HarshAgrawal\_HW7.R

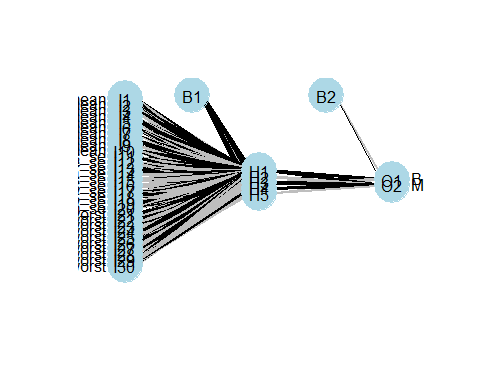
Asus

2021-11-14

# Course : CS 513  
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rm(list=ls())  
  
library(neuralnet)  
library(NeuralNetTools)  
  
setwd("C:/Users/Asus/Desktop/Github/MSCS/CS-513/HW7")  
  
db = read.csv('wisc\_bc\_ContinuousVar.csv',header=TRUE, sep=",")  
db = db[,-1]  
db<-na.omit(db)  
summary(db)

## diagnosis radius\_mean texture\_mean perimeter\_mean   
## Length:569 Min. : 6.981 Min. : 9.71 Min. : 43.79   
## Class :character 1st Qu.:11.700 1st Qu.:16.17 1st Qu.: 75.17   
## Mode :character Median :13.370 Median :18.84 Median : 86.24   
## Mean :14.127 Mean :19.29 Mean : 91.97   
## 3rd Qu.:15.780 3rd Qu.:21.80 3rd Qu.:104.10   
## Max. :28.110 Max. :39.28 Max. :188.50   
## area\_mean smoothness\_mean compactness\_mean concavity\_mean   
## Min. : 143.5 Min. :0.05263 Min. :0.01938 Min. :0.00000   
## 1st Qu.: 420.3 1st Qu.:0.08637 1st Qu.:0.06492 1st Qu.:0.02956   
## Median : 551.1 Median :0.09587 Median :0.09263 Median :0.06154   
## Mean : 654.9 Mean :0.09636 Mean :0.10434 Mean :0.08880   
## 3rd Qu.: 782.7 3rd Qu.:0.10530 3rd Qu.:0.13040 3rd Qu.:0.13070   
## Max. :2501.0 Max. :0.16340 Max. :0.34540 Max. :0.42680   
## concave.points\_mean symmetry\_mean fractal\_dimension\_mean radius\_se   
## Min. :0.00000 Min. :0.1060 Min. :0.04996 Min. :0.1115   
## 1st Qu.:0.02031 1st Qu.:0.1619 1st Qu.:0.05770 1st Qu.:0.2324   
## Median :0.03350 Median :0.1792 Median :0.06154 Median :0.3242   
## Mean :0.04892 Mean :0.1812 Mean :0.06280 Mean :0.4052   
## 3rd Qu.:0.07400 3rd Qu.:0.1957 3rd Qu.:0.06612 3rd Qu.:0.4789   
## Max. :0.20120 Max. :0.3040 Max. :0.09744 Max. :2.8730   
## texture\_se perimeter\_se area\_se smoothness\_se   
## Min. :0.3602 Min. : 0.757 Min. : 6.802 Min. :0.001713   
## 1st Qu.:0.8339 1st Qu.: 1.606 1st Qu.: 17.850 1st Qu.:0.005169   
## Median :1.1080 Median : 2.287 Median : 24.530 Median :0.006380   
## Mean :1.2169 Mean : 2.866 Mean : 40.337 Mean :0.007041   
## 3rd Qu.:1.4740 3rd Qu.: 3.357 3rd Qu.: 45.190 3rd Qu.:0.008146   
## Max. :4.8850 Max. :21.980 Max. :542.200 Max. :0.031130   
## compactness\_se concavity\_se concave.points\_se symmetry\_se   
## Min. :0.002252 Min. :0.00000 Min. :0.000000 Min. :0.007882   
## 1st Qu.:0.013080 1st Qu.:0.01509 1st Qu.:0.007638 1st Qu.:0.015160   
## Median :0.020450 Median :0.02589 Median :0.010930 Median :0.018730   
## Mean :0.025478 Mean :0.03189 Mean :0.011796 Mean :0.020542   
## 3rd Qu.:0.032450 3rd Qu.:0.04205 3rd Qu.:0.014710 3rd Qu.:0.023480   
## Max. :0.135400 Max. :0.39600 Max. :0.052790 Max. :0.078950   
## fractal\_dimension\_se radius\_worst texture\_worst perimeter\_worst   
## Min. :0.0008948 Min. : 7.93 Min. :12.02 Min. : 50.41   
## 1st Qu.:0.0022480 1st Qu.:13.01 1st Qu.:21.08 1st Qu.: 84.11   
## Median :0.0031870 Median :14.97 Median :25.41 Median : 97.66   
## Mean :0.0037949 Mean :16.27 Mean :25.68 Mean :107.26   
## 3rd Qu.:0.0045580 3rd Qu.:18.79 3rd Qu.:29.72 3rd Qu.:125.40   
## Max. :0.0298400 Max. :36.04 Max. :49.54 Max. :251.20   
## area\_worst smoothness\_worst compactness\_worst concavity\_worst   
## Min. : 185.2 Min. :0.07117 Min. :0.02729 Min. :0.0000   
## 1st Qu.: 515.3 1st Qu.:0.11660 1st Qu.:0.14720 1st Qu.:0.1145   
## Median : 686.5 Median :0.13130 Median :0.21190 Median :0.2267   
## Mean : 880.6 Mean :0.13237 Mean :0.25427 Mean :0.2722   
## 3rd Qu.:1084.0 3rd Qu.:0.14600 3rd Qu.:0.33910 3rd Qu.:0.3829   
## Max. :4254.0 Max. :0.22260 Max. :1.05800 Max. :1.2520   
## concave.points\_worst symmetry\_worst fractal\_dimension\_worst  
## Min. :0.00000 Min. :0.1565 Min. :0.05504   
## 1st Qu.:0.06493 1st Qu.:0.2504 1st Qu.:0.07146   
## Median :0.09993 Median :0.2822 Median :0.08004   
## Mean :0.11461 Mean :0.2901 Mean :0.08395   
## 3rd Qu.:0.16140 3rd Qu.:0.3179 3rd Qu.:0.09208   
## Max. :0.29100 Max. :0.6638 Max. :0.20750

View(db)  
  
train\_index <- sample(nrow(db),as.integer(.70\*nrow(db)))  
train\_data<-db[train\_index,]  
test\_data<-db[-train\_index,]  
  
model <- neuralnet(diagnosis~.,data=train\_data,hidden=5, threshold=0.01)  
plotnet(model)



pred<-compute(model ,test\_data[,-1])  
ann<-c('B','M')[apply(pred$net.result,1,which.max)]  
  
inc = (test\_data$diagnosis != ann)  
accuracy <-1 - sum(inc)/length(inc)  
accuracy

## [1] 0.5906433