smote BRT

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```r
new_test = test[sample(1:nrow(test), size = nrow(test)/10),]
new_train = train[sample(1:nrow(train), size = nrow(train)/10),]

new_train$def_flag = as.factor(as.logical(new_train$def_flag))
new_test$def_flag = as.factor(as.logical(new_test$def_flag))
```

```r
Y = new_train[,8]
Y = as.numeric(Y)
X = new_train[,-8]
Y[which(Y==1)] = 0
Y[which(Y==2)] = 1
Y = as.factor(Y)
a = ubTomek(X, Y, verbose = TRUE)
```

```
## Instances removed 347 : 1.43 % of 0 class ; 1.4 % of training ; Time needed 0.03
```

```r
un_train_set = cbind(a[[1]],def_flag = a[[2]])
```

un train set is a traing set which delete overlap

```r
un_frac_BLSMOTE_sample = function (data, dupSize){
 a = BLSMOTE(data[,!(names(data) %in%   "def_flag")],data$def_flag,K=5,C=5,dupSize=dupSize,method=c("typ
  names(a)[30]="def_flag"
  a$def_flag = as.character(a$def_flag)
  a$def_flag[which(a$def_flag == 1)] = 'yes'
  a$def_flag[which(a$def_flag == 0)] = 'no'
  return(a)
}
```

```r
un_BLSMOTE_auc_frac = function(data,dupSize){
  un_train_set = un_frac_BLSMOTE_sample(data, dupSize)
  gbmGrid <- expand.grid(interaction.depth=(3:6), n.trees=(1:40)*100, shrinkage=.01)
  gbmGrid$n.minobsinnode = rep(10,nrow(gbmGrid))
  bootControl = trainControl(method='cv',classProbs = TRUE,number=3,summaryFunction =      twoClassSumm
  gmbFit<- caret::train(def_flag~., data = un_train_set,
                        method = "gbm",
                        verbose = F,
                        trControl = bootControl,
                        bag.fraction=0.5,
                        metric="ROC",
                        tuneGrid=gbmGrid)
  predict=predict (gmbFit ,newdata = new_test, type='prob')
  temp = auc_calucator(predict[,2],new_test$def_flag)
```

```r
  auc = temp[[1]]
  return(auc)
}
```

```r
un_BLSMOTE_auc_frac(data = un_train_set, dupSize = 1)
```

```
## [1] "Borderline-SMOTE done"
```

```
## [1] 0.8975862
```

```r
no_cores <- detectCores() - 1
cl <- makeCluster(no_cores, type="FORK")
clusterEvalQ(cl, library(caret))
```

```
## [[1]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
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## [25] "grDevices"    "utils"        "datasets"     "methods"
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```

```r
clusterEvalQ(cl, library(rpart))
```

```
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##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
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```

```r
clusterEvalQ(cl, library(unbalanced))
```

```
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##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
```

```
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```

```r
clusterEvalQ(cl, library(randomForest))
```

```
## [[1]]
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```

```r
clusterEvalQ(cl, library(ROCR))
```

```
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```

```r
clusterEvalQ(cl, library(gbm))
```

```
## [[1]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
```

```
##  [5] "unbalanced"    "doParallel"    "iterators"     "foreach"
##  [9] "mlr"           "ParamHelpers"  "BBmisc"        "ROCR"
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##
## [[2]]
##  [1] "smotefamily"   "Rmisc"         "plyr"          "randomForest"
##  [5] "unbalanced"    "doParallel"    "iterators"     "foreach"
##  [9] "mlr"           "ParamHelpers"  "BBmisc"        "ROCR"
## [13] "gplots"        "gbm"           "parallel"      "splines"
## [17] "survival"      "rpart.plot"    "rpart"         "caret"
## [21] "ggplot2"       "lattice"       "stats"         "graphics"
## [25] "grDevices"     "utils"         "datasets"      "methods"
## [29] "base"
##
## [[3]]
##  [1] "smotefamily"   "Rmisc"         "plyr"          "randomForest"
##  [5] "unbalanced"    "doParallel"    "iterators"     "foreach"
##  [9] "mlr"           "ParamHelpers"  "BBmisc"        "ROCR"
## [13] "gplots"        "gbm"           "parallel"      "splines"
## [17] "survival"      "rpart.plot"    "rpart"         "caret"
## [21] "ggplot2"       "lattice"       "stats"         "graphics"
## [25] "grDevices"     "utils"         "datasets"      "methods"
## [29] "base"
##
## [[4]]
##  [1] "smotefamily"   "Rmisc"         "plyr"          "randomForest"
##  [5] "unbalanced"    "doParallel"    "iterators"     "foreach"
##  [9] "mlr"           "ParamHelpers"  "BBmisc"        "ROCR"
## [13] "gplots"        "gbm"           "parallel"      "splines"
## [17] "survival"      "rpart.plot"    "rpart"         "caret"
## [21] "ggplot2"       "lattice"       "stats"         "graphics"
## [25] "grDevices"     "utils"         "datasets"      "methods"
## [29] "base"
##
## [[5]]
##  [1] "smotefamily"   "Rmisc"         "plyr"          "randomForest"
##  [5] "unbalanced"    "doParallel"    "iterators"     "foreach"
##  [9] "mlr"           "ParamHelpers"  "BBmisc"        "ROCR"
## [13] "gplots"        "gbm"           "parallel"      "splines"
## [17] "survival"      "rpart.plot"    "rpart"         "caret"
## [21] "ggplot2"       "lattice"       "stats"         "graphics"
## [25] "grDevices"     "utils"         "datasets"      "methods"
## [29] "base"
##
## [[6]]
##  [1] "smotefamily"   "Rmisc"         "plyr"          "randomForest"
##  [5] "unbalanced"    "doParallel"    "iterators"     "foreach"
##  [9] "mlr"           "ParamHelpers"  "BBmisc"        "ROCR"
## [13] "gplots"        "gbm"           "parallel"      "splines"
## [17] "survival"      "rpart.plot"    "rpart"         "caret"
```

```
## [21] "ggplot2"      "lattice"      "stats"       "graphics"
## [25] "grDevices"    "utils"        "datasets"    "methods"
## [29] "base"
##
## [[7]]
##  [1] "smotefamily"  "Rmisc"        "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"      "ROCR"
## [13] "gplots"       "gbm"          "parallel"    "splines"
## [17] "survival"     "rpart.plot"   "rpart"       "caret"
## [21] "ggplot2"      "lattice"      "stats"       "graphics"
## [25] "grDevices"    "utils"        "datasets"    "methods"
## [29] "base"
```

```r
clusterEvalQ(cl, library(Rmisc))
```

```
## [[1]]
##  [1] "smotefamily"  "Rmisc"        "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"      "ROCR"
## [13] "gplots"       "gbm"          "parallel"    "splines"
## [17] "survival"     "rpart.plot"   "rpart"       "caret"
## [21] "ggplot2"      "lattice"      "stats"       "graphics"
## [25] "grDevices"    "utils"        "datasets"    "methods"
## [29] "base"
##
## [[2]]
##  [1] "smotefamily"  "Rmisc"        "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"      "ROCR"
## [13] "gplots"       "gbm"          "parallel"    "splines"
## [17] "survival"     "rpart.plot"   "rpart"       "caret"
## [21] "ggplot2"      "lattice"      "stats"       "graphics"
## [25] "grDevices"    "utils"        "datasets"    "methods"
## [29] "base"
##
## [[3]]
##  [1] "smotefamily"  "Rmisc"        "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"      "ROCR"
## [13] "gplots"       "gbm"          "parallel"    "splines"
## [17] "survival"     "rpart.plot"   "rpart"       "caret"
## [21] "ggplot2"      "lattice"      "stats"       "graphics"
## [25] "grDevices"    "utils"        "datasets"    "methods"
## [29] "base"
##
## [[4]]
##  [1] "smotefamily"  "Rmisc"        "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"      "ROCR"
## [13] "gplots"       "gbm"          "parallel"    "splines"
## [17] "survival"     "rpart.plot"   "rpart"       "caret"
## [21] "ggplot2"      "lattice"      "stats"       "graphics"
## [25] "grDevices"    "utils"        "datasets"    "methods"
```

```
## [29] "base"
##
## [[5]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[6]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[7]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
```

```r
clusterEvalQ(cl, library(rpart))
```

```
## [[1]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[2]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
```

```
## [[3]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[4]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[5]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[6]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[7]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
```

```r
clusterEvalQ(cl, library(smotefamily))
```

```
## [[1]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
```

```
##   [5] "unbalanced"    "doParallel"    "iterators"    "foreach"
##   [9] "mlr"           "ParamHelpers"  "BBmisc"       "ROCR"
##  [13] "gplots"        "gbm"           "parallel"     "splines"
##  [17] "survival"      "rpart.plot"    "rpart"        "caret"
##  [21] "ggplot2"       "lattice"       "stats"        "graphics"
##  [25] "grDevices"     "utils"         "datasets"     "methods"
##  [29] "base"
##
## [[2]]
##   [1] "smotefamily"   "Rmisc"         "plyr"         "randomForest"
##   [5] "unbalanced"    "doParallel"    "iterators"    "foreach"
##   [9] "mlr"           "ParamHelpers"  "BBmisc"       "ROCR"
##  [13] "gplots"        "gbm"           "parallel"     "splines"
##  [17] "survival"      "rpart.plot"    "rpart"        "caret"
##  [21] "ggplot2"       "lattice"       "stats"        "graphics"
##  [25] "grDevices"     "utils"         "datasets"     "methods"
##  [29] "base"
##
## [[3]]
##   [1] "smotefamily"   "Rmisc"         "plyr"         "randomForest"
##   [5] "unbalanced"    "doParallel"    "iterators"    "foreach"
##   [9] "mlr"           "ParamHelpers"  "BBmisc"       "ROCR"
##  [13] "gplots"        "gbm"           "parallel"     "splines"
##  [17] "survival"      "rpart.plot"    "rpart"        "caret"
##  [21] "ggplot2"       "lattice"       "stats"        "graphics"
##  [25] "grDevices"     "utils"         "datasets"     "methods"
##  [29] "base"
##
## [[4]]
##   [1] "smotefamily"   "Rmisc"         "plyr"         "randomForest"
##   [5] "unbalanced"    "doParallel"    "iterators"    "foreach"
##   [9] "mlr"           "ParamHelpers"  "BBmisc"       "ROCR"
##  [13] "gplots"        "gbm"           "parallel"     "splines"
##  [17] "survival"      "rpart.plot"    "rpart"        "caret"
##  [21] "ggplot2"       "lattice"       "stats"        "graphics"
##  [25] "grDevices"     "utils"         "datasets"     "methods"
##  [29] "base"
##
## [[5]]
##   [1] "smotefamily"   "Rmisc"         "plyr"         "randomForest"
##   [5] "unbalanced"    "doParallel"    "iterators"    "foreach"
##   [9] "mlr"           "ParamHelpers"  "BBmisc"       "ROCR"
##  [13] "gplots"        "gbm"           "parallel"     "splines"
##  [17] "survival"      "rpart.plot"    "rpart"        "caret"
##  [21] "ggplot2"       "lattice"       "stats"        "graphics"
##  [25] "grDevices"     "utils"         "datasets"     "methods"
##  [29] "base"
##
## [[6]]
##   [1] "smotefamily"   "Rmisc"         "plyr"         "randomForest"
##   [5] "unbalanced"    "doParallel"    "iterators"    "foreach"
##   [9] "mlr"           "ParamHelpers"  "BBmisc"       "ROCR"
##  [13] "gplots"        "gbm"           "parallel"     "splines"
##  [17] "survival"      "rpart.plot"    "rpart"        "caret"
```

```
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[7]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
```

```r
result = parLapply(cl, (1:3), function(x) {un_BLSMOTE_auc_frac(data = un_train_set, dupSize = x)})

stopCluster(cl)

data_smote1 = un_frac_BLSMOTE_sample(un_train_set,1);table(data_smote1$def_flag)
```

```
## [1] "Borderline-SMOTE done"


##
##    no   yes
## 23997   432
```

```r
data_smote2 = un_frac_BLSMOTE_sample(un_train_set,2);table(data_smote2$def_flag)
```

```
## [1] "Borderline-SMOTE done"


##
##    no   yes
## 23997   506
```

```r
data_smote3 = un_frac_BLSMOTE_sample(un_train_set,3);table(data_smote3$def_flag)
```

```
## [1] "Borderline-SMOTE done"


##
##    no   yes
## 23997   580
```

```r
un_frac_sample = function (data, frac){
  Y = data$def_flag
  X = data[,!(names(data)  %in%   "def_flag")]
  Y[which(Y=="no")] = 0
  Y[which(Y=="yes")] = 1
  under_sample = ubUnder(X,Y, perc = frac, method = "percPos")
  un_train_set = cbind(under_sample[[1]],def_flag = under_sample[[2]])
  un_train_set$def_flag = as.numeric(un_train_set$def_flag)
```

```
  un_train_set$def_flag[which(un_train_set$def_flag == 2)] = 'yes'
  un_train_set$def_flag[which(un_train_set$def_flag == 1)] = 'no'
  return(un_train_set)
}


un_auc_frac = function(data, frac){
  un_train_set = un_frac_sample(data, frac)
  gbmGrid <- expand.grid(interaction.depth=(3:6), n.trees=(1:40)*100, shrinkage=.01)
  gbmGrid$n.minobsinnode = rep(10,nrow(gbmGrid))
  bootControl = trainControl(method='cv',classProbs = TRUE,number=3,summaryFunction =       twoClassSu
  gmbFit<- caret::train(def_flag~., data = un_train_set,
              method = "gbm",
              verbose = F,
              trControl = bootControl,
              bag.fraction=0.5,
              metric="ROC",
              tuneGrid=gbmGrid)
  predict=predict (gmbFit ,newdata = new_test, type='prob')
  temp = auc_calucator(predict[,2],new_test$def_flag)
  auc = temp[[1]]
  return(auc)
}


ten_time_auc=function(data , frac){
  frac = rep(frac,10)
  auc = lapply(frac, function(x) {un_auc_frac(data = data ,frac = x)})
  return(unlist(auc))
}
```

change to use parallel here

```
#ten_time_auc(data = data_smote1, 50)

no_cores <- detectCores() - 1
cl <- makeCluster(no_cores, type="FORK")
clusterEvalQ(cl, library(caret))
```

```
## [[1]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[2]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
```

```
## [17] "survival"      "rpart.plot"    "rpart"         "caret"
## [21] "ggplot2"       "lattice"       "stats"         "graphics"
## [25] "grDevices"     "utils"         "datasets"      "methods"
## [29] "base"
##
## [[3]]
##  [1] "smotefamily"   "Rmisc"         "plyr"          "randomForest"
##  [5] "unbalanced"    "doParallel"    "iterators"     "foreach"
##  [9] "mlr"           "ParamHelpers"  "BBmisc"        "ROCR"
## [13] "gplots"        "gbm"           "parallel"      "splines"
## [17] "survival"      "rpart.plot"    "rpart"         "caret"
## [21] "ggplot2"       "lattice"       "stats"         "graphics"
## [25] "grDevices"     "utils"         "datasets"      "methods"
## [29] "base"
##
## [[4]]
##  [1] "smotefamily"   "Rmisc"         "plyr"          "randomForest"
##  [5] "unbalanced"    "doParallel"    "iterators"     "foreach"
##  [9] "mlr"           "ParamHelpers"  "BBmisc"        "ROCR"
## [13] "gplots"        "gbm"           "parallel"      "splines"
## [17] "survival"      "rpart.plot"    "rpart"         "caret"
## [21] "ggplot2"       "lattice"       "stats"         "graphics"
## [25] "grDevices"     "utils"         "datasets"      "methods"
## [29] "base"
##
## [[5]]
##  [1] "smotefamily"   "Rmisc"         "plyr"          "randomForest"
##  [5] "unbalanced"    "doParallel"    "iterators"     "foreach"
##  [9] "mlr"           "ParamHelpers"  "BBmisc"        "ROCR"
## [13] "gplots"        "gbm"           "parallel"      "splines"
## [17] "survival"      "rpart.plot"    "rpart"         "caret"
## [21] "ggplot2"       "lattice"       "stats"         "graphics"
## [25] "grDevices"     "utils"         "datasets"      "methods"
## [29] "base"
##
## [[6]]
##  [1] "smotefamily"   "Rmisc"         "plyr"          "randomForest"
##  [5] "unbalanced"    "doParallel"    "iterators"     "foreach"
##  [9] "mlr"           "ParamHelpers"  "BBmisc"        "ROCR"
## [13] "gplots"        "gbm"           "parallel"      "splines"
## [17] "survival"      "rpart.plot"    "rpart"         "caret"
## [21] "ggplot2"       "lattice"       "stats"         "graphics"
## [25] "grDevices"     "utils"         "datasets"      "methods"
## [29] "base"
##
## [[7]]
##  [1] "smotefamily"   "Rmisc"         "plyr"          "randomForest"
##  [5] "unbalanced"    "doParallel"    "iterators"     "foreach"
##  [9] "mlr"           "ParamHelpers"  "BBmisc"        "ROCR"
## [13] "gplots"        "gbm"           "parallel"      "splines"
## [17] "survival"      "rpart.plot"    "rpart"         "caret"
## [21] "ggplot2"       "lattice"       "stats"         "graphics"
## [25] "grDevices"     "utils"         "datasets"      "methods"
## [29] "base"
```

```r
clusterEvalQ(cl, library(rpart))
```

```
## [[1]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[2]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[3]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[4]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[5]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[6]]
```

```
##  [1] "smotefamily"  "Rmisc"       "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"  "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"         "parallel"    "splines"
## [17] "survival"     "rpart.plot"  "rpart"       "caret"
## [21] "ggplot2"      "lattice"     "stats"       "graphics"
## [25] "grDevices"    "utils"       "datasets"    "methods"
## [29] "base"
##
## [[7]]
##  [1] "smotefamily"  "Rmisc"       "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"  "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"         "parallel"    "splines"
## [17] "survival"     "rpart.plot"  "rpart"       "caret"
## [21] "ggplot2"      "lattice"     "stats"       "graphics"
## [25] "grDevices"    "utils"       "datasets"    "methods"
## [29] "base"
```

```r
clusterEvalQ(cl, library(unbalanced))
```

```
## [[1]]
##  [1] "smotefamily"  "Rmisc"       "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"  "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"         "parallel"    "splines"
## [17] "survival"     "rpart.plot"  "rpart"       "caret"
## [21] "ggplot2"      "lattice"     "stats"       "graphics"
## [25] "grDevices"    "utils"       "datasets"    "methods"
## [29] "base"
##
## [[2]]
##  [1] "smotefamily"  "Rmisc"       "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"  "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"         "parallel"    "splines"
## [17] "survival"     "rpart.plot"  "rpart"       "caret"
## [21] "ggplot2"      "lattice"     "stats"       "graphics"
## [25] "grDevices"    "utils"       "datasets"    "methods"
## [29] "base"
##
## [[3]]
##  [1] "smotefamily"  "Rmisc"       "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"  "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"         "parallel"    "splines"
## [17] "survival"     "rpart.plot"  "rpart"       "caret"
## [21] "ggplot2"      "lattice"     "stats"       "graphics"
## [25] "grDevices"    "utils"       "datasets"    "methods"
## [29] "base"
##
## [[4]]
##  [1] "smotefamily"  "Rmisc"       "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"  "iterators"   "foreach"
```

```
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[5]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[6]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[7]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
```

```r
clusterEvalQ(cl, library(randomForest))
```

```
## [[1]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[2]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
```

```
## [17] "survival"     "rpart.plot"   "rpart"       "caret"
## [21] "ggplot2"       "lattice"      "stats"       "graphics"
## [25] "grDevices"     "utils"        "datasets"    "methods"
## [29] "base"
##
## [[3]]
##  [1] "smotefamily"  "Rmisc"        "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"      "ROCR"
## [13] "gplots"       "gbm"          "parallel"    "splines"
## [17] "survival"     "rpart.plot"   "rpart"       "caret"
## [21] "ggplot2"       "lattice"      "stats"       "graphics"
## [25] "grDevices"     "utils"        "datasets"    "methods"
## [29] "base"
##
## [[4]]
##  [1] "smotefamily"  "Rmisc"        "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"      "ROCR"
## [13] "gplots"       "gbm"          "parallel"    "splines"
## [17] "survival"     "rpart.plot"   "rpart"       "caret"
## [21] "ggplot2"       "lattice"      "stats"       "graphics"
## [25] "grDevices"     "utils"        "datasets"    "methods"
## [29] "base"
##
## [[5]]
##  [1] "smotefamily"  "Rmisc"        "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"      "ROCR"
## [13] "gplots"       "gbm"          "parallel"    "splines"
## [17] "survival"     "rpart.plot"   "rpart"       "caret"
## [21] "ggplot2"       "lattice"      "stats"       "graphics"
## [25] "grDevices"     "utils"        "datasets"    "methods"
## [29] "base"
##
## [[6]]
##  [1] "smotefamily"  "Rmisc"        "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"      "ROCR"
## [13] "gplots"       "gbm"          "parallel"    "splines"
## [17] "survival"     "rpart.plot"   "rpart"       "caret"
## [21] "ggplot2"       "lattice"      "stats"       "graphics"
## [25] "grDevices"     "utils"        "datasets"    "methods"
## [29] "base"
##
## [[7]]
##  [1] "smotefamily"  "Rmisc"        "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"      "ROCR"
## [13] "gplots"       "gbm"          "parallel"    "splines"
## [17] "survival"     "rpart.plot"   "rpart"       "caret"
## [21] "ggplot2"       "lattice"      "stats"       "graphics"
## [25] "grDevices"     "utils"        "datasets"    "methods"
## [29] "base"
```

```r
clusterEvalQ(cl, library(ROCR))
```

```
## [[1]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[2]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[3]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[4]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[5]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[6]]
```

```
##  [1] "smotefamily"  "Rmisc"        "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"      "ROCR"
## [13] "gplots"       "gbm"          "parallel"    "splines"
## [17] "survival"     "rpart.plot"   "rpart"       "caret"
## [21] "ggplot2"      "lattice"      "stats"       "graphics"
## [25] "grDevices"    "utils"        "datasets"    "methods"
## [29] "base"
##
## [[7]]
##  [1] "smotefamily"  "Rmisc"        "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"      "ROCR"
## [13] "gplots"       "gbm"          "parallel"    "splines"
## [17] "survival"     "rpart.plot"   "rpart"       "caret"
## [21] "ggplot2"      "lattice"      "stats"       "graphics"
## [25] "grDevices"    "utils"        "datasets"    "methods"
## [29] "base"
```

```r
clusterEvalQ(cl, library(gbm))
```

```
## [[1]]
##  [1] "smotefamily"  "Rmisc"        "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"      "ROCR"
## [13] "gplots"       "gbm"          "parallel"    "splines"
## [17] "survival"     "rpart.plot"   "rpart"       "caret"
## [21] "ggplot2"      "lattice"      "stats"       "graphics"
## [25] "grDevices"    "utils"        "datasets"    "methods"
## [29] "base"
##
## [[2]]
##  [1] "smotefamily"  "Rmisc"        "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"      "ROCR"
## [13] "gplots"       "gbm"          "parallel"    "splines"
## [17] "survival"     "rpart.plot"   "rpart"       "caret"
## [21] "ggplot2"      "lattice"      "stats"       "graphics"
## [25] "grDevices"    "utils"        "datasets"    "methods"
## [29] "base"
##
## [[3]]
##  [1] "smotefamily"  "Rmisc"        "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"      "ROCR"
## [13] "gplots"       "gbm"          "parallel"    "splines"
## [17] "survival"     "rpart.plot"   "rpart"       "caret"
## [21] "ggplot2"      "lattice"      "stats"       "graphics"
## [25] "grDevices"    "utils"        "datasets"    "methods"
## [29] "base"
##
## [[4]]
##  [1] "smotefamily"  "Rmisc"        "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"   "foreach"
```

```
##  [9] "mlr"           "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"        "gbm"          "parallel"     "splines"
## [17] "survival"      "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"       "lattice"      "stats"        "graphics"
## [25] "grDevices"     "utils"        "datasets"     "methods"
## [29] "base"
##
## [[5]]
##  [1] "smotefamily"   "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"    "doParallel"   "iterators"    "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"        "gbm"          "parallel"     "splines"
## [17] "survival"      "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"       "lattice"      "stats"        "graphics"
## [25] "grDevices"     "utils"        "datasets"     "methods"
## [29] "base"
##
## [[6]]
##  [1] "smotefamily"   "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"    "doParallel"   "iterators"    "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"        "gbm"          "parallel"     "splines"
## [17] "survival"      "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"       "lattice"      "stats"        "graphics"
## [25] "grDevices"     "utils"        "datasets"     "methods"
## [29] "base"
##
## [[7]]
##  [1] "smotefamily"   "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"    "doParallel"   "iterators"    "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"        "gbm"          "parallel"     "splines"
## [17] "survival"      "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"       "lattice"      "stats"        "graphics"
## [25] "grDevices"     "utils"        "datasets"     "methods"
## [29] "base"
```

```r
clusterEvalQ(cl, library(Rmisc))
```

```
## [[1]]
##  [1] "smotefamily"   "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"    "doParallel"   "iterators"    "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"        "gbm"          "parallel"     "splines"
## [17] "survival"      "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"       "lattice"      "stats"        "graphics"
## [25] "grDevices"     "utils"        "datasets"     "methods"
## [29] "base"
##
## [[2]]
##  [1] "smotefamily"   "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"    "doParallel"   "iterators"    "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"        "gbm"          "parallel"     "splines"
```

```
## [17] "survival"     "rpart.plot"    "rpart"        "caret"
## [21] "ggplot2"      "lattice"       "stats"        "graphics"
## [25] "grDevices"    "utils"         "datasets"     "methods"
## [29] "base"
##
## [[3]]
##  [1] "smotefamily"  "Rmisc"         "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"    "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers"  "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"           "parallel"     "splines"
## [17] "survival"     "rpart.plot"    "rpart"        "caret"
## [21] "ggplot2"      "lattice"       "stats"        "graphics"
## [25] "grDevices"    "utils"         "datasets"     "methods"
## [29] "base"
##
## [[4]]
##  [1] "smotefamily"  "Rmisc"         "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"    "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers"  "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"           "parallel"     "splines"
## [17] "survival"     "rpart.plot"    "rpart"        "caret"
## [21] "ggplot2"      "lattice"       "stats"        "graphics"
## [25] "grDevices"    "utils"         "datasets"     "methods"
## [29] "base"
##
## [[5]]
##  [1] "smotefamily"  "Rmisc"         "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"    "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers"  "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"           "parallel"     "splines"
## [17] "survival"     "rpart.plot"    "rpart"        "caret"
## [21] "ggplot2"      "lattice"       "stats"        "graphics"
## [25] "grDevices"    "utils"         "datasets"     "methods"
## [29] "base"
##
## [[6]]
##  [1] "smotefamily"  "Rmisc"         "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"    "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers"  "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"           "parallel"     "splines"
## [17] "survival"     "rpart.plot"    "rpart"        "caret"
## [21] "ggplot2"      "lattice"       "stats"        "graphics"
## [25] "grDevices"    "utils"         "datasets"     "methods"
## [29] "base"
##
## [[7]]
##  [1] "smotefamily"  "Rmisc"         "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"    "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers"  "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"           "parallel"     "splines"
## [17] "survival"     "rpart.plot"    "rpart"        "caret"
## [21] "ggplot2"      "lattice"       "stats"        "graphics"
## [25] "grDevices"    "utils"         "datasets"     "methods"
## [29] "base"
```

```r
clusterEvalQ(cl, library(rpart))
```

```
## [[1]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[2]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[3]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[4]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[5]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[6]]
```

```
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[7]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
```

```r
clusterEvalQ(cl, library(smotefamily))
```

```
## [[1]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[2]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[3]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[4]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
```

```
##  [9] "mlr"           "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"        "gbm"          "parallel"     "splines"
## [17] "survival"      "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"       "lattice"      "stats"        "graphics"
## [25] "grDevices"     "utils"        "datasets"     "methods"
## [29] "base"
##
## [[5]]
##  [1] "smotefamily"   "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"    "doParallel"   "iterators"    "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"        "gbm"          "parallel"     "splines"
## [17] "survival"      "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"       "lattice"      "stats"        "graphics"
## [25] "grDevices"     "utils"        "datasets"     "methods"
## [29] "base"
##
## [[6]]
##  [1] "smotefamily"   "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"    "doParallel"   "iterators"    "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"        "gbm"          "parallel"     "splines"
## [17] "survival"      "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"       "lattice"      "stats"        "graphics"
## [25] "grDevices"     "utils"        "datasets"     "methods"
## [29] "base"
##
## [[7]]
##  [1] "smotefamily"   "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"    "doParallel"   "iterators"    "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"        "gbm"          "parallel"     "splines"
## [17] "survival"      "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"       "lattice"      "stats"        "graphics"
## [25] "grDevices"     "utils"        "datasets"     "methods"
## [29] "base"
```

```r
result1 = parLapply(cl, c(5,10,15,20,25,30), function(x) {ten_time_auc(data = data_smote1, x)})

stopCluster(cl)
result1
```

```
## [[1]]
##  [1] 0.8981212 0.8997653 0.8982981 0.8989172 0.8985485 0.8994829 0.8979608
##  [8] 0.8996014 0.8999235 0.8995090
##
## [[2]]
##  [1] 0.9005264 0.8991894 0.9017424 0.9000559 0.8989684 0.8987629 0.9004465
##  [8] 0.9006435 0.8992376 0.9011041
##
## [[3]]
##  [1] 0.9017368 0.8993661 0.8993416 0.9008547 0.9009918 0.9017395 0.9010297
##  [8] 0.8999823 0.8989269 0.9015689
##
```

```
## [[4]]
##  [1] 0.9006953 0.9015291 0.9020129 0.9022971 0.9016987 0.9004115 0.8993895
##  [8] 0.8993930 0.8998064 0.9008608
##
## [[5]]
##  [1] 0.9007183 0.8995653 0.9001392 0.8994311 0.8981917 0.8983275 0.8998478
##  [8] 0.9020118 0.9006684 0.8999263
##
## [[6]]
##  [1] 0.8983945 0.9004555 0.8981528 0.9002274 0.8978542 0.8985575 0.9001888
##  [8] 0.8996610 0.8985156 0.8963495
```

```r
no_cores <- detectCores() - 1
cl <- makeCluster(no_cores, type="FORK")
clusterEvalQ(cl, library(caret))
```

```
## [[1]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[2]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[3]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[4]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
```

```
## [29] "base"
##
## [[5]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[6]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[7]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
```

```r
clusterEvalQ(cl, library(rpart))
```

```
## [[1]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[2]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
```

```
## [[3]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[4]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[5]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[6]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[7]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
```

```r
clusterEvalQ(cl, library(unbalanced))
```

```
## [[1]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
```

```
##  [5] "unbalanced"    "doParallel"   "iterators"    "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"        "gbm"          "parallel"     "splines"
## [17] "survival"      "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"       "lattice"      "stats"        "graphics"
## [25] "grDevices"     "utils"        "datasets"     "methods"
## [29] "base"
##
## [[2]]
##  [1] "smotefamily"   "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"    "doParallel"   "iterators"    "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"        "gbm"          "parallel"     "splines"
## [17] "survival"      "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"       "lattice"      "stats"        "graphics"
## [25] "grDevices"     "utils"        "datasets"     "methods"
## [29] "base"
##
## [[3]]
##  [1] "smotefamily"   "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"    "doParallel"   "iterators"    "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"        "gbm"          "parallel"     "splines"
## [17] "survival"      "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"       "lattice"      "stats"        "graphics"
## [25] "grDevices"     "utils"        "datasets"     "methods"
## [29] "base"
##
## [[4]]
##  [1] "smotefamily"   "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"    "doParallel"   "iterators"    "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"        "gbm"          "parallel"     "splines"
## [17] "survival"      "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"       "lattice"      "stats"        "graphics"
## [25] "grDevices"     "utils"        "datasets"     "methods"
## [29] "base"
##
## [[5]]
##  [1] "smotefamily"   "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"    "doParallel"   "iterators"    "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"        "gbm"          "parallel"     "splines"
## [17] "survival"      "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"       "lattice"      "stats"        "graphics"
## [25] "grDevices"     "utils"        "datasets"     "methods"
## [29] "base"
##
## [[6]]
##  [1] "smotefamily"   "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"    "doParallel"   "iterators"    "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"        "gbm"          "parallel"     "splines"
## [17] "survival"      "rpart.plot"   "rpart"        "caret"
```

```
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[7]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
```

```r
clusterEvalQ(cl, library(randomForest))
```

```
## [[1]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[2]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[3]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[4]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
```

```
## [29] "base"
##
## [[5]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[6]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[7]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
```

```r
clusterEvalQ(cl, library(ROCR))
```

```
## [[1]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[2]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
```

```
## [[3]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[4]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[5]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[6]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[7]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
```

```r
clusterEvalQ(cl, library(gbm))
```

```
## [[1]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
```

```
##  [5] "unbalanced"   "doParallel"   "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"      "ROCR"
## [13] "gplots"       "gbm"          "parallel"    "splines"
## [17] "survival"     "rpart.plot"   "rpart"       "caret"
## [21] "ggplot2"      "lattice"      "stats"       "graphics"
## [25] "grDevices"    "utils"        "datasets"    "methods"
## [29] "base"
##
## [[2]]
##  [1] "smotefamily"  "Rmisc"        "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"      "ROCR"
## [13] "gplots"       "gbm"          "parallel"    "splines"
## [17] "survival"     "rpart.plot"   "rpart"       "caret"
## [21] "ggplot2"      "lattice"      "stats"       "graphics"
## [25] "grDevices"    "utils"        "datasets"    "methods"
## [29] "base"
##
## [[3]]
##  [1] "smotefamily"  "Rmisc"        "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"      "ROCR"
## [13] "gplots"       "gbm"          "parallel"    "splines"
## [17] "survival"     "rpart.plot"   "rpart"       "caret"
## [21] "ggplot2"      "lattice"      "stats"       "graphics"
## [25] "grDevices"    "utils"        "datasets"    "methods"
## [29] "base"
##
## [[4]]
##  [1] "smotefamily"  "Rmisc"        "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"      "ROCR"
## [13] "gplots"       "gbm"          "parallel"    "splines"
## [17] "survival"     "rpart.plot"   "rpart"       "caret"
## [21] "ggplot2"      "lattice"      "stats"       "graphics"
## [25] "grDevices"    "utils"        "datasets"    "methods"
## [29] "base"
##
## [[5]]
##  [1] "smotefamily"  "Rmisc"        "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"      "ROCR"
## [13] "gplots"       "gbm"          "parallel"    "splines"
## [17] "survival"     "rpart.plot"   "rpart"       "caret"
## [21] "ggplot2"      "lattice"      "stats"       "graphics"
## [25] "grDevices"    "utils"        "datasets"    "methods"
## [29] "base"
##
## [[6]]
##  [1] "smotefamily"  "Rmisc"        "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"      "ROCR"
## [13] "gplots"       "gbm"          "parallel"    "splines"
## [17] "survival"     "rpart.plot"   "rpart"       "caret"
```

```
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[7]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
```

```r
clusterEvalQ(cl, library(Rmisc))
```

```
## [[1]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[2]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[3]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[4]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
```

```
## [29] "base"
##
## [[5]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[6]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[7]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
```

```r
clusterEvalQ(cl, library(rpart))
```

```
## [[1]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[2]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
```

```
## [[3]]
##  [1] "smotefamily"  "Rmisc"       "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"  "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"         "parallel"    "splines"
## [17] "survival"     "rpart.plot"  "rpart"       "caret"
## [21] "ggplot2"      "lattice"     "stats"       "graphics"
## [25] "grDevices"    "utils"       "datasets"    "methods"
## [29] "base"
##
## [[4]]
##  [1] "smotefamily"  "Rmisc"       "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"  "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"         "parallel"    "splines"
## [17] "survival"     "rpart.plot"  "rpart"       "caret"
## [21] "ggplot2"      "lattice"     "stats"       "graphics"
## [25] "grDevices"    "utils"       "datasets"    "methods"
## [29] "base"
##
## [[5]]
##  [1] "smotefamily"  "Rmisc"       "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"  "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"         "parallel"    "splines"
## [17] "survival"     "rpart.plot"  "rpart"       "caret"
## [21] "ggplot2"      "lattice"     "stats"       "graphics"
## [25] "grDevices"    "utils"       "datasets"    "methods"
## [29] "base"
##
## [[6]]
##  [1] "smotefamily"  "Rmisc"       "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"  "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"         "parallel"    "splines"
## [17] "survival"     "rpart.plot"  "rpart"       "caret"
## [21] "ggplot2"      "lattice"     "stats"       "graphics"
## [25] "grDevices"    "utils"       "datasets"    "methods"
## [29] "base"
##
## [[7]]
##  [1] "smotefamily"  "Rmisc"       "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"  "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"         "parallel"    "splines"
## [17] "survival"     "rpart.plot"  "rpart"       "caret"
## [21] "ggplot2"      "lattice"     "stats"       "graphics"
## [25] "grDevices"    "utils"       "datasets"    "methods"
## [29] "base"
```

```r
clusterEvalQ(cl, library(smotefamily))
```

```
## [[1]]
##  [1] "smotefamily"  "Rmisc"       "plyr"        "randomForest"
```

```
##  [5] "unbalanced"    "doParallel"    "iterators"    "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"        "ROCR"
## [13] "gplots"        "gbm"           "parallel"     "splines"
## [17] "survival"      "rpart.plot"    "rpart"        "caret"
## [21] "ggplot2"       "lattice"       "stats"        "graphics"
## [25] "grDevices"     "utils"         "datasets"     "methods"
## [29] "base"
##
## [[2]]
##  [1] "smotefamily"   "Rmisc"         "plyr"         "randomForest"
##  [5] "unbalanced"    "doParallel"    "iterators"    "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"        "ROCR"
## [13] "gplots"        "gbm"           "parallel"     "splines"
## [17] "survival"      "rpart.plot"    "rpart"        "caret"
## [21] "ggplot2"       "lattice"       "stats"        "graphics"
## [25] "grDevices"     "utils"         "datasets"     "methods"
## [29] "base"
##
## [[3]]
##  [1] "smotefamily"   "Rmisc"         "plyr"         "randomForest"
##  [5] "unbalanced"    "doParallel"    "iterators"    "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"        "ROCR"
## [13] "gplots"        "gbm"           "parallel"     "splines"
## [17] "survival"      "rpart.plot"    "rpart"        "caret"
## [21] "ggplot2"       "lattice"       "stats"        "graphics"
## [25] "grDevices"     "utils"         "datasets"     "methods"
## [29] "base"
##
## [[4]]
##  [1] "smotefamily"   "Rmisc"         "plyr"         "randomForest"
##  [5] "unbalanced"    "doParallel"    "iterators"    "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"        "ROCR"
## [13] "gplots"        "gbm"           "parallel"     "splines"
## [17] "survival"      "rpart.plot"    "rpart"        "caret"
## [21] "ggplot2"       "lattice"       "stats"        "graphics"
## [25] "grDevices"     "utils"         "datasets"     "methods"
## [29] "base"
##
## [[5]]
##  [1] "smotefamily"   "Rmisc"         "plyr"         "randomForest"
##  [5] "unbalanced"    "doParallel"    "iterators"    "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"        "ROCR"
## [13] "gplots"        "gbm"           "parallel"     "splines"
## [17] "survival"      "rpart.plot"    "rpart"        "caret"
## [21] "ggplot2"       "lattice"       "stats"        "graphics"
## [25] "grDevices"     "utils"         "datasets"     "methods"
## [29] "base"
##
## [[6]]
##  [1] "smotefamily"   "Rmisc"         "plyr"         "randomForest"
##  [5] "unbalanced"    "doParallel"    "iterators"    "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"        "ROCR"
## [13] "gplots"        "gbm"           "parallel"     "splines"
## [17] "survival"      "rpart.plot"    "rpart"        "caret"
```

```
## [21] "ggplot2"      "lattice"     "stats"       "graphics"
## [25] "grDevices"    "utils"       "datasets"    "methods"
## [29] "base"
##
## [[7]]
##  [1] "smotefamily"  "Rmisc"       "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"  "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"         "parallel"    "splines"
## [17] "survival"     "rpart.plot"  "rpart"       "caret"
## [21] "ggplot2"      "lattice"     "stats"       "graphics"
## [25] "grDevices"    "utils"       "datasets"    "methods"
## [29] "base"
```

```r
result2 = parLapply(cl, c(5,10,15,20,25,30), function(x) {ten_time_auc(data = data_smote2, x)})

stopCluster(cl)
result2
```

```
## [[1]]
##  [1] 0.8993109 0.8999737 0.8984976 0.8996975 0.8986775 0.8996758 0.8991432
##  [8] 0.9003516 0.8995926 0.8994351
##
## [[2]]
##  [1] 0.8994126 0.8989091 0.8993822 0.9010425 0.8999546 0.8986857 0.8979720
##  [8] 0.9006835 0.8987542 0.9014412
##
## [[3]]
##  [1] 0.9010008 0.8974906 0.8969334 0.9010060 0.8993415 0.8950410 0.9010816
##  [8] 0.8996760 0.9021653 0.9004129
##
## [[4]]
##  [1] 0.8997467 0.8981375 0.8986893 0.9022647 0.8977578 0.8988563 0.9010450
##  [8] 0.9021580 0.8997353 0.8979704
##
## [[5]]
##  [1] 0.8993512 0.8996104 0.8956411 0.9000031 0.8980326 0.9011132 0.8979781
##  [8] 0.9009035 0.9000388 0.8992826
##
## [[6]]
##  [1] 0.8972737 0.8961742 0.8998780 0.9009451 0.8962361 0.8986949 0.8959055
##  [8] 0.8976550 0.8971941 0.8964559
```

```r
no_cores <- detectCores() - 1
cl <- makeCluster(no_cores, type="FORK")
clusterEvalQ(cl, library(caret))
```

```
## [[1]]
##  [1] "smotefamily"  "Rmisc"       "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"  "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"         "parallel"    "splines"
## [17] "survival"     "rpart.plot"  "rpart"       "caret"
```

```
## [21] "ggplot2"      "lattice"     "stats"       "graphics"
## [25] "grDevices"    "utils"       "datasets"    "methods"
## [29] "base"
##
## [[2]]
##  [1] "smotefamily"  "Rmisc"       "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"  "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"         "parallel"    "splines"
## [17] "survival"     "rpart.plot"  "rpart"       "caret"
## [21] "ggplot2"      "lattice"     "stats"       "graphics"
## [25] "grDevices"    "utils"       "datasets"    "methods"
## [29] "base"
##
## [[3]]
##  [1] "smotefamily"  "Rmisc"       "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"  "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"         "parallel"    "splines"
## [17] "survival"     "rpart.plot"  "rpart"       "caret"
## [21] "ggplot2"      "lattice"     "stats"       "graphics"
## [25] "grDevices"    "utils"       "datasets"    "methods"
## [29] "base"
##
## [[4]]
##  [1] "smotefamily"  "Rmisc"       "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"  "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"         "parallel"    "splines"
## [17] "survival"     "rpart.plot"  "rpart"       "caret"
## [21] "ggplot2"      "lattice"     "stats"       "graphics"
## [25] "grDevices"    "utils"       "datasets"    "methods"
## [29] "base"
##
## [[5]]
##  [1] "smotefamily"  "Rmisc"       "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"  "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"         "parallel"    "splines"
## [17] "survival"     "rpart.plot"  "rpart"       "caret"
## [21] "ggplot2"      "lattice"     "stats"       "graphics"
## [25] "grDevices"    "utils"       "datasets"    "methods"
## [29] "base"
##
## [[6]]
##  [1] "smotefamily"  "Rmisc"       "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"  "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"         "parallel"    "splines"
## [17] "survival"     "rpart.plot"  "rpart"       "caret"
## [21] "ggplot2"      "lattice"     "stats"       "graphics"
## [25] "grDevices"    "utils"       "datasets"    "methods"
## [29] "base"
##
```

```
## [[7]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
```

```r
clusterEvalQ(cl, library(rpart))
```

```
## [[1]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[2]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[3]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[4]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[5]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
```

```
##  [5] "unbalanced"    "doParallel"   "iterators"  "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"        "gbm"          "parallel"   "splines"
## [17] "survival"      "rpart.plot"   "rpart"      "caret"
## [21] "ggplot2"       "lattice"      "stats"      "graphics"
## [25] "grDevices"     "utils"        "datasets"   "methods"
## [29] "base"
##
## [[6]]
##  [1] "smotefamily"   "Rmisc"        "plyr"       "randomForest"
##  [5] "unbalanced"    "doParallel"   "iterators"  "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"        "gbm"          "parallel"   "splines"
## [17] "survival"      "rpart.plot"   "rpart"      "caret"
## [21] "ggplot2"       "lattice"      "stats"      "graphics"
## [25] "grDevices"     "utils"        "datasets"   "methods"
## [29] "base"
##
## [[7]]
##  [1] "smotefamily"   "Rmisc"        "plyr"       "randomForest"
##  [5] "unbalanced"    "doParallel"   "iterators"  "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"        "gbm"          "parallel"   "splines"
## [17] "survival"      "rpart.plot"   "rpart"      "caret"
## [21] "ggplot2"       "lattice"      "stats"      "graphics"
## [25] "grDevices"     "utils"        "datasets"   "methods"
## [29] "base"
```

```r
clusterEvalQ(cl, library(unbalanced))
```

```
## [[1]]
##  [1] "smotefamily"   "Rmisc"        "plyr"       "randomForest"
##  [5] "unbalanced"    "doParallel"   "iterators"  "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"        "gbm"          "parallel"   "splines"
## [17] "survival"      "rpart.plot"   "rpart"      "caret"
## [21] "ggplot2"       "lattice"      "stats"      "graphics"
## [25] "grDevices"     "utils"        "datasets"   "methods"
## [29] "base"
##
## [[2]]
##  [1] "smotefamily"   "Rmisc"        "plyr"       "randomForest"
##  [5] "unbalanced"    "doParallel"   "iterators"  "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"        "gbm"          "parallel"   "splines"
## [17] "survival"      "rpart.plot"   "rpart"      "caret"
## [21] "ggplot2"       "lattice"      "stats"      "graphics"
## [25] "grDevices"     "utils"        "datasets"   "methods"
## [29] "base"
##
## [[3]]
##  [1] "smotefamily"   "Rmisc"        "plyr"       "randomForest"
##  [5] "unbalanced"    "doParallel"   "iterators"  "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"     "ROCR"
```

```
## [13] "gplots"        "gbm"            "parallel"    "splines"
## [17] "survival"      "rpart.plot"     "rpart"       "caret"
## [21] "ggplot2"       "lattice"        "stats"       "graphics"
## [25] "grDevices"     "utils"          "datasets"    "methods"
## [29] "base"
##
## [[4]]
##  [1] "smotefamily"   "Rmisc"          "plyr"        "randomForest"
##  [5] "unbalanced"    "doParallel"     "iterators"   "foreach"
##  [9] "mlr"           "ParamHelpers"   "BBmisc"      "ROCR"
## [13] "gplots"        "gbm"            "parallel"    "splines"
## [17] "survival"      "rpart.plot"     "rpart"       "caret"
## [21] "ggplot2"       "lattice"        "stats"       "graphics"
## [25] "grDevices"     "utils"          "datasets"    "methods"
## [29] "base"
##
## [[5]]
##  [1] "smotefamily"   "Rmisc"          "plyr"        "randomForest"
##  [5] "unbalanced"    "doParallel"     "iterators"   "foreach"
##  [9] "mlr"           "ParamHelpers"   "BBmisc"      "ROCR"
## [13] "gplots"        "gbm"            "parallel"    "splines"
## [17] "survival"      "rpart.plot"     "rpart"       "caret"
## [21] "ggplot2"       "lattice"        "stats"       "graphics"
## [25] "grDevices"     "utils"          "datasets"    "methods"
## [29] "base"
##
## [[6]]
##  [1] "smotefamily"   "Rmisc"          "plyr"        "randomForest"
##  [5] "unbalanced"    "doParallel"     "iterators"   "foreach"
##  [9] "mlr"           "ParamHelpers"   "BBmisc"      "ROCR"
## [13] "gplots"        "gbm"            "parallel"    "splines"
## [17] "survival"      "rpart.plot"     "rpart"       "caret"
## [21] "ggplot2"       "lattice"        "stats"       "graphics"
## [25] "grDevices"     "utils"          "datasets"    "methods"
## [29] "base"
##
## [[7]]
##  [1] "smotefamily"   "Rmisc"          "plyr"        "randomForest"
##  [5] "unbalanced"    "doParallel"     "iterators"   "foreach"
##  [9] "mlr"           "ParamHelpers"   "BBmisc"      "ROCR"
## [13] "gplots"        "gbm"            "parallel"    "splines"
## [17] "survival"      "rpart.plot"     "rpart"       "caret"
## [21] "ggplot2"       "lattice"        "stats"       "graphics"
## [25] "grDevices"     "utils"          "datasets"    "methods"
## [29] "base"
```

```r
clusterEvalQ(cl, library(randomForest))
```

```
## [[1]]
##  [1] "smotefamily"   "Rmisc"          "plyr"        "randomForest"
##  [5] "unbalanced"    "doParallel"     "iterators"   "foreach"
##  [9] "mlr"           "ParamHelpers"   "BBmisc"      "ROCR"
## [13] "gplots"        "gbm"            "parallel"    "splines"
## [17] "survival"      "rpart.plot"     "rpart"       "caret"
```

```
## [21] "ggplot2"      "lattice"      "stats"      "graphics"
## [25] "grDevices"     "utils"       "datasets"   "methods"
## [29] "base"
##
## [[2]]
##  [1] "smotefamily"  "Rmisc"        "plyr"       "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"  "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"          "parallel"   "splines"
## [17] "survival"     "rpart.plot"   "rpart"      "caret"
## [21] "ggplot2"      "lattice"      "stats"      "graphics"
## [25] "grDevices"    "utils"        "datasets"   "methods"
## [29] "base"
##
## [[3]]
##  [1] "smotefamily"  "Rmisc"        "plyr"       "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"  "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"          "parallel"   "splines"
## [17] "survival"     "rpart.plot"   "rpart"      "caret"
## [21] "ggplot2"      "lattice"      "stats"      "graphics"
## [25] "grDevices"    "utils"        "datasets"   "methods"
## [29] "base"
##
## [[4]]
##  [1] "smotefamily"  "Rmisc"        "plyr"       "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"  "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"          "parallel"   "splines"
## [17] "survival"     "rpart.plot"   "rpart"      "caret"
## [21] "ggplot2"      "lattice"      "stats"      "graphics"
## [25] "grDevices"    "utils"        "datasets"   "methods"
## [29] "base"
##
## [[5]]
##  [1] "smotefamily"  "Rmisc"        "plyr"       "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"  "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"          "parallel"   "splines"
## [17] "survival"     "rpart.plot"   "rpart"      "caret"
## [21] "ggplot2"      "lattice"      "stats"      "graphics"
## [25] "grDevices"    "utils"        "datasets"   "methods"
## [29] "base"
##
## [[6]]
##  [1] "smotefamily"  "Rmisc"        "plyr"       "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"  "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"          "parallel"   "splines"
## [17] "survival"     "rpart.plot"   "rpart"      "caret"
## [21] "ggplot2"      "lattice"      "stats"      "graphics"
## [25] "grDevices"    "utils"        "datasets"   "methods"
## [29] "base"
##
```

```
## [[7]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
```

```r
clusterEvalQ(cl, library(ROCR))
```

```
## [[1]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[2]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[3]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[4]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[5]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
```

```
##  [5] "unbalanced"    "doParallel"   "iterators"  "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"        "gbm"          "parallel"   "splines"
## [17] "survival"      "rpart.plot"   "rpart"      "caret"
## [21] "ggplot2"       "lattice"      "stats"      "graphics"
## [25] "grDevices"     "utils"        "datasets"   "methods"
## [29] "base"
##
## [[6]]
##  [1] "smotefamily"   "Rmisc"        "plyr"       "randomForest"
##  [5] "unbalanced"    "doParallel"   "iterators"  "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"        "gbm"          "parallel"   "splines"
## [17] "survival"      "rpart.plot"   "rpart"      "caret"
## [21] "ggplot2"       "lattice"      "stats"      "graphics"
## [25] "grDevices"     "utils"        "datasets"   "methods"
## [29] "base"
##
## [[7]]
##  [1] "smotefamily"   "Rmisc"        "plyr"       "randomForest"
##  [5] "unbalanced"    "doParallel"   "iterators"  "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"        "gbm"          "parallel"   "splines"
## [17] "survival"      "rpart.plot"   "rpart"      "caret"
## [21] "ggplot2"       "lattice"      "stats"      "graphics"
## [25] "grDevices"     "utils"        "datasets"   "methods"
## [29] "base"
```

```r
clusterEvalQ(cl, library(gbm))
```

```
## [[1]]
##  [1] "smotefamily"   "Rmisc"        "plyr"       "randomForest"
##  [5] "unbalanced"    "doParallel"   "iterators"  "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"        "gbm"          "parallel"   "splines"
## [17] "survival"      "rpart.plot"   "rpart"      "caret"
## [21] "ggplot2"       "lattice"      "stats"      "graphics"
## [25] "grDevices"     "utils"        "datasets"   "methods"
## [29] "base"
##
## [[2]]
##  [1] "smotefamily"   "Rmisc"        "plyr"       "randomForest"
##  [5] "unbalanced"    "doParallel"   "iterators"  "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"        "gbm"          "parallel"   "splines"
## [17] "survival"      "rpart.plot"   "rpart"      "caret"
## [21] "ggplot2"       "lattice"      "stats"      "graphics"
## [25] "grDevices"     "utils"        "datasets"   "methods"
## [29] "base"
##
## [[3]]
##  [1] "smotefamily"   "Rmisc"        "plyr"       "randomForest"
##  [5] "unbalanced"    "doParallel"   "iterators"  "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"     "ROCR"
```

```
## [13] "gplots"      "gbm"           "parallel"   "splines"
## [17] "survival"    "rpart.plot"    "rpart"      "caret"
## [21] "ggplot2"     "lattice"       "stats"      "graphics"
## [25] "grDevices"   "utils"         "datasets"   "methods"
## [29] "base"
##
## [[4]]
##  [1] "smotefamily"  "Rmisc"         "plyr"       "randomForest"
##  [5] "unbalanced"   "doParallel"    "iterators"  "foreach"
##  [9] "mlr"          "ParamHelpers"  "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"           "parallel"   "splines"
## [17] "survival"     "rpart.plot"    "rpart"      "caret"
## [21] "ggplot2"      "lattice"       "stats"      "graphics"
## [25] "grDevices"    "utils"         "datasets"   "methods"
## [29] "base"
##
## [[5]]
##  [1] "smotefamily"  "Rmisc"         "plyr"       "randomForest"
##  [5] "unbalanced"   "doParallel"    "iterators"  "foreach"
##  [9] "mlr"          "ParamHelpers"  "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"           "parallel"   "splines"
## [17] "survival"     "rpart.plot"    "rpart"      "caret"
## [21] "ggplot2"      "lattice"       "stats"      "graphics"
## [25] "grDevices"    "utils"         "datasets"   "methods"
## [29] "base"
##
## [[6]]
##  [1] "smotefamily"  "Rmisc"         "plyr"       "randomForest"
##  [5] "unbalanced"   "doParallel"    "iterators"  "foreach"
##  [9] "mlr"          "ParamHelpers"  "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"           "parallel"   "splines"
## [17] "survival"     "rpart.plot"    "rpart"      "caret"
## [21] "ggplot2"      "lattice"       "stats"      "graphics"
## [25] "grDevices"    "utils"         "datasets"   "methods"
## [29] "base"
##
## [[7]]
##  [1] "smotefamily"  "Rmisc"         "plyr"       "randomForest"
##  [5] "unbalanced"   "doParallel"    "iterators"  "foreach"
##  [9] "mlr"          "ParamHelpers"  "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"           "parallel"   "splines"
## [17] "survival"     "rpart.plot"    "rpart"      "caret"
## [21] "ggplot2"      "lattice"       "stats"      "graphics"
## [25] "grDevices"    "utils"         "datasets"   "methods"
## [29] "base"
```

```r
clusterEvalQ(cl, library(Rmisc))
```

```
## [[1]]
##  [1] "smotefamily"  "Rmisc"         "plyr"       "randomForest"
##  [5] "unbalanced"   "doParallel"    "iterators"  "foreach"
##  [9] "mlr"          "ParamHelpers"  "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"           "parallel"   "splines"
## [17] "survival"     "rpart.plot"    "rpart"      "caret"
```

```
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"     "utils"        "datasets"     "methods"
## [29] "base"
##
## [[2]]
##  [1] "smotefamily"   "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"    "doParallel"   "iterators"    "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"        "gbm"          "parallel"     "splines"
## [17] "survival"      "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"       "lattice"      "stats"        "graphics"
## [25] "grDevices"     "utils"        "datasets"     "methods"
## [29] "base"
##
## [[3]]
##  [1] "smotefamily"   "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"    "doParallel"   "iterators"    "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"        "gbm"          "parallel"     "splines"
## [17] "survival"      "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"       "lattice"      "stats"        "graphics"
## [25] "grDevices"     "utils"        "datasets"     "methods"
## [29] "base"
##
## [[4]]
##  [1] "smotefamily"   "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"    "doParallel"   "iterators"    "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"        "gbm"          "parallel"     "splines"
## [17] "survival"      "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"       "lattice"      "stats"        "graphics"
## [25] "grDevices"     "utils"        "datasets"     "methods"
## [29] "base"
##
## [[5]]
##  [1] "smotefamily"   "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"    "doParallel"   "iterators"    "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"        "gbm"          "parallel"     "splines"
## [17] "survival"      "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"       "lattice"      "stats"        "graphics"
## [25] "grDevices"     "utils"        "datasets"     "methods"
## [29] "base"
##
## [[6]]
##  [1] "smotefamily"   "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"    "doParallel"   "iterators"    "foreach"
##  [9] "mlr"           "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"        "gbm"          "parallel"     "splines"
## [17] "survival"      "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"       "lattice"      "stats"        "graphics"
## [25] "grDevices"     "utils"        "datasets"     "methods"
## [29] "base"
##
```

```
## [[7]]
##  [1] "smotefamily"  "Rmisc"       "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"  "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"         "parallel"    "splines"
## [17] "survival"     "rpart.plot"  "rpart"       "caret"
## [21] "ggplot2"      "lattice"     "stats"       "graphics"
## [25] "grDevices"    "utils"       "datasets"    "methods"
## [29] "base"
```

```r
clusterEvalQ(cl, library(rpart))
```

```
## [[1]]
##  [1] "smotefamily"  "Rmisc"       "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"  "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"         "parallel"    "splines"
## [17] "survival"     "rpart.plot"  "rpart"       "caret"
## [21] "ggplot2"      "lattice"     "stats"       "graphics"
## [25] "grDevices"    "utils"       "datasets"    "methods"
## [29] "base"
##
## [[2]]
##  [1] "smotefamily"  "Rmisc"       "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"  "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"         "parallel"    "splines"
## [17] "survival"     "rpart.plot"  "rpart"       "caret"
## [21] "ggplot2"      "lattice"     "stats"       "graphics"
## [25] "grDevices"    "utils"       "datasets"    "methods"
## [29] "base"
##
## [[3]]
##  [1] "smotefamily"  "Rmisc"       "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"  "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"         "parallel"    "splines"
## [17] "survival"     "rpart.plot"  "rpart"       "caret"
## [21] "ggplot2"      "lattice"     "stats"       "graphics"
## [25] "grDevices"    "utils"       "datasets"    "methods"
## [29] "base"
##
## [[4]]
##  [1] "smotefamily"  "Rmisc"       "plyr"        "randomForest"
##  [5] "unbalanced"   "doParallel"  "iterators"   "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"     "ROCR"
## [13] "gplots"       "gbm"         "parallel"    "splines"
## [17] "survival"     "rpart.plot"  "rpart"       "caret"
## [21] "ggplot2"      "lattice"     "stats"       "graphics"
## [25] "grDevices"    "utils"       "datasets"    "methods"
## [29] "base"
##
## [[5]]
##  [1] "smotefamily"  "Rmisc"       "plyr"        "randomForest"
```

```
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[6]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[7]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
```

```r
clusterEvalQ(cl, library(smotefamily))
```

```
## [[1]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[2]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[3]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
```

```
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[4]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[5]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[6]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
##
## [[7]]
##  [1] "smotefamily"  "Rmisc"        "plyr"         "randomForest"
##  [5] "unbalanced"   "doParallel"   "iterators"    "foreach"
##  [9] "mlr"          "ParamHelpers" "BBmisc"       "ROCR"
## [13] "gplots"       "gbm"          "parallel"     "splines"
## [17] "survival"     "rpart.plot"   "rpart"        "caret"
## [21] "ggplot2"      "lattice"      "stats"        "graphics"
## [25] "grDevices"    "utils"        "datasets"     "methods"
## [29] "base"
```

```r
result3 = parLapply(cl, c(5,10,15,20,25,30), function(x) {ten_time_auc(data = data_smote3, x)})

stopCluster(cl)
result3
```

```
## [[1]]
##  [1] 0.8991674 0.8988595 0.8985762 0.8985791 0.8993352 0.8992872 0.8990062
##  [8] 0.8982467 0.9004945 0.8988716
```

```
## 
## [[2]]
##  [1] 0.8986254 0.9006411 0.8991321 0.9001352 0.8983128 0.9013481 0.8999809
##  [8] 0.9001708 0.9001934 0.8990551
## 
## [[3]]
##  [1] 0.9005765 0.8996142 0.9000499 0.8979536 0.8976530 0.8990698 0.9010800
##  [8] 0.8999848 0.8968901 0.8995972
## 
## [[4]]
##  [1] 0.9005480 0.8994987 0.9002129 0.9002613 0.9007766 0.8977562 0.8981102
##  [8] 0.8990877 0.9002971 0.8993854
## 
## [[5]]
##  [1] 0.9001996 0.9003711 0.8985507 0.8996516 0.8960490 0.8992961 0.9022389
##  [8] 0.8988115 0.8999040 0.9010943
## 
## [[6]]
##  [1] 0.8988959 0.9001849 0.9017667 0.8981849 0.8993737 0.8973279 0.9001109
##  [8] 0.8978659 0.8983715 0.8964974
```