

Output tables for the test of Multiple comparisons.

December 21, 2011

1 Average rankings of Friedman test

Average ranks obtained by applying the Friedman procedure

Algorithm	Ranking
Self-Training (C45)	4.6136
Self-Training (SMO)	4.7636
Co-Training (SMO)	4.3409
Democratic-Co	4.1205
TriTraining (C45)	3.9477
TriTraining (SMO)	5.0295
Co-Bagging (C45)	4.2409
Co-Bagging (SMO)	4.9432

Table 1: Average Rankings of the algorithms

Friedman statistic considering reduction performance (distributed according to chi-square with 7 degrees of freedom: 40.360606.

P-value computed by Friedman Test: 1.073766305093038E-6.

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	Holm	Shaffer
28	TriTraining (C45) vs. TriTraining (SMO)	4.632069	0.000004	0.001786	0.001786
27	TriTraining (C45) vs. Co-Bagging (SMO)	4.262282	0.00002	0.001852	0.002381
26	Democratic-Co vs. TriTraining (SMO)	3.892495	0.000099	0.001923	0.002381
25	Democratic-Co vs. Co-Bagging (SMO)	3.522708	0.000427	0.002	0.002381
24	Self-Training (SMO) vs. TriTraining (C45)	3.493514	0.000477	0.002083	0.002381
23	TriTraining (SMO) vs. Co-Bagging (C45)	3.376739	0.000734	0.002174	0.002381
22	Co-Bagging (C45) vs. Co-Bagging (SMO)	3.006952	0.002639	0.002273	0.002381
21	Co-Training (SMO) vs. TriTraining (SMO)	2.948565	0.003193	0.002381	0.002381
20	Self-Training (C45) vs. TriTraining (C45)	2.851252	0.004355	0.0025	0.0025
19	Self-Training (SMO) vs. Democratic-Co	2.75394	0.005888	0.002632	0.002632
18	Co-Training (SMO) vs. Co-Bagging (SMO)	2.578778	0.009915	0.002778	0.002778
17	Self-Training (SMO) vs. Co-Bagging (C45)	2.238184	0.025209	0.002941	0.002941
16	Self-Training (C45) vs. Democratic-Co	2.111678	0.034714	0.003125	0.003125
15	Self-Training (SMO) vs. Co-Training (SMO)	1.81001	0.070294	0.003333	0.003333
14	Self-Training (C45) vs. TriTraining (SMO)	1.780816	0.074942	0.003571	0.003571
13	Co-Training (SMO) vs. TriTraining (C45)	1.683504	0.092278	0.003846	0.003846
12	Self-Training (C45) vs. Co-Bagging (C45)	1.595923	0.110506	0.004167	0.004167
11	Self-Training (C45) vs. Co-Bagging (SMO)	1.411029	0.158236	0.004545	0.004545
10	TriTraining (C45) vs. Co-Bagging (C45)	1.25533	0.209359	0.005	0.005
9	Self-Training (C45) vs. Co-Training (SMO)	1.167748	0.242908	0.005556	0.005556
8	Self-Training (SMO) vs. TriTraining (SMO)	1.138555	0.254889	0.00625	0.00625
7	Co-Training (SMO) vs. Democratic-Co	0.94393	0.345205	0.007143	0.007143
6	Self-Training (SMO) vs. Co-Bagging (SMO)	0.768768	0.442031	0.008333	0.008333
5	Democratic-Co vs. TriTraining (C45)	0.739574	0.459559	0.01	0.01
4	Self-Training (C45) vs. Self-Training (SMO)	0.642262	0.520703	0.0125	0.0125
3	Democratic-Co vs. Co-Bagging (C45)	0.515756	0.606025	0.016667	0.016667
2	Co-Training (SMO) vs. Co-Bagging (C45)	0.428174	0.668524	0.025	0.025
1	TriTraining (SMO) vs. Co-Bagging (SMO)	0.369787	0.711541	0.05	0.05

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

Holm's procedure rejects those hypotheses that have a p-value ≤ 0.002273 .
Shaffer's procedure rejects those hypotheses that have a p-value ≤ 0.001786 .
Bergmann's procedure rejects these hypotheses:

- Self-Training (SMO) vs. TriTraining (C45)
- Co-Training (SMO) vs. TriTraining (SMO)
- Democratic-Co vs. TriTraining (SMO)
- Democratic-Co vs. Co-Bagging (SMO)
- TriTraining (C45) vs. TriTraining (SMO)
- TriTraining (C45) vs. Co-Bagging (SMO)
- TriTraining (SMO) vs. Co-Bagging (C45)
- Co-Bagging (C45) vs. Co-Bagging (SMO)

2.2 P-values for $\alpha = 0.10$

i	algorithms	$z = (R_0 - R_i)/SE$	p	Holm	Shaffer
28	TriTraining (C45) vs. TriTraining (SMO)	4.632069	0.000004	0.003571	0.003571
27	TriTraining (C45) vs. Co-Bagging (SMO)	4.262282	0.00002	0.003704	0.004762
26	Democratic-Co vs. TriTraining (SMO)	3.892495	0.000099	0.003846	0.004762
25	Democratic-Co vs. Co-Bagging (SMO)	3.522708	0.000427	0.004	0.004762
24	Self-Training (SMO) vs. TriTraining (C45)	3.493514	0.000477	0.004167	0.004762
23	TriTraining (SMO) vs. Co-Bagging (C45)	3.376739	0.000734	0.004348	0.004762
22	Co-Bagging (C45) vs. Co-Bagging (SMO)	3.006952	0.002639	0.004545	0.004762
21	Co-Training (SMO) vs. TriTraining (SMO)	2.948565	0.003193	0.004762	0.004762
20	Self-Training (C45) vs. TriTraining (C45)	2.851252	0.004355	0.005	0.00625
19	Self-Training (SMO) vs. Democratic-Co	2.75394	0.005888	0.005263	0.00625
18	Co-Training (SMO) vs. Co-Bagging (SMO)	2.578778	0.009915	0.005556	0.00625
17	Self-Training (SMO) vs. Co-Bagging (C45)	2.238184	0.025209	0.005882	0.00625
16	Self-Training (C45) vs. Democratic-Co	2.111678	0.034714	0.00625	0.00625
15	Self-Training (SMO) vs. Co-Training (SMO)	1.81001	0.070294	0.006667	0.006667
14	Self-Training (C45) vs. TriTraining (SMO)	1.780816	0.074942	0.007143	0.007143
13	Co-Training (SMO) vs. TriTraining (C45)	1.683504	0.092278	0.007692	0.007692
12	Self-Training (C45) vs. Co-Bagging (C45)	1.595923	0.110506	0.008333	0.008333
11	Self-Training (C45) vs. Co-Bagging (SMO)	1.411029	0.158236	0.009091	0.009091
10	TriTraining (C45) vs. Co-Bagging (C45)	1.25533	0.209359	0.01	0.01
9	Self-Training (C45) vs. Co-Training (SMO)	1.167748	0.242908	0.011111	0.011111
8	Self-Training (SMO) vs. TriTraining (SMO)	1.138555	0.254889	0.0125	0.0125
7	Co-Training (SMO) vs. Democratic-Co	0.94393	0.345205	0.014286	0.014286
6	Self-Training (SMO) vs. Co-Bagging (SMO)	0.768768	0.442031	0.016667	0.016667
5	Democratic-Co vs. TriTraining (C45)	0.739574	0.459559	0.02	0.02
4	Self-Training (C45) vs. Self-Training (SMO)	0.642262	0.520703	0.025	0.025
3	Democratic-Co vs. Co-Bagging (C45)	0.515756	0.606025	0.033333	0.033333
2	Co-Training (SMO) vs. Co-Bagging (C45)	0.428174	0.668524	0.05	0.05
1	TriTraining (SMO) vs. Co-Bagging (SMO)	0.369787	0.711541	0.1	0.1

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

Holm's procedure rejects those hypotheses that have a p-value ≤ 0.005263 .

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

Bergmann's procedure rejects these hypotheses:

- Self-Training (C45) vs. TriTraining (C45)

- Self-Training (SMO) vs. Democratic-Co
- Self-Training (SMO) vs. TriTraining (C45)
- Co-Training (SMO) vs. TriTraining (SMO)
- Co-Training (SMO) vs. Co-Bagging (SMO)
- Democratic-Co vs. TriTraining (SMO)
- Democratic-Co vs. Co-Bagging (SMO)
- TriTraining (C45) vs. TriTraining (SMO)
- TriTraining (C45) vs. Co-Bagging (SMO)
- TriTraining (SMO) vs. Co-Bagging (C45)
- Co-Bagging (C45) vs. Co-Bagging (SMO)

2.3 Adjusted p-values

i	hypothesis	unadjusted p	p_{Holm}	p_{Shaf}	p_{Berg}
1	TriTraining (C45) vs .TriTraining (SMO)	0.000004	0.000101	0.000101	0.000101
2	TriTraining (C45) vs .Co-Bagging (SMO)	0.00002	0.000546	0.000425	0.000425
3	Democratic-Co vs .TriTraining (SMO)	0.000099	0.00258	0.002084	0.002084
4	Democratic-Co vs .Co-Bagging (SMO)	0.000427	0.010679	0.00897	0.006407
5	Self-Training (SMO) vs .TriTraining (C45)	0.000477	0.011441	0.010011	0.007627
6	TriTraining (SMO) vs .Co-Bagging (C45)	0.000734	0.016871	0.015404	0.011736
7	Co-Bagging (C45) vs .Co-Bagging (SMO)	0.002639	0.058054	0.055415	0.029027
8	Co-Training (SMO) vs .TriTraining (SMO)	0.003193	0.067043	0.067043	0.041503
9	Self-Training (C45) vs .TriTraining (C45)	0.004355	0.087095	0.069676	0.056612
10	Self-Training (SMO) vs .Democratic-Co	0.005888	0.111877	0.094212	0.064771
11	Co-Training (SMO) vs .Co-Bagging (SMO)	0.009915	0.178471	0.158641	0.089235
12	Self-Training (SMO) vs .Co-Bagging (C45)	0.025209	0.428553	0.403344	0.201672
13	Self-Training (C45) vs .Democratic-Co	0.034714	0.555425	0.555425	0.312426
14	Self-Training (SMO) vs .Co-Training (SMO)	0.070294	1.054413	1.054413	0.49206
15	Self-Training (C45) vs .TriTraining (SMO)	0.074942	1.054413	1.054413	0.89931
16	Co-Training (SMO) vs .TriTraining (C45)	0.092278	1.199608	1.199608	0.89931
17	Self-Training (C45) vs .Co-Bagging (C45)	0.110506	1.326072	1.326072	0.89931
18	Self-Training (C45) vs .Co-Bagging (SMO)	0.158236	1.740596	1.740596	0.949416
19	TriTraining (C45) vs .Co-Bagging (C45)	0.209359	2.093592	2.093592	1.465514
20	Self-Training (C45) vs .Co-Training (SMO)	0.242908	2.186174	2.186174	1.465514
21	Self-Training (SMO) vs .TriTraining (SMO)	0.254889	2.186174	2.186174	1.529334
22	Co-Training (SMO) vs .Democratic-Co	0.345205	2.416438	2.416438	1.726027
23	Self-Training (SMO) vs .Co-Bagging (SMO)	0.442031	2.652187	2.652187	1.726027
24	Democratic-Co vs .TriTraining (C45)	0.459559	2.652187	2.652187	1.838234
25	Self-Training (C45) vs .Self-Training (SMO)	0.520703	2.652187	2.652187	1.838234
26	Democratic-Co vs .Co-Bagging (C45)	0.606025	2.652187	2.652187	1.838234
27	Co-Training (SMO) vs .Co-Bagging (C45)	0.668524	2.652187	2.652187	1.838234
28	TriTraining (SMO) vs .Co-Bagging (SMO)	0.711541	2.652187	2.652187	1.838234

Table 4: Adjusted p -values