

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	1.9412
CNN	4.4706
GRU	5.7059
Seq2Seq	3
V-LSTM	2.1176
S-LSTM	6.7647
CNN-BiLSTM	6.3529
CNN-LSTM	7.0588
GRU-BiLSTM	7.5882

Table 1: Average Rankings of the algorithms

Friedman statistic considering reduction performance (distributed according to chi-square with 8 degrees of freedom: 86.870588.

P-value computed by Friedman Test: 4.555311683418495E-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	BiLSTM vs. GRU-BiLSTM	6.011753	0
35	V-LSTM vs. GRU-BiLSTM	5.823886	0
34	BiLSTM vs. CNN-LSTM	5.448151	0
33	V-LSTM vs. CNN-LSTM	5.260284	0
32	BiLSTM vs. S-LSTM	5.135039	0
31	V-LSTM vs. S-LSTM	4.947172	0.000001
30	Seq2Seq vs. GRU-BiLSTM	4.884549	0.000001
29	BiLSTM vs. CNN-BiLSTM	4.696682	0.000003
28	V-LSTM vs. CNN-BiLSTM	4.508815	0.000007
27	Seq2Seq vs. CNN-LSTM	4.320948	0.000016
26	Seq2Seq vs. S-LSTM	4.007835	0.000061
25	BiLSTM vs. GRU	4.007835	0.000061
24	GRU vs. V-LSTM	3.819968	0.000133
23	Seq2Seq vs. CNN-BiLSTM	3.569478	0.000358
22	CNN vs. GRU-BiLSTM	3.318989	0.000903
21	GRU vs. Seq2Seq	2.880632	0.003969
20	CNN vs. CNN-LSTM	2.755387	0.005862
19	BiLSTM vs. CNN	2.692764	0.007086
18	CNN vs. V-LSTM	2.504897	0.012249
17	CNN vs. S-LSTM	2.442275	0.014595
16	CNN vs. CNN-BiLSTM	2.003918	0.045079
15	GRU vs. GRU-BiLSTM	2.003918	0.045079
14	CNN vs. Seq2Seq	1.565561	0.117451
13	GRU vs. CNN-LSTM	1.440316	0.149778
12	CNN vs. GRU	1.315071	0.188486
11	CNN-BiLSTM vs. GRU-BiLSTM	1.315071	0.188486
10	GRU vs. S-LSTM	1.127204	0.259656
9	BiLSTM vs. Seq2Seq	1.127204	0.259656
8	Seq2Seq vs. V-LSTM	0.939336	0.347558
7	S-LSTM vs. GRU-BiLSTM	0.876714	0.380642
6	CNN-BiLSTM vs. CNN-LSTM	0.751469	0.45237
5	GRU vs. CNN-BiLSTM	0.688847	0.49092
4	CNN-LSTM vs. GRU-BiLSTM	0.563602	0.573025
3	S-LSTM vs. CNN-BiLSTM	0.438357	0.661128
2	S-LSTM vs. CNN-LSTM	0.313112	0.754195
1	BiLSTM vs. V-LSTM	0.187867	0.850981

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	BiLSTM vs. GRU-BiLSTM	6.011753	0
35	V-LSTM vs. GRU-BiLSTM	5.823886	0
34	BiLSTM vs. CNN-LSTM	5.448151	0
33	V-LSTM vs. CNN-LSTM	5.260284	0
32	BiLSTM vs. S-LSTM	5.135039	0
31	V-LSTM vs. S-LSTM	4.947172	0.000001
30	Seq2Seq vs. GRU-BiLSTM	4.884549	0.000001
29	BiLSTM vs. CNN-BiLSTM	4.696682	0.000003
28	V-LSTM vs. CNN-BiLSTM	4.508815	0.000007
27	Seq2Seq vs. CNN-LSTM	4.320948	0.000016
26	Seq2Seq vs. S-LSTM	4.007835	0.000061
25	BiLSTM vs. GRU	4.007835	0.000061
24	GRU vs. V-LSTM	3.819968	0.000133
23	Seq2Seq vs. CNN-BiLSTM	3.569478	0.000358
22	CNN vs. GRU-BiLSTM	3.318989	0.000903
21	GRU vs. Seq2Seq	2.880632	0.003969
20	CNN vs. CNN-LSTM	2.755387	0.005862
19	BiLSTM vs. CNN	2.692764	0.007086
18	CNN vs. V-LSTM	2.504897	0.012249
17	CNN vs. S-LSTM	2.442275	0.014595
16	CNN vs. CNN-BiLSTM	2.003918	0.045079
15	GRU vs. GRU-BiLSTM	2.003918	0.045079
14	CNN vs. Seq2Seq	1.565561	0.117451
13	GRU vs. CNN-LSTM	1.440316	0.149778
12	CNN vs. GRU	1.315071	0.188486
11	CNN-BiLSTM vs. GRU-BiLSTM	1.315071	0.188486
10	GRU vs. S-LSTM	1.127204	0.259656
9	BiLSTM vs. Seq2Seq	1.127204	0.259656
8	Seq2Seq vs. V-LSTM	0.939336	0.347558
7	S-LSTM vs. GRU-BiLSTM	0.876714	0.380642
6	CNN-BiLSTM vs. CNN-LSTM	0.751469	0.45237
5	GRU vs. CNN-BiLSTM	0.688847	0.49092
4	CNN-LSTM vs. GRU-BiLSTM	0.563602	0.573025
3	S-LSTM vs. CNN-BiLSTM	0.438357	0.661128
2	S-LSTM vs. CNN-LSTM	0.313112	0.754195
1	BiLSTM vs. V-LSTM	0.187867	0.850981

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

2.3 Adjusted p-values

i	hypothesis	unadjusted p
1	BiLSTM vs .GRU-BiLSTM	0
2	V-LSTM vs .GRU-BiLSTM	0
3	BiLSTM vs .CNN-LSTM	0
4	V-LSTM vs .CNN-LSTM	0
5	BiLSTM vs .S-LSTM	0
6	V-LSTM vs .S-LSTM	0.000001
7	Seq2Seq vs .GRU-BiLSTM	0.000001
8	BiLSTM vs .CNN-BiLSTM	0.000003
9	V-LSTM vs .CNN-BiLSTM	0.000007
10	Seq2Seq vs .CNN-LSTM	0.000016
11	Seq2Seq vs .S-LSTM	0.000061
12	BiLSTM vs .GRU	0.000061
13	GRU vs .V-LSTM	0.000133
14	Seq2Seq vs .CNN-BiLSTM	0.000358
15	CNN vs .GRU-BiLSTM	0.000903
16	GRU vs .Seq2Seq	0.003969
17	CNN vs .CNN-LSTM	0.005862
18	BiLSTM vs .CNN	0.007086
19	CNN vs .V-LSTM	0.012249
20	CNN vs .S-LSTM	0.014595
21	CNN vs .CNN-BiLSTM	0.045079
22	GRU vs .GRU-BiLSTM	0.045079
23	CNN vs .Seq2Seq	0.117451
24	GRU vs .CNN-LSTM	0.149778
25	CNN vs .GRU	0.188486
26	CNN-BiLSTM vs .GRU-BiLSTM	0.188486
27	GRU vs .S-LSTM	0.259656
28	BiLSTM vs .Seq2Seq	0.259656
29	Seq2Seq vs .V-LSTM	0.347558
30	S-LSTM vs .GRU-BiLSTM	0.380642
31	CNN-BiLSTM vs .CNN-LSTM	0.45237
32	GRU vs .CNN-BiLSTM	0.49092
33	CNN-LSTM vs .GRU-BiLSTM	0.573025
34	S-LSTM vs .CNN-BiLSTM	0.661128
35	S-LSTM vs .CNN-LSTM	0.754195
36	BiLSTM vs .V-LSTM	0.850981

Table 4: Adjusted p -values