# 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

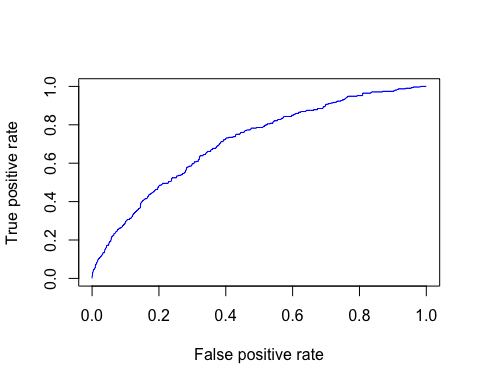
library(caret)

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

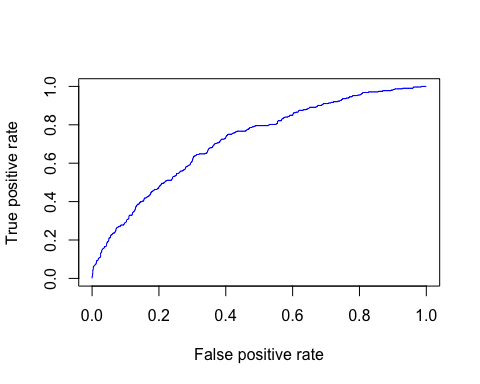
## Loading required package: lattice

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]],]  
 td <- rbind(td,td\_u)  
 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   
}

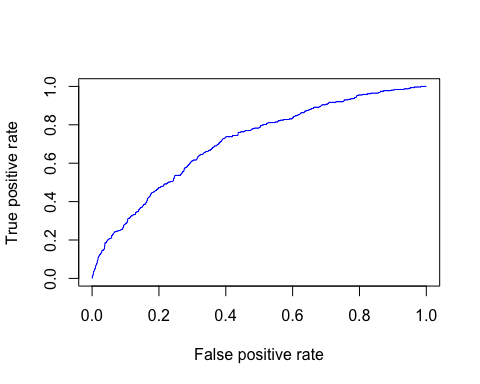
## [1] "fold 1"  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 15 9600 36 Months 4 OWN 78000  
## 22 5000 36 Months 8 MORTGAGE 150000  
## 24 5000 36 Months 7 MORTGAGE 95000  
## 27 5000 36 Months 2 MORTGAGE 180000  
## 29 5000 36 Months 8 MORTGAGE 120000  
## 32 5300 36 Months 7 MORTGAGE 74000  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 15 Debt Consolidation AL 8.80  
## 22 Home Improvement AZ 0.00  
## 24 Medical AL 3.83  
## 27 Home Improvement AZ 11.93  
## 29 Debt Consolidation AL 2.29  
## 32 0 14.37  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 15 Eight 35762.40  
## 22 Eight 32136.35  
## 24 Eight 36728.29  
## 27 Eight 34749.18  
## 29 Eight 35709.44  
## 32 Eight 33643.47  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 15 670 0  
## 22 775 0  
## 24 770 0  
## 27 715 1  
## 29 775 0  
## 32 795 0  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 15 68 One  
## 22 0 Four  
## 24 0 Four  
## 27 0 Four  
## 29 0 Four  
## 32 0 Four  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 15 4822 58.1 27  
## 22 6053 19.5 19  
## 24 3660 6.8 16  
## 27 50000 39.2 38  
## 29 8379 16.9 16  
## 32 6844 14.4 29  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 15 89 One 0  
## 22 103 None 0  
## 24 214 None 0  
## 27 41 None 0  
## 29 68 None 0  
## 32 88 None 0  
## [1] "AUC 0.709846884363985"  
## [1] "GC 0.419693768727969"  
## [1] "KS 0.33078253340879"



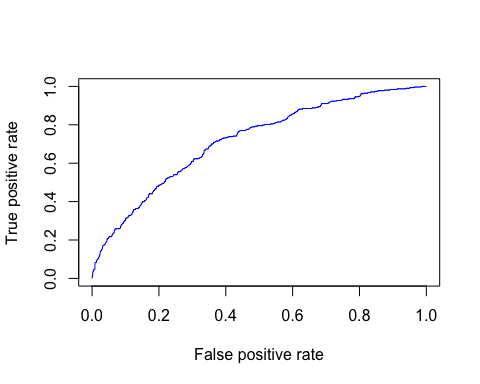
## [1] "cutoffvalue 0.435508951811455"  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 1423 10000 36 Months 6 MORTGAGE 75000  
## 1702 15000 36 Months 6 MORTGAGE 98000  
## 1418 5400 36 Months 6 MORTGAGE 30000  
## 607 13725 36 Months 5 MORTGAGE 80000  
## 1490 6400 36 Months 5 MORTGAGE 45600  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 1423 Debt Consolidation AZ 11.14  
## 1702 Debt Consolidation AZ 11.41  
## 1418 Debt Consolidation AZ 13.10  
## 607 Debt Consolidation AZ 20.68  
## 1490 Debt Consolidation AL 13.39  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 1423 Eight 37859.32  
## 1702 Eight 35684.06  
## 1418 Eight 39056.53  
## 607 Eight 36140.38  
## 1490 Eight 37249.38  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 1423 670 0  
## 1702 675 0  
## 1418 685 0  
## 607 695 0  
## 1490 715 0  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 1423 0 Four  
## 1702 0 Four  
## 1418 0 Four  
## 607 0 Four  
## 1490 0 Four  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 1423 11260 54.9 26  
## 1702 4414 81.7 14  
## 1418 7589 70.9 16  
## 607 27629 61.9 28  
## 1490 7486 53.5 22  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 1423 146 None 1  
## 1702 84 None 1  
## 1418 0 None 1  
## 607 172 None 0  
## 1490 405 None 1  
## predprob predclass  
## 1423 0.4219977 0  
## 1702 0.4676942 1  
## 1418 0.4944882 1  
## 607 0.4037372 0  
## 1490 0.2648996 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 0.6579531 1  
## 630 0.6503484 1  
## 851 0.6392451 1  
## 1174 0.5081336 1  
## 170 0.4740753 1  
##   
## 0 1  
## 0 849 85  
## 1 568 228  
## [1] "recall 0.728434504792332"  
## [1] "accuracy 0.622543352601156"  
## [1] "now check on test daata"  
## [1] "AUC 0.716777785042871"  
## [1] "GC 0.433555570085743"  
## [1] "KS 0.3443061320659"



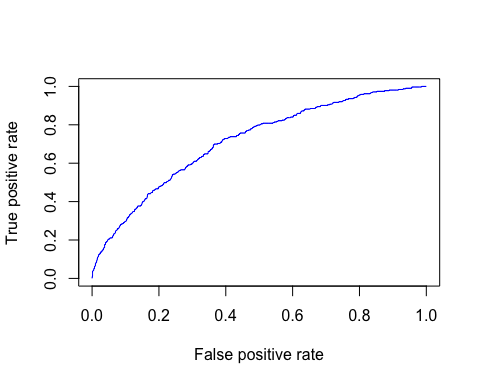
## [1] "cutoffvalue 0.364507314630481"  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 1427 10000 36 Months 8 OWN 42000  
## 1617 5000 36 Months 2 OWN 37300  
## 1564 12500 36 Months 10 OWN 49000  
## 1601 10275 36 Months 5 OWN 32400  
## 1590 2050 36 Months 10 OWN 95000  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 1427 Medical FL 18.24  
## 1617 Debt Consolidation FL 21.49  
## 1564 0 FL 17.41  
## 1601 Debt Consolidation AZ 27.78  
## 1590 Debt Consolidation FL 24.13  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 1427 Eight 35392.51  
## 1617 Eight 35553.27  
## 1564 Four 35785.17  
## 1601 Eight 35777.40  
## 1590 Eight 34407.34  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 1427 745 1  
## 1617 705 0  
## 1564 750 1  
## 1601 735 0  
## 1590 730 2  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 1427 0 Four  
## 1617 0 Four  
## 1564 16 Four  
## 1601 0 Four  
## 1590 37 Four  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 1427 11642 35.6 59  
## 1617 0 0.0 35  
## 1564 6351 24.1 42  
## 1601 11362 34.6 41  
## 1590 0 0.0 45  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 1427 303 None 1  
## 1617 296 None 1  
## 1564 387 None 1  
## 1601 89 None 1  
## 1590 125 None 1  
## predprob predclass  
## 1427 0.3555865 0  
## 1617 0.3352691 0  
## 1564 0.2053644 0  
## 1601 0.2817934 0  
## 1590 0.2483408 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 0.6127347 1  
## 630 0.5868142 1  
## 851 0.5790632 1  
## 1174 0.4338709 1  
## 170 0.4331369 1  
##   
## 0 1  
## 0 841 79  
## 1 576 234  
## [1] "recall 0.747603833865815"  
## [1] "accuracy 0.621387283236994"  
## [1] "fold 2"  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 8 10000 36 Months 10.0 MORTGAGE 46116  
## 10 5000 36 Months 2.0 OWN 60000  
## 16 5000 36 Months 10.0 MORTGAGE 65000  
## 17 7500 36 Months 0.5 OWN 22000  
## 23 5000 36 Months 5.0 MORTGAGE 75000  
## 25 5000 36 Months 0.5 OWN 80000  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 8 Home Improvement AZ 13.04  
## 10 Home Improvement AZ 2.74  
## 16 Medical AL 0.28  
## 17 Debt Consolidation AL 14.29  
## 23 0 AL 15.55  
## 25 0 AZ 1.21  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 8 Eight 31360.22  
## 10 Eight 38411.21  
## 16 Eight 34669.33  
## 17 Four 37921.28  
## 23 Eight 34478.25  
## 25 Eight 35258.44  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 8 700 1  
## 10 665 3  
## 16 800 1  
## 17 660 0  
## 23 755 0  
## 25 670 3  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 8 45 Four  
## 10 0 Four  
## 16 0 Four  
## 17 11 Four  
## 23 0 Four  
## 25 0 One  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 8 5394 53.4 23  
## 10 591 84.4 6  
## 16 1576 5.7 21  
## 17 4175 51.5 8  
## 23 50000 23.0 29  
## 25 27185 16.1 29  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 8 40 None 0  
## 10 192 None 0  
## 16 31 None 0  
## 17 91 None 0  
## 23 72 None 0  
## 25 0 None 0  
## [1] "AUC 0.709973146705566"  
## [1] "GC 0.419946293411133"  
## [1] "KS 0.337878026068664"



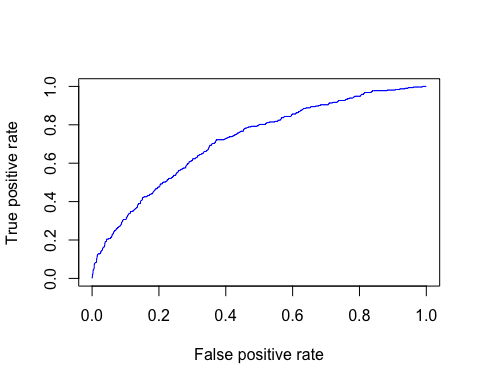
## [1] "cutoffvalue 0.441825743316771"  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 1423 10000 36 Months 6 MORTGAGE 75000  
## 1702 15000 36 Months 6 MORTGAGE 98000  
## 1418 5400 36 Months 6 MORTGAGE 30000  
## 607 13725 36 Months 5 MORTGAGE 80000  
## 1490 6400 36 Months 5 MORTGAGE 45600  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 1423 Debt Consolidation AZ 11.14  
## 1702 Debt Consolidation AZ 11.41  
## 1418 Debt Consolidation AZ 13.10  
## 607 Debt Consolidation AZ 20.68  
## 1490 Debt Consolidation AL 13.39  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 1423 Eight 37859.32  
## 1702 Eight 35684.06  
## 1418 Eight 39056.53  
## 607 Eight 36140.38  
## 1490 Eight 37249.38  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 1423 670 0  
## 1702 675 0  
## 1418 685 0  
## 607 695 0  
## 1490 715 0  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 1423 0 Four  
## 1702 0 Four  
## 1418 0 Four  
## 607 0 Four  
## 1490 0 Four  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 1423 11260 54.9 26  
## 1702 4414 81.7 14  
## 1418 7589 70.9 16  
## 607 27629 61.9 28  
## 1490 7486 53.5 22  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 1423 146 None 1  
## 1702 84 None 1  
## 1418 0 None 1  
## 607 172 None 0  
## 1490 405 None 1  
## predprob predclass  
## 1423 0.4107380 0  
## 1702 0.4205583 0  
## 1418 0.4834843 1  
## 607 0.4019602 0  
## 1490 0.2457321 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  
## 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  
## 1174 Medical AL 19.04  
## 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  
## 1174 Eight 36585.12  
## 243 Eight 34425.37  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 1 735 1  
## 630 745 1  
## 851 730 0  
## 1174 665 1  
## 243 720 0  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 1 0 Four  
## 630 0 Four  
## 851 0 Four  
## 1174 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  
## 1174 11320 52.7 20  
## 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  
## 1174 814 None 0  
## 243 1000 None 0  
## predprob predclass  
## 1 0.6173222 1  
## 630 0.5728058 1  
## 851 0.6004415 1  
## 1174 0.5177940 1  
## 243 0.5931480 1  
##   
## 0 1  
## 0 850 83  
## 1 567 230  
## [1] "recall 0.73482428115016"  
## [1] "accuracy 0.624277456647399"  
## [1] "now check on test daata"  
## [1] "AUC 0.716904047384453"  
## [1] "GC 0.433808094768906"  
## [1] "KS 0.345153893502224"



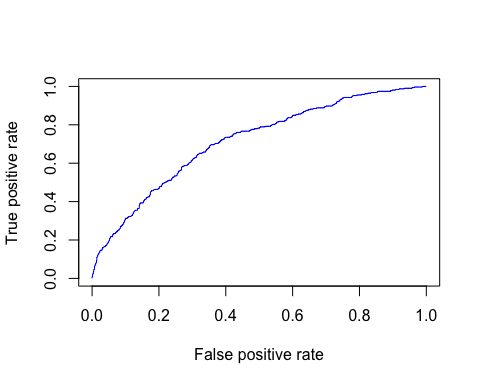
## [1] "cutoffvalue 0.38832567718922"  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 1423 10000 36 Months 6 MORTGAGE 75000  
## 1702 15000 36 Months 6 MORTGAGE 98000  
## 1418 5400 36 Months 6 MORTGAGE 30000  
## 607 13725 36 Months 5 MORTGAGE 80000  
## 1490 6400 36 Months 5 MORTGAGE 45600  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 1423 Debt Consolidation AZ 11.14  
## 1702 Debt Consolidation AZ 11.41  
## 1418 Debt Consolidation AZ 13.10  
## 607 Debt Consolidation AZ 20.68  
## 1490 Debt Consolidation AL 13.39  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 1423 Eight 37859.32  
## 1702 Eight 35684.06  
## 1418 Eight 39056.53  
## 607 Eight 36140.38  
## 1490 Eight 37249.38  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 1423 670 0  
## 1702 675 0  
## 1418 685 0  
## 607 695 0  
## 1490 715 0  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 1423 0 Four  
## 1702 0 Four  
## 1418 0 Four  
## 607 0 Four  
## 1490 0 Four  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 1423 11260 54.9 26  
## 1702 4414 81.7 14  
## 1418 7589 70.9 16  
## 607 27629 61.9 28  
## 1490 7486 53.5 22  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 1423 146 None 1  
## 1702 84 None 1  
## 1418 0 None 1  
## 607 172 None 0  
## 1490 405 None 1  
## predprob predclass  
## 1423 0.3597347 0  
## 1702 0.3714989 0  
## 1418 0.4311401 1  
## 607 0.3508504 0  
## 1490 0.2134194 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  
## 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  
## 1174 Medical AL 19.04  
## 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  
## 1174 Eight 36585.12  
## 243 Eight 34425.37  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 1 735 1  
## 630 745 1  
## 851 730 0  
## 1174 665 1  
## 243 720 0  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 1 0 Four  
## 630 0 Four  
## 851 0 Four  
## 1174 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  
## 1174 11320 52.7 20  
## 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  
## 1174 814 None 0  
## 243 1000 None 0  
## predprob predclass  
## 1 0.5858692 1  
## 630 0.5332410 1  
## 851 0.5508914 1  
## 1174 0.4409047 1  
## 243 0.5556135 1  
##   
## 0 1  
## 0 892 90  
## 1 525 223  
## [1] "recall 0.712460063897764"  
## [1] "accuracy 0.644508670520231"  
## [1] "fold 3"  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 1 1200 36 Months 10.0 OWN 54000  
## 3 4000 36 Months 0.5 MORTGAGE 148000  
## 4 3200 36 Months 5.0 OWN 54000  
## 5 10625 36 Months 10.0 MORTGAGE 34000  
## 6 2800 60 Months 0.5 OWN 24000  
## 7 3000 36 Months 9.0 MORTGAGE 100000  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 1 Debt Consolidation AL 5.47  
## 3 0 AL 16.98  
## 4 Debt Consolidation AL 6.51  
## 5 Debt Consolidation 22.09  
## 6 Debt Consolidation AZ 4.00  
## 7 Small Business AZ 6.50  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 1 Eight 31068.22  
## 3 Eight 34095.41  
## 4 Eight 38872.24  
## 5 Eight 33085.06  
## 6 Eight 36865.50  
## 7 Four 35827.16  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 1 675 0  
## 3 725 0  
## 4 740 0  
## 5 675 2  
## 6 705 0  
## 7 745 0  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 1 64 Four  
## 3 0 Four  
## 4 0 Four  
## 5 57 One  
## 6 0 One  
## 7 16 Four  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 1 2584 40.4 31  
## 3 50000 51.0 19  
## 4 3198 51.1 11  
## 5 13846 71.0 16  
## 6 2183 19.5 23  
## 7 3021 4.8 25  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 1 748 None 0  
## 3 363 None 0  
## 4 141 None 0  
## 5 62 One 0  
## 6 302 One 0  
## 7 651 None 0  
## [1] "AUC 0.713131959929743"  
## [1] "GC 0.426263919859486"  
## [1] "KS 0.334825183024028"



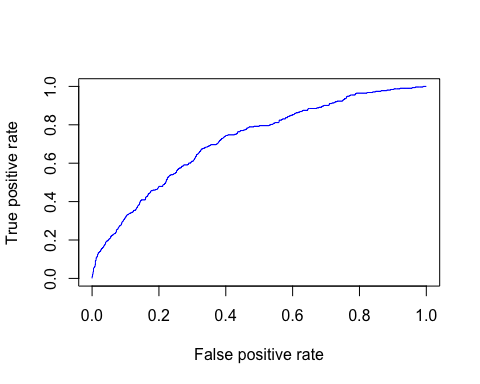
## [1] "cutoffvalue 0.4570668645035"  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 1423 10000 36 Months 6 MORTGAGE 75000  
## 1480 2800 36 Months 4 MORTGAGE 88000  
## 1702 15000 36 Months 6 MORTGAGE 98000  
## 1418 5400 36 Months 6 MORTGAGE 30000  
## 607 13725 36 Months 5 MORTGAGE 80000  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 1423 Debt Consolidation AZ 11.14  
## 1480 Debt Consolidation AZ 13.66  
## 1702 Debt Consolidation AZ 11.41  
## 1418 Debt Consolidation AZ 13.10  
## 607 Debt Consolidation AZ 20.68  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 1423 Eight 37859.32  
## 1480 Eight 37006.25  
## 1702 Eight 35684.06  
## 1418 Eight 39056.53  
## 607 Eight 36140.38  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 1423 670 0  
## 1480 660 1  
## 1702 675 0  
## 1418 685 0  
## 607 695 0  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 1423 0 Four  
## 1480 56 Four  
## 1702 0 Four  
## 1418 0 Four  
## 607 0 Four  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 1423 11260 54.9 26  
## 1480 6050 79.6 17  
## 1702 4414 81.7 14  
## 1418 7589 70.9 16  
## 607 27629 61.9 28  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 1423 146 None 1  
## 1480 159 None 1  
## 1702 84 None 1  
## 1418 0 None 1  
## 607 172 None 0  
## predprob predclass  
## 1423 0.4134140 0  
## 1480 0.4482472 0  
## 1702 0.4605379 1  
## 1418 0.5113045 1  
## 607 0.4068061 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 0.5908811 1  
## 630 0.5878363 1  
## 851 0.5277965 1  
## 1174 0.4938646 1  
## 170 0.5122653 1  
##   
## 0 1  
## 0 900 95  
## 1 517 218  
## [1] "recall 0.696485623003195"  
## [1] "accuracy 0.646242774566474"  
## [1] "now check on test daata"  
## [1] "AUC 0.718967083858485"  
## [1] "GC 0.437934167716971"  
## [1] "KS 0.350837953558005"



## [1] "cutoffvalue 0.382462229297714"  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 1423 10000 36 Months 6 MORTGAGE 75000  
## 1702 15000 36 Months 6 MORTGAGE 98000  
## 1418 5400 36 Months 6 MORTGAGE 30000  
## 607 13725 36 Months 5 MORTGAGE 80000  
## 1490 6400 36 Months 5 MORTGAGE 45600  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 1423 Debt Consolidation AZ 11.14  
## 1702 Debt Consolidation AZ 11.41  
## 1418 Debt Consolidation AZ 13.10  
## 607 Debt Consolidation AZ 20.68  
## 1490 Debt Consolidation AL 13.39  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 1423 Eight 37859.32  
## 1702 Eight 35684.06  
## 1418 Eight 39056.53  
## 607 Eight 36140.38  
## 1490 Eight 37249.38  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 1423 670 0  
## 1702 675 0  
## 1418 685 0  
## 607 695 0  
## 1490 715 0  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 1423 0 Four  
## 1702 0 Four  
## 1418 0 Four  
## 607 0 Four  
## 1490 0 Four  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 1423 11260 54.9 26  
## 1702 4414 81.7 14  
## 1418 7589 70.9 16  
## 607 27629 61.9 28  
## 1490 7486 53.5 22  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 1423 146 None 1  
## 1702 84 None 1  
## 1418 0 None 1  
## 607 172 None 0  
## 1490 405 None 1  
## predprob predclass  
## 1423 0.3610736 0  
## 1702 0.3985853 1  
## 1418 0.4494021 1  
## 607 0.3538144 0  
## 1490 0.2211098 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 0.5676776 1  
## 630 0.5427622 1  
## 851 0.5012975 1  
## 1174 0.4263152 1  
## 170 0.4632778 1  
##   
## 0 1  
## 0 891 88  
## 1 526 225  
## [1] "recall 0.718849840255591"  
## [1] "accuracy 0.645086705202312"  
## [1] "fold 4"  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 2 10800 36 Months 6.0 OWN 32000  
## 9 18000 36 Months 10.0 MORTGAGE 36000  
## 14 15500 36 Months 0.5 OWN 125000  
## 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  
## 2 Debt Consolidation AL 11.63  
## 9 Debt Consolidation AZ 3.80  
## 14 0 AL 7.05  
## 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  
## 2 Eight 35411.32  
## 9 Eight 36759.34  
## 14 Eight 34582.10  
## 18 Eight 34773.39  
## 19 Eight 32466.06  
## 20 Eight 36096.10  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 2 680 1  
## 9 710 0  
## 14 780 1  
## 18 770 0  
## 19 810 0  
## 20 740 0  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 2 58 Four  
## 9 0 Four  
## 14 0 Four  
## 18 0 Four  
## 19 0 Four  
## 20 0 Four  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 2 3511 25.6 40  
## 9 8311 59.8 9  
## 14 16931 34.6 21  
## 18 3164 13.7 2  
## 19 50000 0.7 26  
## 20 9698 19.4 20  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 2 403 None 0  
## 9 55 None 0  
## 14 280 None 0  
## 18 0 None 0  
## 19 0 None 0  
## 20 0 None 0  
## [1] "AUC 0.713274005064018"  
## [1] "GC 0.426548010128036"  
## [1] "KS 0.341138300103039"



## [1] "cutoffvalue 0.455539930552526"  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 1423 10000 36 Months 6 MORTGAGE 75000  
## 1702 15000 36 Months 6 MORTGAGE 98000  
## 1418 5400 36 Months 6 MORTGAGE 30000  
## 607 13725 36 Months 5 MORTGAGE 80000  
## 1490 6400 36 Months 5 MORTGAGE 45600  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 1423 Debt Consolidation AZ 11.14  
## 1702 Debt Consolidation AZ 11.41  
## 1418 Debt Consolidation AZ 13.10  
## 607 Debt Consolidation AZ 20.68  
## 1490 Debt Consolidation AL 13.39  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 1423 Eight 37859.32  
## 1702 Eight 35684.06  
## 1418 Eight 39056.53  
## 607 Eight 36140.38  
## 1490 Eight 37249.38  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 1423 670 0  
## 1702 675 0  
## 1418 685 0  
## 607 695 0  
## 1490 715 0  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 1423 0 Four  
## 1702 0 Four  
## 1418 0 Four  
## 607 0 Four  
## 1490 0 Four  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 1423 11260 54.9 26  
## 1702 4414 81.7 14  
## 1418 7589 70.9 16  
## 607 27629 61.9 28  
## 1490 7486 53.5 22  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 1423 146 None 1  
## 1702 84 None 1  
## 1418 0 None 1  
## 607 172 None 0  
## 1490 405 None 1  
## predprob predclass  
## 1423 0.4387808 0  
## 1702 0.4898890 1  
## 1418 0.5081964 1  
## 607 0.4159060 0  
## 1490 0.2595412 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  
## 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  
## 1174 Medical AL 19.04  
## 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  
## 1174 Eight 36585.12  
## 243 Eight 34425.37  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 1 735 1  
## 630 745 1  
## 851 730 0  
## 1174 665 1  
## 243 720 0  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 1 0 Four  
## 630 0 Four  
## 851 0 Four  
## 1174 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  
## 1174 11320 52.7 20  
## 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  
## 1174 814 None 0  
## 243 1000 None 0  
## predprob predclass  
## 1 0.6375154 1  
## 630 0.5964384 1  
## 851 0.6027269 1  
## 1174 0.5065285 1  
## 243 0.6247057 1  
##   
## 0 1  
## 0 918 97  
## 1 499 216  
## [1] "recall 0.690095846645367"  
## [1] "accuracy 0.655491329479769"  
## [1] "now check on test daata"  
## [1] "AUC 0.71916549610954"  
## [1] "GC 0.438330992219081"  
## [1] "KS 0.347374757903233"



## [1] "cutoffvalue 0.407986477517016"  
## Loan.Amount Loan.Term Employment.Length Home.Ownership Annual.Income  
## 1423 10000 36 Months 6 MORTGAGE 75000  
## 1480 2800 36 Months 4 MORTGAGE 88000  
## 1702 15000 36 Months 6 MORTGAGE 98000  
## 1418 5400 36 Months 6 MORTGAGE 30000  
## 607 13725 36 Months 5 MORTGAGE 80000  
## Loan.Purpose Address.State Debt.To.Income.Ratio  
## 1423 Debt Consolidation AZ 11.14  
## 1480 Debt Consolidation AZ 13.66  
## 1702 Debt Consolidation AZ 11.41  
## 1418 Debt Consolidation AZ 13.10  
## 607 Debt Consolidation AZ 20.68  
## No..Delinquencies.In.Last.2.Years Earliest.Credit.Line.Opened  
## 1423 Eight 37859.32  
## 1480 Eight 37006.25  
## 1702 Eight 35684.06  
## 1418 Eight 39056.53  
## 607 Eight 36140.38  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 1423 670 0  
## 1480 660 1  
## 1702 675 0  
## 1418 685 0  
## 607 695 0  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 1423 0 Four  
## 1480 56 Four  
## 1702 0 Four  
## 1418 0 Four  
## 607 0 Four  
## Total.Credit.Balance Use.Of.Credit.Line Total.Number.Of.Credit.Lines  
## 1423 11260 54.9 26  
## 1480 6050 79.6 17  
## 1702 4414 81.7 14  
## 1418 7589 70.9 16  
## 607 27629 61.9 28  
## Loan.Application.Description No..Of.Public.Record.Bankruptcies Class  
## 1423 146 None 1  
## 1480 159 None 1  
## 1702 84 None 1  
## 1418 0 None 1  
## 607 172 None 0  
## predprob predclass  
## 1423 0.3776402 0  
## 1480 0.3968208 0  
## 1702 0.4186921 1  
## 1418 0.4467716 1  
## 607 0.3597656 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  
## 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  
## 1174 Medical AL 19.04  
## 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  
## 1174 Eight 36585.12  
## 243 Eight 34425.37  
## FICO.Credit.Score No..Inquiries.In.Last.6.Months  
## 1 735 1  
## 630 745 1  
## 851 730 0  
## 1174 665 1  
## 243 720 0  
## Months.Since.Last.Delinquency No..Adverse.Public.Records  
## 1 0 Four  
## 630 0 Four  
## 851 0 Four  
## 1174 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  
## 1174 11320 52.7 20  
## 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  
## 1174 814 None 0  
## 243 1000 None 0  
## predprob predclass  
## 1 0.6031959 1  
## 630 0.5510073 1  
## 851 0.5526626 1  
## 1174 0.4377480 1  
## 243 0.5781053 1  
##   
## 0 1  
## 0 954 103  
## 1 463 210  
## [1] "recall 0.670926517571885"  
## [1] "accuracy 0.672832369942197"