

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)		892.0	906.0	967.0	966.5	959.5	919.5	934.0	936.0	986.0	936.0	999.5	709.5	839.0	660.0	910.0	965.5	693.0	1014.0	817.0	1002.0	1027.0	610.5	960.0	993.0	950.5	1031.0	896.0	981.5	1066.0	1127.5	1097.5	924.0	896.5				
Self-Training (CB) (2)	884.0		1177.0	802.0	964.0	547.0	1103.5	781.0	690.0	868.0	968.0	218.0	1063.0	875.5	962.0	995.5	1172.0	918.0	547.5	1454.0	1374.0	1175.0	1271.5	911.0	128.5	1110.0	873.0	1460.0	1333.0	1168.0	1288.0	1241.0	1143.0	833.0	966.0			
Self-Training (NB) (3)	888.0	863.0		896.0	629.0	881.0	224.5	444.0	105.5	928.0	936.0	298.5	182.5	826.0	928.5	409.0	141.0	891.0	340.0	1026.0	864.0	901.5	990.0	494.5	932.0	241.5	392.0	1039.0	689.0	928.5	826.5	885.5	922.0	430.0	848.5			
Self-Training (SMD) (4)	818.0	983.0	1044.0		996.5	874.0	991.0	844.5	686.5	846.5	897.5	618.0	946.0	969.5	913.0	836.0	1002.0	895.0	761.0	1363.0	922.0	1018.0	1217.5	824.0	664.5	983.5	890.0	1088.0	943.0	1015.0	1272.5	1166.0	1088.0	988.5	1043.0			
Co-Training (NN) (5)	539.0	491.0	913.0	964.5		493.0	829.0	428.0	382.0	456.0	703.5	440.5	796.0	576.0	699.0	853.5	825.0	508.0	488.5	1389.0	801.5	922.0	997.0	492.0	455.5	823.5	457.0	1316.0	819.0	910.0	989.0	1032.0	936.0	938.5	701.0			
Co-Training (CB) (6)	392.5	938.0	1184.0	988.0	1047.0		1093.0	832.0	610.0	929.5	1014.0	831.5	1022.0	939.5	976.0	1070.0	1162.0	985.0	916.0	1420.5	1114.0	1274.0	996.5	901.0	1113.0	931.0	1444.5	1358.0	1183.5	1227.0	1210.0	1113.0	898.5	990.0				
Co-Training (NB) (7)	620.5	1366.5	549.0	711.0	447.0		530.0	130.0	598.0	650.0	382.0	295.5	613.0	632.5	545.0	793.0	666.0	520.0	1106.0	726.0	931.5	891.5	980.0	132.0	699.0	568.5	1114.5	734.5	846.5	933.0	1116.0	808.0	935.0	672.0				
Co-Training (SMD) (8)	1036.5	799.0	1064.0	940.5	1142.0	708.0	1010.0		633.5	89.5	1143.0	643.0	983.0	1063.5	1010.0	827.0	1063.0	977.0	805.0	1488.0	1000.0	1081.0	1286.0	996.0	668.0	1002.0	1073.5	1451.0	1041.5	1077.0	1389.5	1468.0	1406.0	1086.5	1042.5			
Democratic-Cop (9)	1096.0	950.0	1439.5	713.5	1158.0	876.0	1355.0	906.5		1024.0	1113.0	891.0	1332.0	1029.0	1154.0	1187.0	1430.0	1059.0	810.5	1393.0	1233.5	1430.0	1298.0	1072.0	860.0	1420.5	999.0	1427.0	1394.0	1321.0	1490.0	1425.0	1068.0	1158.5				
SFTRED (10)	1066.0	622.0	1013.0	697.5	1030.0	619.5	942.0	552.5	516.0		1100.0	558.0	895.5	762.0	861.0	693.0	931.0	631.5	642.0	1520.0	868.0	1021.5	1049.0	671.5	573.5	927.0	989.0	1037.0	888.0	1006.0	1079.0	1190.5	1109.0	936.5	836.5			
IT-Training (NN) (11)	641.0	622.0	862.0	687.5	761.5	529.0	890.0	397.0	427.0	441.0		474.0	856.0	641.5	732.0	885.0	882.0	692.0	584.0	1433.0	984.0	979.0	318.0	449.0	876.0	441.0	1447.0	813.0	979.0	1012.0	1118.0	1039.0	867.5	737.0				
IT-Training (CB) (12)	1004.0	1267.0	1186.5	922.0	1099.5	1053.5	1158.0	842.0	799.0	982.0	1066.0		1123.0	990.0	1055.0	1143.0	1213.0	1025.5	649.5	1488.0	1434.5	1224.0	1312.0	1032.0	671.5	1105.0	970.0	1392.5	1444.5	1296.5	1354.0	1286.0	1197.0	949.0	1088.0			
IT-Training (NB) (13)	670.5	477.0	199.0	894.0	744.0	478.0	1244.5	559.0	268.0	644.5	684.0	417.0		672.0	666.0	610.0	1033.5	663.0	536.0	1176.5	781.5	1161.5	946.0	619.0	459.0	1138.0	626.5	1187.0	766.0	1156.0	989.0	1164.0	871.0	887.0	736.0			
IT-Training (SMD) (14)	832.5	664.5	1004.0	695.5	864.0	609.5	927.0	419.5	815.0	778.0	898.5	554.0	868.0		834.0	711.0	924.0	718.5	683.0	1368.0	888.0	968.0	1229.0	799.0	859.0	893.0	709.5	1313.5	936.0	973.0	1246.5	1063.0	1033.0	1156.5	883.0			
DE-IT-Training (NN) (15)	701.0	578.0	1010.5	627.0	841.0	562.0	967.5	529.0	399.0	623.0	808.0	487.0	820.0	706.0		649.0	953.0	568.0	562.0	1372.0	887.0	984.0	1041.0	559.0	499.5	888.0	654.5	1379.0	892.0	973.0	1077.0	1154.0	971.0	552.5	701.5			
DE-IT-Training (CB) (16)	880.0	544.5	1133.0	704.0	986.5	470.0	995.0	668.0	353.0	847.0	964.5	342.0	930.0	799.0	891.0		1084.0	780.5	549.0	1444.0	1026.0	1073.0	1150.0	832.0	376.0	989.5	764.5	1424.0	1040.0	1022.0	1170.0	1190.0	1080.0	818.0	874.5			
DE-IT-Training (NB) (17)	630.0	368.0	1109.0	688.0	713.0	371.0	747.0	476.0	110.0	609.0	638.0	322.0	566.0	369.0	387.0	401.0		972.0	568.0	489.0	1072.5	684.0	786.0	851.0	522.0	328.5	679.0	441.0	1086.0	697.0	746.0	890.0	1013.5	796.0	435.0	611.0		
DE-IT-Training (SMD) (18)	974.5	922.0	1049.0	738.0	1032.0	887.0	934.0	865.0	811.0	968.5	1078.0	314.5	877.0	821.5	979.0	665.5		916.5	1363.0	921.0	979.0	1110.0	883.0	410.5	923.0	743.0	1069.5	933.5	999.0	1157.5	1188.0	1063.5	818.0	897.0	897.0			
CoForest (19)	937.0	992.5	1060.0	779.0	1041.5	928.0	1020.0	738.0	729.5	898.0	896.0	890.5	1004.0	882.0	978.0	1000.0	1051.0	923.5		1276.0	1098.0	1088.0	1114.0	956.5	906.0	1042.0	826.0	1277.0	1168.0	1077.5	1138.0	1222.5	968.0	897.0	1071.0			
Racco (NN) (20)	39.0	86.0	626.0	177.0	201.0	89.0	1460.0	92.0	476.0	30.0	107.0	52.0	364.5	172.0	168.0	26.0	467.5	87.0	264.0		172.0	479.0	334.5	69.0	49.0	378.0	164.0	767.0	203.0	478.0	388.5	687.0	478.0	37.0	313.0			
Racco (CB) (21)	691.0	166.0	921.0	618.0	768.5	119.5	814.0	840.0	369.5	672.0	710.0	105.5	988.5	699.0	683.0	514.0	856.0	619.0	422.0	1368.0			601.0	78.0	795.0	612.5	1388.0	896.5	888.0	1093.0	986.0	922.0	476.5	690.0				
Racco (NB) (22)	538.0	395.0	983.5	522.0	618.0	369.0	553.5	459.0	104.0	518.5	556.0	316.0	323.5	572.0	556.0	467.0	744.0	510.0	452.0	1067.0	654.0		830.0	481.0	327.0	483.0	519.0	1073.0	679.5	626.5	867.0	955.0	732.0	461.0	591.5			
Racco (SMD) (23)	814.0	898.5	660.0	892.5	881.0	966.0	688.5	901.0	244.0	491.0	466.0	228.0	894.0	311.0	899.0	390.0	680.0	389.0	420.0	1208.5	494.0	1101.0		480.0	216.0	618.0	894.0	1228.0	488.5	769.0	889.0	889.0	928.5	410.0	847.0			
Co-Bagging (NN) (24)	929.5	629.0	1072.5	833.0	1048.0	882.5	960.0	494.5	468.0	868.5	967.0	568.0	921.0	741.0	981.0	652.5	988.0	657.0	583.5	1477.0	884.0	1049.0	1110.0		480.0	216.0	618.0	894.0	1228.0	488.5	769.0	889.0	889.0	928.5	410.0	847.0		
Co-Bagging (CB) (25)	980.0	1056.5	1218.0	879.5	1084.5	1039.0	1108.0	877.0	680.0	1061.0	868.5	1081.0	981.0	1040.5	1164.0	1214.5	1029.5	634.0	1445.0	1422.0	1213.0	1244.0	1027.0		1104.0	978.0	1495.0	1408.0	1196.0	1311.0	1277.0	1128.0	926.0	1053.0				
Co-Bagging (NB) (26)	837.0	830.0	1248.5	856.5	1168.5	424.0	841.0	889.0	1178.5	943.0	1064.0	366.0	1008.0	610.0	899.0	590.5	869.0	914.0	989.0	1112.0	1464.0	922.0	926.0	924.0	381.0		1084.0	1184.0	643.0	989.0	1107.0	810.0	843.0	663.0				
Co-Bagging (SMD) (27)	934.5	667.0	1048.0	850.0	1083.0	699.0	971.5	466.5	544.0	896.0	1038.0	576.0	914.5	775.5	889.5	775.5	960.5	997.0	714.0	1276.0	927.5	1021.0	1191.0	893.5	562.0	964.0	981.0		1081.0	934.0	1019.0	1286.0	1100.0	1101.5	869.5	935.0		
Rel-Racco (NN) (28)	77.0	80.0	321.0	173.0	169.0	92.5	125.5	89.0	41.0	3.0	93.0	47.5	833.0	166.5	161.0	116.0	442.0	71.0	263.0	718.0	182.0	467.0	312.0	37.0	45.0	376.0	159.0		196.5	468.0	990.5	680.0	464.5	22.0	311.0			
Rel-Racco (CB) (29)	674.0	132.0	911.0	607.0	721.0	142.0	808.5	535.5	317.0	653.0	461.0	333.5	885.0	567.0	566.0	438.0	792.0	541.0	462.5	1064.0	652.0	919.5	831.0	350.0	534.0													

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

Table 2: Summary of the Wilcoxon test. •= the method in the row improves the method of the column. ◦= 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)	10	26	6	29
Self-Training (C45)	19	30	16	32
Self-Training (NB)	2	10	2	12
Self-Training (SMO)	14	33	10	34
Co-Training (NN)	5	19	3	22
Co-Training (C45)	21	32	18	32
Co-Training (NB)	4	22	4	25
Co-Training (SMO)	26	34	20	34
Democratic-Co	27	34	26	34
SETRED	12	29	12	33
TriTraining (NN)	8	22	5	25
TriTraining (C45)	28	34	25	34
TriTraining (NB)	10	27	9	28
TriTraining (SMO)	9	30	7	32
DE-TriTraining (NN)	9	25	6	29
DE-TriTraining (C45)	15	28	12	30
DE-TriTraining (NB)	4	20	4	25
DE-TriTraining (SMO)	15	30	11	31
CoForest	21	34	16	34
Rasco (NN)	0	2	0	2
Rasco (C45)	5	26	4	27
Rasco (NB)	3	14	3	18
Rasco (SMO)	2	13	2	15
Co-Bagging (NN)	13	30	10	30
Co-Bagging (C45)	28	34	24	34
Co-Bagging (NB)	7	23	5	27
Co-Bagging (SMO)	14	30	11	33
Rel-Rasco (NN)	0	2	0	2
Rel-Rasco (C45)	4	26	4	26
Rel-Rasco (NB)	3	14	3	20
Rel-Rasco (SMO)	2	10	2	14
CLCC	0	8	0	10
APSSC	3	15	2	18
SNNRCE	17	33	13	33
ADE-CoForest	6	25	3	28

Table 3: Wilcoxon test summary results