Analysis of various machine learning algorithms through both their learning phase and testing phase.

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1 Training Phase

1.1 Algorithm Accuracy

Table 1: Accuracy During Training of the Algorithms

Data sets	AdaBoost.NC-C	C45-C	Ripper-C	SIA-C	GFS-GCCL-C	Chi-RW-C	iRProp+-c
bupa	0.8888712948	0.8588887296	0.8595852374	1.0	0.5999858288	0.5987037249	0.735583307
cleveland	0.6520983632	0.8305207032	0.8200435419	1.0	0.5667956505	0.9139676423	0.6681685244
glass	0.6661449733	0.9371804036	0.9077588163	1.0	0.6854301106	0.659897225	0.6000364304
haberman	0.7941396574	0.7585177866	0.5689459816	0.974944664	0.7385638999	0.7425546772	0.7723227931
iris	0.6666666667	0.98	0.9466666667	1.0	0.9577777778	0.9377777778	0.9762962963
monk2	1.0	1.0	1.0	0.6127404703	0.9722272853	0.9724856798	0.9794045317
new-thyroid	0.8599487207	0.9844986913	0.9927648096	1.0	0.8749452487	0.8594359276	0.9312643555
pima	0.9186947065	0.8381056819	0.8504096379	1.0	0.6976281338	0.7521719218	0.7748853005
vehicle	0.4841081461.0	0.9055718232	0.8794465081.0	1.0	0.6201682411.0	0.6591842823	0.7407407024
wine	0.7297166149	0.988761646	0.998136646	1.0	0.9769060559	0.988140528	1
wisconsin	0.9907306085	0.9812959722	0.9837358005	0.9985347264	0.9762505403	0.9803187761.0	0.9816187955

1.2 Ranking

Average ranks obtained by applying the Friedman procedure to the accuracy reported by each of the algorithms during their training phase.

Table 2: Average Rankings of the algorithms

Algorithm	Ranking
AdaBoost.NC-C	4.3636
C45-C	3.1818
Ripper-C	3.4545
SIA-C	1.5909
GFS-GCCL-C	5.8182
Chi-RW-C	5.4545
iRProp+-c	4.1364

P-value computed by Friedman Test: 5.8390905970928664E-5.

1.3 Adjusted p-values

Table 3: Adjusted p-values

i	hypothesis	unadjusted p	p_{Holm}	p_{Shaf}
1	SIA-C vs .GFS-GCCL-C	0.000004	0.000093	0.000093
2	SIA-C vs .Chi-RW-C	0.000027	0.000547	0.00041
3	AdaBoost.NC-C vs .SIA-C	0.002611	0.049616	0.039171
4	C45-C vs .GFS-GCCL-C	0.004209	0.075754	0.063129
5	SIA-C vs .iRProp+-c	0.00572	0.097245	0.085805
6	Ripper-C vs .GFS-GCCL-C	0.010288	0.164601	0.154313
7	C45-C vs .Chi-RW-C	0.013613	0.204194	0.204194
8	Ripper-C vs .Chi-RW-C	0.029913	0.418782	0.329043
9	Ripper-C vs .SIA-C	0.043052	0.559681	0.473576
10	GFS-GCCL-C vs .iRProp+-c	0.067878	0.814536	0.746658
11	C45-C vs .SIA-C	0.084146	0.925601	0.925601
12	AdaBoost.NC-C vs .GFS-GCCL-C	0.114317	1.143168	1.143168
13	Chi-RW-C vs .iRProp+-c	0.152417	1.371756	1.371756
14	AdaBoost.NC-C vs .C45-C	0.19949	1.59592	1.39643
15	AdaBoost.NC-C vs .Chi-RW-C	0.236289	1.654024	1.654024
16	C45-C vs .iRProp+-c	0.300074	1.800446	1.800446
17	AdaBoost.NC-C vs .Ripper-C	0.323678	1.800446	1.800446
18	Ripper-C vs .iRProp+-c	0.459181	1.836725	1.836725
19	GFS-GCCL-C vs .Chi-RW-C	0.693012	2.079036	2.079036
20	C45-C vs .Ripper-C	0.76717	2.079036	2.079036
21	AdaBoost.NC-C vs .iRProp+-c	0.805116	2.079036	2.079036

2 Testing Phase

2.1 Algorithm Accuracy

Table 4: Accuracy During Testing of the Algorithms

Data sets	AdaBoost.NC-C	C45-C	Ripper-C	SIA-C	GFS-GCCL-C	Chi-RW-C	iRProp+-c
bupa	0.7021252372	0.6699918677	0.5932095419	0.6295066414	0.5846381133	0.5787232312	0.713185145
cleveland	0.5087549658	0.5248379151.0	0.4215750305	0.5257746703	0.5288789131.0	0.3802621961.0	0.580374755
glass	0.5493051634	0.6744271912	0.6629650543	0.7186046803	0.6320572181.0	0.6004121965	0.5820380827
haberman	0.7248387097	0.7316129032	0.467311828	0.6697849462	0.7320430108	0.7319354839	0.7577419355
iris	0.66	0.96	0.9466666667	0.96	0.9533333333	0.9266666667	0.9533333333
monk2	1.0	1.0	1.0	0.6251557806	0.9726744186	0.4289223323	0.9704016913
new-thyroid	0.8188311688	0.9398268398	0.9257575758	0.9491341991.0	0.8612554113	0.8424242424	0.9396103896
pima	0.741069895	0.7423173318	0.7083981808	0.716274515	0.6823189968	0.7305773174	0.7656794959
vehicle	0.4562184874	0.7469187675	0.6866806723	0.5969327731.0	0.5722689076	0.6077310924	0.7305182073
wine	0.7137254902	0.9490196078	0.9320261438	0.9437908497	0.910130719	0.9382352941.0	0.9774509804
wisconsin	0.9768492939	0.9562572397	0.959089887	0.9679799288	0.9708791719	0.9125118784	0.9708364627

2.2 Ranking

Average ranks obtained by applying the Friedman procedure to the accuracy reported by each of the algorithms during their testing phase.

Table 5: Average Rankings of the Algorithms

Algorithm	Ranking
AdaBoost.NC-C	4.8182
C45-C	2.6818
Ripper-C	4.6364
SIA-C	3.5909
GFS-GCCL-C	4.3182
Chi-RW-C	5.4545
iRProp+-c	2.5

P-value computed by Friedman Test: 0.007455103063423896.

2.3 Adjusted p-values

Table 6: Adjusted p-values

i	hypothesis	unadjusted p	p_{Holm}	p_{Shaf}
1	Chi-RW-C vs .iRProp+-c	0.001339	0.028116	0.028116
2	C45-C vs .Chi-RW-C	0.002611	0.052227	0.039171
3	AdaBoost.NC-C vs .iRProp+-c	0.011847	0.225096	0.177707
4	AdaBoost.NC-C vs .C45-C	0.02038	0.366838	0.305698
5	Ripper-C vs .iRProp+-c	0.02038	0.366838	0.305698
6	C45-C vs .Ripper-C	0.033847	0.541546	0.507699
7	SIA-C vs .Chi-RW-C	0.043052	0.645786	0.645786
8	GFS-GCCL-C vs .iRProp+-c	0.048398	0.677575	0.645786
9	C45-C vs .GFS-GCCL-C	0.075656	0.983522	0.832211
10	AdaBoost.NC-C vs .SIA-C	0.182744	2.192934	2.010189
11	GFS-GCCL-C vs .Chi-RW-C	0.21733	2.390628	2.390628
12	SIA-C vs .iRProp+-c	0.236289	2.390628	2.390628
13	Ripper-C vs .SIA-C	0.256389	2.390628	2.390628
14	C45-C vs .SIA-C	0.323678	2.589425	2.390628
15	Ripper-C vs .Chi-RW-C	0.374414	2.620901	2.620901
16	SIA-C vs .GFS-GCCL-C	0.429795	2.620901	2.620901
17	AdaBoost.NC-C vs .Chi-RW-C	0.48966	2.620901	2.620901
18	AdaBoost.NC-C vs .GFS-GCCL-C	0.587261	2.620901	2.620901
19	Ripper-C vs .GFS-GCCL-C	0.729775	2.620901	2.620901
20	AdaBoost.NC-C vs .Ripper-C	0.843526	2.620901	2.620901
21	C45-C vs .iRProp+-c	0.843526	2.620901	2.620901

3 Analysis

It's pretty clear to us that AdaBoost.NC-C, C45-C, and .GFS-GCCL-C are among the top performers for these algorithms, easily outperforming their competition. Also to note that while during the training phase Ripper-C was a little bit lower on the chain, it performed much better during the testing phase. The Chi-RW-C algorithm seems to have experienced the opposite, with its accuracy decreasing as it left the training phase.