

## HarshAgrawal\_HW7.R

Asus

2021-11-10

```
# Course      : CS 513
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```

```
rm(list=ls())
```

```
library(neuralnet)
```

```
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)

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] 0.9590643
```