Output tables for the test of Multiple comparisons.

February 25, 2023

1 Average rankings of Friedman test

Average ranks obtained by applying the Friedman procedure

Algorithm	Ranking
BiLSTM	1.8235
CNN	4.5882
GRU	5.6471
Seq2Seq	3.4118
V-LSTM	1.7059
S-LSTM	7.2353
CNN-BiLSTM	7
CNN-LSTM	6.5882
GRU-BiLSTM	7

Table 1: Average Rankings of the algorithms

Friedman statistic considering reduction performance (distributed according to chi-square with 8 degrees of freedom: 89.694118.

P-value computed by Friedman Test: 4.942357634263317E-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
36	V-LSTM vs. S-LSTM	5.886508	0
35	BiLSTM vs. S-LSTM	5.761263	0
34	V-LSTM vs. CNN-BiLSTM	5.636019	0
33	V-LSTM vs. GRU-BiLSTM	5.636019	0
32	BiLSTM vs. CNN-BiLSTM	5.510774	0
31	BiLSTM vs. GRU-BiLSTM	5.510774	0
30	V-LSTM vs. CNN-LSTM	5.197662	0
29	BiLSTM vs. CNN-LSTM	5.072417	0
28	GRU vs. V-LSTM	4.195703	0.000027
27	BiLSTM vs. GRU	4.070458	0.000047
26	Seq2Seq vs. S-LSTM	4.070458	0.000047
25	Seq2Seq vs. CNN-BiLSTM	3.819968	0.000133
24	Seq2Seq vs. GRU-BiLSTM	3.819968	0.000133
23	Seq2Seq vs. CNN-LSTM	3.381611	0.000721
22	CNN vs. V-LSTM	3.068499	0.002151
21	BiLSTM vs. CNN	2.943254	0.003248
20	CNN vs. S-LSTM	2.818009	0.004832
19	CNN vs. CNN-BiLSTM	2.56752	0.010243
18	CNN vs. GRU-BiLSTM	2.56752	0.010243
17	GRU vs. Seq2Seq	2.379652	0.017329
16	CNN vs. CNN-LSTM	2.129163	0.033241
15	Seq2Seq vs. V-LSTM	1.81605	0.069363
14	BiLSTM vs. Seq2Seq	1.690806	0.090874
13	GRU vs. S-LSTM	1.690806	0.090874
12	GRU vs. CNN-BiLSTM	1.440316	0.149778
11	GRU vs. GRU-BiLSTM	1.440316	0.149778
10	CNN vs. Seq2Seq	1.252449	0.210406
9	CNN vs. GRU	1.127204	0.259656
8	GRU vs. CNN-LSTM	1.001959	0.316363
7	S-LSTM vs. CNN-LSTM	0.688847	0.49092
6	CNN-BiLSTM vs. CNN-LSTM	0.438357	0.661128
5	CNN-LSTM vs. GRU-BiLSTM	0.438357	0.661128
4	S-LSTM vs. CNN-BiLSTM	0.25049	0.802209
3	S-LSTM vs. GRU-BiLSTM	0.25049	0.802209
2	BiLSTM vs. V-LSTM	0.125245	0.90033
1	CNN-BiLSTM vs. GRU-BiLSTM	0	1

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

2.2 P-values for $\alpha = 0.10$

i	algorithms	$z = (R_0 - R_i)/SE$	p
36	V-LSTM vs. S-LSTM	5.886508	0
35	BiLSTM vs. S-LSTM	5.761263	0
34	V-LSTM vs. CNN-BiLSTM	5.636019	0
33	V-LSTM vs. GRU-BiLSTM	5.636019	0
32	BiLSTM vs. CNN-BiLSTM	5.510774	0
31	BiLSTM vs. GRU-BiLSTM	5.510774	0
30	V-LSTM vs. CNN-LSTM	5.197662	0
29	BiLSTM vs. CNN-LSTM	5.072417	0
28	GRU vs. V-LSTM	4.195703	0.000027
27	BiLSTM vs. GRU	4.070458	0.000047
26	Seq2Seq vs. S-LSTM	4.070458	0.000047
25	Seq2Seq vs. CNN-BiLSTM	3.819968	0.000133
24	Seq2Seq vs. GRU-BiLSTM	3.819968	0.000133
23	Seq2Seq vs. CNN-LSTM	3.381611	0.000721
22	CNN vs. V-LSTM	3.068499	0.002151
21	BiLSTM vs. CNN	2.943254	0.003248
20	CNN vs. S-LSTM	2.818009	0.004832
19	CNN vs. CNN-BiLSTM	2.56752	0.010243
18	CNN vs. GRU-BiLSTM	2.56752	0.010243
17	GRU vs. Seq2Seq	2.379652	0.017329
16	CNN vs. CNN-LSTM	2.129163	0.033241
15	Seq2Seq vs. V-LSTM	1.81605	0.069363
14	BiLSTM vs. Seq2Seq	1.690806	0.090874
13	GRU vs. S-LSTM	1.690806	0.090874
12	GRU vs. CNN-BiLSTM	1.440316	0.149778
11	GRU vs. GRU-BiLSTM	1.440316	0.149778
10	CNN vs. Seq2Seq	1.252449	0.210406
9	CNN vs. GRU	1.127204	0.259656
8	GRU vs. CNN-LSTM	1.001959	0.316363
7	S-LSTM vs. CNN-LSTM	0.688847	0.49092
6	CNN-BiLSTM vs. CNN-LSTM	0.438357	0.661128
5	CNN-LSTM vs. GRU-BiLSTM	0.438357	0.661128
4	S-LSTM vs. CNN-BiLSTM	0.25049	0.802209
3	S-LSTM vs. GRU-BiLSTM	0.25049	0.802209
2	BiLSTM vs. V-LSTM	0.125245	0.90033
1	CNN-BiLSTM vs. GRU-BiLSTM	0	1

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

2.3 Adjusted p-values

i	hypothesis	unadjusted p
1	V-LSTM vs .S-LSTM	0
2	BiLSTM vs .S-LSTM	0
3	V-LSTM vs .CNN-BiLSTM	0
4	V-LSTM vs .GRU-BiLSTM	0
5	BiLSTM vs .CNN-BiLSTM	0
6	BiLSTM vs .GRU-BiLSTM	0
7	V-LSTM vs .CNN-LSTM	0
8	BiLSTM vs .CNN-LSTM	0
9	GRU vs .V-LSTM	0.000027
10	BiLSTM vs .GRU	0.000047
11	Seq2Seq vs .S-LSTM	0.000047
12	Seq2Seq vs .CNN-BiLSTM	0.000133
13	Seq2Seq vs .GRU-BiLSTM	0.000133
14	Seq2Seq vs .CNN-LSTM	0.000721
15	CNN vs .V-LSTM	0.002151
16	BiLSTM vs .CNN	0.003248
17	CNN vs .S-LSTM	0.004832
18	CNN vs .CNN-BiLSTM	0.010243
19	CNN vs .GRU-BiLSTM	0.010243
20	GRU vs .Seq2Seq	0.017329
21	CNN vs .CNN-LSTM	0.033241
22	Seq2Seq vs .V-LSTM	0.069363
23	BiLSTM vs .Seq2Seq	0.090874
24	GRU vs .S-LSTM	0.090874
25	GRU vs .CNN-BiLSTM	0.149778
26	GRU vs .GRU-BiLSTM	0.149778
27	CNN vs .Seq2Seq	0.210406
28	CNN vs .GRU	0.259656
29	GRU vs .CNN-LSTM	0.316363
30	S-LSTM vs .CNN-LSTM	0.49092
31	CNN-BiLSTM vs .CNN-LSTM	0.661128
32	CNN-LSTM vs .GRU-BiLSTM	0.661128
33	S-LSTM vs .CNN-BiLSTM	0.802209
34	S-LSTM vs .GRU-BiLSTM	0.802209
35	BiLSTM vs .V-LSTM	0.90033
36	CNN-BiLSTM vs .GRU-BiLSTM	1

Table 4: Adjusted p-values