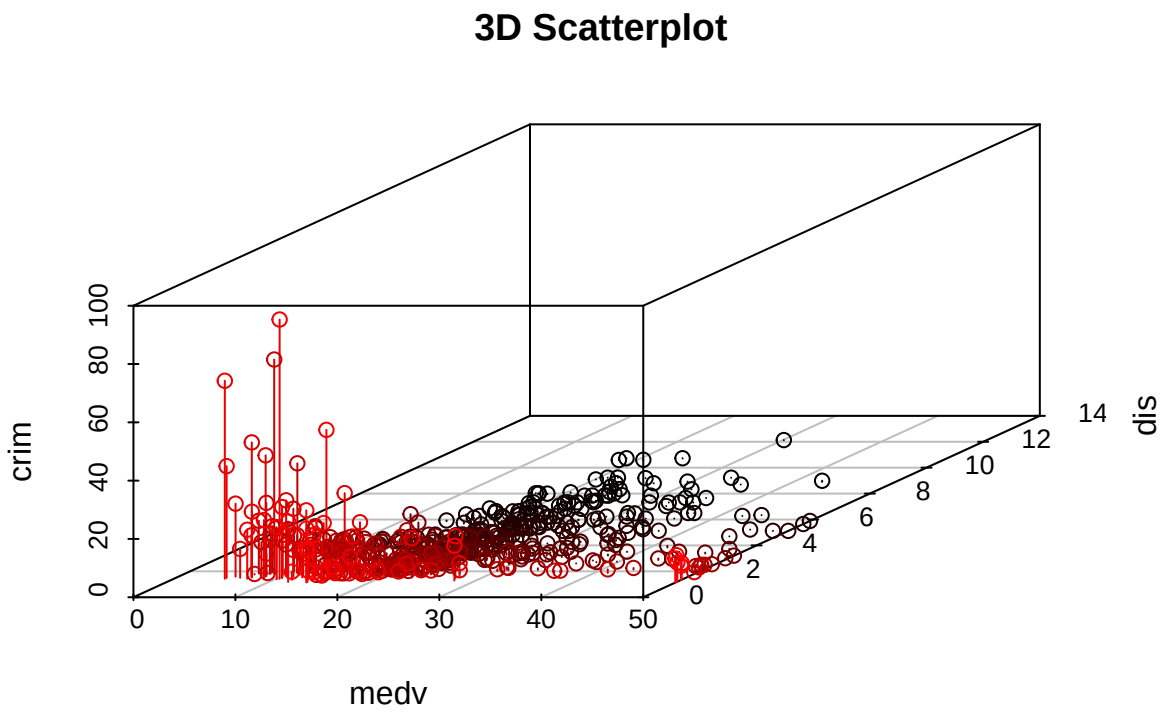
You can create a 3D scatterplot with the scatterplot3d package. Use the function scatterplot3d(x, y, z).

```
library(MASS)
library(scatterplot3d)
attach(Boston)
scatterplot3d(medv,dis,crim, main="3D Scatterplot")
```



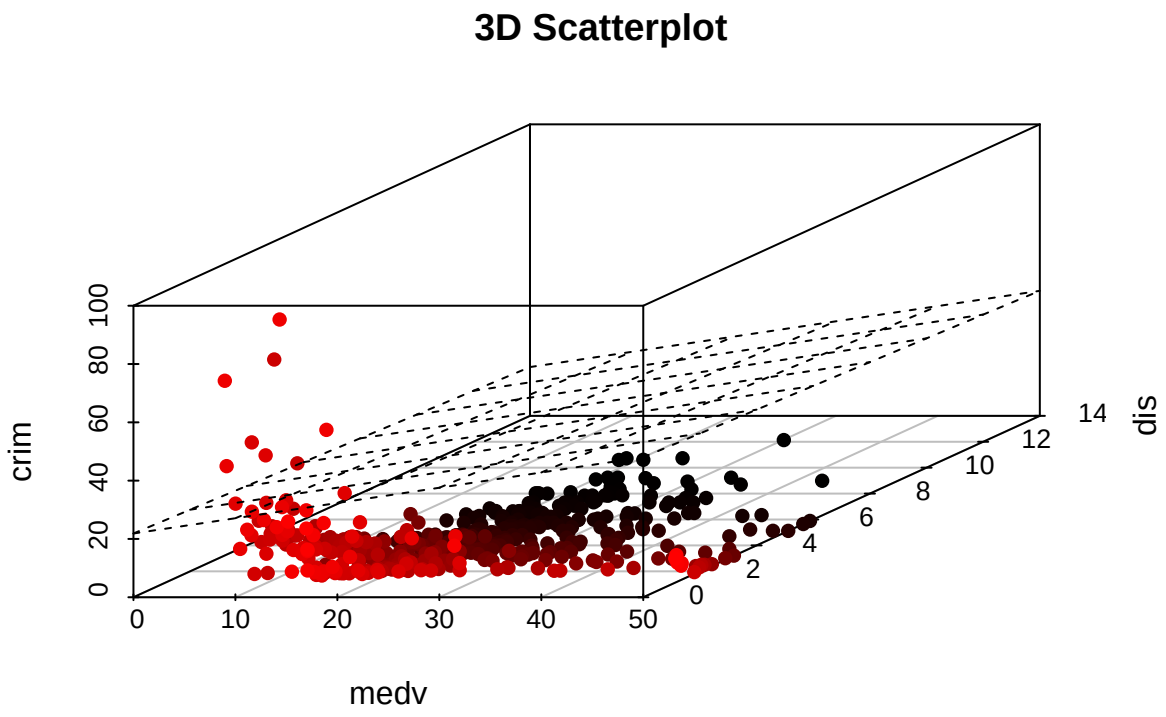
3D Scatterplot with Coloring and Vertical Drop Lines

```
scatterplot3d(medv,dis,crim,highlight.3d=TRUE,
  type="h", main="3D Scatterplot")
```



3D Scatterplot with Coloring and Regression Plane

```
s3d <-scatterplot3d(medv,dis,crim, pch=16, highlight.3d=TRUE,
      main="3D Scatterplot")
fit <- lm(medv ~ dis + crim)
s3d$plane3d(fit)
```



Spinning 3D Scatterplots

You can also create an interactive 3D scatterplot using the plot3d(x, y, z) in the rgl package.. It creates a spinning 3D scatterplot that can be rotated with the mouse.

```
library(rgl)
```

```
## Warning: package 'rgl' was built under R version 3.3.2
```

```
plot3d(medv,dis,crim, col="red", size=3)
```

Surface Plot Using Lattice

You can create a surface plot with the Lattice package using the following codes.

```
library(lattice)
```

```
## Warning: package 'lattice' was built under R version 3.3.2
```

```
require(MASS)

Boston.df = data.frame(medv = Boston$medv, lstat = Boston$lstat, dis = Boston$dis)
Boston.loess = loess(medv ~ lstat+dis, data = Boston.df,
  degree = 2, span = 0.25)
Boston.fit = expand.grid(list(lstat = seq(1, 40, 1), dis = seq(0, 89, 1)))
```

```
medv = predict(Boston.loess, newdata = Boston.fit)

wireframe(medv ~ dis*lstat, data = Boston.fit,
    xlab = "Distance to Working Place", ylab = "Percentage of Low Status Population",
  main = "Surface Boston Housing",
  drape = TRUE,
  colorkey = TRUE,
  screen = list(z = -60, x = -60)
)
```