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**DATA ANALYTICS WITH R, EXCEL and TABLEAU**

**Session 20 – Assignment – 20**

#1. Use the below given data set

#Data Set

#2. Perform the below given activities:

# a. Create classification model using different random forest models

#b. Verify model goodness of fit

#c. Apply all the model validation techniques

#d. Make conclusions

#e. Plot importance of variables

#Answers

#a

#reading the dataset

#using bankloan dataset

bankloan1 <- read.csv("D:\\BIG DATA\\DATA ANALYTICS WITH R, EXCEL & TABLEAU\\20 TIME SERIES FORECASTING\\bank-additional-full.csv",sep = ";")

View(bankloan1)

str(bankloan1)

# tree

library(caTools)

library(tree)

set.seed(1)

sam<- sample(x=1: nrow(bankloan1), size = 0.80\*nrow(bankloan1))

train1<- bankloan1[sam, ]

table(bankloan1$default)

table(train1$default)

test1<- bankloan1[-sam, ]

table(test1$default)

model\_tree1<- tree(default~., data = train1)

summary(model\_tree1)

plot(model\_tree1); text(model\_tree1, pretty = 0, cex = 0.75)

pred\_tree1<- predict(model\_tree1, newdata = test1,

type = 'class')

conf\_tree1<- table(test1$default, pred\_tree1)

conf\_tree1

OAA\_tree1<- (conf\_tree1[1,1]+conf\_tree1[2,2])/sum(conf\_tree1)

OAA\_tree1

#~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~RF

#random forest

library(randomForest)

model\_rf1<- randomForest(default~., data = train1)

model\_rf1

summary(model\_rf1)

#b),c),d),e)

#Answers

#validation

#interpretation, Accuracy and model goodness of our model

#verify model goodness of fit

library(rpart)

library(caret)

# define training control

train\_control<- trainControl(method="cv", number=10)

# train the model

#method rf

model<- train(default~., data=train1, trControl=train\_control, method="rf")

model

# make predictions

predictions<- predict(model,test1)

# append predictions

pred<- cbind(test1,predictions)

# summarize results

confusionMatrix<- confusionMatrix(pred$predictions,pred$default)

confusionMatrix

# define training control

train\_control<- trainControl(method="cv", number=10)

# train the model

# method boosted tree

model<- train(default~., data=train1, trControl=train\_control, method="bstTree")

model

# make predictions

predictions<- predict(model,test1)

# append predictions

pred<- cbind(test1,predictions)

# summarize results

confusionMatrix<- confusionMatrix(pred$predictions,pred$churn)

confusionMatrix

#how do we create a cross validation scheme

control <- trainControl(method = 'repeatedcv',

number = 10,

repeats = 3)

seed <-7

metric <- 'Accuracy'

set.seed(seed)

mtry <- sqrt(ncol(train1))

tunegrid <- expand.grid(.mtry=mtry)

rf\_default <- train(default~.,

data = train1,

method = 'rf',

metric = metric,

tuneGrid = tunegrid,

trControl = control)

print(rf\_default)

#prediction of model\_rf1

pred\_rf1<- predict(model\_rf1, test1, type = 'class')

head(pred\_rf1, 15)

#interpretation, Accuracy and model goodness of our model

#verify model goodness of fit

#summary

summary(model\_rf1)

#confusion matrix of model\_rf1

conf\_rf1<- table(test1$default, pred\_rf1)

conf\_rf1

#accuracy of model\_rf1

OAA\_rf1<- (conf\_rf1[1,1]+conf\_rf1[2,2])/sum(conf\_rf1)

OAA\_rf1

#plotting imp of variance

library(caret)

importance(model\_rf1)

varImp(model\_rf1)

varImpPlot(model\_rf1, col = 'red')