R Notebook

Parametros:

Measure = F1 measure
Columns = sampling, weight_space, underbagging
Performance = tuning_measure
Filter keys = imba.rate
Filter values = 0.05

```r
library("scmamp")
library(dplyr)
```

Tratamento dos dados

Carregando data set compilado

```r
ds = read.csv("/home/rodrigo/Dropbox/UNICAMP/IC/estudo_cost_learning/SummaryResults/summary_compilation

ds = filter(ds, learner != "classif.rusboost")
summary(ds)
```

```
##                   learner      weight_space
##  classif.ksvm        :17100   Mode :logical
##  classif.randomForest:17100   FALSE:41040
##  classif.rusboost    :    0   TRUE :10260
##  classif.xgboost     :17100   NA's :0
##
##
##
##                               measure        sampling     underbagging
##  Accuracy                        :10260   ADASYN:10260   Mode :logical
##  Area under the curve            :10260   FALSE :30780   FALSE:41040
##  F1 measure                      :10260   SMOTE :10260   TRUE :10260
##  G-mean                          :10260                  NA's :0
##  Matthews correlation coefficient:10260
##
##
##  tuning_measure    holdout_measure   holdout_measure_residual
##  Min.   :-0.1277   Min.   :-0.2120   Min.   :-0.4658
##  1st Qu.: 0.6911   1st Qu.: 0.4001   1st Qu.: 0.1994
##  Median : 0.9700   Median : 0.8571   Median : 0.5581
##  Mean   : 0.7903   Mean   : 0.6718   Mean   : 0.5298
##  3rd Qu.: 0.9975   3rd Qu.: 0.9900   3rd Qu.: 0.8755
##  Max.   : 1.0000   Max.   : 1.0000   Max.   : 1.0000
##  NA's   :1077      NA's   :1077      NA's   :1077
##  iteration_count                      dataset        imba.rate
##  Min.   :1       abalone                 :  900   Min.   :0.0010
##  1st Qu.:1       adult                   :  900   1st Qu.:0.0100
##  Median :2       bank                    :  900   Median :0.0300
##  Mean   :2       car                     :  900   Mean   :0.0286
##  3rd Qu.:3       cardiotocography-10clases:  900   3rd Qu.:0.0500
##  Max.   :3       cardiotocography-3clases :  900   Max.   :0.0500
##  NA's   :1077    (Other)                  :45900
```

Filtrando pela metrica

```
ds = filter(ds, measure == params$measure)
```

Filtrando o data set

```
if(params$filter_keys != 'NULL' && !is.null(params$filter_keys)){
  dots = paste0(params$filter_keys," == '",params$filter_values,"'")
  ds = filter_(ds, .dots = dots)
}

summary(ds)
```

```
##                   learner     weight_space
##  classif.ksvm        :1230   Mode :logical
##  classif.randomForest:1230   FALSE:2952
##  classif.rusboost    :   0   TRUE :738
##  classif.xgboost     :1230   NA's :0
##
##
##
##                             measure       sampling    underbagging
##  Accuracy                        :   0   ADASYN: 738   Mode :logical
##  Area under the curve            :   0   FALSE :2214   FALSE:2952
##  F1 measure                      :3690   SMOTE : 738   TRUE :738
##  G-mean                          :   0                 NA's :0
##  Matthews correlation coefficient:   0
##
##
##  tuning_measure   holdout_measure  holdout_measure_residual
##  Min.   :0.0000   Min.   :0.0000   Min.   :0.00000
##  1st Qu.:0.3333   1st Qu.:0.1000   1st Qu.:0.07022
##  Median :0.8198   Median :0.5000   Median :0.32530
##  Mean   :0.6671   Mean   :0.4905   Mean   :0.39891
##  3rd Qu.:0.9848   3rd Qu.:0.8333   3rd Qu.:0.73016
##  Max.   :1.0000   Max.   :1.0000   Max.   :1.00000
##  NA's   :51       NA's   :51       NA's   :51
##  iteration_count          dataset       imba.rate
##  Min.   :1       abalone      :  45   Min.   :0.05
##  1st Qu.:1       adult        :  45   1st Qu.:0.05
##  Median :2       annealing    :  45   Median :0.05
##  Mean   :2       arrhythmia   :  45   Mean   :0.05
##  3rd Qu.:3       balance-scale:  45   3rd Qu.:0.05
##  Max.   :3       bank         :  45   Max.   :0.05
##  NA's   :51      (Other)      :3420
```

Computando as médias das iteracoes

```
ds = group_by(ds, learner , weight_space , measure , sampling , underbagging , dataset , imba.rate)
ds = summarise(ds, tuning_measure = mean(tuning_measure), holdout_measure = mean(holdout_measure),
               holdout_measure_residual = mean(holdout_measure_residual))

ds = as.data.frame(ds)
```

Criando dataframe

```r
# Dividindo o ds em n, um para cada técnica
splited_df = ds %>% group_by_at(.vars = params$columns) %>% do(vals = as.data.frame(.)) %>% select(vals

# Juntando cada uma das partes horizontalmente em um data set
df_tec_wide = do.call("cbind", splited_df)

# Renomeando duplicacao de nomes
colnames(df_tec_wide) = make.unique(colnames(df_tec_wide))

# Selecionando apenas as medidas da performance escolhida
df_tec_wide_residual = select(df_tec_wide, matches(paste("^", params$performance, "$|", params$performan

# Renomeando colunas
new_names = NULL
for(i in (1:length(splited_df))){
  id = toString(sapply(splited_df[[i]][1, params$columns], as.character))
  new_names = c(new_names, id)
}
colnames(df_tec_wide_residual) = new_names

# Verificando a dimensao do df
dim(df_tec_wide_residual)
```

```
## [1] 246   5
```

```r
# Renomeando a variavel
df = df_tec_wide_residual

head(df)
```

```
##   ADASYN, FALSE, FALSE FALSE, FALSE, FALSE FALSE, FALSE, TRUE
## 1            0.9472249           0.1290537          0.1485313
## 2            0.9611172           0.2772359          0.2542338
## 3            0.9511782           0.2927554          0.3086281
## 4            0.8095020           0.0000000          0.1271359
## 5            1.0000000           1.0000000          0.9025814
## 6            0.9769593           0.1247397          0.1623156
##   FALSE, TRUE, FALSE SMOTE, FALSE, FALSE
## 1         0.12382963           0.9464710
## 2         0.28566897           0.9596461
## 3         0.32873851           0.9595356
## 4         0.00000000           0.7646842
## 5         1.00000000           1.0000000
## 6         0.09682558           0.9851804
```

```r
summary(df)
```

```
##  ADASYN, FALSE, FALSE FALSE, FALSE, FALSE FALSE, FALSE, TRUE
##  Min.   :0.7179       Min.   :0.0000      Min.   :0.09246   
##  1st Qu.:0.9674       1st Qu.:0.1343      1st Qu.:0.23679   
##  Median :0.9868       Median :0.4481      Median :0.42047   
##  Mean   :0.9706       Mean   :0.4699      Mean   :0.46236   
##  3rd Qu.:0.9962       3rd Qu.:0.7810      3rd Qu.:0.68453   
##  Max.   :1.0000       Max.   :1.0000      Max.   :1.00000   
##  NA's   :6            NA's   :1           NA's   :3
##  FALSE, TRUE, FALSE SMOTE, FALSE, FALSE
##  Min.   :0.0000     Min.   :0.6908
##  1st Qu.:0.1338     1st Qu.:0.9675
##  Median :0.4311     Median :0.9864
##  Mean   :0.4689     Mean   :0.9705
##  3rd Qu.:0.7988     3rd Qu.:0.9967
##  Max.   :1.0000     Max.   :1.0000
##  NA's   :3          NA's   :4
```

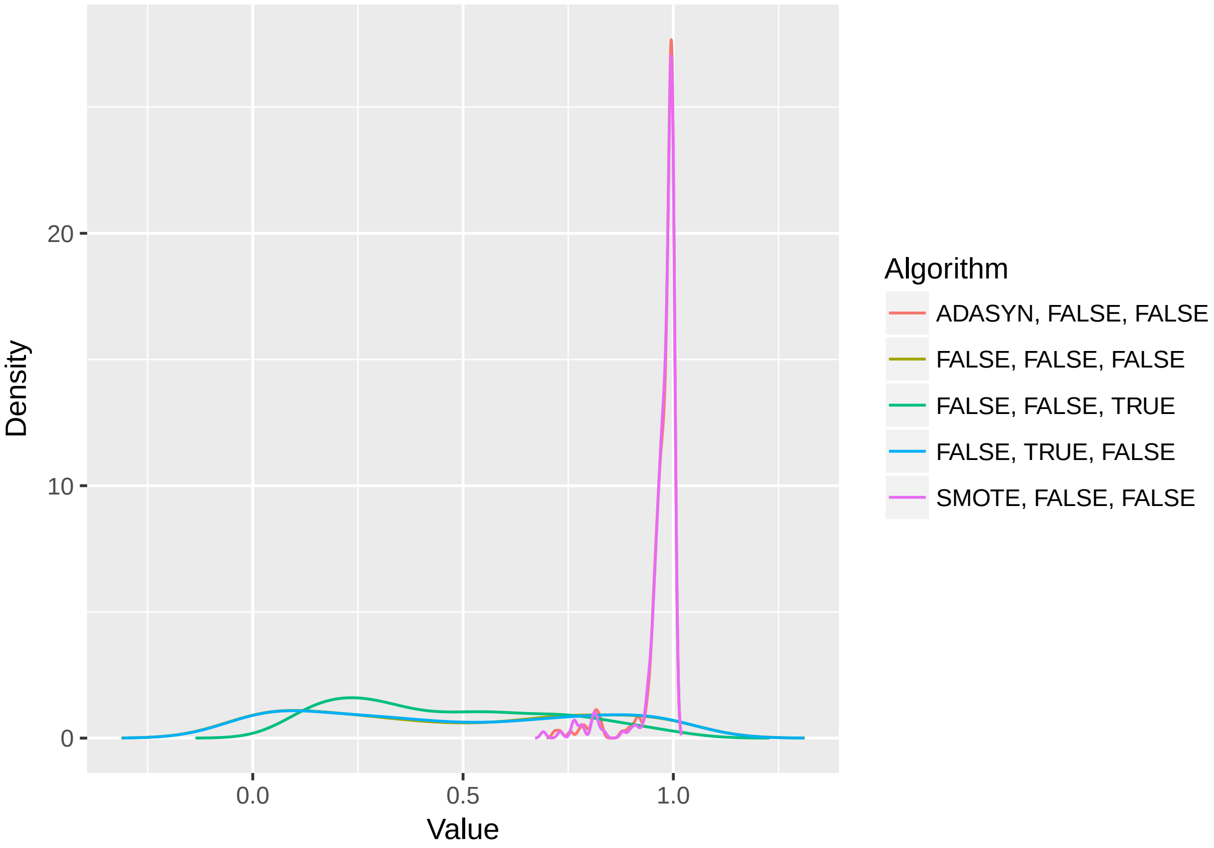
Verificando a média de cada coluna selecionada

```
for(i in (1:dim(df)[2])){
  print(paste("Media da coluna ", colnames(df)[i], " = ", mean(df[,i], na.rm = TRUE), sep=""))
}
```

```
## [1] "Media da coluna ADASYN, FALSE, FALSE = 0.970570458980341"
## [1] "Media da coluna FALSE, FALSE, FALSE = 0.469915350332108"
## [1] "Media da coluna FALSE, FALSE, TRUE = 0.462359809472293"
## [1] "Media da coluna FALSE, TRUE, FALSE = 0.468931622288057"
## [1] "Media da coluna SMOTE, FALSE, FALSE = 0.97047184732852"
```

Fazendo teste de normalidade

```
plotDensities(data = na.omit(df))
```



Testando as diferencas

```
friedmanTest(df)
```

```
##
##  Friedman's rank sum test
##
## data:  df
## Friedman's chi-squared = 655.62, df = 4, p-value < 2.2e-16
```

Testando as diferencas par a par

```
test <- nemenyiTest (df, alpha=0.05)
abs(test$diff.matrix) > test$statistic
```

```
##      ADASYN, FALSE, FALSE FALSE, FALSE, FALSE FALSE, FALSE, TRUE
## [1,]                FALSE                TRUE               TRUE
## [2,]                 TRUE               FALSE              FALSE
## [3,]                 TRUE               FALSE              FALSE
## [4,]                 TRUE               FALSE              FALSE
## [5,]                FALSE                TRUE               TRUE
##      FALSE, TRUE, FALSE SMOTE, FALSE, FALSE
## [1,]               TRUE               FALSE
## [2,]              FALSE                TRUE
## [3,]              FALSE                TRUE
## [4,]              FALSE                TRUE
## [5,]               TRUE               FALSE
```

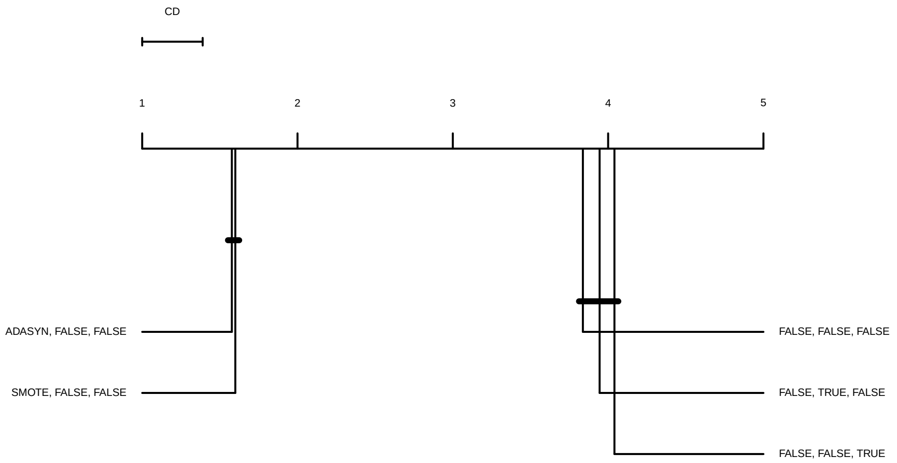
Plotando os ranks

```
print(colMeans(rankMatrix(df)))
```

```
## ADASYN, FALSE, FALSE  FALSE, FALSE, FALSE   FALSE, FALSE, TRUE
##             1.577236             3.837398             4.040650
##   FALSE, TRUE, FALSE  SMOTE, FALSE, FALSE
##             3.945122             1.599593
```

Plotando grafico de Critical Diference

```
result = tryCatch({
    plotCD(df, alpha=0.05, cex = 0.35)
}, error = function(e) {})
```


CD
ADASYN, FALSE, FALSE
SMOTE, FALSE, FALSE
FALSE, FALSE, FALSE
FALSE, TRUE, FALSE
FALSE, FALSE, TRUE