

Statistical comparisons considering all the tested databases and a cost of 5 for each misclassified object of the minority class for the paper entitled:

## **Cost-sensitive pattern-based classification for class imbalance problems**

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### **1 Average rankings of Friedman test**

Average ranks obtained by each method in the Friedman test.

Algorithm	Ranking
CSPm+CACSP (Our Proposal)	5.8
MetaCost+Adaboost	5.3263
MetaCost+Bagging	5.7158
MetaCost+Bayes Net	7.4105
MetaCost+C4.5	6.3
MetaCost+kNN	5.5263
MetaCost+Logistic Regression	5.1368
MetaCost+MLP	4.1579
MetaCost+Naïve Bayes	8.3842
MetaCost+Random Forest	3.9947
MetaCost+SVM	8.2474

Table 1: Average Rankings of the algorithms (Friedman)

Friedman statistic (distributed according to chi-square with 10 degrees of freedom): 188.041148.

P-value computed by Friedman Test: 0.

## 2 Post hoc comparison (Friedman)

P-values obtained in by applying post hoc methods over the results of Friedman procedure.

$i$	algorithm	$z = (R_0 - R_i)/SE$	$p$	Finner
10	MetaCost+Nave Bayes	9.12143	0	0.005116
9	MetaCost+SVM	8.837069	0	0.010206
8	MetaCost+Bayes Net	7.098091	0	0.01527
7	MetaCost+C4.5	4.790391	0.000002	0.020308
6	CSPm+CACSP (Our Proposal)	3.751379	0.000176	0.025321
5	MetaCost+Bagging	3.576388	0.000348	0.030307
4	MetaCost+kNN	3.182657	0.001459	0.035268
3	MetaCost+Adaboost	2.767052	0.005657	0.040204
2	MetaCost+Logistic Regression	2.373322	0.017629	0.045115
1	MetaCost+MLP	0.339046	0.734575	0.05

Table 2: Post Hoc comparison Table for  $\alpha = 0.05$  (FRIEDMAN)

Finner's procedure rejects those hypotheses that have an unadjusted p-value  $\leq 0.05$ .

### 3 Adjusted P-Values (Friedman)

Adjusted P-values obtained through the application of the post hoc methods (Friedman).

i	algorithm	unadjusted $p$
1	MetaCost+Nave Bayes	0
2	MetaCost+SVM	0
3	MetaCost+Bayes Net	0
4	MetaCost+C4.5	0.000002
5	CSPm+CACSP (Our Proposal)	0.000176
6	MetaCost+Bagging	0.000348
7	MetaCost+kNN	0.001459
8	MetaCost+Adaboost	0.005657
9	MetaCost+Logistic Regression	0.017629
10	MetaCost+MLP	0.734575

Table 3: Adjusted  $p$ -values (FRIEDMAN) (I)

i	algorithm	unadjusted $p$	$p_{Finner}$
1	MetaCost+Nave Bayes	0	0
2	MetaCost+SVM	0	0
3	MetaCost+Bayes Net	0	0
4	MetaCost+C4.5	0.000002	0.000004
5	CSPm+CACSP (Our Proposal)	0.000176	0.000352
6	MetaCost+Bagging	0.000348	0.000581
7	MetaCost+kNN	0.001459	0.002084
8	MetaCost+Adaboost	0.005657	0.007066
9	MetaCost+Logistic Regression	0.017629	0.019568
10	MetaCost+MLP	0.734575	0.734575

Table 4: Adjusted  $p$ -values (FRIEDMAN) (II)