Output tables for 1xN statistical comparisons.

June 6, 2025

1 Average rankings of Friedman test

Average ranks obtained by each method in the Friedman test.

Friedman statistic (distributed according to chi-square with 17 degrees of freedom): 369.690526.
P-value computed by Friedman Test: 0.

Iman and Davenport statistic (distributed according to F-distribution with 17 and 408 degrees of freedom): 160.41687.
P-value computed by Iman and Daveport Test: -0.

Algorithm	Ranking
BestCyclicAssignment	6.92
BestNearest	6.4
CLARA	17.52
CoefficientPropagation	11.88
CyclicAssignment	4.74
Farthest-First	15.72
KMEANS	14.88
NearestByCustomer	5.52
NearestByDepot	10.54
PAM	17.44
Parallel	5.7
RandomByElement	1.7
RandomSequentialCyclic	4.4
SequentialCyclic	4.32
Simplified	7.52
Sweep	8.76
ThreeCriteriaClustering	13.64
UPGMC	13.4

Table 1: Average Rankings of the algorithms (Friedman)

2 Post hoc comparison (Friedman)

P-values obtained in by applying post hoc methods over the results of Friedman procedure.

i	algorithm	$z = (R_0 - R_i)/SE$	p	Holm Hochberg Hommel	Holland	Rom	Finner	Li
17	CLARA	10.477051	0	0.002941	0.003013	0.003094	0.003013	0.048278
16	PAM	10.42407	0	0.003125	0.003201	0.003288	0.006016	0.048278
15	Farthest-First	9.284972	0	0.003333	0.003414	0.003507	0.009011	0.048278
14	KMEANS	8.728668	0	0.003571	0.003657	0.003757	0.011996	0.048278
13	ThreeCriteriaClustering	7.907458	0	0.003846	0.003938	0.004046	0.014973	0.048278
12	UPGMC	7.748514	0	0.004167	0.004265	0.004383	0.017941	0.048278
11	CoefficientPropagation	6.74187	0	0.004545	0.004652	0.004782	0.020899	0.048278
10	NearestByDepot	5.854433	0	0.005	0.005116	0.00526	0.023849	0.048278
9	Sweep	4.675599	0.000003	0.005556	0.005683	0.005844	0.02679	0.048278
8	Simplified	3.854389	0.000116	0.00625	0.006391	0.006574	0.029722	0.048278
7	BestCyclicAssignment	3.457029	0.000546	0.007143	0.007301	0.007513	0.032645	0.048278
6	BestNearest	3.112651	0.001854	0.008333	0.008512	0.008764	0.035559	0.048278
5	Parallel	2.649065	0.008071	0.01	0.010206	0.010515	0.038465	0.048278
4	NearestByCustomer	2.529857	0.011411	0.0125	0.012741	0.013109	0.041362	0.048278
3	CyclicAssignment	2.013289	0.044084	0.016667	0.016952	0.016667	0.04425	0.048278
2	RandomSequentialCyclic	1.788119	0.073757	0.025	0.025321	0.025	0.047129	0.048278
1	SequentialCyclic	1.735137	0.082716	0.05	0.05	0.05	0.05	0.05

Table 2: Post Hoc comparison Table for $\alpha = 0.05$ (FRIEDMAN)

Bonferroni-Dunn's procedure rejects those hypotheses that have an unadjusted p-value ≤ 0.002941.
Holm's procedure rejects those hypotheses that have an unadjusted p-value ≤ 0.016667.
Hochberg's procedure rejects those hypotheses that have an unadjusted p-value ≤ 0.0125.
Hommel's procedure rejects those hypotheses that have an unadjusted p-value ≤ 0.016667.
Holland's procedure rejects those hypotheses that have an unadjusted p-value ≤ 0.016952.
Rom's procedure rejects those hypotheses that have an unadjusted p-value ≤ 0.013109.
Finner's procedure rejects those hypotheses that have an unadjusted p-value ≤ 0.047129.
Li's procedure rejects those hypotheses that have an unadjusted p-value ≤ 0.048278.

3 Adjusted P-Values (Friedman)

Adjusted P-values obtained through the application of the post hoc methods (Friedman).

i	algorithm	unadjusted p	p_{Bonf}	p_{Holm}	$p_{Hochberg}$	p_{Hommel}
1	CLARA	0	0	0	0	0
2	PAM	0	0	0	0	0
3	Farthest-First	0	0	0	0	0
4	KMEANS	0	0	0	0	0
5	ThreeCriteriaClustering	0	0	0	0	0
6	UPGMC	0	0	0	0	0
7	CoefficientPropagation	0	0	0	0	0
8	NearestByDepot	0	0	0	0	0
9	Sweep	0.000003	0.00005	0.000026	0.000026	0.000026
10	Simplified	0.000116	0.001972	0.000928	0.000928	0.000928
11	BestCyclicAssignment	0.000546	0.009285	0.003823	0.003823	0.003823
12	BestNearest	0.001854	0.031521	0.011125	0.011125	0.011125
13	Parallel	0.008071	0.137215	0.040357	0.040357	0.032286
14	NearestByCustomer	0.011411	0.193985	0.045644	0.045644	0.045644
15	CyclicAssignment	0.044084	0.749432	0.132253	0.082716	0.082716
16	RandomSequentialCyclic	0.073757	1.253867	0.147514	0.082716	0.082716
17	SequentialCyclic	0.082716	1.40618	0.147514	0.082716	0.082716

Table 3: Adjusted p-values (FRIEDMAN) (I)

i	algorithm	unadjusted p	$p_{Holland}$	p_{Rom}	p_{Finner}	p_{L}
1	CLARA	0	0	0	0	0
2	PAM	0	0	0	0	0
3	Farthest-First	0	0	0	0	0
4	KMEANS	0	0	0	0	0
5	ThreeCriteriaClustering	0	0	0	0	0
6	UPGMC	0	0	0	0	0
7	CoefficientPropagation	0	0	0	0	0
8	NearestByDepot	0	0	0	0	0
9	Sweep	0.000003	0.000026	0.000025	0.000006	0.000
10	Simplified	0.000116	0.000928	0.000882	0.000197	0.000
11	BestCyclicAssignment	0.000546	0.003817	0.003635	0.000844	0.000
12	BestNearest	0.001854	0.011073	0.010578	0.002626	0.002
13	Parallel	0.008071	0.039711	0.03838	0.010542	0.008
14	NearestByCustomer	0.011411	0.044868	0.043522	0.013839	0.012
15	CyclicAssignment	0.044084	0.126508	0.082716	0.049813	0.045
16	RandomSequentialCyclic	0.073757	0.142074	0.082716	0.078182	0.074
17	SequentialCyclic	0.082716	0.142074	0.082716	0.082716	0.082

Table 4: Adjusted p-values (FRIEDMAN) (II)