Appendix

1 Experimental results using Random Forest with 500 trees

Table 1: Accuracy results of the methods when they are used on data sets without added noise.

Data set	BA-C4.5-U	BA-CDT-U	BA-CC4.5-U	BA-C4.5	BA-CDT	BA-CC4.5	RF
anneal	98.90	98.89	98.65	98.79	98.59	98.78	99.67
arrhythmia	75.35	74.49	75.16	75.04	74.36	75.09	68.94
audiology	81.83	80.41	82.03	80.75	74.35	82.08	80.05
autos	85.45	80.27	79.28	84.39	72.65	78.98	84.48
balance-scale	81.56	82.41	82.65	82.39	83.82	82.65	80.55
breast-cancer	70.43	70.35	72.84	73.09	72.35	73.73	69.88
wisconsin-breast-cancer	96.45	96.14	96.31	96.32	95.85	96.14	96.61
car	94.33	93.55	93.30	93.65	91.24	93.04	94.86
cmc	52.19	53.21	53.92	53.12	56.02	54.09	50.44
horse-colic	85.51	84.91	85.40	85.21	85.21	85.48	85.83
credit-rating	85.68	86.07	86.84	86.14	86.16	86.43	85.87
german-credit	73.01	74.64	73.96	74.73	75.26	74.84	76.12
dermatology	97.13	94.18	96.77	96.61	93.63	96.23	97.05
pima-diabetes	76.14	75.80	75.94	76.17	75.92	75.90	75.78
ecoli	84.88	83.82	84.34	84.70	83.75	84.49	84.88
Glass	74.49	75.51	72.66	74.96	73.31	72.80	79.90
haberman	70.17	73.76	74.25	72.95	73.47	73.89	65.32
cleveland-14-heart-disease	80.23	78.68	80.13	79.90	80.39	80.20	81.52
hungarian-14-heart-disease	78.92	81.18	82.88	79.87	82.09	82.88	81.17
heart-statlog	80.96	81.41	82.26	81.19	82.33	82.19	83.04
hepatitis	81.76	80.99	82.09	81.37	81.57	81.90	83.64
hypothyroid	99.62	99.59	99.59	99.61	99.55	99.58	99.56
ionosphere	92.57	91.23	91.74	92.54	90.77	91.74	93.37
iris	94.47	95.07	94.40	94.47	94.80	94.40	94.20
kr-vs-kp	99.46	99.40	99.46	99.44	98.92	99.45	99.30
letter	94.03	92.44	93.48	93.86	90.80	93.45	96.75
liver-disorders	73.42	72.21	71.02	73.25	71.31	70.76	72.52
lymphography	79.96	76.24	79.47	79.69	77.51	79.74	83.76
mfeat-pixel	83.86	87.20	84.40	83.60	87.04	84.37	96.83
nursery	98.68	96.66	96.53	97.41	95.90	96.51	99.26
optdigits	95.84	95.55	95.84	95.79	94.74	95.83	98.50
page-blocks	97.36	97.32	97.33	97.37	97.29	97.38	97.48
pendigits	98.32	98.45	98.12	98.25	98.15	98.10	99.23
primary-tumor	44.22	43.93	44.11	44.93	41.98	44.52	44.19
segment	97.75	97.45	97.22	97.64	96.74	97.21	98.16
sick	98.97	98.97	98.91	98.85	98.54	98.84	98.45
solar-flare2	99.49	99.53	99.53	99.53	99.53	99.53	99.45
sonar	80.07	80.78	78.86	80.40	77.57	78.77	84.87
soybean	92.28	90.47	92.37	93.10	88.81	92.37	93.76
spambase	94.73	94.65	94.30	94.58	93.98	94.24	95.75
spectrometer	56.61	54.48	54.58	56.53	52.91	54.57	57.99
splice	94.70	94.40	94.84	94.68	94.06	94.71	96.57
Sponge	93.91	92.63	93.88	92.63	92.50	92.63	95.00
tae	60.88	60.88	54.85	59.43	57.56	55.18	68.25
vehicle	75.22	74.78	74.47	75.17	73.06	74.49	74.63
vote	96.78	96.34	96.62	96.69	95.52	96.69	96.59
vowel	94.04	92.17	90.66	92.64	88.96	90.68	98.42
waveform	83.40	83.51	83.08	83.35	83.31	83.08	85.41
wine	95.34	95.84	94.89	95.23	95.10	94.89	97.63
zoo	92.80	92.40	92.90	92.50	92.61	92.90	96.15
Average	85.28	84.90	84.98	85.29	84.24	84.97	86.35

Table 2: Accuracy results of the methods when they are used on data sets with a percentage of added noise equal to 10%.

Data set	BA-C4.5-U	BA-CDT-U	BA-CC4.5-U	BA-C4.5	BA-CDT	BA-CC4.5	RF
anneal	98.05	98.50	98.45	98.64	98.36	98.59	96.48
arrhythmia	74.29	73.88	74.85	74.40	73.28	74.93	68.03
audiology	80.84	79.28	81.27	81.01	75.68	81.13	75.89
autos	80.44	75.79	77.56	79.99	67.43	77.18	77.16
balance-scale	81.09	81.97	82.67	82.22	83.84	82.71	77.98
breast-cancer	67.17	69.87	70.93	72.04	71.44	72.74	66.20
wisconsin-breast-cancer	95.49	95.75	96.24	95.81	96.11	96.27	94.94
car	90.92	92.34	92.29	91.98	90.94	92.08	93.32
cmc	50.12	51.82	52.78	51.56	54.75	53.22	48.80
horse-colic	84.55	83.71	84.93	85.07	84.64	84.96	83.85
credit-rating	83.30	84.77	86.12	85.87	85.80	85.97	84.16
german-credit	72.67	73.43	73.09	73.92	74.66	73.78	75.09
dermatology	95.46	93.82	96.64	96.48	93.85	96.53	96.44
pima-diabetes	75.59	74.48	75.92	75.53	75.84	75.80	74.25
ecoli	84.82	84.70	84.79	85.09	84.11	84.67	84.22
Glass	73.33	74.37	72.48	73.10	72.32	72.30	76.87
haberman	69.05	70.44	73.40	71.68	73.99	73.44	62.69
cleveland-14-heart-disease	80.30	79.73	80.73	80.43	81.07	80.77	80.63
hungarian-14-heart-disease	78.96	79.46	82.13	79.54	80.86	82.29	79.63
heart-statlog	79.70	79.26	80.74	80.07	81.11	81.11	80.07
hepatitis	80.63	81.53	81.72	82.06	82.64	81.79	82.78
hypothyroid	99.30	99.48	99.48	99.50	99.47	99.48	99.27
ionosphere	91.80	90.58	91.40	91.71	91.35	91.40	92.25
iris	93.80	94.20	93.87	94.00	94.33	93.87	90.33
kr-vs-kp	98.02	98.72	98.81	99.17	98.79	99.09	96.78
letter	93.56	92.56	93.32	93.43	91.10	93.19	94.38
liver-disorders	70.47	69.43	68.66	70.09	69.97	68.37	69.43
lymphography	79.58	77.02	78.69	78.63	78.10	78.75	83.29
mfeat-pixel	83.09	86.71	83.89	83.14	87.27	84.01	96.46
nursery	96.27	97.11	96.95	97.12	96.08	96.69	97.80
optdigits	95.70	95.81	95.62	95.62	95.07	95.54	98.41
page-blocks	97.11	97.20	97.20	97.22	97.20	97.20	96.57
pendigits	98.43	98.43	98.27	98.35	97.99	98.19	99.15
primary-tumor	41.62	43.06	42.77	42.33	43.12	43.04	42.48
segment	96.75	97.08	97.10	97.14	96.49	97.04	95.96
sick	98.08	98.47	98.40	98.43	98.45	98.43	98.26
solar-flare2	98.58	99.47	99.48	99.53	99.53	99.53	97.74
sonar	77.45	79.47	78.02	77.60	76.99	77.97	82.50
soybean	91.22	90.25	92.61	92.72	88.45	92.62	90.80
spambase	93.23	93.32	93.55	93.53	93.55	93.54	93.25
spectrometer	55.42	51.85	54.16	55.67	50.58	54.16	57.27
splice	93.11	93.54	94.08	94.18	93.54	94.22	95.14
Sponge	91.39	92.68	93.00	92.34	92.50	92.57	93.11
tae	56.17	57.15	52.12	55.70	53.78	52.38	61.82
vehicle	73.88	73.54	72.96	74.15	72.42	72.98	74.17
vote	95.22	95.35	95.49	95.91	95.56	95.89	94.46
vowel	92.73	90.74	90.30	91.95	88.58	90.22	92.26
waveform	83.16	83.16	82.99	83.17	83.05	82.98	85.39
wine	94.44	94.50	94.77	94.60	94.54	94.77	97.25
zoo	93.66	93.37	93.27	93.77	93.77	93.27	93.18
Average	84.00	84.06	84.42	84.54	83.89	84.47	84.37

Table 3: Accuracy results of the methods when they are used on data sets with a percentage of added noise equal to 20%.

Data set	BA-C4.5-U	BA-CDT-U	BA-CC4.5-U	BA-C4.5	BA-CDT	BA-CC4.5	RF
anneal	95.34	97.42	97.41	98.04	98.10	98.05	91.27
arrhythmia	73.87	72.84	74.87	74.25	72.02	74.91	66.33
audiology	76.25	75.57	78.81	78.37	72.84	79.12	71.60
autos	73.34	69.80	74.52	73.88	63.51	74.61	70.38
balance-scale	79.26	80.97	82.09	81.37	83.25	82.08	74.93
breast-cancer	63.40	66.20	67.74	70.95	69.94	71.10	62.72
wisconsin-breast-cancer	93.41	94.00	95.91	94.91	96.22	95.98	91.39
car	85.43	89.72	89.76	89.82	89.76	90.02	90.57
cmc	48.38	50.14	50.93	50.39	53.21	51.54	46.33
horse-colic	81.46	80.73	83.93	83.96	83.44	84.42	81.02
credit-rating	79.41	82.67	84.03	83.58	85.42	85.03	80.29
german-credit	69.91	71.38	70.82	71.90	73.85	71.64	72.49
dermatology	92.73	93.52	95.46	95.39	94.01	95.63	95.35
pima-diabetes	74.62	72.60	75.41	74.76	75.30	75.64	72.22
ecoli	82.56	82.91	83.81	83.06	83.81	83.78	80.92
Glass	70.61	72.67	70.75	70.71	71.33	70.57	73.44
haberman	66.55	66.33	70.98	68.45	71.80	72.79	59.43
cleveland-14-heart-disease	79.02	79.15	80.39	79.71	81.04	79.93	80.07
hungarian-14-heart-disease	78.14	78.36	81.99	79.34	80.79	81.96	78.17
heart-statlog	76.93	76.81	79.00	78.11	79.04	79.48	77.44
hepatitis	79.35	79.95	80.88	80.63	81.38	81.20	80.53
hypothyroid	98.34	99.37	99.36	99.29	99.36	99.40	98.80
ionosphere	87.84	86.70	89.44	88.01	90.41	89.41	88.61
iris	90.07	90.93	92.73	92.27	93.80	92.67	83.13
kr-vs-kp	92.68	95.63	95.75	97.50	97.99	97.43	90.67
letter	92.57	92.32	93.01	92.97	91.28	92.92	91.09
liver-disorders	67.08	66.45	66.69	67.22	68.59	66.69	65.81
lymphography	75.99	76.00	78.17	77.49	77.44	78.65	78.60
mfeat-pixel	82.19	86.60	83.17	82.59	87.63	83.52	96.01
nursery	90.42	96.50	96.55	96.52	96.06	96.41	94.29
optdigits	95.73	96.07	95.74	95.75	95.41	95.68	98.24
page-blocks	96.33	96.79	97.12	96.80	97.10	97.10	94.89
pendigits	98.08	98.19	98.17	98.16	97.93	98.13	98.91
primary-tumor	40.20	41.03	41.71	41.26	42.80	42.39	41.09
segment	94.29	95.83	96.33	95.81	96.28	96.38	93.65
sick	96.14	97.87	97.99	97.29	98.29	98.10	97.12
solar-flare2	96.45	99.23	99.15	99.52	99.53	99.51	94.96
sonar	74.77	76.27	76.06	74.86	76.22	76.06	79.58
soybean	88.07	87.70	92.21	91.93	85.51	92.42	85.65
spambase	90.39	89.95	92.26	91.13	92.78	92.31	89.63
spectrometer	54.15	49.97	54.03	54.11	48.89	54.05	56.24
splice	90.87	91.50	92.12	92.87	92.87	92.92	92.98
Sponge	87.89	90.57	91.38	91.79	92.50	91.77	89.32
tae	53.13	54.80	51.21	53.27	50.48	51.02	54.60
vehicle	72.59	72.41	72.68	73.01	72.55	72.60	73.02
vote	92.59	93.93	93.93	95.17	95.49	95.24	90.50
vowel	88.88	84.42	88.31	89.17	84.80	88.26	84.70
waveform	82.70	82.80	82.82	82.71	83.08	82.82	85.12
wine	91.35	90.68	92.77	91.51	93.76	92.66	93.83
zoo	93.50	93.27	93.10	93.99	91.39	92.91	88.73
Average	81.50	82.15	83.27	83.11	83.01	83.58	81.33

Table 4: Accuracy results of the methods when they are used on data sets with a percentage of added noise equal to 30%.

Data set	BA-C4.5-U	BA-CDT-U	BA-CC4.5-U	BA-C4.5	BA-CDT	BA-CC4.5	RF
anneal	89.44	93.97	94.70	95.99	97.54	96.36	83.85
arrhythmia	72.86	71.64	73.41	73.14	70.64	73.88	65.84
audiology	73.37	71.51	75.62	77.21	69.01	76.72	66.78
autos	64.32	62.54	68.31	64.91	57.87	68.80	61.88
balance-scale	74.95	77.10	80.27	78.32	81.82	80.59	69.06
breast-cancer	59.83	61.24	63.19	64.31	64.62	66.34	59.45
wisconsin-breast-cancer	87.78	88.35	93.46	90.96	94.15	93.95	83.26
car	78.65	84.87	85.65	87.05	88.13	87.45	85.89
cmc	45.41	47.51	48.73	47.75	51.32	49.65	43.96
horse-colic	76.04	75.16	79.67	80.43	78.12	81.75	75.05
credit-rating	71.61	75.30	77.57	74.54	81.55	79.43	72.30
german-credit	65.07	67.19	66.37	67.27	70.65	67.52	67.38
dermatology	88.71	91.04	92.35	93.30	93.63	93.41	93.25
pima-diabetes	70.80	67.50	73.68	71.09	71.53	73.72	66.99
ecoli	79.88	80.86	83.58	81.04	83.58	83.46	77.64
Glass	66.90	68.39	68.46	67.18	69.32	68.46	68.55
haberman	62.34	60.46	66.06	62.95	66.79	70.26	56.26
cleveland-14-heart-disease	75.60	76.57	78.49	77.41	80.14	78.52	76.12
hungarian-14-heart-disease	75.96	76.09	81.93	78.63	80.18	81.52	75.05
heart-statlog	69.52	69.89	75.30	70.52	75.44	75.63	71.59
hepatitis	73.24	75.51	75.99	75.18	80.33	76.49	75.55
hypothyroid	95.90	98.82	98.77	97.43	99.15	99.06	97.59
ionosphere	79.86	78.38	83.57	80.06	84.37	83.94	81.80
iris	81.73	84.13	89.20	84.80	91.67	89.47	73.60
kr-vs-kp	82.68	86.36	86.56	88.91	95.14	89.77	80.39
letter	90.29	91.30	91.91	91.93	91.30	92.21	86.59
liver-disorders	61.66	61.44	61.71	61.89	63.61	62.01	60.63
lymphography	73.02	73.14	76.13	75.82	76.53	76.00	72.50
mfeat-pixel	81.81	87.03	83.18	82.61	88.30	83.56	95.41
nursery	81.74	93.42	94.23	95.32	95.64	95.60	87.55
optdigits	95.08	95.90	95.32	95.18	95.74	95.33	97.99
page-blocks	94.22	95.73	96.80	95.28	97.05	96.84	91.81
pendigits	97.39	97.76	97.87	97.62	97.86	97.87	98.29
primary-tumor	37.61	39.73	39.85	39.05	42.42	41.15	37.84
segment	90.50	93.15	94.84	92.33	95.99	95.09	90.51
sick	90.34	94.64	95.77	92.47	97.25	96.69	92.09
solar-flare2	92.24	97.11	97.28	99.39	99.50	99.40	90.55
sonar	69.52	71.75	71.05	69.47	73.22	70.99	73.44
soybean	83.45	81.65	90.73	90.82	81.61	91.21	79.93
spambase	86.06	83.51	89.57	86.91	89.57	89.69	83.68
spectrometer	51.62	47.97	52.28	51.89	47.05	52.28	54.67
splice	87.83	88.76	89.11	89.86	91.89	89.97	89.90
Sponge	77.45	84.05	82.27	89.16	91.95	86.88	81.52
tae	49.83	49.20	47.32	49.22	48.48	46.99	51.81
vehicle	70.13	70.36	71.25	70.45	72.02	71.45	70.51
vote	86.25	88.87	88.75	91.54	94.00	91.79	83.80
vowel	81.63	74.76	85.01	82.95	74.61	85.10	75.51
waveform	81.82	82.14	82.40	81.86	82.83	82.40	84.70
wine	85.63	85.69	89.12	85.97	92.91	89.06	90.34
zoo	89.71	90.71	90.50	91.31	90.53	91.41	82.00
Average	76.99	78.20	80.30	79.61	80.97	81.14	76.65

Table 5: Accuracy results of the methods when they are used on data sets with a percentage of added noise equal to 40%.

Data set	BA-C4.5-U	BA-CDT-U	BA-CC4.5-U	BA-C4.5	BA-CDT	BA-CC4.5	RF
anneal	80.69	87.46	88.69	89.11	96.65	92.29	74.47
arrhythmia	69.56	70.07	69.34	70.07	67.57	71.2	64.25
audiology	66.31	60.64	72.52	72.34	60.2	74.31	60.43
autos	53.96	53.59	59.65	54.36	50.98	59.99	52.45
balance-scale	65.70	69.10	75.04	69.8	78.24	75.86	60.05
breast-cancer	53.26	54.14	55.64	56.02	57.15	57.26	53.71
wisconsin-breast-cancer	75.72	73.16	84.16	79.23	83.39	85.48	68.87
car	68.86	76.19	77.37	83.32	85.42	83.63	78.64
cmc	42.41	44.33	44.45	44.19	49.14	45.84	41.02
horse-colic	64.64	63.42	69.32	68.48	65.78	71.58	63.95
credit-rating	60.59	61.03	63.65	62.96	64.65	65.58	61.17
german-credit	57.51	59.63	58.96	58.86	62.57	59.71	59.37
dermatology	83.33	85.41	87.62	88.38	91.74	89.62	89.20
pima-diabetes	66.12	60.25	68.40	66.05	64.37	68.49	59.97
ecoli	74.69	76.33	80.30	76.06	82.69	80.68	71.99
Glass	61.45	62.87	64.07	62.05	67.52	64.2	61.73
haberman	56.14	55.44	58.39	56.24	57.1	60.62	53.06
cleveland-14-heart-disease	69.76	72.58	75.20	71.6	78.52	75.83	71.55
hungarian-14-heart-disease	73.51	72.42	80.94	76.92	79.56	80.9	70.08
heart-statlog	62.07	61.56	64.59	63.3	65.96	64.67	62.33
hepatitis	62.77	63.98	66.71	65.3	69.43	68.1	65.43
hypothyroid	90.62	97.44	96.84	92.82	98.91	97.46	94.70
ionosphere	67.79	66.60	72.41	68.39	71.52	72.72	68.48
iris	72.60	74.87	86.13	75.2	87.73	86.07	66.53
kr-vs-kp	67.81	69.83	70.06	71.52	80.02	72.24	66.05
letter	85.81	88.67	89.10	89.21	90.94	90.23	80.28
liver-disorders	57.16	57.17	58.24	57.01	58.28	58.67	56.40
lymphography	65.98	66.58	70.64	69.15	75.07	71.51	66.67
mfeat-pixel	81.54	86.94	82.79	82.43	88.71	83.42	94.68
nursery	70.94	85.09	87.80	92.78	94.55	93.56	77.10
optdigits	93.99	95.56	94.46	94.23	95.82	94.52	97.48
page-blocks	89.84	92.85	96.05	91.33	96.75	96.15	86.55
pendigits	95.76	96.70	97.03	96.16	97.69	97.09	96.91
primary-tumor	34.53	36.51	37.22	35.86	40.53	38.61	33.60
segment	85.65	88.71	92.15	86.99	95.71	92.57	85.90
sick	76.76	80.85	85.46	78.64	87.27	87.38	77.52
solar-flare2	85.62	90.37	90.66	98.69	98.6	98.71	83.25
sonar	60.66	62.10	62.30	60.52	62.16	62.35	63.21
soybean	74.85	69.30	86.09	86.89	73.66	88.5	70.76
spambase	76.70	70.98	82.02	77.74	77.3	82.31	71.98
spectrometer	48.99	43.13	50.12	49.19	43.11	50.14	51.59
splice	82.91	84.34	84.40	84.97	89.2	85.23	85.68
Sponge	69.29	75.05	72.79	79.73	89.18	77.18	73.86
tae	46.17	45.71	43.48	45.9	43.17	43.22	46.52
vehicle	65.00	65.98	67.71	65.54	69.76	68.11	65.47
vote	73.54	75.62	76.20	79.39	83.92	79.85	70.94
vowel	71.84	65.65	78.47	73.27	63.14	78.54	65.74
waveform	79.59	80.21	80.84	79.65	81.78	80.84	83.57
wine	78.25	79.10	83.99	78.82	88.06	83.99	81.95
zoo	81.58	84.46	85.15	86.05	87.52	86.05	72.80
Average	70.02	71.2	74.51	73.25	75.77	75.86	69.60

Table 6: Average result of the accuracy of the different algorithms when they are built from data sets with added noise.

Algorithm	noise 0%	noise 10%	noise 20%	noise 30%	noise 40%
BA-C4.5-U	85.28	84.00	81.50	76.99	70.02
BA-CDT-U	84.90	84.06	82.15	78.20	71.20
BA-CC4.5-U	84.98	84.42	*83.27*	80.30	74.51
BA-C4.5	*85.29*	**84.54**	83.11	79.61	73.25
BA-CDT	84.24	83.89	83.01	*80.97*	*75.77*
BA-CC4.5	84.97	*84.47*	**83.58**	**81.14**	**75.86**
RF	**86.35**	84.37	81.33	76.65	69.60

Table 7: Friedman's ranks about the accuracy of the algorithms when they are applied on data sets with different percentages of added noise.

Algorithm	noise 0%	noise 10%	noise 20%	noise 30%	noise 40%
BA-C4.5-U	*3.16*	4.92	5.68	6.02	5.94
BA-CDT-U	4.50	4.45	4.91	4.93	4.99
BA-CC4.5-U	4.07	3.62	3.15	3.42	3.32
BA-C4.5	3.77	**3.14**	3.53	4.00	4.16
BA-CDT	5.45	4.29	*3.15*	*2.27*	*2.38*
BA-CC4.5	4.20	*3.48*	**2.74**	**2.18**	**1.95**
RF	**2.85**	4.10	4.84	5.18	5.26

Table 8: p-values of the Nemenyi test about the accuracy on data sets without added noise. Nemenyi's procedure rejects those hypotheses that have an unadjusted p-value ≤ 0.002381.

i	algorithms	p
21	BA-CDT vs. **RF**	0
20	**BA-C4.5-U** vs. BA-CDT	0
19	**BA-C4.5** vs. BA-CDT	0.000101
18	BA-CDT-U vs. **RF**	0.000134
17	**BA-CC4.5-U** vs. BA-CDT	0.001403
16	BA-CC4.5 vs. **RF**	0.00178
15	**BA-C4.5-U** vs. BA-CDT-U	0.001925
14	BA-CDT vs. BA-CC4.5	0.003814
13	BA-CC4.5-U vs. RF	0.004747
12	BA-C4.5-U vs. BA-CC4.5	0.016078
11	BA-CDT-U vs. BA-CDT	0.027891
10	BA-C4.5 vs. RF	0.033222
9	BA-C4.5-U vs. BA-CC4.5-U	0.035183
8	BA-CDT-U vs. BA-C4.5	0.0911
7	BA-C4.5-U vs. BA-C4.5	0.157987
6	BA-C4.5 vs. BA-CC4.5	0.319611
5	BA-CDT-U vs. BA-CC4.5-U	0.319611
4	BA-C4.5-U vs. RF	0.473059
3	BA-CC4.5-U vs. BA-C4.5	0.487453
2	BA-CDT-U vs. BA-CC4.5	0.487453
1	BA-CC4.5-U vs. BA-CC4.5	0.763497

Table 9: p-values of the Nemenyi test about the accuracy on data sets with 10% of added noise.Nemenyi's procedure rejects those hypotheses that have an unadjusted p-value ≤ 0.002381.

i	algorithms	p
21	BA-C4.5-U vs. **BA-C4.5**	0.000038
20	BA-C4.5-U vs. **BA-CC4.5**	0.000859
19	BA-CDT-U vs. BA-C4.5	0.002429
18	BA-C4.5-U vs. BA-CC4.5-U	0.002622
17	BA-C4.5 vs. BA-CDT	0.007774
16	BA-CDT-U vs. BA-CC4.5	0.024761
15	BA-C4.5 vs. RF	0.026285
14	BA-CDT-U vs. BA-CC4.5-U	0.054722
13	BA-C4.5-U vs. RF	0.057705
12	BA-CDT vs. BA-CC4.5	0.060822
11	BA-CC4.5-U vs. BA-CDT	0.120962
10	BA-C4.5-U vs. BA-CDT	0.144795
9	BA-CC4.5 vs. RF	0.151281
8	BA-CC4.5-U vs. RF	0.266575
7	BA-CC4.5-U vs. BA-C4.5	0.266575
6	BA-C4.5-U vs. BA-CDT-U	0.276666
5	BA-CDT-U vs. RF	0.417887
4	BA-C4.5 vs. BA-CC4.5	0.431313
3	BA-CDT vs. RF	0.660108
2	BA-CDT-U vs. BA-CDT	0.711138
1	BA-CC4.5-U vs. BA-CC4.5	0.74591

Table 10: p-values of the Nemenyi test about the accuracy on data sets with 20% of added noise. Nemenyi's procedure rejects those hypotheses that have an unadjusted p-value ≤ 0.002381.

i	algorithms	p
21	BA-C4.5-U vs. **BA-CC4.5**	0
20	BA-C4.5-U vs. **BA-CC4.5-U**	0
19	BA-C4.5-U vs. **BA-CDT**	0
18	BA-CDT-U vs. **BA-CC4.5**	0.000001
17	BA-C4.5-U vs. **BA-C4.5**	0.000001
16	**BA-CC4.5** vs. RF	0.000001
15	BA-CDT-U vs. **BA-CC4.5-U**	0.000046
14	BA-CDT-U vs. **BA-CDT**	0.000046
13	**BA-CC4.5-U** vs. RF	0.000092
12	**BA-CDT** vs. RF	0.000092
11	BA-CDT-U vs. **BA-C4.5**	0.001403
10	BA-C4.5 vs. RF	0.002429
9	BA-C4.5-U vs. RF	0.051869
8	BA-C4.5 vs. BA-CC4.5	0.067475
7	BA-C4.5-U vs. BA-CDT-U	0.074716
6	BA-CC4.5-U vs. BA-CC4.5	0.342638
5	BA-CDT vs. BA-CC4.5	0.342638
4	BA-CC4.5-U vs. BA-C4.5	0.379114
3	BA-C4.5 vs. BA-CDT	0.379114
2	BA-CDT-U vs. RF	0.871291
1	BA-CC4.5-U vs. BA-CDT	1

Table 11: p-values of the Nemenyi test about the accuracy on data sets with 30% of added noise. Nemenyi's procedure rejects those hypotheses that have an unadjusted p-value ≤ 0.002381.

i	algorithms	p
21	BA-C4.5-U vs. **BA-CC4.5**	0
20	BA-C4.5-U vs. **BA-CDT**	0
19	**BA-CC4.5** vs. RF	0
18	**BA-CDT** vs. RF	0
17	BA-CDT-U vs. **BA-CC4.5**	0
16	BA-CDT-U vs. **BA-CDT**	0
15	BA-C4.5-U vs. **BA-CC4.5-U**	0
14	BA-C4.5-U vs. **BA-C4.5**	0.000003
13	BA-C4.5 vs. **BA-CC4.5**	0.000025
12	**BA-CC4.5-U** vs. RF	0.000046
11	BA-C4.5 vs. **BA-CDT**	0.000062
10	BA-CDT-U vs. **BA-CC4.5-U**	0.000474
9	BA-CC4.5-U vs. BA-CC4.5	0.004104
8	BA-C4.5 vs. RF	0.006311
7	BA-CC4.5-U vs. BA-CDT	0.007774
6	BA-C4.5-U vs. BA-CDT-U	0.01164
5	BA-CDT-U vs. BA-C4.5	0.031355
4	BA-C4.5-U vs. RF	0.051869
3	BA-CC4.5-U vs. BA-C4.5	0.179454
2	BA-CDT-U vs. RF	0.562834
1	BA-CDT vs. BA-CC4.5	0.834987

Table 12: p-values of the Nemenyi test about the accuracy on data sets with 40% of added noise. Nemenyi's procedure rejects those hypotheses that have an unadjusted p-value ≤ 0.002381.

i	algorithms	p
21	BA-C4.5-U vs. **BA-CC4.5**	0
20	BA-C4.5-U vs. **BA-CDT**	0
19	**BA-CC4.5** vs. RF	0
18	BA-CDT-U vs. **BA-CC4.5**	0
17	**BA-CDT** vs. RF	0
16	BA-C4.5-U vs. **BA-CC4.5-U**	0
15	BA-CDT-U vs. **BA-CDT**	0
14	BA-C4.5 vs. **BA-CC4.5**	0
13	**BA-CC4.5-U** vs. RF	0.000007
12	BA-C4.5 vs. **BA-CDT**	0.000038
11	BA-C4.5-U vs. **BA-C4.5**	0.000038
10	BA-CDT-U vs. **BA-CC4.5-U**	0.000111
9	BA-CC4.5-U vs. **BA-CC4.5**	0.001519
8	**BA-C4.5** vs. RF	0.010896
7	BA-C4.5-U vs. BA-CDT-U	0.027891
6	BA-CC4.5-U vs. BA-CDT	0.029579
5	BA-CC4.5-U vs. BA-C4.5	0.051869
4	BA-CDT-U vs. BA-C4.5	0.054722
3	BA-C4.5-U vs. RF	0.115512
2	BA-CDT vs. BA-CC4.5	0.319611
1	BA-CDT-U vs. RF	0.532018

2 Post hoc comparison using Bonferroni-Dun's procedure

Bonferroni-Dunn's procedure rejects those hypotheses that have an unadjusted p-value ≤ 0.008333. New significative differences found are noted with italic fonts.

Table 13: p-values of the Bonferroni-Dunn test about the accuracy on data sets without added noise, where Random Forest is the best method in the Friedman's rank.

i	algorithm	p-value
1	BA-CDT	0
2	BA-CDT-U	0.000056
3	BA-CC4.5	0.000727
4	*BA-CC4.5-U*	*0.002622*
5	BA-C4.5	0.020638
6	BA-C4.5-U	0.366699

Table 14: p-values of the Bonferroni-Dunn test about the accuracy on data sets with 10% of added noise, where Bagging of C4.5 is the best method in the Friedman's rank.

i	algorithm	p-value
1	BA-C4.5-U	0.000034
2	BA-CDT-U	0.002081
3	*BA-CDT*	*0.006311*
4	*RF*	*0.006769*
5	BA-CC4.5-U	0.237833
6	BA-CC4.5	0.366699

Table 15: p-values of the Bonferroni-Dunn test about the accuracy on data sets with 20% of added noise, where Bagging of Credal-C4.5 is the best method in the Friedman's rank.

i	algorithm	p-value
1	BA-C4.5-U	0
2	RF	0
3	BA-CDT-U	0.000001
4	BA-C4.5	0.074716
5	BA-CC4.5-U	0.342638
6	BA-CDT	0.366699

Table 16: p-values of the Bonferroni-Dunn test about the accuracy on data sets with 30% of added noise, where Bagging of Credal-C4.5 is the best method in the Friedman's rank.

i	algorithm	p-value
1	BA-C4.5-U	0
2	RF	0
3	BA-CDT-U	0
4	BA-C4.5	0.000038
5	*BA-CC4.5-U*	*0.005479*
6	BA-CDT	0.799032

Table 17: p-values of the Bonferroni-Dunn test about the accuracy on data sets with 40% of added noise, where Bagging of Credal-C4.5 is the best method in the Friedman's rank.

i	algorithm	p-value
1	BA-C4.5-U	0
2	RF	0
3	BA-CDT-U	0
4	BA-C4.5	0.000001
5	BA-CC4.5-U	0.00178
6	BA-CDT	0.319611