Build a Neural Network model for 50\_startups data to predict profit

**Ans :**

**R Code :**

## Neural Network

########## 50 Startups Data Set #########

startups <- read.csv('D:\\Data Science\\Excelr\\Assignments\\Assignment\\Neural Networks\\50\_Startups\_r.csv')

# custom normalization function

normalize <- function(x) {

return((x - min(x)) / (max(x) - min(x)))

}

# apply normalization to entire data frame

startups\_norm <- as.data.frame(lapply(startups[2:5], normalize))

# create training and test data

startups\_train <- startups\_norm[1:35, ]

startups\_test <- startups\_norm[36:50, ]

## Training a model on the data ----

# train the neuralnet model

library(neuralnet)

# simple ANN with only a single hidden neuron

startups\_model <- neuralnet(formula = Profit ~ R.D.Spend + Administration +

Marketing.Spend ,

data = startups\_train)

# visualize the network topology

windows()

plot(startups\_model)

## Evaluating model performance ----

# obtain model results

model\_results <- compute(startups\_model, startups\_test)

# obtain predicted strength values

predicted\_profit <- model\_results$net.result

# examine the correlation between predicted and actual values

cor(predicted\_profit, startups\_test$strength)

## Improving model performance ----

# a more complex neural network topology with 5 hidden neurons

startups\_model2 <- neuralnet(Profit ~ R.D.Spend + Administration +

Marketing.Spend ,

data = startups\_train, hidden =c(5,2))

# plot the network

windows()

plot(startups\_model2)

# evaluate the results as we did before

model\_results2 <- compute(startups\_model2, startups\_test)

predicted\_profit2 <- model\_results2$net.result

cor(predicted\_profit2, startups\_test$Profit)

**Results :**

> cor(predicted\_profit, startups\_test$strength)

[,1]

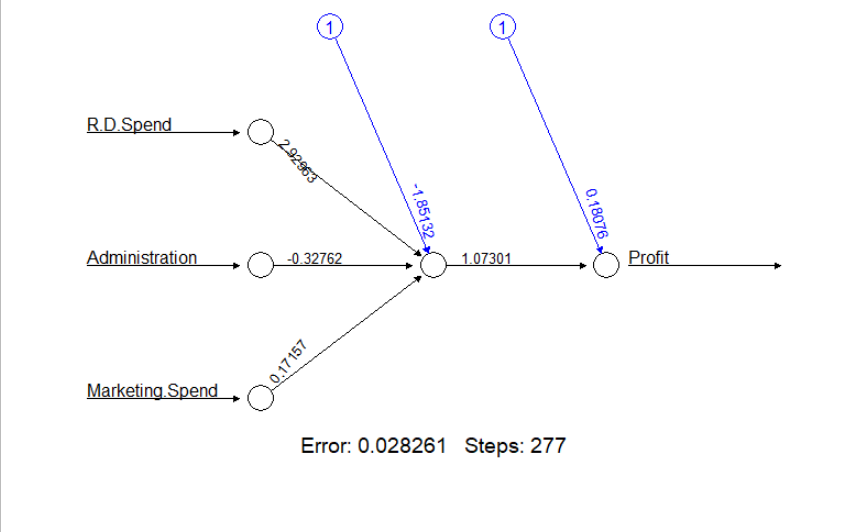
[1,] 1

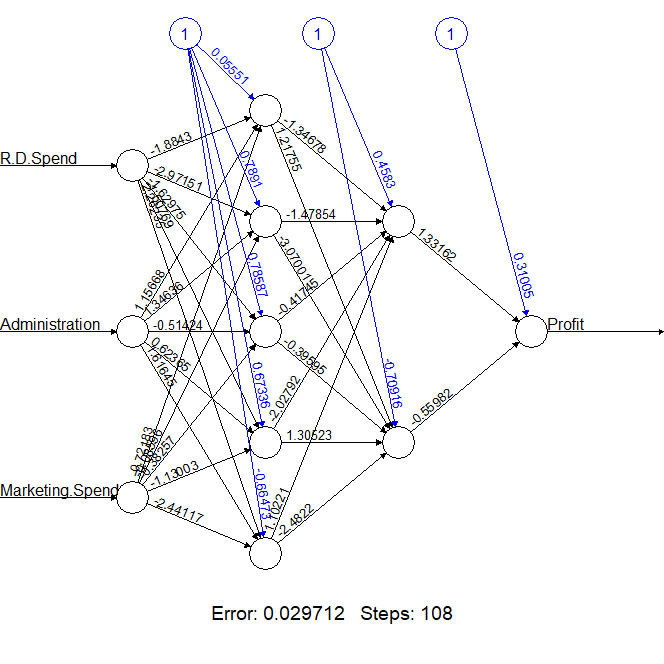
> cor(predicted\_profit2, startups\_test$Profit)

[,1]

[1,] 0.7857518

**Plots :**





**Inference :**

Getting more accuracy without the extra hidden layers. So the normal model is sufficient.