Output tables for the test of Multiple comparisons.

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1 Average rankings of Friedman test

Average ranks obtained by applying the Friedman procedure

Algorithm	Ranking
Base	1.9062
ADASYN	5.2812
SMOTE	4.9688
Bord	4.375
NCL	3.0312
SMOTE+TL	4.9844
SMOTE+ENN	4.5
CCR	6.9531

Table 1: Average Rankings of the algorithms

Friedman statistic considering reduction performance (distributed according to chi-square with 7 degrees of freedom: 85.242188.

P-value computed by Friedman Test: 5.666067615095477147E-11.

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	Shaffer
28	Base vs. CCR	8.241512	0	0.001786
27	NCL vs. CCR	6.404395	0	0.002381
26	Base vs. ADASYN	5.511352	0	0.002381
25	Base vs. SMOTE+TL	5.026657	0	0.002381
24	Base vs. SMOTE	5.001042	0.000001	0.002381
23	Base vs. SMOTE+ENN	4.235576	0.000023	0.002381
22	Bord vs. CCR	4.21006	0.000026	0.002381
21	Base vs. Bord	4.031452	0.000055	0.002381
20	SMOTE+ENN vs. CCR	4.005936	0.000062	0.003125
19	ADASYN vs. NCL	3.674235	0.000239	0.003125
18	SMOTE vs. CCR	3.240471	0.001193	0.003125
17	SMOTE+TL vs. CCR	3.214955	0.001305	0.003125
16	NCL vs. SMOTE+TL	3.18944	0.001425	0.003125
15	SMOTE vs. NCL	3.163924	0.001557	0.003333
14	ADASYN vs. CCR	2.73016	0.00633	0.003846
13	NCL vs. SMOTE+ENN	2.398459	0.016464	0.003846
12	Bord vs. NCL	2.194335	0.028211	0.004167
11	Base vs. NCL	1.837117	0.066193	0.004545
10	ADASYN vs. Bord	1.4799	0.1389	0.005
9	ADASYN vs. SMOTE+ENN	1.275776	0.202035	0.005556
8	Bord vs. SMOTE+TL	0.995105	0.319685	0.00625
7	SMOTE vs. Bord	0.96959	0.332251	0.007143
6	SMOTE+TL vs. SMOTE+ENN	0.790981	0.428955	0.008333
5	SMOTE vs. SMOTE+ENN	0.765466	0.443994	0.01
4	ADASYN vs. SMOTE	0.51031	0.609834	0.0125
3	ADASYN vs. SMOTE+TL	0.484795	0.627822	0.016667
2	Bord vs. SMOTE+ENN	0.204124	0.838256	0.025
1	SMOTE vs. SMOTE+TL	0.025516	0.979644	0.05

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

Shaffer's procedure rejects those hypotheses that have an unadjusted p-value ≤ 0.001786.

2.2 P-values for $\alpha = 0.10$

i	algorithms	$z = (R_0 - R_i)/SE$	p	Shaffer
28	Base vs. CCR	8.241512	0	0.003571
27	NCL vs. CCR	6.404395	0	0.004762
26	Base vs. ADASYN	5.511352	0	0.004762
25	Base vs. SMOTE+TL	5.026557	0	0.004762
24	Base vs. SMOTE	5.001042	0.000001	0.004762
23	Base vs. SMOTE+ENN	4.235576	0.000023	0.004762
22	Bord vs. CCR	4.21006	0.000026	0.004762
21	Base vs. Bord	4.031452	0.000055	0.004762
20	SMOTE+ENN vs. CCR	4.005936	0.000062	0.00625
19	ADASYN vs. NCL	3.674235	0.000239	0.00625
18	SMOTE vs. CCR	3.240471	0.001193	0.00625
17	SMOTE+TL vs. CCR	3.214955	0.001305	0.00625
16	NCL vs. SMOTE+TL	3.18944	0.001425	0.00625
15	SMOTE vs. NCL	3.163924	0.001557	0.006667
14	ADASYN vs. CCR	2.73016	0.00633	0.007692
13	NCL vs. SMOTE+ENN	2.398459	0.016464	0.007692
12	Bord vs. NCL	2.194335	0.028211	0.008333
11	Base vs. NCL	1.837117	0.066193	0.009091
10	ADASYN vs. Bord	1.4799	0.1389	0.01
9	ADASYN vs. SMOTE+ENN	1.275776	0.202035	0.011111
8	Bord vs. SMOTE+TL	0.995105	0.319685	0.0125
7	SMOTE vs. Bord	0.96959	0.332251	0.014286
6	SMOTE+TL vs. SMOTE+ENN	0.790981	0.428955	0.016667
5	SMOTE vs. SMOTE+ENN	0.765466	0.443994	0.02
4	ADASYN vs. SMOTE	0.51031	0.609834	0.025
3	ADASYN vs. SMOTE+TL	0.484795	0.627822	0.033333
2	Bord vs. SMOTE+ENN	0.204124	0.838256	0.05
1	SMOTE vs. SMOTE+TL	0.025516	0.979644	0.1

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

Shaffer's procedure rejects those hypotheses that have an unadjusted p-value ≤ 0.003571.

2.3 Adjusted p-values

i	hypothesis	unadjusted p	p_{Shaf}
1	Base vs .CCR	0	0
2	NCL vs .CCR	0	0
3	Base vs .ADASYN	0	0.000001
4	Base vs .SMOTE+TL	0	0.00001
5	Base vs .SMOTE	0.000001	0.000012
6	Base vs .SMOTE+ENN	0.000023	0.000479
7	Bord vs .CCR	0.000026	0.000536
8	Base vs .Bord	0.000055	0.001164
9	SMOTE+ENN vs .CCR	0.000062	0.001164
10	ADASYN vs .NCL	0.000239	0.003817
11	SMOTE vs .CCR	0.001193	0.019093
12	SMOTE+TL vs .CCR	0.001305	0.020874
13	NCL vs .SMOTE+TL	0.001425	0.022808
14	SMOTE vs .NCL	0.001557	0.023349
15	ADASYN vs .CCR	0.00633	0.082295
16	NCL vs .SMOTE+ENN	0.016464	0.214035
17	Bord vs .NCL	0.028211	0.338536
18	Base vs .NCL	0.066193	0.728118
19	ADASYN vs .Bord	0.1389	1.388999
20	ADASYN vs .SMOTE+ENN	0.202035	1.818313
21	Bord vs .SMOTE+TL	0.319685	2.557481
22	SMOTE vs .Bord	0.332251	2.557481
23	SMOTE+TL vs .SMOTE+ENN	0.428955	2.57373
24	SMOTE vs .SMOTE+ENN	0.443994	2.57373
25	ADASYN vs .SMOTE	0.609834	2.57373
26	ADASYN vs .SMOTE+TL	0.627822	2.57373
27	Bord vs .SMOTE+ENN	0.838256	2.57373
28	SMOTE vs .SMOTE+TL	0.979644	2.57373

Table 4: Adjusted p-values