## Output tables for the test of Multiple comparisons.

June 23, 2019

## 1 Average rankings of Friedman test

Average ranks obtained by applying the Friedman procedure

Algorithm	Ranking
DSC-R	2.0385
DSC-S	2.0769
KMeanClustering	5.5
LearnppCDS	3.3077
LearnppNIE	5.6538
REA	3.5
OUSE	6.1538
MLPClassifier	7.7692

Table 1: Average Rankings of the algorithms

Friedman statistic considering reduction performance (distributed according to chi-square with 7 degrees of freedom: 130.461538.

## 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 $\alpha = 0.05$

 algorithms	$z = (R_0 - R_i)/SE$	d
DSC-R vs. MLPClassifier	8.435464	0
DSC-S vs. MLPClassifier	8.37885	0
LearnppCDS vs. MLPClassifier	6.567207	0
REA vs. MLPClassifier	6.284138	0
DSC-R vs. OUSE	6.057682	0
DSC-S vs. OUSE	6.001068	0
DSC-R vs. LearnppNIE	5.321702	0
DSC-S vs. LearnppNIE	5.265088	0
DSC-R vs. KMeanClustering	5.095247	0
DSC-S vs. KMeanClustering	5.038633	0
LearnppCDS vs. OUSE	4.189425	0.000028
REA vs. OUSE	3.906356	0.000094
LearnppCDS vs. LearnppNIE	3.453445	0.000553
KMeanClustering vs. MLPClassifier	3.340217	0.000837
KMeanClustering vs. LearnppCDS	3.22699	0.001251
LearnppNIE vs. REA	3.170376	0.001522
LearnppNIE vs. MLPClassifier	3.113762	0.001847
KMeanClustering vs. REA	2.94392	0.003241
OUSE vs. MLPClassifier	2.377782	0.017417
DSC-R vs. REA	2.151326	0.03145
DSC-S vs. REA	2.094713	0.036197
DSC-R vs. LearnppCDS	1.868257	0.061726
DSC-S vs. LearnppCDS	1.811643	0.070041
KMeanClustering vs. OUSE	0.962435	0.335831
LearnppNIE vs. OUSE	0.73598	0.461743
LearnppCDS vs. REA	0.283069	0.777124
KMeanClustering vs. LearnppNIE	0.226455	0.820847
DSC-R vs. DSC-S	0.056614	0.954853

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

algorithms $z = (R_0 - R_i)/SE$ DSC-R vs. MLPClassifier         8.435464           DSC-S vs. MLPClassifier         6.567207           REA vs. MLPClassifier         6.567207           BSC-R vs. OUSE         6.057682           DSC-R vs. OUSE         6.001068           DSC-R vs. LearnppNIE         5.26508           DSC-R vs. LearnpNIE         5.03633           DSC-R vs. LearnpNIE         5.03633           LearnppCDS vs. OUSE         4.189425           REA vs. OUSE         3.906356           LearnppCDS vs. LearnpNIE         3.453445           KMeanClustering vs. MLPClassifier         3.340217           KMeanClustering vs. MLPClassifier         3.170376           LearnppNIE vs. REA         2.94392           OUSE         3.170376           LearnppNIE vs. REA         2.04713           DSC-R vs. REA         2.094713           DSC-R vs. REA         2.094713           DSC-S vs. LearnppCDS         1.81643           KMeanClustering vs. OUSE         0.73598           LearnppNIE vs. OUSE         0.73598           LearnppNIE vs. OUSE         0.73598           LearnppNIE vs. OUSE         0.73598           LearnppCOS vs. REA         0.28369 <th>0.820847 <math>0.954853</math></th> <th>0.777124</th> <th>0.461743</th> <th>0.335831</th> <th>0.070041</th> <th>0.061726</th> <th>0.036197</th> <th>0.03145</th> <th>0.017417</th> <th>0.003241</th> <th>0.001847</th> <th>0.001522</th> <th>0.001251</th> <th>0.000837</th> <th>0.000553</th> <th>0.000094</th> <th>0.000028</th> <th>0</th> <th>d</th>	0.820847 $0.954853$	0.777124	0.461743	0.335831	0.070041	0.061726	0.036197	0.03145	0.017417	0.003241	0.001847	0.001522	0.001251	0.000837	0.000553	0.000094	0.000028	0	0	0	0	0	0	0	0	0	0	d
algorithms  DSC-R vs. MLPClassifier DSC-S vs. MLPClassifier LearnppCDS vs. MLPClassifier BC-R vs. OUSE DSC-R vs. OUSE DSC-R vs. LearnppNIE DSC-R vs. LearnppNIE DSC-R vs. KMeanClustering LearnppCDS vs. LearnppNIE DSC-S vs. KMeanClustering LearnppCDS vs. LearnppNIE MREA vs. OUSE REA vs. OUSE REA vs. OUSE LearnppCDS vs. LearnppCDS LearnppNIE vs. MLPClassifier KMeanClustering vs. LearnppCDS LearnppNIE vs. MLPClassifier KMeanClustering vs. REA DSC-R vs. REA DSC-R vs. REA DSC-R vs. LearnppCDS BSC-S vs. LearnppCDS MReanClustering vs. OUSE LearnppNIE vs. OUSE LearnppNIE vs. OUSE LearnppNIE vs. OUSE LearnppNIE vs. OUSE	0.226455 $0.056614$	0.283069	0.73598	0.962435	1.811643	1.868257	2.094713	2.151326	2.377782	2.94392	3.113762	3.170376	3.22699	3.340217	3.453445	3.906356	4.189425	5.038633	5.095247	5.265088	5.321702	6.001068	6.057682	6.284138	6.567207	8.37885	8.435464	
	KMeanClustering vs. LearnppNIE DSC-R vs. DSC-S	LearnppCDS vs. REA	LearnppNIE vs. OUSE	KMeanClustering vs. OUSE	DSC-S vs. LearnppCDS	DSC-R vs. LearnppCDS	DSC-S vs. REA	DSC-R vs. REA	OUSE vs. MLPClassifier	KMeanClustering vs. REA	LearnppNIE vs. MLPClassifier	LearnppNIE vs. REA	KMeanClustering vs. LearnppCDS	KMeanClustering vs. MLPClassifier	LearnppCDS vs. LearnppNIE	REA vs. OUSE	LearnppCDS vs. OUSE	DSC-S vs. KMeanClustering	DSC-R vs. KMeanClustering	DSC-S vs. LearnppNIE	DSC-R vs. LearnppNIE	DSC-S vs. OUSE	DSC-R vs. OUSE	REA vs. MLPClassifier	LearnppCDS vs. MLPClassifier	DSC-S vs. MLPClassifier	DSC-R vs. MLPClassifier	algorithms
28 28 29 27 27 28 28 29 20 20 20 20 20 20 20 20 20 20 20 20 20	7	33	4	ro	9	7	<sub>∞</sub>	6	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	22	56	27	28	$\dot{i}$

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

Nemenyi's procedure rejects those hypotheses that have an unadjusted p-value  $\leq 0.003571$ .

	hypothesis	unadjusted $p$	$p_{Neme}$
1	DSC-R vs .MLPClassifier	0	0
2	DSC-S vs .MLPClassifier	0	0
3	LearnppCDS vs .MLPClassifier	0	0
4	REA vs .MLPClassifier	0	0
ro	DSC-R vs .OUSE	0	0
9	DSC-S vs .OUSE	0	0
7	DSC-R vs .LearnppNIE	0	0.000003
œ	DSC-S vs .LearnppNIE	0	0.000004
6	DSC-R vs .KMeanClustering	0	0.00001
10	DSC-S vs .KMeanClustering	0	0.000013
11	LearnppCDS vs .OUSE	0.000028	0.000783
12	REA vs.OUSE	0.000094	0.002624
13	LearnppCDS vs .LearnppNIE	0.000553	0.015497
14	KMeanClustering vs .MLPClassifier	0.000837	0.02344
15	KMeanClustering vs .LearnppCDS	0.001251	0.035028
16	LearnppNIE vs .REA	0.001522	0.042628
17	LearnppNIE vs .MLPClassifier	0.001847	0.051721
18	KMeanClustering vs .REA	0.003241	0.090743
19	OUSE vs .MLPClassifier	0.017417	0.48768
20	DSC-R vs .REA	0.03145	0.880613
21	DSC-S vs .REA	0.036197	1.013504
22	DSC-R vs .LearnppCDS	0.061726	1.728335
23	DSC-S vs .LearnppCDS	0.070041	1.961157
24	KMeanClustering vs.OUSE	0.335831	9.403265
22	LearnppNIE vs .OUSE	0.461743	12.928799
56	LearnppCDS vs .REA	0.777124	21.759465
27	KMeanClustering vs .LearnppNIE	0.820847	22.983723
58	DSC-R vs .DSC-S	0.954853	26.735878

Table 4: Adjusted p-values