Data 609 HW 8

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Import

```
library(nnet)
```

```
## Warning: package 'nnet' was built under R version 4.2.3
```

EX 1

Use the nnet package to analyze the iris data set. Use 80% of the 150 samples as the training data and the rest for validation. Discuss the results.

```
data(iris)

# Split the data into training and validation sets
s<-sample(150, 150 * .8, replace = FALSE)
iris_train<-iris[s,]
iris_test<-iris[-s,]

# Fit a neural network model to the training data
ann_model <- nnet(Species ~ ., data = iris_train, size = 5)
```

```
## # weights:  43
## initial  value 134.370457
## iter  10 value 54.862069
## iter  20 value 54.825861
## iter  30 value 54.824678
## iter  40 value 54.788523
## iter  50 value 54.017730
## iter  60 value 53.334203
## iter  70 value 53.090267
## iter  80 value 52.672314
## iter  90 value 47.068387
## iter 100 value 19.194579
## final  value 19.194579
## stopped after 100 iterations
```

```r
# Make predictions on the validation data
iris_predict <- predict(ann_model, newdata = iris_test, type = "class")

# Calculate the accuracy of the model on the validation data
table(iris_predict, iris_test[,5])
```

```
##
## iris_predict setosa versicolor virginica
##   setosa         10          0         0
##   versicolor      0         13         0
##   virginica       0          2         5
```

```r
mean(iris_predict== iris_test[,5])
```

```
## [1] 0.9333333
```

The artificial neural network performs very well in predicting the species on the test set with 93% accuracy. It performs similiarly to the support vector machine solution from HW 7.