

R Notebook

Parametros:

```
Measure = F1 measure
Columns = sampling, weight_space, ruspool
Performance = tuning_measure
Filter keys = imba.rate
Filter values = 0.001
```

```
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      :600  Mode :logical  
## classif.randomForest:600 FALSE:1440  
## classif.xgboost    :600  TRUE :360  
##                      NA's :0  
##  
##  
##  
##           measure      sampling      ruspool  
## Accuracy              : 0  ADASYN: 360  Mode :logical  
## Area under the curve  : 0  FALSE :1080  FALSE:1440  
## F1 measure            :1800  SMOTE : 360  TRUE :360  
## G-mean                : 0                      NA's :0  
## Matthews correlation coefficient: 0  
##  
##  
## tuning_measure  holdout_measure  holdout_measure_residual  
## Min. :0.00000  Min. :0.0000  Min. :0.00000  
## 1st Qu.:0.08027 1st Qu.:0.0000 1st Qu.:0.00185  
## Median :0.65714 Median :0.2143  Median :0.16236  
## Mean :0.56564  Mean :0.3683  Mean :0.29822  
## 3rd Qu.:0.99827 3rd Qu.:0.7899 3rd Qu.:0.53625  
## Max. :1.00000  Max. :1.0000  Max. :1.00000  
## NA's :93      NA's :93      NA's :93  
## iteration_count      dataset      imba.rate  
## Min. :1      abalone      : 45  Min. :0.001  
## 1st Qu.:1      adult      : 45  1st Qu.:0.001  
## Median :2      bank      : 45  Median :0.001  
## Mean :2      car      : 45  Mean :0.001  
## 3rd Qu.:3      cardiotocography-10clases: 45 3rd Qu.:0.001  
## Max. :3      cardiotocography-3clases : 45 Max. :0.001  
## NA's :93      (Other)      :1530
```

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] 120 5

# Renomeando a variavel
df = df_tec_wide_residual

summary(df)

```

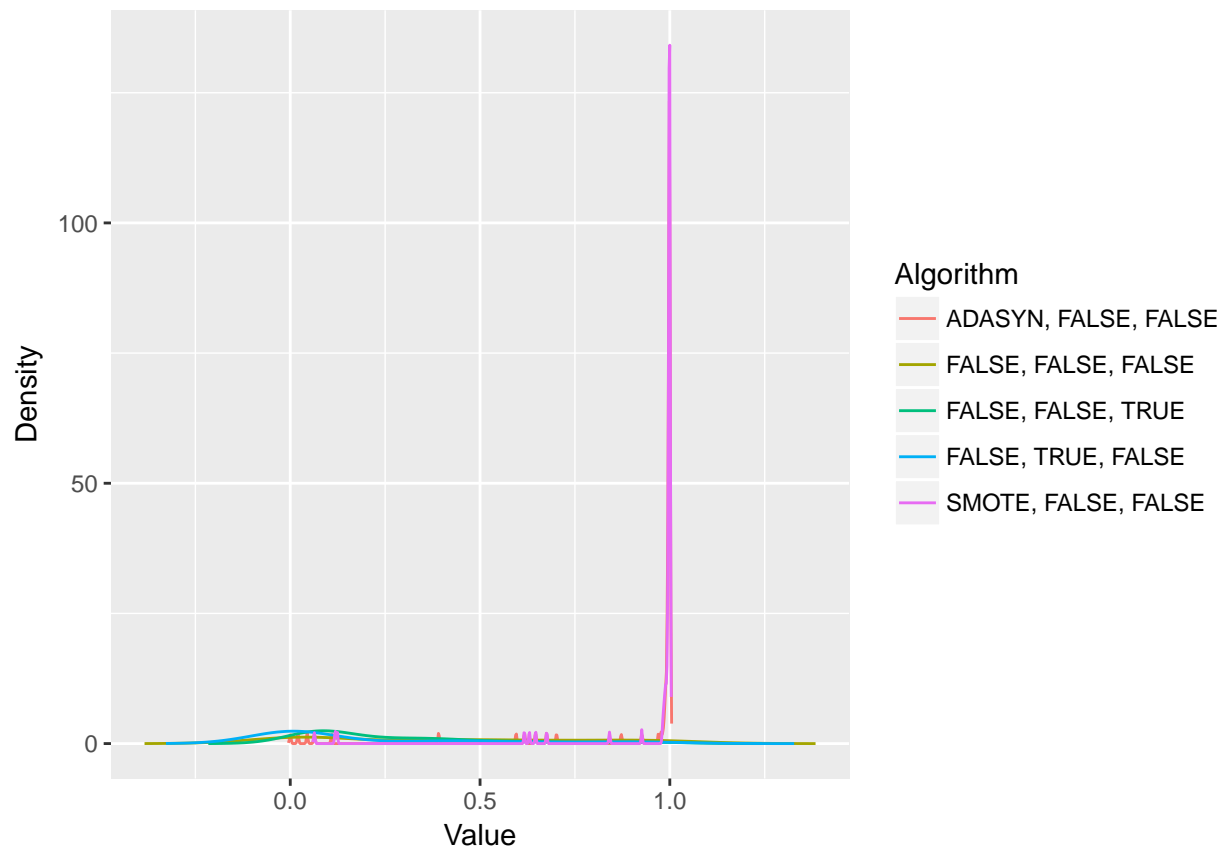
```

## ADASYN, FALSE, FALSE FALSE, FALSE, FALSE FALSE, FALSE, TRUE
## Min. :0.0000 Min. :0.00000 Min. :0.02691
## 1st Qu.:0.9934 1st Qu.:0.04444 1st Qu.:0.07783
## Median :0.9983 Median :0.41481 Median :0.18463
## Mean :0.9303 Mean :0.43353 Mean :0.29434
## 3rd Qu.:0.9995 3rd Qu.:0.74813 3rd Qu.:0.41963
## Max. :1.0000 Max. :1.00000 Max. :1.00000
## NA's :10 NA's :3 NA's :4
## FALSE, TRUE, FALSE SMOTE, FALSE, FALSE
## Min. :0.0000 Min. :0.06349
## 1st Qu.:0.0000 1st Qu.:0.99506
## Median :0.0000 Median :0.99858
## Mean :0.2460 Mean :0.95812
## 3rd Qu.:0.4597 3rd Qu.:0.99971
## Max. :1.0000 Max. :1.00000
## NA's :5 NA's :9

```

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 = 231.65, 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      TRUE      FALSE
## [5,]      FALSE      TRUE      TRUE
##      FALSE, TRUE, FALSE SMOTE, FALSE, FALSE
## [1,]      TRUE      FALSE
```

```
## [2,]          TRUE          TRUE
## [3,]        FALSE          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) {})
```

