

Wilcoxon Signed Ranks test.

KEEL non-parametric statistical module

December 15, 2011

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)	
Self-Training (NN) (1)	-	588.0	661.0	666.5	674.0	685.5	694.0	728.5	691.0	1076.5	909.0	887.0	846.0	810.0	689.0	901.0	456.0	681.0	1446.0	769.0	976.5	876.0	610.0	601.0	609.0	548.5	1603.5	784.5	990.5	883.0	1126.0	1076.0	913.0	816.5		
Self-Training (C45) (2)	952.0	-	1189.0	830.5	699.5	681.5	1117.0	821.0	624.0	921.0	1011.0	497.0	1076.0	828.0	988.0	1055.0	1181.5	926.5	618.5	1377.5	1200.0	1164.5	1155.0	918.5	478.0	1145.0	884.0	1438.0	1260.5	1166.5	1146.0	1245.0	1103.0	992.0	966.0	
Self-Training (NB) (3)	854.0	850.5	-	850.0	885.0	240.5	620.0	118.5	340.0	644.0	283.0	485.0	316.0	918.5	924.0	495.5	600.0	430.0	801.0	854.0	485.0	686.5	376.0	226.0	314.5	365.5	922.5	829.0	444.0	44.5	993.0	686.0	832.0	891.0		
Self-Training (SMD) (4)	824.0	709.5	1045.0	-	924.5	662.0	961.0	601.5	619.5	847.0	962.5	638.5	887.5	792.5	904.0	874.0	979.0	741.0	790.5	1271.0	835.5	969.0	1082.0	809.5	636.5	939.0	731.5	1273.0	885.5	1006.0	1101.0	1126.0	1031.0	891.5	1066.0	
Co-Training (NN) (5)	573.5	540.5	950.0	615.5	-	560.0	892.0	438.5	413.0	447.5	999.5	477.0	822.5	358.0	795.5	636.0	875.0	515.5	564.0	1262.5	178.5	926.0	826.5	374.0	464.0	875.0	505.5	1347.5	777.5	936.0	849.5	1120.0	996.0	763.0	759.0	
Co-Training (C45) (6)	911.0	803.5	1182.0	848.0	980.0	-	1063.0	809.5	576.5	921.5	1015.0	581.0	1052.5	838.5	940.5	1097.5	1153.0	907.5	608.5	1384.0	1185.0	1147.0	1133.0	843.0	521.5	1107.5	872.0	1362.0	1316.5	1143.0	1132.0	1231.0	1061.5	899.0	996.0	
Co-Training (NB) (7)	699.5	423.0	1299.5	479.0	-	528.5	495.0	699.5	680.5	479.0	894.5	488.0	654.0	816.5	576.5	628.0	961.0	683.0	899.0	812.0	839.0	406.0	699.5	882.5	1021.0	661.0	806.0	824.0	1134.0	785.5	626.0	708.5	-	-		
Co-Training (SMD) (8)	1009.0	719.0	1078.0	883.5	1046.5	730.5	999.5	-	964.0	1102.5	634.0	927.0	965.5	1994.5	915.0	1047.5	918.0	794.5	1313.0	1649.0	1068.0	1200.0	615.0	647.0	583.0	967.5	1346.0	968.0	1061.0	1257.0	1144.5	1138.0	1024.5	1044.0	-	-
Democratization (9)	1092.5	616.0	1424.5	869.5	1127.0	693.5	1290.0	886.5	-	1090.0	1211.0	810.5	628.5	908.5	1149.0	1174.0	1254.5	1062.5	824.0	1426.0	1109.0	1338.0	629.0	1044.5	749.5	1391.0	962.0	1549.0	1158.0	1330.0	1217.0	1327.0	1160.0	1151.5	-	-
SF-PRED (10)	849.0	619.0	1030.0	693.0	1037.5	618.5	940.5	546.0	674.0	-	1170.0	530.0	921.5	686.0	873.0	723.5	916.0	561.5	616.0	1420.0	869.0	1063.0	918.0	635.0	517.0	932.5	594.5	1624.0	826.0	1000.0	944.5	1177.0	1079.0	966.5	829.5	-
TT-Training (NN) (11)	409.5	529.0	896.0	577.5	373.5	526.0	795.5	437.5	364.0	310.0	-	435.5	809.5	553.0	526.0	596.5	820.5	401.5	530.0	1173.0	119.5	875.0	811.0	688.0	438.5	178.0	489.5	1182.0	719.0	879.5	812.0	1044.0	919.0	579.0	740.0	-
TT-Training (C45) (12)	379.0	688.0	1242.0	901.5	1008.0	359.0	1161.0	851.0	674.5	352.0	3049.5	-	1129.0	911.0	1048.0	1108.5	1235.0	941.5	679.0	1430.0	1277.0	1210.0	1215.0	956.5	658.5	1177.0	932.0	1341.0	1288.0	1210.0	1216.5	1298.0	1171.0	1075.0	1059.0	-
TT-Training (NB) (13)	654.0	464.0	1355.0	597.5	662.5	487.5	1090.5	558.0	226.5	618.5	739.5	429.0	-	664.0	689.0	631.0	1023.5	655.0	544.0	1036.0	118.0	1103.5	839.0	610.0	410.0	983.5	596.5	1090.0	723.0	1025.0	851.0	1260.0	844.0	618.0	734.0	-
TT-Training (SMD) (14)	894.0	412.0	1033.0	447.5	629.0	401.5	862.0	319.5	611.5	824.0	887.0	629.0	881.0	858.0	1003.0	792.5	736.0	1262.0	881.0	963.0	1068.0	713.0	649.0	343.0	746.0	1288.0	889.0	999.0	1096.5	1099.0	1014.0	919.0	1040.5	-	-	
DE-TP-Training (NN) (15)	675.0	552.0	1020.5	636.0	780.5	544.5	886.0	455.5	363.0	612.0	959.0	491.0	851.0	627.0	-	697.5	984.5	514.0	608.5	1268.0	792.0	970.5	896.0	442.0	467.5	911.5	625.0	1398.0	807.0	968.0	921.5	1217.0	928.5	787.0	778.0	-
DE-TP-Training (C45) (16)	851.0	430.0	1118.0	666.0	904.0	442.5	976.0	570.0	308.0	816.5	944.5	441.5	889.0	652.0	842.5	-	1069.5	688.0	562.0	1261.0	864.0	1036.0	983.0	766.5	324.5	911.0	715.0	1294.0	919.0	1029.0	963.0	1228.0	1052.5	902.0	763.5	-
DE-TP-Training (NB) (17)	637.0	345.5	1044.5	596.0	665.0	381.0	668.5	422.5	383.5	669.0	719.5	365.0	611.5	522.0	555.5	476.0	-	541.5	479.0	956.0	631.0	777.5	774.5	580.0	288.5	610.0	114.0	979.0	625.0	707.0	765.0	1239.0	758.0	699.0	629.5	-
DE-TP-Training (SMD) (18)	1029.0	613.5	1040.0	744.0	1024.5	632.5	998.5	622.0	82.5	978.5	1138.5	998.5	885.0	745.5	971.0	852.0	998.5	-	684.0	1341.0	842.0	1010.0	994.5	803.0	541.0	947.0	1006.0	1366.5	863.0	1016.0	983.5	1263.0	1125.5	1070.0	965.0	-
CoForest (19)	901.0	866.5	1091.0	769.5	976.0	931.5	1017.0	745.5	716.0	924.0	1001.0	887.0	996.0	884.0	939.5	983.0	1061.0	856.0	1061.0	1225.0	1050.0	1065.5	1022.0	907.5	827.5	1047.5	761.5	1242.0	1038.0	1075.0	1032.0	1235.0	967.0	994.0	1138.0	-
Raao (NN) (20)	819.0	684.8	824.0	869.0	222.5	1166.0	924.0	229.5	1143.0	665.0	969.0	1100.0	459.0	298.0	292.0	293.0	581.0	156.0	316.0	1392.0	669.0	809.0	383.0	36.0	922.0	266.0	681.0	333.0	562.0	611.0	866.0	593.0	181.5	381.0	-	-
Raao (C45) (21)	726.0	910.0	986.0	645.5	761.5	355.0	877.0	591.0	375.5	731.0	820.5	265.0	822.0	659.0	745.0	676.0	906.0	698.0	490.0	1208.0	392.0	930.0	867.0	669.0	167.0	873.0	675.5	1220.0	895.0	908.0	854.0	1071.0	945.0	732.5	734.0	-
Raao (NB) (22)	664.5	397.5	980.0	516.0	614.0	393.0	645.0	480.0	137.0	537.0	666.0	338.0	381.5	522.0	568.5	604.0	762.5	536.0	474.5	971.0	610.0	744.0	604.5	306.0	600.0	536.0	948.0	617.0	626.0	740.0	1026.5	739.5	564.0	619.0	-	
Raao (SMD) (23)	690.0	385.0	798.5	358.0	658.5	467.0	728.0	283.0	336.0	677.0	726.0	328.0	701.0	417.0	844.0	557.0	785.5	545.5	518.0	1157.0	618.0	797.0	590.0	504.0	294.0	734.0	425.5	1134.0	634.0	795.0	671.5	980.0	841.0	637.0	724.0	-
Co-Bagging (NN) (24)	930.0	621.5	1083.0	790.5	966.0	642.0	946.0	970.0	89.5	850.0	1102.0	583.5	930.0	712.0	1098.0	783.5	1085.0	682.0	632.5	1417.0	871.0	1038.5	1000.0	504.0	642.5	884.0	655.0	1066.0	851.0	1028.0	1097.0	1297.5	1020.0	1040.5	983.0	-
Co-Bagging (C45) (25)	984.0	1062.0	1186.0	903.5	1021.0	1018.5	1134.0	838.0	714.5	968.0	1100.5	826.5	1075.0	881.0	1017.5	1215.5	1186.5	944.0	657.5	1444.0	1373.0	1180.0	1191.0	942.5	-	1175.0	928.0	1451.0	1403.5	1201.0	1236.0	1294.5	1177.0	1073.0	1072.5	-
Co-Bagging (NB) (26)	643.0	398.0	1228.5	601.0	665.0	432.5	858.5	350.0	1481.0	665.5	909.0	363.0	501.5	699.0	828.5	468.0	928.5	858.0	624.5	1038.0	669.0	810.0	814.0	866.0	366.0	608.5	1022.0	663.0	918.5	832.0	1147.0	801.0	624.0	683.0	-	
Co-Bagging (SMD) (27)	991.5	656.0	1069.5	753.5	1030.5	668.0	957.5	527.5	578.0	926.5	1050.5	608.0	894.5	704.0	915.0	927.0	1026.0	785.0	723.5	1275.0	969.5	1004.0	1114.5	685.0	557.0	939.5	-	1318.0	847.0	1007.5	1065.0	1100.0	1128.0	1001.0	985.5	-
Rel-Raao (NN) (28)	36.5	122.0	617.5	267.0	192.5	178.0	519.0	165.0	67.0	16.0	385.0	86.0	450.0	262.0	232.0	246.0	561.0	170.5	258.0	804.0	820.0	537.0	406.0	74.0	86.0	463.0	222.0	-	322.0	552.0	392.5	797.5	570.0	125.0	367.5	-
Rel-Raao (C45) (29)	748.5	299.5	959.0	654.5	624.5	224.8	879.0	690.0	82.0	719.0	824.0	107.0	81.0	944.5	635.0	621.0	919.0	676.0	620.0	1207.0	889.5	923.0	986.0	634.0	136.8	822.0	688.0	1418.0	811.0	898.5	1050.0	994.8	486.0	725.0	-	-
Rel-Raao (NB) (30)	699.5	373.5	1041.0	634.0	604																															

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)	(31)	(32)	(33)	(34)	(35)				
Self-Training (NN) (1)	-		•		•			o	o		•	o						o		•		•		o		o	•		•		•		•		•		•		
Self-Training (C45) (2)		-	•		•		•				•	o	•		•	•	•		•	•	•	•	•		o	•	•	•	•	•	•	•	•	•	•	•			
Self-Training (NB) (3)		o	-	o	•	o	o	o	o	o		o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o			
Self-Training (SMO) (4)			•	-				o	o	o	o	o						•	o	o	•		•	•	o	o	o	•		•		•		•		•			
Co-Training (NN) (5)				-	-	o		o	o	o	o	o						o	o	•		•	•	o	o	o	•		•		•		•		•				
Co-Training (C45) (6)			•		-	•		o	o	o	•	o	•		•	•	•		o	•	•	•	•	•	o	•	•	•	•	•	•	•	•	•	•	•			
Co-Training (NB) (7)		o	•			o	-	o	o		o	o	o			o	o		o	•		•	•	o	o	o	•		•		•		•		•		•		
Co-Training (SMO) (8)	•		•		•		-		•	•	•		•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
Democratic-Co (9)	•		•		•		•	-	•	•	•		•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
SETRFD (10)			•		•			o	-	•	o							o		•		•	•	o	o		•		•		•		•		•		•		
TriTraining (NN) (11)	o	o		•		•		o	-	•	o			o	o			o		•		•	•	o	o		•		•		•		•		•		•		
TriTraining (C45) (12)	•	•	•		•		•	o	o	-	o			o	o	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
TriTraining (NB) (13)	o	o	•		•	o	•	o		o	o	-						o	o	•		•	•	o	o		•		•		•		•		•		•		
TriTraining (SMO) (14)			•		•									-			•		•		•	•	•	•	o	•		•		•		•		•		•			
DE-TriTraining (NN) (15)			•		•			o		o		o		-		•	o		•		•	•	•	o	o		•		•		•		•		•		•		
DE-TriTraining (C45) (16)		o	•		•		o		o		o				-	•	o		o	o	•	•	•	o	o		•		•		•		•		•		•		
DE-TriTraining (NB) (17)		o	•	o		•	o	o	o	o	o	-	o	o		o	o		o	o	•	•	•	o	o	o	o	o	•		•		•		•		•		
DE-TriTraining (SMO) (18)	•		•		•		•		o		•	o	o	o	o	•	•	-		•	•	•	•	•	o	o		•		•		•		•		•		•	
CoForest (19)			•		•		•									•	•		-		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		
Rasco (NN) (20)	o	o		o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	-	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o		
Rasco (C45) (21)		o			o		o		o		o		o		o		o		o	•	-		o	o	o	o	o	o	o	o	o	o	o	o	o	o	o		
Rasco (NB) (22)		o	•		•		o		o		o		o		o		o		o	o	-		o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	
Rasco (SMO) (23)		o	•	o		•	o	o	o	o	o		o	o	o	o	o	o	o	o		-	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	
Co-Bagging (NN) (24)											•	o	o		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Co-Bagging (C45) (25)	•	•	•		•	•	•		o		•	o	•		•	•	•		o	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Co-Bagging (NB) (26)		o	•		•			o			o	o							o	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Co-Bagging (SMO) (27)			•		•			o			•	o	o				•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Rel-Rasco (NN) (28)	o	o		o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	
Rel-Rasco (C45) (29)		o		o		o		o		o		o		o		o		o		o		o		o		o		o		o		o		o		o		o	
Rel-Rasco (NB) (30)		o	•		•		o		o		o		o		o		o		o		o		o		o		o		o		o		o		o		o		o
Rel-Rasco (SMO) (31)		o	o		o		o		o		o		o		o		o		o		o		o		o		o		o		o		o		o		o		o
CLCC (32)	o	o		o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	
APSSC (33)	o	o		o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	
SNRCE (34)			•					o	o		o		o		o		o		o		•		•		o	o		•		•		•		•		•		•	
ADE-CoForest (35)			o					o	o		o		o		o		o		o		•		•		o	o		•		•		•		•		•		•	

Table 2: Summary of the Wilcoxon test. •= the method in the row improves the method of the column. o= the method in the column improves the method of the row. Upper diagonal of level significance $\alpha = 0.9$, Lower diagonal level of significance $\alpha = 0.95$

Method	$\alpha = 0.9$		$\alpha = 0.95$	
	+	±	+	±
Self-Training (NN)	9	28	5	29
Self-Training (C45)	21	32	17	32
Self-Training (NB)	1	9	0	12
Self-Training (SMO)	11	34	10	34
Co-Training (NN)	4	22	3	27
Co-Training (C45)	21	33	17	33
Co-Training (NB)	4	24	3	27
Co-Training (SMO)	21	34	15	34
Democratic-Co	25	34	25	34
SETRED	10	29	7	33
TriTraining (NN)	3	20	3	23
TriTraining (C45)	24	34	23	34
TriTraining (NB)	9	28	9	29
TriTraining (SMO)	12	33	9	34
DE-TriTraining (NN)	8	26	4	29
DE-TriTraining (C45)	11	28	8	28
DE-TriTraining (NB)	3	19	2	21
DE-TriTraining (SMO)	16	32	13	33
CoForest	20	34	15	34
Rasco (NN)	0	5	0	8
Rasco (C45)	4	28	3	28
Rasco (NB)	4	17	2	22
Rasco (SMO)	3	21	2	24
Co-Bagging (NN)	17	32	12	33
Co-Bagging (C45)	27	34	24	34
Co-Bagging (NB)	4	25	4	27
Co-Bagging (SMO)	15	33	12	34
Rel-Rasco (NN)	0	3	0	7
Rel-Rasco (C45)	4	28	3	28
Rel-Rasco (NB)	4	17	2	21
Rel-Rasco (SMO)	3	21	2	22
CLCC	0	2	0	5
APSSC	2	17	1	19
SNNRCE	5	23	5	28
ADE-CoForest	3	23	3	27

Table 3: Wilcoxon test summary results