Tables and CD diagram of the statistical tests considering all the imbalanced databases.

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Abstract

In this document we show supplementary material for the paper entitled "Detecting Pneumatic Failures on Temporary Immersion Bioreactors: A Class Imbalance Problem" submitted to the 8^{th} Mexican Conference on Pattern Recognition

1 Average rankings of Friedman test

Average ranks obtained by applying the Friedman procedure

Algorithm	Ranking
RUSBoost	2.75
HeDex	1.3125
Coverage	2.6875
Bagging + iCAEP	3.25

Table 1: Average Rankings of the algorithms

Friedman statistic considering reduction performance (distributed according to chi-square with 3 degrees of freedom: 9.9375.

P-value computed by Friedman Test: 0.019104948176775105.

2 Post hoc comparisons

Results achieved on post hoc comparisons for $\alpha = 0.05$, $\alpha = 0.10$ and adjusted p-values.

2.1 P-values for $\alpha = 0.05$

i	algorithms	$z = (R_0 - R_i)/SE$	p
6	HeDex vs. Bagging + iCAEP	3.001562	0.002686
5	RUSBoost vs. HeDex	2.226965	0.02595
4	HeDex vs. Coverage	2.130141	0.03316
3	Coverage vs. Bagging + iCAEP	0.871421	0.383524
2	RUSBoost vs. Bagging + iCAEP	0.774597	0.438578
1	RUSBoost vs. Coverage	0.096825	0.922866

Table 2: P-values Table for $\alpha = 0.05$

Bergmann's procedure rejects these hypotheses:

- HeDex vs. Bagging + iCAEP

2.2 P-values for $\alpha = 0.10$

i	algorithms	$z = (R_0 - R_i)/SE$	p
6	HeDex vs. Bagging + iCAEP	3.001562	0.002686
5	RUSBoost vs. HeDex	2.226965	0.02595
4	HeDex vs. Coverage	2.130141	0.03316
3	Coverage vs. Bagging + iCAEP	0.871421	0.383524
2	RUSBoost vs. Bagging + iCAEP	0.774597	0.438578
1	RUSBoost vs. Coverage	0.096825	0.922866

Table 3: P-values Table for $\alpha = 0.10$

Bergmann's procedure rejects these hypotheses:

- RUSBoost vs. HeDex
- HeDex vs. Coverage
- HeDex vs. Bagging + iCAEP

2.3 Adjusted p-values

i	hypothesis	unadjusted p	p_{Berg}
1	HeDex vs .Bagging + iCAEP	0.002686	0.016116
2	RUSBoost vs .HeDex	0.02595	0.077849
3	HeDex vs .Coverage	0.03316	0.077849
4	Coverage vs .Bagging + iCAEP	0.383524	1.150573
5	RUSBoost vs .Bagging + iCAEP	0.438578	1.150573
6	RUSBoost vs .Coverage	0.922866	1.150573

Table 4: Adjusted p-values

2.4 CD Diagram

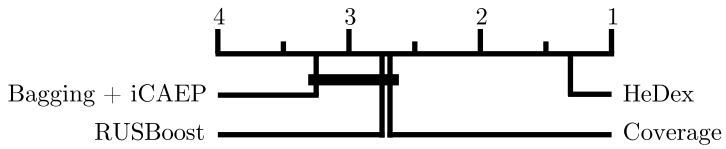

Figure 1: CD diagram with a statistical comparison (using $\alpha = 0.10$) of the AUC results for the all contrast pattern-based classifiers over all the tested databases.