Results

April 6, 2021

1 Tables of Friedman, Bonferroni-Dunn, Holm, Hochberg and Hommel Tests

Table 1: Average Rankings of the algorithms

Algorithm	Ranking
kmeans	2.954545454545453
kmeans des	1.9090909090909085
kmeans desthr	1.1363636363636358

Friedman statistic considering reduction performance (distributed according to chi-square with 2 degrees of freedom: 36.63636363636333.
P-value computed by Friedman Test: 1.1112804454427305E-8.

Iman and Davenport statistic considering reduction performance (distributed according to F-distribution with 2 and 42 degrees of freedom: 104.48148148147622.
P-value computed by Iman and Daveport Test: 4.9708745378137235E-17.

Bonferroni-Dunn's procedure rejects those hypotheses that have a p-value ≤ 0.025.

Table 2: Holm / Hochberg Table for $\alpha = 0.05$

i	algorithm	$z = (R_0 - R_i)/SE$	p	Holm/Hochberg/Hommel
2	kmeans	6.030226891555269	1.637296451224841E-9	0.025
1	kmeans des	2.5628464289109907	0.010381795789701729	0.05

Hochberg's procedure rejects those hypotheses that have a p-value ≤ 0.05.
Hommel's procedure rejects all hypotheses.

Table 3: Holm / Hochberg Table for $\alpha = 0.10$

i	algorithm	$z = (R_0 - R_i)/SE$	p	Holm/Hochberg/Hommel
2	kmeans	6.030226891555269	1.637296451224841E-9	0.05
1	kmeans des	2.5628464289109907	0.010381795789701729	0.1

Bonferroni-Dunn's procedure rejects those hypotheses that have a p-value ≤ 0.05.
Hochberg's procedure rejects those hypotheses that have a p-value ≤ 0.1.
Hommel's procedure rejects all hypotheses.

Table 4: Adjusted p-values

i	algorithm	unadjusted p	p_{Bonf}	p_{Holm}	p_{Hoch}	p_{Homm}
1	kmeans	1.637296451224841E-9	3.274592902449682E-9	3.274592902449682E-9	3.274592902449682E-9	3.274592902449682E-9
2	kmeans des	0.010381795789701729	0.020763591579403457	0.010381795789701729	0.010381795789701729	0.010381795789701729

Table 5: Holm / Shaffer Table for $\alpha = 0.05$

i	algorithms	$z = (R_0 - R_i)/SE$	p	Holm	Shaffer
3	kmeans vs. kmeans desthr	6.030226891555269	1.637296451224841E-9	0.016666666666666666	0.016666666666666666
2	kmeans vs. kmeans des	3.46738046264427 8	5.255574382728222E-4	0.025	0.05
1	kmeans des vs. kmeans desthr	2.5628464289109907	0.010381795789701729	0.05	0.05

Nemenyi's procedure rejects those hypotheses that have a p-value $\leq 0.016666666666666666$.
Shaffer's procedure rejects those hypotheses that have a p-value $\leq 0.016666666666666666$.
Bergmann's procedure rejects these hypotheses:

- kmeans vs. kmeans des
- kmeans vs. kmeans desthr
- kmeans des vs. kmeans desthr

Table 6: Holm / Shaffer Table for $\alpha = 0.10$

i	algorithms	$z = (R_0 - R_i)/SE$	p	Holm	Shaffer
3	kmeans vs. kmeans desthr	6.030226891555269	1.637296451224841E-9	0.03333333333333333	0.03333333333333333
2	kmeans vs. kmeans des	3.467380462644278	5.255574382728222E-4	0.05	0.1
1	kmeans des vs. kmeans desthr	2.562846428910990 7	0.010381795789701729	0.1	0.1

Nemenyi's procedure rejects those hypotheses that have a p-value ≤ 0.03333333333333333.
Shaffer's procedure rejects those hypotheses that have a p-value ≤ 0.03333333333333333.
Bergmann's procedure rejects these hypotheses:

- kmeans vs. kmeans des
- kmeans vs. kmeans desthr
- kmeans des vs. kmeans desthr

Table 7: Adjusted p-values

i	hypothesis	unadjusted p	p_{Neme}	p_{Holm}	p_{Shaf}	p_{Berg}
1	kmeans vs .kmeans desthr	1.637296451224841E-9	4.911889353674523E-9	4.911889353674523E-9	4.911889353674523E-9	4.911889353674523E-9
2	kmeans vs .kmeans des	5.255574382728222E-4	0.0015766723148184665	0.0010511148765456444	5.255574382728222E-4	5.255574382728222E-4
3	kmeans des vs .kmeans desthr	0.010381795789701729	0.03114538736910518 7	0.010381795789701729	0.010381795789701729	0.010381795789701729