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	7.4531
ADASYN	4.4375
SMOTE	3.0625
Bord	3.8125
NCL	6.4219
SMOTE+TL	3.1562
SMOTE+ENN	4.0938
CCR	3.5625

Table 1: Average Rankings of the algorithms

Friedman statistic considering reduction performance (distributed according to chi-square with 7 degrees of freedom: 94.971354.

P-value computed by Friedman Test: 6.687994602572189E-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	7.169861	0	0.001786
27	Base vs. SMOTE+TL	7.016767	0	0.002381
26	Base vs. CCR	6.353364	0	0.002381
25	Base vs. Bord	5.945116	0	0.002381
24	Base vs. SMOTE+ENN	5.485836	0	0.002381
23	SMOTE vs. NCL	5.485836	0	0.002381
22	NCL vs. SMOTE+TL	5.332743	0	0.002381
21	Base vs. ADASYN	4.924495	0.000001	0.002381
20	NCL vs. CCR	4.66934	0.000003	0.003125
19	Bord vs. NCL	4.261092	0.00002	0.003125
18	NCL vs. SMOTE+ENN	3.801812	0.000144	0.003125
17	ADASYN vs. NCL	3.240471	0.001193	0.003125
16	ADASYN vs. SMOTE	2.245366	0.024745	0.003125
15	ADASYN vs. SMOTE+TL	2.092272	0.036414	0.003333
14	Base vs. NCL	1.684024	0.092177	0.003571
13	SMOTE vs. SMOTE+ENN	1.684024	0.092177	0.003846
12	SMOTE+TL vs. SMOTE+ENN	1.530931	0.125786	0.004167
11	ADASYN vs. CCR	1.428869	0.153042	0.004545
10	SMOTE vs. Bord	1.224745	0.220671	0.005
9	Bord vs. SMOTE+TL	1.071652	0.283876	0.005556
8	ADASYN vs. Bord	1.020621	0.307434	0.00625
7	SMOTE+ENN vs. CCR	0.867528	0.385653	0.007143
6	SMOTE vs. CCR	0.816497	0.414216	0.008333
5	SMOTE+TL vs. CCR	0.663403	0.507072	0.01
4	ADASYN vs. SMOTE+ENN	0.561341	0.574565	0.0125
3	Bord vs. SMOTE+ENN	0.459279	0.646034	0.016667
2	Bord vs. CCR	0.408248	0.683091	0.025
1	SMOTE vs. SMOTE+TL	0.153093	0.878325	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	7.169861	0	0.003571
27	Base vs. SMOTE+TL	7.016767	0	0.004762
26	Base vs. CCR	6.353364	0	0.004762
25	Base vs. Bord	5.945116	0	0.004762
24	Base vs. SMOTE+ENN	5.485836	0	0.004762
23	SMOTE vs. NCL	5.485836	0	0.004762
22	NCL vs. SMOTE+TL	5.332743	0	0.004762
21	Base vs. ADASYN	4.924495	0.000001	0.004762
20	NCL vs. CCR	4.66934	0.000003	0.00625
19	Bord vs. NCL	4.261092	0.00002	0.00625
18	NCL vs. SMOTE+ENN	3.801812	0.000144	0.00625
17	ADASYN vs. NCL	3.240471	0.001193	0.00625
16	ADASYN vs. SMOTE	2.245366	0.024745	0.00625
15	ADASYN vs. SMOTE+TL	2.092272	0.036414	0.006667
14	Base vs. NCL	1.684024	0.092177	0.007143
13	SMOTE vs. SMOTE+ENN	1.684024	0.092177	0.007692
12	SMOTE+TL vs. SMOTE+ENN	1.530931	0.125786	0.008333
11	ADASYN vs. CCR	1.428869	0.153042	0.009091
10	SMOTE vs. Bord	1.224745	0.220671	0.01
9	Bord vs. SMOTE+TL	1.071652	0.283876	0.011111
8	ADASYN vs. Bord	1.020621	0.307434	0.0125
7	SMOTE+ENN vs. CCR	0.867528	0.385653	0.014286
6	SMOTE vs. CCR	0.816497	0.414216	0.016667
5	SMOTE+TL vs. CCR	0.663403	0.507072	0.02
4	ADASYN vs. SMOTE+ENN	0.561341	0.574565	0.025
3	Bord vs. SMOTE+ENN	0.459279	0.646034	0.033333
2	Bord vs. CCR	0.408248	0.683091	0.05
1	SMOTE vs. SMOTE+TL	0.153093	0.878325	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	0	0
2	Base vs .SMOTE+TL	0	0
3	Base vs .CCR	0	0
4	Base vs .Bord	0	0
5	Base vs .SMOTE+ENN	0	0.000001
6	SMOTE vs .NCL	0	0.000001
7	NCL vs .SMOTE+TL	0	0.000002
8	Base vs .ADASYN	0.000001	0.000018
9	NCL vs .CCR	0.000003	0.000048
10	Bord vs .NCL	0.00002	0.000325
11	NCL vs .SMOTE+ENN	0.000144	0.002298
12	ADASYN vs .NCL	0.001193	0.019093
13	ADASYN vs .SMOTE	0.024745	0.395915
14	ADASYN vs .SMOTE+TL	0.036414	0.546212
15	Base vs .NCL	0.092177	1.198301
16	SMOTE vs .SMOTE+ENN	0.092177	1.198301
17	SMOTE+TL vs .SMOTE+ENN	0.125786	1.509437
18	ADASYN vs .CCR	0.153042	1.683461
19	SMOTE vs .Bord	0.220671	2.206714
20	Bord vs .SMOTE+TL	0.283876	2.554888
21	ADASYN vs .Bord	0.307434	2.554888
22	SMOTE+ENN vs .CCR	0.385653	2.699571
23	SMOTE vs .CCR	0.414216	2.699571
24	SMOTE+TL vs .CCR	0.507072	2.699571
25	ADASYN vs .SMOTE+ENN	0.574565	2.699571
26	Bord vs .SMOTE+ENN	0.646034	2.699571
27	Bord vs .CCR	0.683091	2.699571
28	SMOTE vs .SMOTE+TL	0.878325	2.699571

Table 4: Adjusted p-values