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	7.3281
ADASYN	4.25
SMOTE	3.4375
Bord	3.9062
NCL	6.7031
SMOTE+TL	3.2188
SMOTE+ENN	3.75
CCR	3.4062

Table 1: Average Rankings of the algorithms

Friedman statistic considering reduction performance (distributed according to chi-square with 7 degrees of freedom: 94.914062.

P-value computed by Friedman Test: 6.48183728912954E-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. SMOTE+TL	6.710581	0	0.001786
27	Base vs. CCR	6.404395	0	0.002381
26	Base vs. SMOTE	6.353364	0	0.002381
25	Base vs. SMOTE+ENN	5.843054	0	0.002381
24	NCL vs. SMOTE+TL	5.689961	0	0.002381
23	Base vs. Bord	5.587898	0	0.002381
22	NCL vs. CCR	5.383774	0	0.002381
21	SMOTE vs. NCL	5.332743	0	0.002381
20	Base vs. ADASYN	5.026557	0	0.003125
19	NCL vs. SMOTE+ENN	4.822433	0.000001	0.003125
18	Bord vs. NCL	4.567278	0.000005	0.003125
17	ADASYN vs. NCL	4.005936	0.000062	0.003125
16	ADASYN vs. SMOTE+TL	1.684024	0.092177	0.003125
15	ADASYN vs. CCR	1.377838	0.168253	0.003333
14	ADASYN vs. SMOTE	1.326807	0.184573	0.003571
13	Bord vs. SMOTE+TL	1.122683	0.261572	0.003846
12	Base vs. NCL	1.020621	0.307434	0.004167
11	SMOTE+TL vs. SMOTE+ENN	0.867528	0.385653	0.004545
10	ADASYN vs. SMOTE+ENN	0.816497	0.414216	0.005
9	Bord vs. CCR	0.816497	0.414216	0.005556
8	SMOTE vs. Bord	0.765466	0.443994	0.00625
7	ADASYN vs. Bord	0.561341	0.574565	0.007143
6	SMOTE+ENN vs. CCR	0.561341	0.574565	0.008333
5	SMOTE vs. SMOTE+ENN	0.51031	0.609834	0.01
4	SMOTE+TL vs. SMOTE+TL	0.357217	0.720929	0.0125
3	SMOTE+TL vs. CCR	0.306186	0.759463	0.016667
2	Bord vs. SMOTE+ENN	0.255155	0.798603	0.025
1	SMOTE vs. CCR	0.051031	0.959301	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. SMOTE+TL	6.710581	0	0.003571
27	Base vs. CCR	6.404395	0	0.004762
26	Base vs. SMOTE	6.353364	0	0.004762
25	Base vs. SMOTE+ENN	5.843054	0	0.004762
24	NCL vs. SMOTE+TL	5.689961	0	0.004762
23	Base vs. Bord	5.587898	0	0.004762
22	NCL vs. CCR	5.383774	0	0.004762
21	SMOTE vs. NCL	5.332743	0	0.004762
20	Base vs. ADASYN	5.026557	0	0.00625
19	NCL vs. SMOTE+ENN	4.822433	0.000001	0.00625
18	Bord vs. NCL	4.567278	0.000005	0.00625
17	ADASYN vs. NCL	4.005936	0.000062	0.00625
16	ADASYN vs. SMOTE+TL	1.684024	0.092177	0.006667
15	ADASYN vs. CCR	1.377838	0.168253	0.007143
14	ADASYN vs. SMOTE	1.326807	0.184573	0.007692
13	Bord vs. SMOTE+TL	1.122683	0.261572	0.008333
12	Base vs. NCL	1.020621	0.307434	0.009091
11	SMOTE+TL vs. SMOTE+ENN	0.867528	0.385653	0.01
10	ADASYN vs. SMOTE+ENN	0.816497	0.414216	0.011111
9	Bord vs. CCR	0.816497	0.414216	0.0125
8	SMOTE vs. Bord	0.765466	0.443994	0.014286
7	ADASYN vs. Bord	0.561341	0.574565	0.016667
6	SMOTE+ENN vs. CCR	0.561341	0.574565	0.02
5	SMOTE vs. SMOTE+ENN	0.51031	0.609834	0.025
4	SMOTE vs. SMOTE+TL	0.357217	0.720929	0.033333
3	SMOTE+TL vs. CCR	0.306186	0.759463	0.05
2	Bord vs. SMOTE+ENN	0.255155	0.798603	0.1
1	SMOTE vs. CCR	0.051031	0.959301	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 .SMOTE+TL	0	0
2	Base vs .CCR	0	0
3	Base vs .SMOTE	0	0
4	Base vs .SMOTE+ENN	0	0
5	NCL vs .SMOTE+TL	0	0
6	Base vs .Bord	0	0
7	NCL vs .CCR	0	0.000002
8	SMOTE vs .NCL	0	0.000002
9	Base vs .ADASYN	0	0.000008
10	NCL vs .SMOTE+ENN	0.000001	0.000023
11	Bord vs .NCL	0.000005	0.000079
12	ADASYN vs .NCL	0.000062	0.000988
13	ADASYN vs .SMOTE+TL	0.092177	1.474832
14	ADASYN vs .CCR	0.168253	2.5238
15	ADASYN vs .SMOTE	0.184573	2.5238
16	Bord vs .SMOTE+TL	0.261572	3.400439
17	Base vs .NCL	0.307434	3.68921
18	SMOTE+TL vs .SMOTE+ENN	0.385653	4.242183
19	ADASYN vs .SMOTE+ENN	0.414216	4.242183
20	Bord vs .CCR	0.414216	4.242183
21	SMOTE vs .Bord	0.443994	4.242183
22	ADASYN vs .Bord	0.574565	4.242183
23	SMOTE+ENN vs .CCR	0.574565	4.242183
24	SMOTE vs .SMOTE+ENN	0.609834	4.242183
25	SMOTE vs .SMOTE+TL	0.720929	4.242183
26	SMOTE+TL vs .CCR	0.759463	4.242183
27	Bord vs .SMOTE+ENN	0.798603	4.242183
28	SMOTE vs .CCR	0.959301	4.242183

Table 4: Adjusted p-values