**R script**

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# MIS 545 Section 02

# Lab12DineshA.R

# To import a dataset of people and generate a neural network model that will

# predict if a fisher used a chartered boat service based on their

# fishing catch rate and their annual income

# We will be importing csv files, assigning data types,

# building a supervised neural network model, and testing for model fit.

# install.packages("tidyverse")

# install.packages("neuralnet")

library(tidyverse)

library(neuralnet)

library(factoextra)

library(cluster)

library(gridExtra)

# set the working directory

setwd("~/MIS/Classes/MIS545/Assignments/Lab12")

fishingCharter <- read\_csv(file = "FishingCharter.csv",

col\_types = "lnn",

col\_names = TRUE)

# print the fishingCharter tibble

print(fishingCharter)

# print the structure of fishingCharter

print(str(fishingCharter))

# print the summary of fishingCharter

print(summary(fishingCharter))

# scaling the annual income to a value between 0 and 1

fishingCharter <- fishingCharter %>%

mutate(AnnualIncomeScaled = (AnnualIncome - min(AnnualIncome))/

(max(AnnualIncome) - min(AnnualIncome)))

# scaling the catch rate to a value between 0 and 1

fishingCharter <- fishingCharter %>%

mutate(CatchRateScaled = (CatchRate - min(CatchRate))/

(max(CatchRate) - min(CatchRate)))

# set the seed to 591

set.seed(591)

sampleSet <- sample(nrow(fishingCharter),

round(nrow(fishingCharter)\*0.75),

replace = FALSE)

# splitting into 75% training dataset

fishingCharterTraining <- fishingCharter[sampleSet, ]

# loading the remaining 25% of the dataset for testing

fishingCharterTesting <- fishingCharter[-sampleSet, ]

# generating the neural network

fishingCharterNeuralNet <- neuralnet(

formula = CharteredBoat ~ CatchRateScaled + AnnualIncomeScaled,

data = fishingCharterTraining,

hidden = 3,

act.fct = "logistic",

linear.output = FALSE)

# displaying the neural network results

print(fishingCharterNeuralNet$result.matrix)

# using fishingCharterProbability to generate probablities on the testing dataset

fishingCharterProbability <- compute(fishingCharterNeuralNet,

fishingCharterTesting)

# visualizing the neural network

plot(fishingCharterNeuralNet)

# displaying the results from the testing dataset on the console

print(fishingCharterProbability$net.result)

# converting probability predictions into 0 or 1 predictions

fishingCharterPrediction <-

ifelse(fishingCharterProbability$net.result > 0.5, 1, 0)

# displaying the predictions on the console

print(fishingCharterPrediction)

# evaluating the model by forming a confusion matrix

fishingCharterConfusionMatrix <- table(fishingCharterTesting$CharteredBoat,

fishingCharterPrediction)

# displaying confusion matrix on the console

print(fishingCharterConfusionMatrix)

# calculating model predictive accuracy

predictiveAccuracy <- sum(diag(fishingCharterConfusionMatrix)) /

nrow(fishingCharterTesting)

# displaying the predictive accuracy

print(predictiveAccuracy)

**Neural Network Visualization**

**Graphical user interface, application

Description automatically generated**

**Answers:**

1. Number of steps in the visualization indicate the number of iterations it took the neural network to land up on a prediction.
2. The disadvantage of using neural network to build a supervised model in this case is that there is no way to directly interpret the hidden layers although the predictive accuracy is high.