data <- UniversalBank

library(caret)

library(class)

Loan\_normalized <- data[, -1]

Loan\_normalized <- Loan\_normalized[,-4]

str(Loan\_normalized)

norm\_model <- preProcess(Loan\_normalized, method = c('range'))

Loan\_normalized <- predict(norm\_model,Loan\_normalized)

Training <- 0.5

Validation <- 0.3

Test <- 0.2

num\_samples <- nrow(Loan\_normalized)

num\_train <- floor(Training \* num\_samples)

num\_val <- floor(Validation \* num\_samples)

num\_test <- floor(Test \* num\_samples)

# Create random indices for data splitting

indices <- sample(1:num\_samples, num\_samples, replace = FALSE)

# Split the data into training, validation, and test sets

Train\_Predictors3 <- Loan\_normalized[indices[1:num\_train], c(1:7, 9:12)]

Val\_Predictors3 <- Loan\_normalized[indices[(num\_train + 1):(num\_train + num\_val)], c(1:7, 9:12)]

Test\_Predictors3 <- Loan\_normalized[indices[(num\_train + num\_val + 1):(num\_train + num\_val + num\_test)], c(1:7, 9:12)]

Train\_labels3 <- data$`Personal Loan`[indices[1:num\_train]]

Val\_labels3 <- data$`Personal Loan`[indices[(num\_train + 1):(num\_train + num\_val)]]

Test\_labels3 <- data$`Personal Loan`[indices[(num\_train + num\_val + 1):(num\_train + num\_val + num\_test)]]

# Print the validation data

print(Val\_Predictors3)

# Set the seed for reproducibility

set.seed(123)

# Train the k-NN model on the training data

k <- 1 # Set the value of k

Predicted\_Test\_Labels <- knn(train = Train\_Predictors3,

test = Val\_Predictors3,

cl = Train\_labels3,

k = 1)

# Make predictions on the new data

new\_data <- data.frame(

Age = c(40),

Experience = c(10),

Income = c(84),

Family = c(2),

CCAvg = c(2),

Education = c(2),

Mortgage = c(0),

`Securities Account` = c(0),

`CD Account' = c(0),

Online = c(1),

CreditCard = c(1)

)

new\_data\_normalized <- predict(norm\_model, new\_data)

predicted\_loan\_status <- knn(train = Train\_Predictors3,

test = new\_data\_normalized,

cl = Train\_labels3,

k = 1)

print(predicted\_loan\_status)

library(gmodels)

CrossTable(x=Val\_labels3$`Personal Loan`,y=Predicted\_Test\_labels, prop.chisq = FALSE)