

data/C45Rules.csv

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

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Table 1: Average Rankings of the algorithms (Friedman)

Algorithm	Ranking
continuous $M_tst$	2.5952380952380945
CADD $_G M_tst$	4.904761904761903
CAIM $_G M_tst$	4.047619047619048
Chi2Merge $_G M_tst$	3.88095238095238
ChiMerge $_G M_tst$	4.130952380952381
Fayyad $_G M_tst$	4.499999999999997
ID3 $_G M_tst$	6.773809523809527
USD $_G M_tst$	5.166666666666668

Friedman statistic (distributed according to chi-square with 7 degrees of freedom: 70.91468253968273. P-value computed by Friedman

Test: 6.250355788495199E-11.

Iman and Davenport statistic (distributed according to F-distribution with 7 and 287 degrees of freedom: 13.033139147062792. P-value computed by Iman and Davenport Test: 1.5380975635798768E-14.

Table 2: Average Rankings of the algorithms (Aligned Friedman)

Algorithm	Ranking
$\text{continuous}_G M_{tst}$	92.61904761904765
$CADD_G M_{tst}$	203.26190476190473
$CAIM_G M_{tst}$	139.73809523809524
$\text{Chi2Merge}_G M_{tst}$	140.2142857142857
$\text{ChiMerge}_G M_{tst}$	148.17857142857142
$\text{Fayyad}_G M_{tst}$	162.57142857142856
$ID3_G M_{tst}$	266.8690476190476
$USD_G M_{tst}$	194.54761904761907

Aligned Friedman statistic (distributed according to chi-square with 7 degrees of freedom): 37.66482109159776. P-value computed by Aligned Friedman Test: 3.508779572669596E-6.

Table 3: Average Rankings of the algorithms (Quade)

Algorithm	Ranking
$\text{continuos}_G M_{tst}$	2.401993355481727
$CADD_G M_{tst}$	5.438538205980069
$CAIM_G M_{tst}$	3.973975636766335
$\text{Chi2Merge}_G M_{tst}$	3.8892580287929124
$\text{ChiMerge}_G M_{tst}$	3.7995570321151724
$\text{Fayyad}_G M_{tst}$	4.129014396456257
$ID3_G M_{tst}$	6.8062015503875966
$USD_G M_{tst}$	5.561461794019936

Quade statistic (distributed according to F-distribution with 7 and 287 degrees of freedom: 15.250036079451672. P-value computed by Quade Test: 6.00766764063048E-17.

Table 4: Contrast Estimation

continuous $_G$ $M_t.st$	continuous $_G$ $M_t.st$	CADD $_G$ $M_t.st$	Chi2Merge $_G$ $M_t.st$	ChiMerge $_G$ $M_t.st$	Fayyad $_G$ $M_t.st$	ID3 $_G$ $M_t.st$	USD $_G$ $M_t.st$
0.00000000	0.00000000	0.09697000	0.04155062	0.05976688	0.06809500	0.19808937	0.09716875
-0.09697000	-0.05426937	0.00000000	-0.05541938	-0.03720313	-0.02887500	0.10111937	0.00019875
-0.05426937	0.00000000	0.04270063	0.01271875	0.00549750	0.01382563	0.14382000	0.04289938
-0.04155062	0.0541938	0.0541938	0.00000000	0.01821625	0.02654438	0.15653875	0.05561812
-0.05976688	-0.00549750	0.03720313	-0.01821625	0.00000000	0.00832912	0.13832250	0.03740187
-0.06809500	-0.01382563	0.02887500	-0.02654438	-0.00832812	0.00000000	0.12999438	0.02907375
-0.19808937	-0.14382000	-0.10111937	-0.15653875	-0.13832250	-0.12999438	0.00000000	-0.10092062
-0.09716875	-0.04289938	-0.00019875	-0.05561812	-0.03740187	-0.02907375	0.10092062	0.00000000

Table 5: Holm / Hochberg / Holland / Rom / Finner / Li Table for  $\alpha = 0.05$  (FRIEDMAN)

$i$	algorithm	$z = (R_0 - R_i)/SE$	$p$	Holm/Hochberg/Hommel	Holland	Rom	Finner	Li
7	ID <sub>3G</sub> $M_{t,st}$	7.81739132593842	5.3929251460279315E-15	0.0071428571428571435	0.007300831979014655	0.0075128293213784685	0.007300831979014655	0.0517812141441
6	USD <sub>G</sub> $M_{t,st}$	4.8107023544236425	1.504008486044958E-6	0.008333333333333333	0.008512444610847103	0.008764162596519848	0.01454836181044361	0.0517812141441
5	CADD <sub>G</sub> $M_{t,st}$	4.320723410917526	1.5551851003187292E-5		0.010206218313011495	0.010515350115740741	0.021742978644310407	0.0517812141441
4	Fayyad <sub>G</sub> $M_{t,st}$	3.563483225498988	3.659660914779577E-4	0.0125	0.012741455098566168	0.013109375000000001	0.028885068789519686	0.0517812141441
3	ChiMerge <sub>G</sub> $M_{t,st}$	2.8730583505585643	0.004065190254562451	0.016666666666666666	0.016952427508441503	0.016666666666666666	0.035975015734599824	0.0517812141441
2	CAlM <sub>G</sub> $M_{t,st}$	2.717159594429837	0.00658455721449403	0.025	0.025320565519103666	0.025	0.0430132001682938	0.0517812141441
1	Chi2Merge <sub>G</sub> $M_{t,st}$	2.405351177211819	0.016156931261181298	0.05	0.050000000000000044	0.05	0.050000000000000044	0.05

Bonferroni-Dunn's procedure rejects those hypotheses that have a p-value  $\leq 0.0071428571428571435$ .

Hochberg's procedure rejects those hypotheses that have a p-value  $\leq 0.05$ .

Hommel's procedure rejects all hypotheses.

Rom's procedure rejects those hypotheses that have a p-value  $\leq 0.05$ .

Li's procedure rejects those hypotheses that have a p-value  $\leq 0.05$ .

Table 6: Holm / Hochberg / Holland / Rom / Finner / Li Table for  $\alpha = 0.05$  (ALIGNED FRIEDMAN)

$i$	algorithm	$z = (R_0 - R_i)/SE$	$p$	Holm/Hochberg/Hommel	Holland	Rom	Finner	Li
7	ID <sub>3G</sub> $M_tst$	8.220315154022622	2.0296909614353182E-16	0.0071428571428571435	0.007300831979014655	0.0075128293213784685	0.007300831979014655	0.0512513044152
6	CADD <sub>G</sub> $M_tst$	5.2196221248538786	1.7928855880315367E-7	0.0083333333333333333	0.008512444610847103	0.008764162596519848	0.01454836181044361	0.0512513044152
5	USD <sub>G</sub> $M_tst$	4.808522125349573	1.520502022776305E-6	0.01	0.010206218313011495	0.010515350115740741	0.021742978644310407	0.0512513044152
4	Fayyad <sub>G</sub> $M_tst$	3.300032236458079	9.667372316318315E-4	0.0125	0.012741455098566168	0.013109375000000001	0.028885068789519686	0.0512513044152
3	ChiMerge <sub>G</sub> $M_tst$	2.6210433028505538	0.008766112649820551	0.016666666666666666	0.016952427508441503	0.016666666666666666	0.035975015734599824	0.0512513044152
2	ChiMerge <sub>G</sub> $M_tst$	2.2453248606806326	0.024747285191833158	0.025	0.025320565519103666	0.025	0.0430132001682938	0.0512513044152
1	CAIM <sub>G</sub> $M_tst$	2.2228603798334037	0.02622521611037989	0.05	0.0500000000000000044	0.05	0.0500000000000000044	0.05

Bonferroni-Dunn's procedure rejects those hypotheses that have a p-value  $\leq 0.0071428571428571435$ .

Hochberg's procedure rejects those hypotheses that have a p-value  $\leq 0.05$ .

Hommel's procedure rejects all hypotheses.

Rom's procedure rejects those hypotheses that have a p-value  $\leq 0.05$ .

Li's procedure rejects those hypotheses that have a p-value  $\leq 0.05$ .

Table 7: Holm / Hochberg / Holland / Rom / Finner / Li Table for  $\alpha = 0.05$  (QUADE)

$i$	algorithm	$z = (R_0 - R_i)/SE$	$p$	Holm/Hochberg/Hommel	Holland	Rom	Finner	Li
7	ID <sub>3G</sub> $M_t.st$	3.836526789647274	1.2478658936319436E-4	0.0071428571428571435	0.007300831979014655	0.0075128293213784685	0.007300831979014655	0.040871432226160
6	USD <sub>G</sub> $M_t.st$	2.7522280439687403	0.005919128676876862	0.008333333333333333	0.008512444610847103	0.008764162596519848	0.01454836181044361	0.040871432226160
5	CADD <sub>G</sub> $M_t.st$	2.6451487194399883	0.008165502030815184	0.01	0.010206218313011495	0.010515350115740741	0.021742978644310407	0.040871432226160
4	Fayvad <sub>G</sub> $M_t.st$	1.5044162756990003	0.13247421613214092	0.0125	0.012741455098566168	0.013109375000000001	0.028885068789519686	0.040871432226160
3	CAIM <sub>G</sub> $M_t.st$	1.369361271788863	0.17088637390198816	0.016666666666666666	0.016952427508441503	0.016666666666666666	0.035975015734599824	0.040871432226160
2	Chi2Merge <sub>G</sub> $M_t.st$	1.2955633589379656	0.19512595960534537	0.025	0.025320565519103666	0.025	0.0430132001682938	0.040871432226160
1	ChiMerge <sub>G</sub> $M_t.st$	1.217424392389958	0.22344278702944553	0.05	0.0500000000000000044	0.05	0.0500000000000000044	0.05

Bonferroni-Dunn's procedure rejects those hypotheses that have a p-value  $\leq 0.0071428571428571435$ .

Holm's procedure rejects those hypotheses that have a p-value  $\leq 0.0125$ .

Hochberg's procedure rejects those hypotheses that have a p-value  $\leq 0.01$ .

Hommel's procedure rejects those hypotheses that have a p-value  $\leq 0.0125$ .

Holland's procedure rejects those hypotheses that have a p-value  $\leq 0.012741455098566168$ .

Rom's procedure rejects those hypotheses that have a p-value  $\leq 0.010515350115740741$ .

Finner's procedure rejects those hypotheses that have a p-value  $\leq 0.028885068789519686$ .

Li's procedure rejects those hypotheses that have a p-value  $\leq 0.040871432226160814$ .



Table 8: Adjusted  $p$ -values (FRIEDMAN)

$i$	algorithm	unadjusted $p$	$p_{Bonf}$	$p_{Holm}$	$p_{Hoch}$	$p_{Hommel}$
1	ID3 $_G M_t st$	5.3929251460279315E-15	3.775047602219552E-14	3.775047602219552E-14	3.775047602219552E-14	3.775047602219552E-14
2	USD $_G M_t st$	1.504008486044958E-6	1.0528059402314707E-5	9.024050916269748E-6	9.024050916269748E-6	9.024050916269748E-6
3	CADD $_G M_t st$	1.5551851003187292E-5	1.0886295702231105E-4	7.7759255901593645E-5	7.7759255901593645E-5	7.7759255901593645E-5
4	Fayyad $_G M_t st$	3.6596609147795776E-4	0.0025617626403457044	0.001463864365911831	0.001463864365911831	0.001463864365911831
5	ChiMerge $_G M_t st$	0.004065190254562451	0.028456331781937155	0.012195570763687352	0.012195570763687352	0.0098768385821741044
6	CALM $_G M_t st$	0.00658455721449403	0.046091900501458206	0.01316911442898806	0.01316911442898806	0.01316911442898806
7	Chi2Merge $_G M_t st$	0.016156931261181298	0.11309851882826909	0.016156931261181298	0.016156931261181298	0.016156931261181298

Table 9: Adjusted  $p$ -values (FRIEDMAN)

$i$	algorithm	unadjusted $p$	$p_{Hol}$	$p_{Rom}$	$p_{Finn}$	$p_{Li}$
1	ID3 $_G M_t st$	5.3929251460279315E-15	3.808064974464287E-14	3.589143926564292E-14	3.808064974464287E-14	5.481489190080949E-15
2	USD $_G M_t st$	1.504008486044958E-6	9.024016985992311E-6	8.580446046506389E-6	5.2640198048292675E-6	1.5287053745137188E-6
3	CADD $_G M_t st$	1.5551851003187292E-5	7.775683645294684E-5	7.394832712182956E-5	3.628727611471039E-5	1.580699775122566E-5
4	Fayyad $_G M_t st$	3.6596609147795776E-4	0.0014630609748704781	0.001395818227329517	6.403527650687968E-4	3.718377687327976E-4
5	ChiMerge $_G M_t st$	0.004065190254562451	0.012146060628676403	0.012195570763687352	0.00568663537204861	0.004114947129508396
6	CALM $_G M_t st$	0.00658455721449403	0.013125758035277157	0.01316911442898806	0.00767760478816964	0.0066481962355969424
7	Chi2Merge $_G M_t st$	0.016156931261181298	0.01615693126118134	0.016156931261181298	0.01615693126118134	0.016156931261181298

Table 10: Adjusted  $p$ -values (ALIGNED FRIEDMAN)

$i$	algorithm	unadjusted $p$	$p_{Bonf}$	$p_{Holm}$	$p_{Hoch}$	$p_{Hommel}$
1	ID <sub>3G</sub> $M_t$ $st$	2.0296909614353182E-16	1.4207836730047228E-15	1.4207836730047228E-15	1.4207836730047228E-15	1.4207836730047228E-15
2	CADD <sub>G</sub> $M_t$ $st$	1.7928855880315367E-7	1.2550199116220758E-6	1.075731352818922E-6	1.075731352818922E-6	1.075731352818922E-6
3	USD <sub>G</sub> $M_t$ $st$	1.520502022776305E-6	1.0643514159434136E-5	7.602510113881525E-6	7.602510113881525E-6	7.602510113881525E-6
4	Fayyad <sub>G</sub> $M_t$ $st$	9.667372316318315E-4	0.006767160621422821	0.003866948926527326	0.003866948926527326	0.003866948926527326
5	ChiMerge <sub>G</sub> $M_t$ $st$	0.008766112649820551	0.06136278854874386	0.02622521611037989	0.02622521611037989	0.02622521611037989
6	Chi2Merge <sub>G</sub> $M_t$ $st$	0.024747285191833158	0.1732309963428321	0.049494570383666316	0.02622521611037989	0.02622521611037989
7	CAIM <sub>G</sub> $M_t$ $st$	0.02622521611037989	0.1835765127726592	0.049494570383666316	0.02622521611037989	0.02622521611037989

Table 11: Adjusted  $p$ -values (ALIGNED FRIEDMAN)

$i$	algorithm	unadjusted $p$	$p_{Hol}$	$p_{Rom}$	$p_{Finn}$	$p_{Li}$
1	ID <sub>3G</sub> $M_t$ $st$	2.0296909614353182E-16	1.5543122344752192E-15	1.3508166328626955E-15	1.5543122344752192E-15	2.084353584643026E-16
2	CADD <sub>G</sub> $M_t$ $st$	1.7928855880315367E-7	1.0757308704922863E-6	1.0228504824542345E-6	6.275098151098391E-7	1.841170348208551E-7
3	USD <sub>G</sub> $M_t$ $st$	1.520502022776305E-6	7.602486994384705E-6	7.229916293991107E-6	3.547834456663068E-6	1.5614489856848834E-6
4	Fayyad <sub>G</sub> $M_t$ $st$	9.667372316318315E-4	0.003861345054380405	0.003687198022910442	0.0016911767872317407	9.91788295341915E-4
5	ChiMerge <sub>G</sub> $M_t$ $st$	0.008766112649820551	0.026068477386061994	0.02622521611037989	0.012251003332893525	0.008921880687811823
6	Chi2Merge <sub>G</sub> $M_t$ $st$	0.024747285191833158	0.04888214225930032	0.02622521611037989	0.028811877088162907	0.024783914104771206
7	CAIM <sub>G</sub> $M_t$ $st$	0.02622521611037989	0.04888214225930032	0.02622521611037989	0.028811877088162907	0.02622521611037989

Table 12: Adjusted  $p$ -values (QUADE)

i	algorithm	unadjusted $p$	$p_{Bonf}$	$p_{Holm}$	$p_{Hoch}$	$p_{Hommel}$
1	ID3 $_G M_t st$	1.2478658936319436E-4	8.735061255423606E-4	8.735061255423606E-4	8.735061255423606E-4	8.735061255423606E-4
2	USD $_G M_t st$	0.005919128676876862	0.04143390073813803	0.03551477206126117	0.03551477206126117	0.02959564338438431
3	CADD $_G M_t st$	0.008165502030815184	0.03715851421570629	0.040827510154075916	0.040827510154075916	0.040827510154075916
4	Fayyad $_G M_t st$	0.13247421613214092	0.9273195129249864	0.5298968645285637	0.22344278702944553	0.22344278702944553
5	CAIM $_G M_t st$	0.17088637390198816	1.1962046173139171	0.5298968645285637	0.22344278702944553	0.22344278702944553
6	Chi2Merge $_G M_t st$	0.19512595960534537	1.3658817172374176	0.5298968645285637	0.22344278702944553	0.22344278702944553
7	ChiMerge $_G M_t st$	0.22344278702944553	1.5640995092061187	0.5298968645285637	0.22344278702944553	0.22344278702944553

Table 13: Adjusted  $p$ -values (QUADE)

i	algorithm	unadjusted $p$	$p_{Rom}$	$p_{Finn}$	$p_{Li}$
1	ID3 $_G M_t st$	1.2478658936319436E-4	8.731791879932338E-4	8.731791879932338E-4	1.6066625650382104E-4
2	USD $_G M_t st$	0.005919128676876862	0.034993360089329184	0.020564120814946407	0.007564610406513615
3	CADD $_G M_t st$	0.008165502030815184	0.04016617811121692	0.020564120814946407	0.01040588973935759
4	Fayyad $_G M_t st$	0.13247421613214092	0.43359175636020064	0.22018033109438695	0.14573117264262928
5	CAIM $_G M_t st$	0.17088637390198816	0.43359175636020064	0.23076387105557805	0.18036575081591333
6	Chi2Merge $_G M_t st$	0.19512595960534537	0.43359175636020064	0.23076387105557805	0.20081232763151896
7	ChiMerge $_G M_t st$	0.22344278702944553	0.43359175636020064	0.23076387105557805	0.22344278702944553