

R Notebook

Parametros:

Measure = Matthews correlation coefficient
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          : 0 SMOTE : 594 TRUE :594  
## G-mean              : 0 NA's :0  
## Matthews correlation coefficient:2970  
##  
##  
## tuning_measure      holdout_measure      holdout_measure_residual  
## Min. : -0.05673 Min. : -0.1757 Min. : -0.46576  
## 1st Qu.: 0.22629 1st Qu.: 0.0000 1st Qu.: 0.00628  
## Median : 0.73872 Median : 0.4650 Median : 0.17752  
## Mean : 0.61177 Mean : 0.4417 Mean : 0.28999  
## 3rd Qu.: 0.97985 3rd Qu.: 0.8103 3rd Qu.: 0.50377  
## Max. : 1.00000 Max. : 1.0000 Max. : 1.00000  
## NA's :90 NA's :90 NA's :90  
## iteration_count      dataset      imba.rate  
## Min. :1 abalone : 45 Min. :0.03  
## 1st Qu.:1 adult : 45 1st Qu.:0.03  
## Median :2 annealing : 45 Median :0.03  
## Mean :2 arrhythmia : 45 Mean :0.03  
## 3rd Qu.:3 balance-scale: 45 3rd Qu.:0.03  
## Max. :3 bank : 45 Max. :0.03  
## NA's :90 (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

# Renomeando a variavel
df = df_tec_wide_residual

summary(df)

```

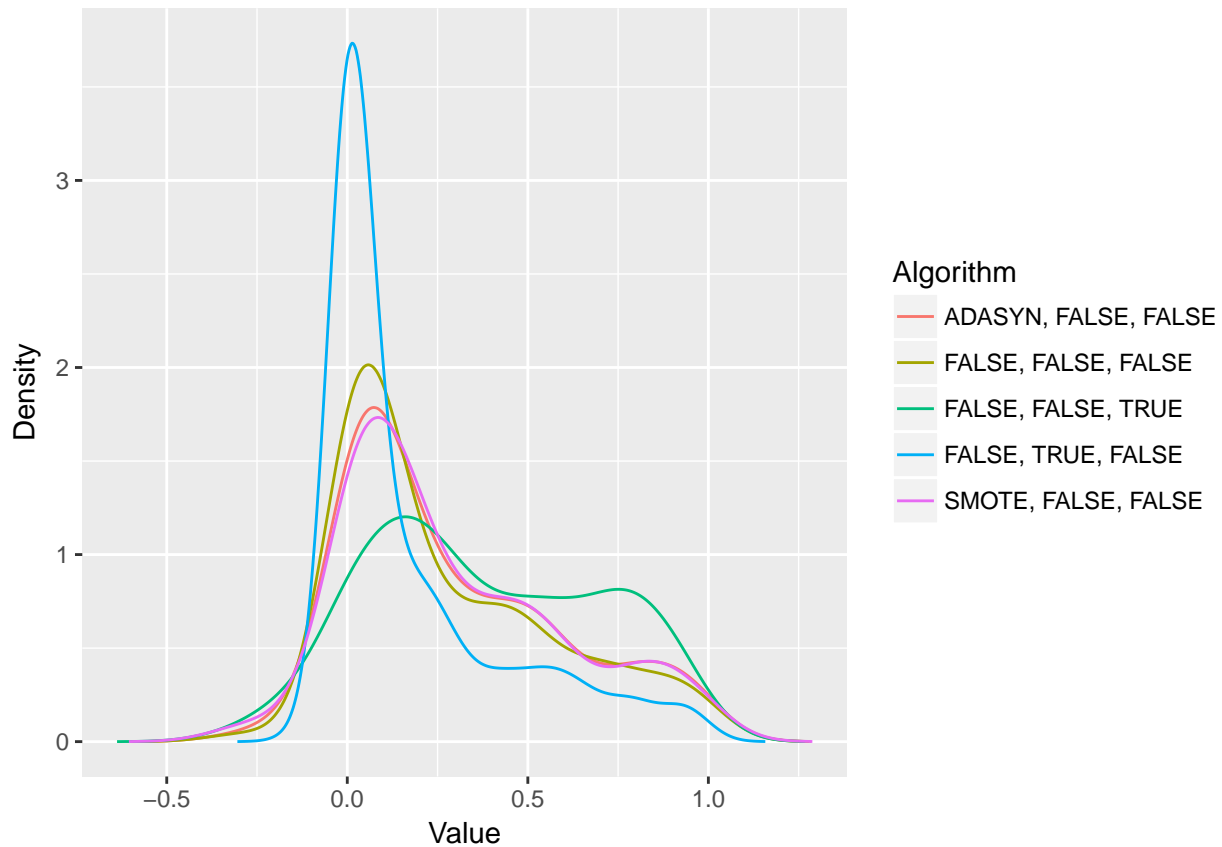
```

## ADASYN, FALSE, FALSE FALSE, FALSE, FALSE FALSE, FALSE, TRUE
## Min.   :-0.31686    Min.   :-0.31686    Min.   :-0.3331
## 1st Qu.: 0.04895    1st Qu.: 0.04242    1st Qu.: 0.1304
## Median : 0.18093    Median : 0.17555    Median : 0.3477
## Mean   : 0.29031    Mean    : 0.28424    Mean    : 0.3895
## 3rd Qu.: 0.49230    3rd Qu.: 0.47623    3rd Qu.: 0.6755
## Max.   : 0.99743    Max.    : 1.00000    Max.    : 0.9630
## NA's   :10         NA's    :2         NA's    :8
## FALSE, TRUE, FALSE SMOTE, FALSE, FALSE
## Min.   :-0.12254    Min.   :-0.31686
## 1st Qu.: 0.00000    1st Qu.: 0.06529
## Median : 0.05195    Median : 0.19336
## Mean   : 0.19243    Mean    : 0.29670
## 3rd Qu.: 0.29234    3rd Qu.: 0.49980
## Max.   : 0.99475    Max.    : 1.00000
## NA's   :2         NA's    :8

```

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 = 81.025, 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          FALSE          TRUE
## [2,]          FALSE          FALSE          TRUE
## [3,]           TRUE          TRUE         FALSE
## [4,]           TRUE          TRUE          TRUE
## [5,]          FALSE          FALSE          TRUE
##      FALSE, TRUE, FALSE SMOTE, FALSE, FALSE
## [1,]           TRUE          FALSE
```

| | | |
|---------|-------|-------|
| ## [2,] | TRUE | FALSE |
| ## [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) {})
```

