

R Notebook

Parametros:

```
Measure = F1 measure
Columns = sampling, weight_space, ruspool
Performance = holdout_measure_residual
Filter keys = imba.rate
Filter values = 0.03
```

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

Tratamento dos dados

Carregando data set compilado

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

```
##           learner      weight_space
## classif.ksvm      :17100  Mode :logical
## classif.randomForest:17100 FALSE:41040
## classif.xgboost    :17100  TRUE :10260
##                                     NA's :0
##
##
##
##           measure      sampling      ruspool
## 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.: 0.5924  1st Qu.: 0.3114  1st Qu.: 0.1648
## Median : 0.9624  Median : 0.8193  Median : 0.5192
## Mean   : 0.7570  Mean   : 0.6469  Mean   : 0.5099
## 3rd Qu.: 0.9965  3rd Qu.: 0.9879  3rd Qu.: 0.8636
## Max.    : 1.0000  Max.    : 1.0000  Max.    : 1.0000
## NA's    :1761    NA's    :1761    NA's    :1761
## 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 :1761 (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)){  
  ds = filter_at(ds, .vars = params$filter_keys, .vars_predicate = any_vars(. == params$filter_values))  
}
```

```
summary(ds)
```

```
##           learner      weight_space  
## classif.ksvm      :990 Mode :logical  
## classif.randomForest:990 FALSE:2376  
## classif.xgboost    :990 TRUE :594  
##                   NA's :0  
##  
##  
##  
##           measure      sampling      ruspool  
## Accuracy           : 0 ADASYN: 594 Mode :logical  
## Area under the curve : 0 FALSE :1782 FALSE:2376  
## F1 measure           :2970 SMOTE : 594 TRUE :594  
## G-mean              : 0 NA's :0  
## Matthews correlation coefficient: 0  
##  
##  
## tuning_measure holdout_measure holdout_measure_residual iteration_count  
## Min. :0.0000 Min. :0.000 Min. :0.00000 Min. :1  
## 1st Qu.:0.1705 1st Qu.:0.000 1st Qu.:0.02521 1st Qu.:1  
## Median :0.7453 Median :0.400 Median :0.23327 Median :2  
## Mean :0.6015 Mean :0.427 Mean :0.34872 Mean :2  
## 3rd Qu.:0.9891 3rd Qu.:0.800 3rd Qu.:0.68074 3rd Qu.:3  
## Max. :1.0000 Max. :1.000 Max. :1.00000 Max. :3  
## NA's :96 NA's :96 NA's :96 NA's :96  
##  
##           dataset      imba.rate  
## abalone : 45 Min. :0.03  
## adult : 45 1st Qu.:0.03  
## annealing : 45 Median :0.03  
## arrhythmia : 45 Mean :0.03  
## balance-scale: 45 3rd Qu.:0.03  
## bank : 45 Max. :0.03  
## (Other) :2700
```

Computando as médias das iteracoes

```
ds = group_by(ds, learner , weight_space , measure , sampling , ruspool , 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

```

# 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$performance)))

# 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] 198    5

# Removendo linhas com NA's
df_tec_wide_residual = na.omit(df_tec_wide_residual)

# Renomeando a variavel
df = df_tec_wide_residual

summary(df)

```

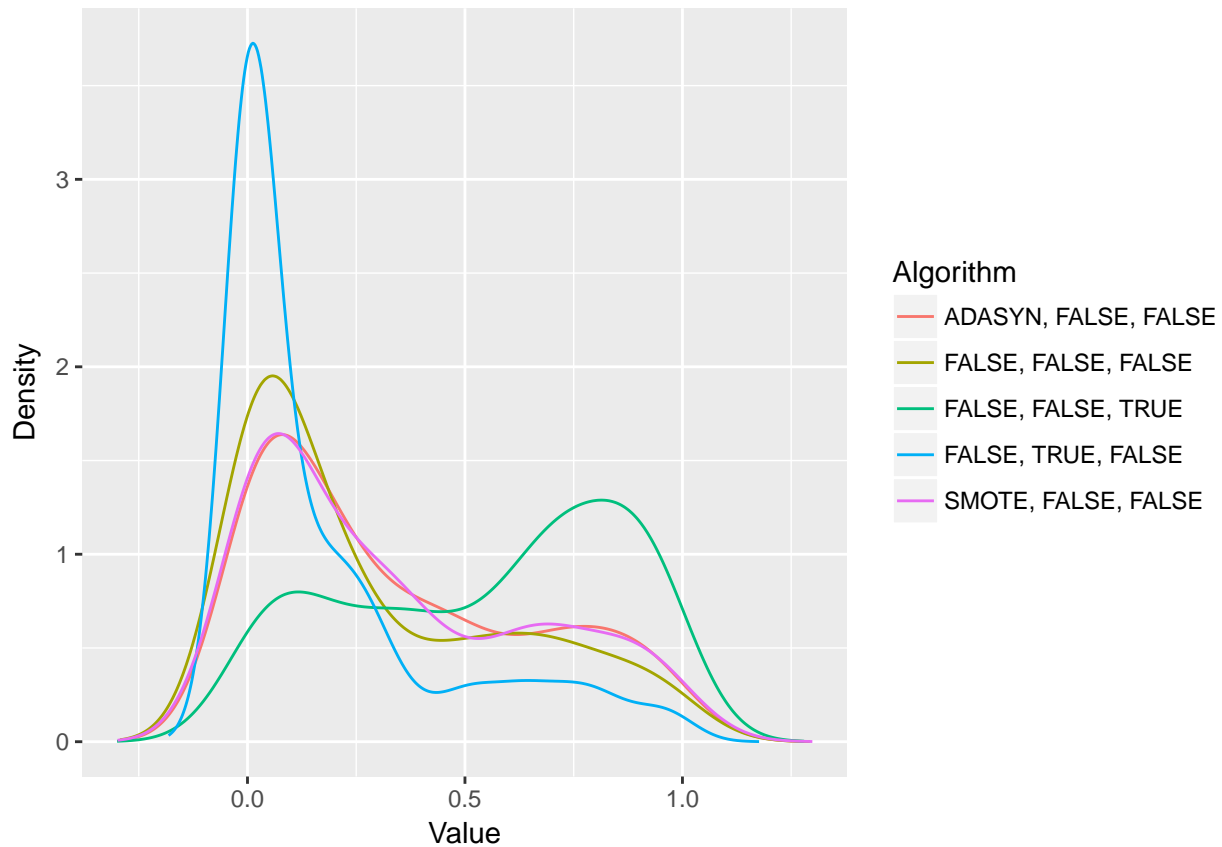
```

## ADASYN, FALSE, FALSE FALSE, FALSE, FALSE FALSE, FALSE, TRUE
## Min. :0.00000 Min. :0.00000 Min. :0.0001813
## 1st Qu.:0.06235 1st Qu.:0.03646 1st Qu.:0.2621754
## Median :0.24905 Median :0.16597 Median :0.6220561
## Mean :0.34115 Mean :0.29267 Mean :0.5473675
## 3rd Qu.:0.58065 3rd Qu.:0.52631 3rd Qu.:0.8369545
## Max. :0.99746 Max. :1.00000 Max. :0.9797133
## FALSE, TRUE, FALSE SMOTE, FALSE, FALSE
## Min. :0.00000 Min. :0.00000
## 1st Qu.:0.00000 1st Qu.:0.05641
## Median :0.04496 Median :0.25667
## Mean :0.17780 Mean :0.33791
## 3rd Qu.:0.25436 3rd Qu.:0.62401
## Max. :0.99479 Max. :1.00000

```

Fazendo teste de normalidade

```
plotDensities(data = df)
```



Testando as diferencas

```
friedmanTest(df)
```

```
##
## Friedman's rank sum test
##
## data: df
## Friedman's chi-squared = 200.17, 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          TRUE
## [3,]          TRUE          TRUE          FALSE
## [4,]          TRUE          TRUE          TRUE
## [5,]          FALSE          TRUE          TRUE
##      FALSE, TRUE, FALSE SMOTE, FALSE, FALSE
## [1,]          TRUE          FALSE
```

## [2,]	TRUE	TRUE
## [3,]	TRUE	TRUE
## [4,]	FALSE	TRUE
## [5,]	TRUE	FALSE

Plotando grafico de Critical Difference

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

