# Now we can model the data  
#loadrequiredlibrariesforpreprocessing(TRUE)  
setwd('/Users/dsing001/LV/R')  
library(ggplot2)  
library(discretization)

## Warning: package 'discretization' was built under R version 3.1.2

library(randomForest)

## Warning: package 'randomForest' was built under R version 3.1.2

## randomForest 4.6-10  
## Type rfNews() to see new features/changes/bug fixes.

library(ROCR)

## Warning: package 'ROCR' was built under R version 3.1.2

## Loading required package: gplots

## Warning: package 'gplots' was built under R version 3.1.2

## KernSmooth 2.23 loaded  
## Copyright M. P. Wand 1997-2009  
##   
## Attaching package: 'gplots'  
##   
## The following object is masked from 'package:stats':  
##   
## lowess

library(LV)  
library(unbalanced)

## Warning: package 'unbalanced' was built under R version 3.1.2

## Loading required package: FNN

## Warning: package 'FNN' was built under R version 3.1.2

## Loading required package: RANN

library(StatMatch)

## Loading required package: proxy  
##   
## Attaching package: 'proxy'  
##   
## The following objects are masked from 'package:stats':  
##   
## as.dist, dist  
##   
## Loading required package: clue  
## Loading required package: survey  
## Loading required package: grid  
##   
## Attaching package: 'survey'  
##   
## The following object is masked from 'package:graphics':  
##   
## dotchart

library(AppliedPredictiveModeling)

## Warning: package 'AppliedPredictiveModeling' was built under R version  
## 3.1.2

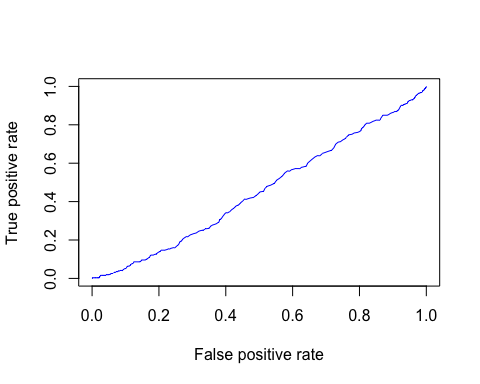
library(caret)

## Warning: package 'caret' was built under R version 3.1.2

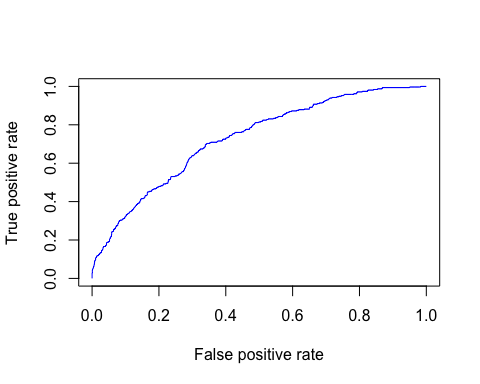
## Loading required package: lattice

clscol='Class'  
  
# read the data which we saved as part of part 2 aka feature selection  
train\_data <- read.csv('fs\_train\_data.csv')  
test\_data <- read.csv('fs\_test\_data.csv')  
valid\_data <- read.csv('fs\_validdata.csv')  
  
  
train\_data$No..Of.Credit.Lines <- NULL  
test\_data$No..Of.Credit.Lines <- NULL  
valid\_data$No..Of.Credit.Lines <- NULL  
  
train\_data[,clscol] <- as.factor(as.numeric(train\_data[,clscol] ))  
test\_data[,clscol] <- as.factor(as.numeric(test\_data[,clscol] ))  
valid\_data[,clscol] <- as.factor(as.numeric(valid\_data[,clscol] ))  
#just put the data for uncreditworthy  
td\_u <- train\_data[train\_data[,clscol]==1,]  
td\_c <- train\_data[train\_data[,clscol]==0,]  
  
numfolds <- floor(nrow(td\_c)/nrow(td\_u))  
  
flds <- createFolds(seq(nrow(td\_c)),numfolds)  
  
for (i in seq(numfolds))  
{  
 print (paste('fold',i))  
 print   
 td <- train\_data[flds[[i]],]  
 print(head(td))  
  
  
#Now add the interaction terms  
# from decision tree  
  
frml1 <- 'Class ~ . + Loan.Purpose:FICO.Credit.Score + Loan.Purpose:Use.Of.Credit.Line + Loan.Term:FICO.Credit.Score + Loan.Term:Annual.Income + Loan.Term:Use.Of.Credit.Line + Annual.Income:FICO.Credit.Score + Loan.Term:Loan.Purpose + FICO.Credit.Score:No..Inquiries.In.Last.6.Months + No..Inquiries.In.Last.6.Months:Use.Of.Credit.Line + FICO.Credit.Score:Total.Number.Of.Credit.Lines + Loan.Term:No..Inquiries.In.Last.6.Months'  
  
md\_prms <- train\_and\_predict\_log\_reg\_and\_ret\_auc(frml1,td,valid\_data,predict\_type='response')  
auc <- md\_prms$auc  
mdl <- md\_prms$model  
tst\_with\_prob <- md\_prms$tst\_with\_prob  
#  
AUC <- auc$AUC  
GC <- (2\*AUC) - 1  
KS <- auc$KS  
KSRealized <- auc$KSRealized  
print(paste('AUC',AUC))  
print(paste('GC',GC))  
print(paste('KS',KS))  
rocperf <- auc$rocperf  
  
plot(rocperf,col='blue',xlim = c(0,1), ylim = c(0,1))   
  
#Plot the roc curve  
# 1- specificity  
fpr <- as.vector(attr(rocperf,'x.values')[[1]])  
tpr <- as.vector(attr(rocperf,'y.values')[[1]])  
pr <- data.frame(cbind(fpr,tpr))  
colnames(pr) <- c('fpr','tpr')  
  
  
  
cutoffvalues <- as.vector(attr(rocperf,'alpha.values')[[1]])  
cutoffvalue <- cutoffvalues[KSRealized]  
#cutoffvalue <- 0.5  
print(paste('cutoffvalue',cutoffvalue))  
#generate the confusion matrix. To get the cutoff I will use the fact that we have KS score. Thus, where we have that value occuring we will have the best accuracy/recall/precision  
tst\_with\_prob$predclass <- ifelse(tst\_with\_prob$predprob>cutoffvalue,1,0)  
#missclassification each one example say where class 1 was predicted as class 0 and vice versa  
  
tst\_with\_prob\_1 <- tst\_with\_prob[tst\_with\_prob$Class==1 & tst\_with\_prob$predclass==0,]  
dim(tst\_with\_prob\_1)  
tst\_with\_prob\_0 <- tst\_with\_prob[tst\_with\_prob$Class==0 & tst\_with\_prob$predclass==1,]  
dim(tst\_with\_prob\_0)  
tst\_with\_prob\_1 <- tst\_with\_prob\_1[1,]  
tst\_with\_prob\_0 <- tst\_with\_prob\_0[1,]  
  
#find all the data which is similar and show that  
k=5  
simitms\_1 <- order(gower.dist(tst\_with\_prob\_1,tst\_with\_prob))[seq(1:k)]  
#show 5 nearst point to the misclassified example  
print(tst\_with\_prob[simitms\_1,])  
  
simitms\_0 <- order(gower.dist(tst\_with\_prob\_0,tst\_with\_prob))[seq(1:k)]  
#show 5 nearst point to the misclassified example  
print(tst\_with\_prob[simitms\_0,])  
  
#calculate accurayce and recall  
ab <- table(tst\_with\_prob$predclass,tst\_with\_prob$Class)  
print(ab)  
recall <- ab[2,2]/(ab[1,2] + ab[2,2])  
print(paste('recall',recall))  
acc <- (ab[2,2] + ab[1,1])/(sum(ab))  
print(paste('accuracy',acc))  
  
#part below this should be run only when you are fine with your model on validation data and you should not cheat by running below an calibrating your model :)  
print  
print("now check on test daata")  
#on test data accuracy  
td <- rbind(td,valid\_data)  
md\_prms <- train\_and\_predict\_log\_reg\_and\_ret\_auc(frml1,td,valid\_data,predict\_type='response')  
auc <- md\_prms$auc  
mdl <- md\_prms$model  
tst\_with\_prob <- md\_prms$tst\_with\_prob  
#  
AUC <- auc$AUC  
GC <- (2\*AUC) - 1  
KS <- auc$KS  
KSRealized <- auc$KSRealized  
print(paste('AUC',AUC))  
print(paste('GC',GC))  
print(paste('KS',KS))  
rocperf <- auc$rocperf  
  
plot(rocperf,col='blue',xlim = c(0,1), ylim = c(0,1))   
  
#Plot the roc curve  
# 1- specificity  
fpr <- as.vector(attr(rocperf,'x.values')[[1]])  
tpr <- as.vector(attr(rocperf,'y.values')[[1]])  
pr <- data.frame(cbind(fpr,tpr))  
colnames(pr) <- c('fpr','tpr')  
  
  
  
cutoffvalues <- as.vector(attr(rocperf,'alpha.values')[[1]])  
cutoffvalue <- cutoffvalues[KSRealized]  
#cutoffvalue <- 0.5  
print(paste('cutoffvalue',cutoffvalue))  
#generate the confusion matrix. To get the cutoff I will use the fact that we have KS score. Thus, where we have that value occuring we will have the best accuracy/recall/precision  
tst\_with\_prob$predclass <- ifelse(tst\_with\_prob$predprob>cutoffvalue,1,0)  
#missclassification each one example say where class 1 was predicted as class 0 and vice versa  
  
tst\_with\_prob\_1 <- tst\_with\_prob[tst\_with\_prob$Class==1 & tst\_with\_prob$predclass==0,]  
dim(tst\_with\_prob\_1)  
tst\_with\_prob\_0 <- tst\_with\_prob[tst\_with\_prob$Class==0 & tst\_with\_prob$predclass==1,]  
dim(tst\_with\_prob\_0)  
tst\_with\_prob\_1 <- tst\_with\_prob\_1[1,]  
tst\_with\_prob\_0 <- tst\_with\_prob\_0[1,]  
  
#find all the data which is similar and show that  
k=5  
simitms\_1 <- order(gower.dist(tst\_with\_prob\_1,tst\_with\_prob))[seq(1:k)]  
#show 5 nearst point to the misclassified example  
print(tst\_with\_prob[simitms\_1,])  
  
simitms\_0 <- order(gower.dist(tst\_with\_prob\_0,tst\_with\_prob))[seq(1:k)]  
#show 5 nearst point to the misclassified example  
print(tst\_with\_prob[simitms\_0,])  
  
#calculate accurayce and recall  
ab <- table(tst\_with\_prob$predclass,tst\_with\_prob$Class)  
print(ab)  
recall <- ab[2,2]/(ab[1,2] + ab[2,2])  
print(paste('recall',recall))  
acc <- (ab[2,2] + ab[1,1])/(sum(ab))  
print(paste('accuracy',acc))  
print   
}

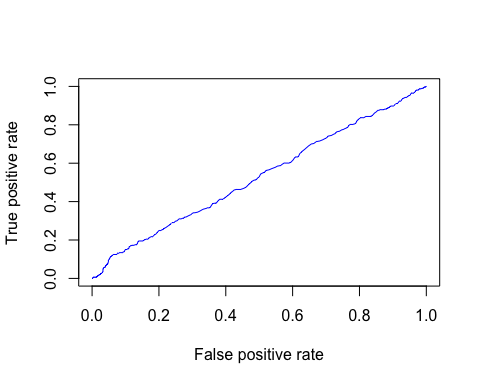
## [1] "fold 1"  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 3 4000 36 Months 0.5 MORTGAGE 148000  
## 4 3200 36 Months 5.0 OWN 54000  
## 8 10000 36 Months 10.0 MORTGAGE 46116  
## 17 7500 36 Months 0.5 OWN 22000  
## 24 5000 36 Months 7.0 MORTGAGE 95000  
## 27 5000 36 Months 2.0 MORTGAGE 180000  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 3 0 AL 16.98  
## 4 Debt Consolidation AL 6.51  
## 8 Home Improvement AZ 13.04  
## 17 Debt Consolidation AL 14.29  
## 24 Medical AL 3.83  
## 27 Home Improvement AZ 11.93  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 3 Eight 34095.41  
## 4 Eight 38872.24  
## 8 Eight 31360.22  
## 17 Four 37921.28  
## 24 Eight 36728.29  
## 27 Eight 34749.18  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 3 725 0  
## 4 740 0  
## 8 700 1  
## 17 660 0  
## 24 770 0  
## 27 715 1  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 3 0 Four  
## 4 0 Four  
## 8 45 Four  
## 17 11 Four  
## 24 0 Four  
## 27 0 Four  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 3 50000 51.0 19  
## 4 3198 51.1 11  
## 8 5394 53.4 23  
## 17 4175 51.5 8  
## 24 3660 6.8 16  
## 27 50000 39.2 38  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 3 363 None 0  
## 4 141 None 0  
## 8 40 None 0  
## 17 91 None 0  
## 24 214 None 0  
## 27 41 None 0  
## [1] "AUC 0.454482425860331"  
## [1] "GC -0.0910351482793372"  
## [1] "KS 0.00248917187686716"



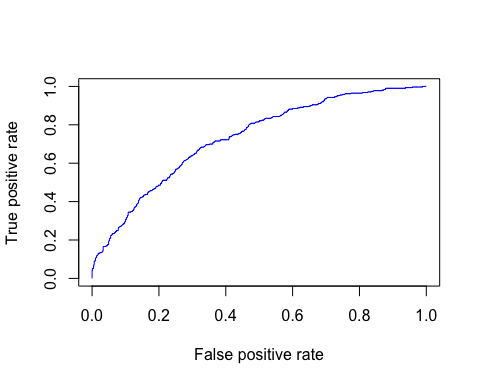
## [1] "cutoffvalue 7.88492408341432e-12"  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 1418 5400 36 Months 6 MORTGAGE 30000  
## 1423 10000 36 Months 6 MORTGAGE 75000  
## 1702 15000 36 Months 6 MORTGAGE 98000  
## 1552 2000 36 Months 3 MORTGAGE 15000  
## 197 6000 36 Months 6 MORTGAGE 58750  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 1418 Debt Consolidation AZ 13.10  
## 1423 Debt Consolidation AZ 11.14  
## 1702 Debt Consolidation AZ 11.41  
## 1552 Debt Consolidation AZ 16.88  
## 197 Debt Consolidation AZ 16.03  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 1418 Eight 39056.53  
## 1423 Eight 37859.32  
## 1702 Eight 35684.06  
## 1552 Eight 39490.39  
## 197 Eight 37133.14  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 1418 685 0  
## 1423 670 0  
## 1702 675 0  
## 1552 660 3  
## 197 665 0  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 1418 0 Four  
## 1423 0 Four  
## 1702 0 Four  
## 1552 0 Four  
## 197 0 Four  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 1418 7589 70.9 16  
## 1423 11260 54.9 26  
## 1702 4414 81.7 14  
## 1552 11089 76.0 6  
## 197 3687 92.2 17  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 1418 0 None 1  
## 1423 146 None 1  
## 1702 84 None 1  
## 1552 55 None 1  
## 197 76 None 0  
## predprob predclass  
## 1418 7.884924e-12 0  
## 1423 7.884924e-12 0  
## 1702 7.884924e-12 0  
## 1552 7.884924e-12 0  
## 197 7.884924e-12 0  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 115 16000 36 Months 4.0 MORTGAGE 200000  
## 1051 8000 36 Months 0.5 MORTGAGE 93000  
## 1510 25000 36 Months 2.0 MORTGAGE 200000  
## 427 22000 36 Months 10.0 MORTGAGE 132000  
## 1219 25000 36 Months 3.0 MORTGAGE 145000  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 115 0 FL 6.40  
## 1051 0 FL 13.47  
## 1510 0 FL 20.15  
## 427 0 FL 9.45  
## 1219 Small Business FL 10.38  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 115 Eight 34741.49  
## 1051 Eight 34215.15  
## 1510 Eight 34760.29  
## 427 Eight 33195.39  
## 1219 Eight 36072.41  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 115 800 0  
## 1051 740 1  
## 1510 770 1  
## 427 760 1  
## 1219 725 0  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 115 0 Four  
## 1051 0 Four  
## 1510 0 Four  
## 427 0 Four  
## 1219 0 Four  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 115 50000 13.9 24  
## 1051 48124 18.7 23  
## 1510 50000 54.0 41  
## 427 26843 60.6 26  
## 1219 50000 76.1 18  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 115 1 None 0  
## 1051 162 None 0  
## 1510 72 None 1  
## 427 90 None 0  
## 1219 0 None 0  
## predprob predclass  
## 115 7.884924e-12 1  
## 1051 7.884924e-12 0  
## 1510 7.884924e-12 0  
## 427 7.884924e-12 0  
## 1219 7.884924e-12 0  
##   
## 0 1  
## 0 1416 313  
## 1 1 0  
## [1] "recall 0"  
## [1] "accuracy 0.81849710982659"  
## [1] "now check on test daata"  
## [1] "AUC 0.727823485246468"  
## [1] "GC 0.455646970492935"  
## [1] "KS 0.359525253595658"



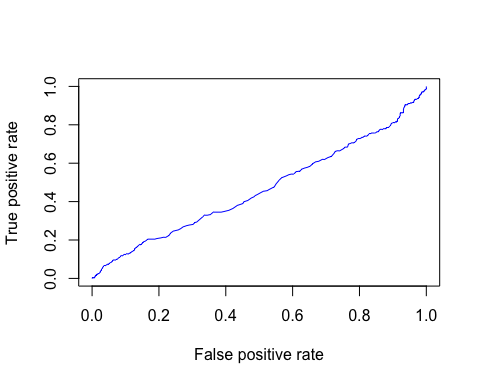
## [1] "cutoffvalue 0.063807696085664"  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 1427 10000 36 Months 8 OWN 42000  
## 1564 12500 36 Months 10 OWN 49000  
## 1601 10275 36 Months 5 OWN 32400  
## 1430 13000 36 Months 3 OWN 54000  
## 972 6000 36 Months 10 OWN 57996  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 1427 Medical FL 18.24  
## 1564 0 FL 17.41  
## 1601 Debt Consolidation AZ 27.78  
## 1430 Medical AL 5.47  
## 972 Medical FL 8.61  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 1427 Eight 35392.51  
## 1564 Four 35785.17  
## 1601 Eight 35777.40  
## 1430 Eight 37057.25  
## 972 Eight 34192.18  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 1427 745 1  
## 1564 750 1  
## 1601 735 0  
## 1430 745 2  
## 972 730 1  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 1427 0 Four  
## 1564 16 Four  
## 1601 0 Four  
## 1430 0 Four  
## 972 68 Four  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 1427 11642 35.6 59  
## 1564 6351 24.1 42  
## 1601 11362 34.6 41  
## 1430 12501 54.1 18  
## 972 19397 38.3 18  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 1427 303 None 1  
## 1564 387 None 1  
## 1601 89 None 1  
## 1430 0 None 1  
## 972 261 None 0  
## predprob predclass  
## 1427 0.04644572 0  
## 1564 0.02870694 0  
## 1601 0.04090476 0  
## 1430 0.05854745 0  
## 972 0.05826508 0  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 1 23500 36 Months 5 MORTGAGE 46000  
## 630 22250 36 Months 10 MORTGAGE 42000  
## 851 9000 36 Months 1 MORTGAGE 92000  
## 1174 8400 36 Months 7 MORTGAGE 60000  
## 170 14250 36 Months 3 MORTGAGE 87950  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 1 Small Business AL 19.67  
## 630 Small Business AL 6.14  
## 851 Small Business FL 15.85  
## 1174 Medical AL 19.04  
## 170 Small Business AL 12.20  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 1 Eight 35359.40  
## 630 Eight 36227.22  
## 851 Eight 35413.51  
## 1174 Eight 36585.12  
## 170 Eight 35041.05  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 1 735 1  
## 630 745 1  
## 851 730 0  
## 1174 665 1  
## 170 750 3  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 1 0 Four  
## 630 0 Four  
## 851 0 Four  
## 1174 0 Four  
## 170 0 Four  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 1 22738 45.9 22  
## 630 9153 36.5 26  
## 851 27458 63.4 32  
## 1174 11320 52.7 20  
## 170 39 0.3 25  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 1 1000 None 0  
## 630 121 None 0  
## 851 1000 None 0  
## 1174 814 None 0  
## 170 350 None 0  
## predprob predclass  
## 1 0.15973943 1  
## 630 0.12817347 1  
## 851 0.15224919 1  
## 1174 0.06982536 1  
## 170 0.11781286 1  
##   
## 0 1  
## 0 935 95  
## 1 482 218  
## [1] "recall 0.696485623003195"  
## [1] "accuracy 0.666473988439306"  
## [1] "fold 2"  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 5 10625 36 Months 10.0 MORTGAGE 34000  
## 7 3000 36 Months 9.0 MORTGAGE 100000  
## 9 18000 36 Months 10.0 MORTGAGE 36000  
## 10 5000 36 Months 2.0 OWN 60000  
## 14 15500 36 Months 0.5 OWN 125000  
## 15 9600 36 Months 4.0 OWN 78000  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 5 Debt Consolidation 22.09  
## 7 Small Business AZ 6.50  
## 9 Debt Consolidation AZ 3.80  
## 10 Home Improvement AZ 2.74  
## 14 0 AL 7.05  
## 15 Debt Consolidation AL 8.80  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 5 Eight 33085.06  
## 7 Four 35827.16  
## 9 Eight 36759.34  
## 10 Eight 38411.21  
## 14 Eight 34582.10  
## 15 Eight 35762.40  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 5 675 2  
## 7 745 0  
## 9 710 0  
## 10 665 3  
## 14 780 1  
## 15 670 0  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 5 57 One  
## 7 16 Four  
## 9 0 Four  
## 10 0 Four  
## 14 0 Four  
## 15 68 One  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 5 13846 71.0 16  
## 7 3021 4.8 25  
## 9 8311 59.8 9  
## 10 591 84.4 6  
## 14 16931 34.6 21  
## 15 4822 58.1 27  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 5 62 One 0  
## 7 651 None 0  
## 9 55 None 0  
## 10 192 None 0  
## 14 280 None 0  
## 15 89 One 0  
## [1] "AUC 0.527710074607516"  
## [1] "GC 0.055420149215031"  
## [1] "KS 0.0607141488227164"



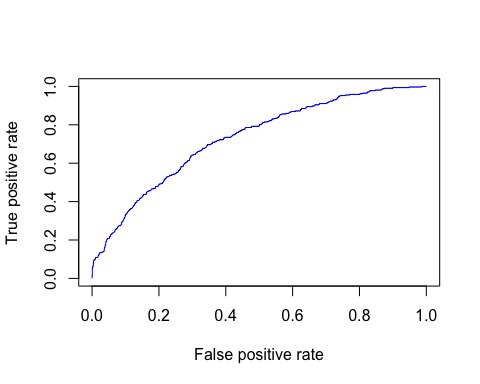
## [1] "cutoffvalue 7.88492408341485e-12"  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 1418 5400 36 Months 6 MORTGAGE 30000  
## 1423 10000 36 Months 6 MORTGAGE 75000  
## 1702 15000 36 Months 6 MORTGAGE 98000  
## 1485 8875 36 Months 5 MORTGAGE 35360  
## 197 6000 36 Months 6 MORTGAGE 58750  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 1418 Debt Consolidation AZ 13.10  
## 1423 Debt Consolidation AZ 11.14  
## 1702 Debt Consolidation AZ 11.41  
## 1485 Debt Consolidation AL 23.11  
## 197 Debt Consolidation AZ 16.03  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 1418 Eight 39056.53  
## 1423 Eight 37859.32  
## 1702 Eight 35684.06  
## 1485 Eight 38607.16  
## 197 Eight 37133.14  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 1418 685 0  
## 1423 670 0  
## 1702 675 0  
## 1485 695 1  
## 197 665 0  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 1418 0 Four  
## 1423 0 Four  
## 1702 0 Four  
## 1485 0 Four  
## 197 0 Four  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 1418 7589 70.9 16  
## 1423 11260 54.9 26  
## 1702 4414 81.7 14  
## 1485 13003 71.1 13  
## 197 3687 92.2 17  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 1418 0 None 1  
## 1423 146 None 1  
## 1702 84 None 1  
## 1485 0 None 1  
## 197 76 None 0  
## predprob predclass  
## 1418 7.884924e-12 0  
## 1423 7.884924e-12 0  
## 1702 7.884924e-12 0  
## 1485 7.884924e-12 0  
## 197 7.884924e-12 0  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 8 10000 36 Months 8 MORTGAGE 64500  
## 1172 13250 36 Months 10 MORTGAGE 79000  
## 1212 10750 36 Months 10 MORTGAGE 53000  
## 1228 14125 36 Months 4 OWN 30000  
## 376 5000 36 Months 6 OWN 54996  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 8 Debt Consolidation AL 18.70  
## 1172 Debt Consolidation AL 21.62  
## 1212 Debt Consolidation AL 14.02  
## 1228 Debt Consolidation AL 18.20  
## 376 Debt Consolidation AL 20.14  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 8 Eight 36511.20  
## 1172 Eight 31798.31  
## 1212 Eight 31409.26  
## 1228 Eight 36601.26  
## 376 Eight 34033.40  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 8 705 3  
## 1172 665 2  
## 1212 685 0  
## 1228 695 3  
## 376 725 3  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 8 60 Four  
## 1172 30 Four  
## 1212 67 Four  
## 1228 52 Four  
## 376 70 Four  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 8 33878 79.0 27  
## 1172 28830 68.6 37  
## 1212 11525 58.8 28  
## 1228 24339 50.5 18  
## 376 22652 53.3 25  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 8 239 None 0  
## 1172 85 None 0  
## 1212 111 None 0  
## 1228 319 None 0  
## 376 62 None 0  
## predprob predclass  
## 8 7.884924e-12 1  
## 1172 7.884924e-12 1  
## 1212 7.884924e-12 1  
## 1228 7.884924e-12 1  
## 376 7.884924e-12 1  
##   
## 0 1  
## 0 1332 276  
## 1 85 37  
## [1] "recall 0.118210862619808"  
## [1] "accuracy 0.791329479768786"  
## [1] "now check on test daata"  
## [1] "AUC 0.730312657123335"  
## [1] "GC 0.46062531424667"  
## [1] "KS 0.358370855044068"



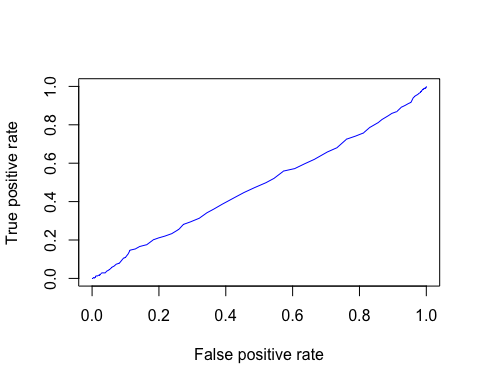
## [1] "cutoffvalue 0.0664975036880399"  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 1427 10000 36 Months 8 OWN 42000  
## 1564 12500 36 Months 10 OWN 49000  
## 1601 10275 36 Months 5 OWN 32400  
## 1430 13000 36 Months 3 OWN 54000  
## 972 6000 36 Months 10 OWN 57996  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 1427 Medical FL 18.24  
## 1564 0 FL 17.41  
## 1601 Debt Consolidation AZ 27.78  
## 1430 Medical AL 5.47  
## 972 Medical FL 8.61  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 1427 Eight 35392.51  
## 1564 Four 35785.17  
## 1601 Eight 35777.40  
## 1430 Eight 37057.25  
## 972 Eight 34192.18  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 1427 745 1  
## 1564 750 1  
## 1601 735 0  
## 1430 745 2  
## 972 730 1  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 1427 0 Four  
## 1564 16 Four  
## 1601 0 Four  
## 1430 0 Four  
## 972 68 Four  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 1427 11642 35.6 59  
## 1564 6351 24.1 42  
## 1601 11362 34.6 41  
## 1430 12501 54.1 18  
## 972 19397 38.3 18  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 1427 303 None 1  
## 1564 387 None 1  
## 1601 89 None 1  
## 1430 0 None 1  
## 972 261 None 0  
## predprob predclass  
## 1427 0.04825351 0  
## 1564 0.03206619 0  
## 1601 0.04439307 0  
## 1430 0.05013421 0  
## 972 0.06063034 0  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 1 23500 36 Months 5 MORTGAGE 46000  
## 630 22250 36 Months 10 MORTGAGE 42000  
## 851 9000 36 Months 1 MORTGAGE 92000  
## 170 14250 36 Months 3 MORTGAGE 87950  
## 1174 8400 36 Months 7 MORTGAGE 60000  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 1 Small Business AL 19.67  
## 630 Small Business AL 6.14  
## 851 Small Business FL 15.85  
## 170 Small Business AL 12.20  
## 1174 Medical AL 19.04  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 1 Eight 35359.40  
## 630 Eight 36227.22  
## 851 Eight 35413.51  
## 170 Eight 35041.05  
## 1174 Eight 36585.12  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 1 735 1  
## 630 745 1  
## 851 730 0  
## 170 750 3  
## 1174 665 1  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 1 0 Four  
## 630 0 Four  
## 851 0 Four  
## 170 0 Four  
## 1174 0 Four  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 1 22738 45.9 22  
## 630 9153 36.5 26  
## 851 27458 63.4 32  
## 170 39 0.3 25  
## 1174 11320 52.7 20  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 1 1000 None 0  
## 630 121 None 0  
## 851 1000 None 0  
## 170 350 None 0  
## 1174 814 None 0  
## predprob predclass  
## 1 0.15364815 1  
## 630 0.14022064 1  
## 851 0.12971023 1  
## 170 0.14016138 1  
## 1174 0.07200808 1  
##   
## 0 1  
## 0 956 100  
## 1 461 213  
## [1] "recall 0.680511182108626"  
## [1] "accuracy 0.675722543352601"  
## [1] "fold 3"  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 6 2800 60 Months 0.5 OWN 24000  
## 11 6000 36 Months 0.5 MORTGAGE 75000  
## 13 10000 36 Months 3.0 OWN 100000  
## 23 5000 36 Months 5.0 MORTGAGE 75000  
## 25 5000 36 Months 0.5 OWN 80000  
## 26 5000 36 Months 4.0 MORTGAGE 48000  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 6 Debt Consolidation AZ 4.00  
## 11 Medical AL 16.08  
## 13 0 AZ 7.94  
## 23 0 AL 15.55  
## 25 0 AZ 1.21  
## 26 Debt Consolidation FL 8.03  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 6 Eight 36865.50  
## 11 Eight 34671.22  
## 13 Eight 37589.45  
## 23 Eight 34478.25  
## 25 Eight 35258.44  
## 26 Eight 34928.48  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 6 705 0  
## 11 770 1  
## 13 660 0  
## 23 755 0  
## 25 670 3  
## 26 705 1  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 6 0 One  
## 11 0 Four  
## 13 0 Four  
## 23 0 Four  
## 25 0 One  
## 26 0 Four  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 6 2183 19.5 23  
## 11 29797 23.2 39  
## 13 21162 57.7 14  
## 23 50000 23.0 29  
## 25 27185 16.1 29  
## 26 28329 48.6 6  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 6 302 One 0  
## 11 161 None 0  
## 13 141 None 0  
## 23 72 None 0  
## 25 0 None 0  
## 26 104 None 0  
## [1] "AUC 0.463507928598646"  
## [1] "GC -0.0729841428027089"  
## [1] "KS 0.0386295124695336"



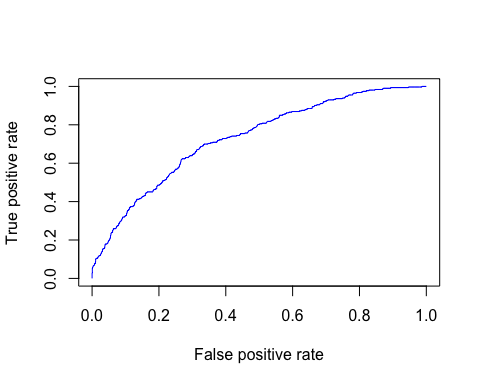
## [1] "cutoffvalue 7.88492408337507e-12"  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 1418 5400 36 Months 6 MORTGAGE 30000  
## 1423 10000 36 Months 6 MORTGAGE 75000  
## 1552 2000 36 Months 3 MORTGAGE 15000  
## 197 6000 36 Months 6 MORTGAGE 58750  
## 1480 2800 36 Months 4 MORTGAGE 88000  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 1418 Debt Consolidation AZ 13.10  
## 1423 Debt Consolidation AZ 11.14  
## 1552 Debt Consolidation AZ 16.88  
## 197 Debt Consolidation AZ 16.03  
## 1480 Debt Consolidation AZ 13.66  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 1418 Eight 39056.53  
## 1423 Eight 37859.32  
## 1552 Eight 39490.39  
## 197 Eight 37133.14  
## 1480 Eight 37006.25  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 1418 685 0  
## 1423 670 0  
## 1552 660 3  
## 197 665 0  
## 1480 660 1  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 1418 0 Four  
## 1423 0 Four  
## 1552 0 Four  
## 197 0 Four  
## 1480 56 Four  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 1418 7589 70.9 16  
## 1423 11260 54.9 26  
## 1552 11089 76.0 6  
## 197 3687 92.2 17  
## 1480 6050 79.6 17  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 1418 0 None 1  
## 1423 146 None 1  
## 1552 55 None 1  
## 197 76 None 0  
## 1480 159 None 1  
## predprob predclass  
## 1418 7.884924e-12 0  
## 1423 7.884924e-12 0  
## 1552 7.884924e-12 0  
## 197 7.884924e-12 0  
## 1480 7.884924e-12 0  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 1 23500 36 Months 5 MORTGAGE 46000  
## 630 22250 36 Months 10 MORTGAGE 42000  
## 174 24000 36 Months 4 MORTGAGE 80000  
## 1397 17500 36 Months 10 MORTGAGE 60000  
## 1174 8400 36 Months 7 MORTGAGE 60000  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 1 Small Business AL 19.67  
## 630 Small Business AL 6.14  
## 174 Debt Consolidation AL 14.44  
## 1397 Debt Consolidation AL 20.04  
## 1174 Medical AL 19.04  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 1 Eight 35359.40  
## 630 Eight 36227.22  
## 174 Eight 34521.27  
## 1397 Eight 35049.25  
## 1174 Eight 36585.12  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 1 735 1  
## 630 745 1  
## 174 725 1  
## 1397 755 0  
## 1174 665 1  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 1 0 Four  
## 630 0 Four  
## 174 0 Four  
## 1397 0 Four  
## 1174 0 Four  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 1 22738 45.9 22  
## 630 9153 36.5 26  
## 174 24480 71.8 26  
## 1397 23211 45.0 29  
## 1174 11320 52.7 20  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 1 1000 None 0  
## 630 121 None 0  
## 174 514 None 0  
## 1397 520 None 0  
## 1174 814 None 0  
## predprob predclass  
## 1 7.884924e-12 1  
## 630 7.884924e-12 1  
## 174 7.884924e-12 1  
## 1397 7.884924e-12 1  
## 1174 7.884924e-12 1  
##   
## 0 1  
## 0 1189 252  
## 1 228 61  
## [1] "recall 0.194888178913738"  
## [1] "accuracy 0.722543352601156"  
## [1] "now check on test daata"  
## [1] "AUC 0.728127867677063"  
## [1] "GC 0.456255735354125"  
## [1] "KS 0.352096067604465"



## [1] "cutoffvalue 0.0626437473117609"  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 1427 10000 36 Months 8 OWN 42000  
## 1564 12500 36 Months 10 OWN 49000  
## 1601 10275 36 Months 5 OWN 32400  
## 1430 13000 36 Months 3 OWN 54000  
## 972 6000 36 Months 10 OWN 57996  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 1427 Medical FL 18.24  
## 1564 0 FL 17.41  
## 1601 Debt Consolidation AZ 27.78  
## 1430 Medical AL 5.47  
## 972 Medical FL 8.61  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 1427 Eight 35392.51  
## 1564 Four 35785.17  
## 1601 Eight 35777.40  
## 1430 Eight 37057.25  
## 972 Eight 34192.18  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 1427 745 1  
## 1564 750 1  
## 1601 735 0  
## 1430 745 2  
## 972 730 1  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 1427 0 Four  
## 1564 16 Four  
## 1601 0 Four  
## 1430 0 Four  
## 972 68 Four  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 1427 11642 35.6 59  
## 1564 6351 24.1 42  
## 1601 11362 34.6 41  
## 1430 12501 54.1 18  
## 972 19397 38.3 18  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 1427 303 None 1  
## 1564 387 None 1  
## 1601 89 None 1  
## 1430 0 None 1  
## 972 261 None 0  
## predprob predclass  
## 1427 0.03980099 0  
## 1564 0.02200222 0  
## 1601 0.04402636 0  
## 1430 0.06049659 0  
## 972 0.05295859 0  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 1 23500 36 Months 5 MORTGAGE 46000  
## 630 22250 36 Months 10 MORTGAGE 42000  
## 851 9000 36 Months 1 MORTGAGE 92000  
## 1174 8400 36 Months 7 MORTGAGE 60000  
## 170 14250 36 Months 3 MORTGAGE 87950  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 1 Small Business AL 19.67  
## 630 Small Business AL 6.14  
## 851 Small Business FL 15.85  
## 1174 Medical AL 19.04  
## 170 Small Business AL 12.20  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 1 Eight 35359.40  
## 630 Eight 36227.22  
## 851 Eight 35413.51  
## 1174 Eight 36585.12  
## 170 Eight 35041.05  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 1 735 1  
## 630 745 1  
## 851 730 0  
## 1174 665 1  
## 170 750 3  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 1 0 Four  
## 630 0 Four  
## 851 0 Four  
## 1174 0 Four  
## 170 0 Four  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 1 22738 45.9 22  
## 630 9153 36.5 26  
## 851 27458 63.4 32  
## 1174 11320 52.7 20  
## 170 39 0.3 25  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 1 1000 None 0  
## 630 121 None 0  
## 851 1000 None 0  
## 1174 814 None 0  
## 170 350 None 0  
## predprob predclass  
## 1 0.16505971 1  
## 630 0.15146619 1  
## 851 0.13078887 1  
## 1174 0.07327909 1  
## 170 0.12286767 1  
##   
## 0 1  
## 0 929 96  
## 1 488 217  
## [1] "recall 0.693290734824281"  
## [1] "accuracy 0.66242774566474"  
## [1] "fold 4"  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 1 1200 36 Months 10.0 OWN 54000  
## 2 10800 36 Months 6.0 OWN 32000  
## 12 15000 36 Months 10.0 OWN 50000  
## 18 5000 36 Months 4.0 OWN 200000  
## 19 5000 36 Months 0.5 MORTGAGE 200000  
## 20 5000 36 Months 0.5 MORTGAGE 100000  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 1 Debt Consolidation AL 5.47  
## 2 Debt Consolidation AL 11.63  
## 12 Medical AL 2.59  
## 18 Debt Consolidation AL 0.28  
## 19 Medical AZ 3.72  
## 20 Debt Consolidation AL 2.30  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 1 Eight 31068.22  
## 2 Eight 35411.32  
## 12 Eight 30000.00  
## 18 Eight 34773.39  
## 19 Eight 32466.06  
## 20 Eight 36096.10  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 1 675 0  
## 2 680 1  
## 12 795 0  
## 18 770 0  
## 19 810 0  
## 20 740 0  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 1 64 Four  
## 2 58 Four  
## 12 0 Four  
## 18 0 Four  
## 19 0 Four  
## 20 0 Four  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 1 2584 40.4 31  
## 2 3511 25.6 40  
## 12 5656 27.6 25  
## 18 3164 13.7 2  
## 19 50000 0.7 26  
## 20 9698 19.4 20  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 1 748 None 0  
## 2 403 None 0  
## 12 499 None 0  
## 18 0 None 0  
## 19 0 None 0  
## 20 0 None 0  
## [1] "AUC 0.482924145643611"  
## [1] "GC -0.0341517087127781"  
## [1] "KS 0.033344531600533"



## [1] "cutoffvalue 7.88492408339412e-12"  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 1418 5400 36 Months 6 MORTGAGE 30000  
## 1423 10000 36 Months 6 MORTGAGE 75000  
## 1702 15000 36 Months 6 MORTGAGE 98000  
## 1552 2000 36 Months 3 MORTGAGE 15000  
## 197 6000 36 Months 6 MORTGAGE 58750  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 1418 Debt Consolidation AZ 13.10  
## 1423 Debt Consolidation AZ 11.14  
## 1702 Debt Consolidation AZ 11.41  
## 1552 Debt Consolidation AZ 16.88  
## 197 Debt Consolidation AZ 16.03  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 1418 Eight 39056.53  
## 1423 Eight 37859.32  
## 1702 Eight 35684.06  
## 1552 Eight 39490.39  
## 197 Eight 37133.14  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 1418 685 0  
## 1423 670 0  
## 1702 675 0  
## 1552 660 3  
## 197 665 0  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 1418 0 Four  
## 1423 0 Four  
## 1702 0 Four  
## 1552 0 Four  
## 197 0 Four  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 1418 7589 70.9 16  
## 1423 11260 54.9 26  
## 1702 4414 81.7 14  
## 1552 11089 76.0 6  
## 197 3687 92.2 17  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 1418 0 None 1  
## 1423 146 None 1  
## 1702 84 None 1  
## 1552 55 None 1  
## 197 76 None 0  
## predprob predclass  
## 1418 7.884924e-12 0  
## 1423 7.884924e-12 0  
## 1702 7.884924e-12 0  
## 1552 7.884924e-12 0  
## 197 7.884924e-12 0  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 10 6000 36 Months 10 OWN 47000  
## 1126 15000 36 Months 10 OWN 65000  
## 294 15000 36 Months 10 OWN 90000  
## 495 8000 36 Months 10 MORTGAGE 36000  
## 1281 6000 36 Months 8 OWN 98000  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 10 Debt Consolidation AL 4.00  
## 1126 Debt Consolidation AL 6.76  
## 294 Debt Consolidation AL 3.28  
## 495 Debt Consolidation AL 10.27  
## 1281 Debt Consolidation AL 6.40  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 10 Eight 33639.50  
## 1126 Eight 33274.05  
## 294 Eight 31014.45  
## 495 Eight 33560.43  
## 1281 Eight 35068.23  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 10 770 2  
## 1126 755 0  
## 294 720 1  
## 495 745 0  
## 1281 680 0  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 10 0 Four  
## 1126 0 Four  
## 294 0 Four  
## 495 0 Four  
## 1281 0 Four  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 10 5631 19.1 14  
## 1126 16223 22.9 29  
## 294 12257 41.4 13  
## 495 6784 16.1 35  
## 1281 6493 67.6 20  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 10 225 None 0  
## 1126 760 None 0  
## 294 510 None 0  
## 495 159 None 0  
## 1281 160 None 0  
## predprob predclass  
## 10 7.884924e-12 1  
## 1126 7.884924e-12 1  
## 294 7.884924e-12 1  
## 495 7.884924e-12 1  
## 1281 7.884924e-12 1  
##   
## 0 1  
## 0 1264 273  
## 1 153 40  
## [1] "recall 0.12779552715655"  
## [1] "accuracy 0.753757225433526"  
## [1] "now check on test daata"  
## [1] "AUC 0.728971119744047"  
## [1] "GC 0.457942239488094"  
## [1] "KS 0.365170984012031"



## [1] "cutoffvalue 0.0657388073313076"  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 1427 10000 36 Months 8 OWN 42000  
## 1564 12500 36 Months 10 OWN 49000  
## 1617 5000 36 Months 2 OWN 37300  
## 1601 10275 36 Months 5 OWN 32400  
## 1430 13000 36 Months 3 OWN 54000  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 1427 Medical FL 18.24  
## 1564 0 FL 17.41  
## 1617 Debt Consolidation FL 21.49  
## 1601 Debt Consolidation AZ 27.78  
## 1430 Medical AL 5.47  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 1427 Eight 35392.51  
## 1564 Four 35785.17  
## 1617 Eight 35553.27  
## 1601 Eight 35777.40  
## 1430 Eight 37057.25  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 1427 745 1  
## 1564 750 1  
## 1617 705 0  
## 1601 735 0  
## 1430 745 2  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 1427 0 Four  
## 1564 16 Four  
## 1617 0 Four  
## 1601 0 Four  
## 1430 0 Four  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 1427 11642 35.6 59  
## 1564 6351 24.1 42  
## 1617 0 0.0 35  
## 1601 11362 34.6 41  
## 1430 12501 54.1 18  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 1427 303 None 1  
## 1564 387 None 1  
## 1617 296 None 1  
## 1601 89 None 1  
## 1430 0 None 1  
## predprob predclass  
## 1427 0.05017645 0  
## 1564 0.02351705 0  
## 1617 0.06427154 0  
## 1601 0.04466890 0  
## 1430 0.06298431 0  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 1 23500 36 Months 5 MORTGAGE 46000  
## 630 22250 36 Months 10 MORTGAGE 42000  
## 851 9000 36 Months 1 MORTGAGE 92000  
## 170 14250 36 Months 3 MORTGAGE 87950  
## 243 15000 36 Months 1 MORTGAGE 85000  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 1 Small Business AL 19.67  
## 630 Small Business AL 6.14  
## 851 Small Business FL 15.85  
## 170 Small Business AL 12.20  
## 243 Small Business AZ 11.92  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 1 Eight 35359.40  
## 630 Eight 36227.22  
## 851 Eight 35413.51  
## 170 Eight 35041.05  
## 243 Eight 34425.37  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 1 735 1  
## 630 745 1  
## 851 730 0  
## 170 750 3  
## 243 720 0  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 1 0 Four  
## 630 0 Four  
## 851 0 Four  
## 170 0 Four  
## 243 0 Four  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 1 22738 45.9 22  
## 630 9153 36.5 26  
## 851 27458 63.4 32  
## 170 39 0.3 25  
## 243 27662 73.4 41  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 1 1000 None 0  
## 630 121 None 0  
## 851 1000 None 0  
## 170 350 None 0  
## 243 1000 None 0  
## predprob predclass  
## 1 0.1654342 1  
## 630 0.1452667 1  
## 851 0.1479545 1  
## 170 0.1086719 1  
## 243 0.1583118 1  
##   
## 0 1  
## 0 943 95  
## 1 474 218  
## [1] "recall 0.696485623003195"  
## [1] "accuracy 0.671098265895954"