

September 14, 2011

# 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
$CADD_G M_{tst}$	6.0238095238095255
$CAIM_G M_{tst}$	2.035714285714286
$Chi2Merge_G M_{tst}$	3.380952380952382
$ChiMerge_G M_{tst}$	1.9404761904761907
$Fayyad_G M_{tst}$	3.214285714285715
$ID3_G M_{tst}$	6.047619047619051
$USD_G M_{tst}$	5.357142857142858

Friedman statistic (distributed according to chi-square with 6 degrees of freedom: 173.07908163265387. P-value computed by Friedman Test: 1.2967860119061925E-10.

Iman and Davenport statistic (distributed according to F-distribution with 6 and 246 degrees of freedom: 89.91586126644604. P-value computed by Iman and Davenport Test: 3.5363009095124195E-59.

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

Algorithm	Ranking
$CADD_G M_{tst}$	228.250000000000003
$CAIM_G M_{tst}$	67.98809523809521
$Chi2Merge_G M_{tst}$	111.40476190476191
$ChiMerge_G M_{tst}$	68.96428571428571
$Fayyad_G M_{tst}$	118.04761904761907
$ID3_G M_{tst}$	233.57142857142864
$USD_G M_{tst}$	204.27380952380955

Aligned Friedman statistic (distributed according to chi-square with 6 degrees of freedom: 36.50538785407265. P-value computed by Aligned Friedman Test: 2.1982884141902304E-6.

Table 3: Average Rankings of the algorithms (Quade)

Algorithm	Ranking
$CADD_G M_{tst}$	5.956810631229235
$CAIM_G M_{tst}$	1.794573643410853
$Chi2Merge_G M_{tst}$	3.250830564784053
$ChiMerge_G M_{tst}$	1.971760797342193
$Fayyad_G M_{tst}$	3.4039313399778517
$ID3_G M_{tst}$	6.128737541528239
$USD_G M_{tst}$	5.493355481727576

Quade statistic (distributed according to F-distribution with 6 and 246 degrees of freedom: 51.167862057414446. P-value computed by Quade Test: 1.2968321590066707E-40.

Table 4: Contrast Estimation

CADD $_G M_t st$	0.00000000	CADM $_G M_t st$	0.00000000	ChiMerge $_G M_t st$	-0.22000000	Fayyad $_G M_t st$	-0.00571429	ID3 $_G M_t st$	-0.05642857	USD $_G M_t st$	-0.11357143
CADM $_G M_t st$	0.26785714	CADM $_G M_t st$	0.26785714	ChiMerge $_G M_t st$	-0.22000000	Fayyad $_G M_t st$	-0.00571429	ID3 $_G M_t st$	-0.05642857	USD $_G M_t st$	-0.11357143
ChiMerge $_G M_t st$	0.22000000	ChiMerge $_G M_t st$	0.22000000	ChiMerge $_G M_t st$	-0.22000000	Fayyad $_G M_t st$	-0.00571429	ID3 $_G M_t st$	-0.05642857	USD $_G M_t st$	-0.11357143
ChiMerge $_G M_t st$	0.27142857	ChiMerge $_G M_t st$	0.27142857	ChiMerge $_G M_t st$	-0.22000000	Fayyad $_G M_t st$	-0.00571429	ID3 $_G M_t st$	-0.05642857	USD $_G M_t st$	-0.11357143
Fayyad $_G M_t st$	0.22571429	Fayyad $_G M_t st$	0.22571429	ChiMerge $_G M_t st$	-0.22000000	Fayyad $_G M_t st$	-0.00571429	ID3 $_G M_t st$	-0.05642857	USD $_G M_t st$	-0.11357143
ID3 $_G M_t st$	0.05642857	ID3 $_G M_t st$	0.05642857	ChiMerge $_G M_t st$	-0.22000000	Fayyad $_G M_t st$	-0.00571429	ID3 $_G M_t st$	-0.05642857	USD $_G M_t st$	-0.11357143
USD $_G M_t st$	0.11357143	USD $_G M_t st$	0.11357143	ChiMerge $_G M_t st$	-0.22000000	Fayyad $_G M_t st$	-0.00571429	ID3 $_G M_t st$	-0.05642857	USD $_G M_t st$	-0.11357143

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
6	ID <sub>3</sub> $M_t.st$	8.712565696762825	2.9707303422190156E-18	0.008333333333333333	0.008512444610847103	0.008764162596519848	0.008512444610847103	0.0084266908804
5	CADD <sub>G</sub> $M_t.st$	8.66205806953521	4.6332221238020426E-18	0.01	0.010206218313011495	0.010515350115740741	0.016952427508441503	0.0084266908804
4	USD $M_t.st$	7.247844507162113	4.234563349341349E-13	0.0125	0.012741455098566168	0.013109375000000001	0.025320565519103666	0.0084266908804
3	Chi2Merge $M_t.st$	3.055711447270439	0.0022452722378399144	0.016666666666666666	0.016952427508441503	0.016666666666666666	0.03361747021845407	0.0084266908804
2	Fayyad $G$ $M_t.st$	2.7021580566771646	0.006889100488448338	0.025	0.025320565519103666	0.025	0.04184374797610979	0.0084266908804
1	CAIM $G$ $M_t.st$	0.20203050891044239	0.8398928732712686	0.05	0.050000000000000044	0.05	0.050000000000000044	0.05

Bonferroni-Dunn's procedure rejects those hypotheses that have a p-value  $\leq 0.008333333333333333$ .

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

Hochberg's procedure rejects those hypotheses that have a p-value  $\leq 0.025$ .

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

Holland's procedure rejects those hypotheses that have a p-value  $\leq 0.050000000000000044$ .

Rom's procedure rejects those hypotheses that have a p-value  $\leq 0.025$ .

Finner's procedure rejects those hypotheses that have a p-value  $\leq 0.050000000000000044$ .

Li's procedure rejects those hypotheses that have a p-value  $\leq 0.008426690880459548$ .

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
6	ID <sub>3G</sub> $M_tst$	8.925493093225922	4.437180699117796E-19	0.008333333333333333	0.008512444610847103	0.008764162596519848	0.008512444610847103	0.002208697525
5	CADD <sub>G</sub> $M_tst$	8.6386503717742	5.6880955561006896E-18	0.01	0.010206218313011495	0.010515350115740741	0.016952427508441503	0.002208697525
4	USD <sub>G</sub> $M_tst$	7.346253859461524	2.0383906505717455E-13	0.0125	0.012741455098566168	0.013109375000000001	0.025320565519103666	0.002208697525
3	Fayyad <sub>G</sub> $M_tst$	2.6983750418444905	0.006967889160111387	0.016666666666666666	0.016952427508441503	0.016666666666666666	0.03361747021845407	0.002208697525
2	Chi2Merge <sub>G</sub> $M_tst$	2.3403029197638183	0.01926810473107422	0.025	0.025320565519103666	0.025	0.04184374797610979	0.002208697525
1	ChiMerge <sub>G</sub> $M_tst$	0.052619917581748506	0.9580347470190181	0.05	0.0500000000000000044	0.05	0.0500000000000000044	0.05

Bonferroni-Dunn's procedure rejects those hypotheses that have a p-value  $\leq 0.008333333333333333$ .

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

Hochberg's procedure rejects those hypotheses that have a p-value  $\leq 0.025$ .

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

Holland's procedure rejects those hypotheses that have a p-value  $\leq 0.0500000000000000044$ .

Rom's procedure rejects those hypotheses that have a p-value  $\leq 0.025$ .

Finner's procedure rejects those hypotheses that have a p-value  $\leq 0.0500000000000000044$ .

Li's procedure rejects those hypotheses that have a p-value  $\leq 0.002208697525314835$ .

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
6	ID <sub>3G</sub> $M_t.st$	4.624037572757538	3.7634165094350153E-6	0.008333333333333333	0.008512444610847103	0.008764162596519848	0.008512444610847103	0.00789140386596
5	CADD <sub>G</sub> $M_t.st$	4.440612000564473	8.97034029580862E-6	0.01	0.010206218313011495	0.010515350115740741	0.016952427508441503	0.00789140386596
4	USD <sub>G</sub> $M_t.st$	3.9461604581309953	7.941440457659192E-5	0.0125	0.012741455098566168	0.013109375000000001	0.025320565519103666	0.00789140386596
3	Fayyad <sub>G</sub> $M_t.st$	1.7169933190954692	0.08598039268762389	0.016666666666666666	0.016952427508441503	0.016666666666666666	0.03361747021845407	0.00789140386596
2	Chi2Merge <sub>G</sub> $M_t.st$	1.5536529947431903	0.12026721100930463	0.025	0.025320565519103666	0.025	0.04184374797610979	0.00789140386596
1	ChiMerge <sub>G</sub> $M_t.st$	0.18903762673681399	0.8500633265466574	0.05	0.0500000000000000044	0.05	0.0500000000000000044	0.05

Bonferroni-Dunn's procedure rejects those hypotheses that have a p-value  $\leq 0.008333333333333333$ .

Holm's procedure rejects those hypotheses that have a p-value  $\leq 0.016666666666666666$ .

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

Hommel's procedure rejects those hypotheses that have a p-value  $\leq 0.016666666666666666$ .

Holland's procedure rejects those hypotheses that have a p-value  $\leq 0.016952427508441503$ .

Rom's procedure rejects those hypotheses that have a p-value  $\leq 0.013109375000000001$ .

Finner's procedure rejects those hypotheses that have a p-value  $\leq 0.03361747021845407$ .

Li's procedure rejects those hypotheses that have a p-value  $\leq 0.0078914038659654$ .



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

$i$	algorithm	unadjusted $p$	$p_{Bonf}$	$p_{Holm}$	$p_{Hoch}$	$p_{Hommel}$
1	ID <sub>3G</sub> $M_t$ $st$	2.9707303422190156E-18	1.7824382053314093E-17	1.7824382053314093E-17	1.7824382053314093E-17	1.4853651711095078E-17
2	CADD <sub>G</sub> $M_t$ $st$	4.6332221238020426E-18	2.7799332742812256E-17	2.3166110619010213E-17	2.3166110619010213E-17	2.3166110619010213E-17
3	USD <sub>G</sub> $M_t$ $st$	4.234563349341349E-13	2.5407380096048097E-12	1.6938253397365397E-12	1.6938253397365397E-12	1.6938253397365397E-12
4	Chi2Merge <sub>G</sub> $M_t$ $st$	0.0022452722378399144	0.013471633427039487	0.006735816713519744	0.006735816713519744	0.006735816713519744
5	Fayyad <sub>G</sub> $M_t$ $st$	0.006889100488448338	0.04133460293069002	0.013778200976896676	0.013778200976896676	0.013778200976896676
6	CAlM <sub>G</sub> $M_t$ $st$	0.8398928732712686	5.039357239627612	0.8398928732712686	0.8398928732712686	0.8398928732712686

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

$i$	algorithm	unadjusted $p$	$p_{Hol}$	$p_{Rom}$	$p_{Finn}$	$p_{Li}$
1	ID <sub>3G</sub> $M_t$ $st$	2.9707303422190156E-18	0.0	1.6948169944945255E-17	0.0	1.8554641526059655E-17
2	CADD <sub>G</sub> $M_t$ $st$	4.6332221238020426E-18	0.0	2.2030755385245967E-17	0.0	2.893826288977183E-17
3	USD <sub>G</sub> $M_t$ $st$	4.234563349341349E-13	1.6937562463681388E-12	1.6150897160777492E-12	8.468781231840694E-13	2.6448312675704605E-12
4	Chi2Merge <sub>G</sub> $M_t$ $st$	0.0022452722378399144	0.00672070429022642	0.006735816713519744	0.003366017180944425	0.013829621564768014
5	Fayyad <sub>G</sub> $M_t$ $st$	0.006889100488448338	0.013730741271356761	0.013778200976896676	0.008261214926362892	0.041253030701639826
6	CAlM <sub>G</sub> $M_t$ $st$	0.8398928732712686	0.8398928732712686	0.8398928732712686	0.8398928732712686	0.8398928732712686

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

$i$	algorithm	unadjusted $p$	$p_{Bonf}$	$p_{Holm}$	$p_{Hoch}$	$p_{Hommel}$
1	ID <sub>3G</sub> $M_t$ $st$	4.437180699117796E-19	2.6623084194706773E-18	2.6623084194706773E-18	2.6623084194706773E-18	2.6623084194706773E-18
2	CADD <sub>G</sub> $M_t$ $st$	5.6880955561006896E-18	3.412857333660414E-17	2.844047778050345E-17	2.844047778050345E-17	2.844047778050345E-17
3	USD <sub>G</sub> $M_t$ $st$	2.0383906505717455E-13	1.2230343903430472E-12	8.153562602286982E-13	8.153562602286982E-13	8.153562602286982E-13
4	Fayyad <sub>G</sub> $M_t$ $st$	0.006967889160111387	0.041807334906668324	0.020903667480334162	0.020903667480334162	0.020903667480334162
5	Chi2Merge <sub>G</sub> $M_t$ $st$	0.01926810473107422	0.11560862838644531	0.03853620946214844	0.03853620946214844	0.03853620946214844
6	ChiMerge <sub>G</sub> $M_t$ $st$	0.9580347470190181	5.748208482114109	0.9580347470190181	0.9580347470190181	0.9580347470190181

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

$i$	algorithm	unadjusted $p$	$p_{Hol}$	$p_{Rom}$	$p_{Finn}$	$p_{Li}$
1	ID <sub>3G</sub> $M_t$ $st$	4.437180699117796E-19	0.0	2.53143449260044E-18	0.0	1.0573463482106664E-17
2	CADD <sub>G</sub> $M_t$ $st$	5.6880955561006896E-18	0.0	2.7046629420289152E-17	0.0	1.3554298263562154E-16
3	USD <sub>G</sub> $M_t$ $st$	2.0383906505717455E-13	8.15347789284715E-13	7.774553136864822E-13	4.076738946423575E-13	4.857329589995843E-12
4	Fayyad <sub>G</sub> $M_t$ $st$	0.006967889160111387	0.02075835134361803	0.020903667480334162	0.010433605736137608	0.14239611141300193
5	Chi2Merge <sub>G</sub> $M_t$ $st$	0.01926810473107422	0.03816494960222072	0.03853620946214844	0.023076943576444964	0.3146668001072321
6	ChiMerge <sub>G</sub> $M_t$ $st$	0.9580347470190181	0.9580347470190181	0.9580347470190181	0.9580347470190181	0.9580347470190181

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

$i$	algorithm	unadjusted $p$	$p_{Bonf}$	$p_{Holm}$	$p_{Hoch}$	$p_{Hommel}$
1	ID $3_G M_t st$	3.7634165094350153E-6	2.258049905661009E-5	2.258049905661009E-5	2.258049905661009E-5	2.258049905661009E-5
2	CADD $G M_t st$	8.97034029580862E-6	5.3822041774851726E-5	4.48517014790431E-5	4.48517014790431E-5	4.48517014790431E-5
3	USD $G M_t st$	7.941440457659192E-5	4.764864274595515E-4	3.176576183063677E-4	3.176576183063677E-4	3.176576183063677E-4
4	Fayyad $G M_t st$	0.08598039268762389	0.5158823561257433	0.25794117806287165	0.24053442201860925	0.18040081651395695
5	Chi2Merge $G M_t st$	0.12026721100930463	0.7216032660558278	0.25794117806287165	0.24053442201860925	0.24053442201860925
6	ChiMerge $G M_t st$	0.8500633265466574	5.100379959279945	0.8500633265466574	0.8500633265466574	0.8500633265466574

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

$i$	algorithm	unadjusted $p$	$p_{Holl}$	$p_{Rom}$	$p_{Finn}$	$p_{Li}$
1	ID $3_G M_t st$	3.7634165094350153E-6	2.258028660806488E-5	2.147048544563417E-5	2.258028660806488E-5	2.509941005908666E-5
2	CADD $G M_t st$	8.97034029580862E-6	4.4850896816162056E-5	4.265355027209532E-5	2.6910779487021586E-5	5.982394732423157E-5
3	USD $G M_t st$	7.941440457659192E-5	3.1761978042377237E-4	3.0289165035172127E-4	1.5882250250554009E-4	5.293725873707999E-4
4	Fayyad $G M_t st$	0.08598039268762389	0.23639891533485047	0.24053442201860925	0.12615728837212958	0.36445177152316904
5	Chi2Merge $G M_t st$	0.12026721100930463	0.23639891533485047	0.24053442201860925	0.14252605032709065	0.44509800904039293
6	ChiMerge $G M_t st$	0.8500633265466574	0.8500633265466574	0.8500633265466574	0.8500633265466574	0.8500633265466574