

Predict Gas Guzzlers using a Neural Net Model on the MPG Data Set

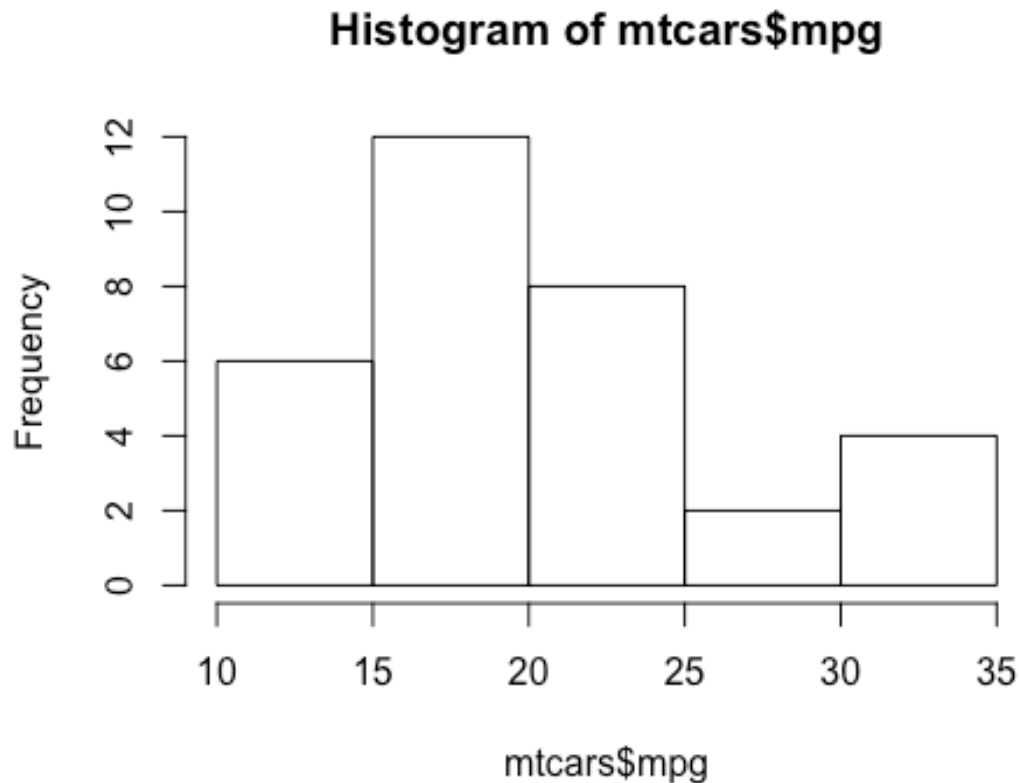
Priya

Loading libraries needed

```
library(neuralnet)
```

Create a Data Frame We will use the dataset mtcars. We're going to create a new variable called mpg2. If the car has greater than 22 mpg that it's a one. If less than 0. This creates a binary variable, which we can use in the NN.

```
hist(mtcars$mpg)
```



```
mtcars$mpg2 <- ifelse(mtcars$mpg > 22,1,0)
data <- mtcars
rows <- sample(1:nrow(data), nrow(data) * .7, replace = F)
train <- data[rows,]
test <- data[-rows,]
```

Creating a neural net model We are going to use all the variables. It is also a logistic neural net model.

```
set.seed(222)
model <- neuralnet(mpg2 ~ ., train,
  act.fct = "logistic", linear.output = F )
?neuralnet
```

We can also plot the model to see the structure of neuralnet

```
plot(model)
```

Testing the model We call the compute method to test the model on our test set.

```
predict <- neuralnet::compute(model, test)
predict
```

```
## $neurons
## $neurons[[1]]
##      mpg cyl  disp  hp drat   wt  qsec vs am gear carb
## Hornet Sportabout 1 18.7  8 360.0 175 3.15 3.440 17.02 0 0   3   2
## Duster 360        1 14.3  8 360.0 245 3.21 3.570 15.84 0 0   3   4
## Merc 450SL        1 17.3  8 275.8 180 3.07 3.730 17.60 0 0   3   3
## Merc 450SLC       1 15.2  8 275.8 180 3.07 3.780 18.00 0 0   3   3
## Dodge Challenger  1 15.5  8 318.0 150 2.76 3.520 16.87 0 0   3   2
## AMC Javelin       1 15.2  8 304.0 150 3.15 3.435 17.30 0 0   3   2
## Fiat X1-9         1 27.3  4  79.0  66 4.08 1.935 18.90 1 1   4   1
## Porsche 914-2     1 26.0  4 120.3  91 4.43 2.140 16.70 0 1   5   2
## Ford Pantera L    1 15.8  8 351.0 264 4.22 3.170 14.50 0 1   5   4
## Maserati Bora     1 15.0  8 301.0 335 3.54 3.570 14.60 0 1   5   8
##
## $neurons[[2]]
##      [,1]      [,2]
## Hornet Sportabout 1 4.983105e-44
```

```
## Duster 360      1 5.953512e-42
## Merc 450SL      1 2.596518e-28
## Merc 450SLC     1 4.856959e-28
## Dodge Challenger 1 1.204269e-37
## AMC Javelin     1 9.736825e-35
## Fiat X1-9       1 9.999784e-01
## Porsche 914-2   1 1.993641e-04
## Ford Pantera L  1 2.669313e-38
## Maserati Bora   1 2.824040e-27
##
##
## $net.result
##           [,1]
## Hornet Sportabout 0.1164533
## Duster 360       0.1164533
## Merc 450SL       0.1164533
## Merc 450SLC      0.1164533
## Dodge Challenger 0.1164533
## AMC Javelin      0.1164533
## Fiat X1-9        0.9898095
## Porsche 914-2    0.1165888
## Ford Pantera L   0.1164533
## Maserati Bora    0.1164533
```

Creating Confusion matrix

```
results <- ifelse(predict$net.result > .5, 1,0)
```

```
table(results, test$mpg2)
```

```
##
## results 0 1
##      0 8 1
##      1 0 1
```