

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)	-	565.0	932.0	742.5	903.5	573.0	872.0	557.0	482.0	523.5	966.5	470.5	835.0	579.0	773.0	621.0	844.0	916.0	596.5	1509.0	1165.0	1130.0	1203.0	520.0	497.0	810.5	499.0	1921.0	1177.0	1112.0	1215.0	1148.0	1063.0	772.0	772.0		
Self-Training (C45) (2)	975.0	-	1159.0	767.0	1010.5	766.0	1069.0	901.0	638.5	949.0	973.0	462.5	1036.0	842.5	981.0	970.0	1122.0	872.5	606.0	1506.0	1534.0	1327.0	1405.0	875.0	521.0	1037.5	882.0	1511.0	1560.5	1338.0	1431.5	1298.0	1150.0	955.0	958.0		
Self-Training (NB) (3)	533.0	326.0	-	549.0	555.0	315.0	221.0	476.0	1133.0	523.0	591.0	290.0	174.0	425.0	501.0	394.0	388.0	435.0	425.0	1239.0	1011.5	1070.5	1062.0	407.5	297.0	210.0	423.0	1952.0	1091.0	1009.0	1069.0	964.0	724.0	517.5	549.5		
Self-Training (SMO) (4)	742.5	568.0	901.0	-	830.0	969.5	898.5	468.5	524.0	748.0	792.0	414.0	812.5	503.5	674.5	685.0	963.5	662.0	665.0	1429.0	1088.0	1144.0	1243.0	648.0	534.0	833.0	998.0	1436.0	1227.0	1122.0	1291.0	1143.0	921.5	764.0	891.5		
Co-Training (NN) (5)	581.5	529.5	910.0	655.0	-	555.0	828.0	599.0	461.0	498.0	875.5	469.0	774.0	594.0	746.5	583.0	842.5	491.0	551.0	1402.0	1148.0	1129.0	1156.0	488.5	448.0	783.0	485.5	1418.0	1155.0	1115.0	1172.0	1118.0	1068.0	689.5	752.5		
Co-Training (C45) (6)	391.0	495.0	1245.0	579.5	985.0	-	1058.5	911.0	933.0	986.0	1000.0	602.5	1010.0	904.0	890.0	1003.5	1138.5	921.0	600.0	1331.0	1558.0	1343.0	1409.5	529.5	593.5	1067.5	897.5	1112.0	1358.0	1346.5	1406.0	1297.0	1129.0	974.5	1019.0		
Co-Training (NB) (7)	668.0	471.0	1319.0	641.5	712.0	444.5	-	591.0	297.0	621.0	703.0	388.0	438.5	564.0	667.0	671.0	739.5	607.0	519.5	1340.0	1126.0	1380.0	1149.5	635.0	469.0	675.5	380.5	1357.5	1138.5	1339.0	1161.0	1134.0	810.0	643.0	769.0		
Co-Training (SMO) (8)	928.0	699.0	1064.0	1071.5	976.0	629.0	943.0	-	563.0	884.0	980.0	550.0	878.5	848.0	832.0	757.0	968.0	731.5	699.0	1476.0	1353.0	1212.0	1360.0	840.5	591.0	903.5	806.0	1474.5	1361.0	1246.0	1376.0	1135.0	1109.0	635.0	888.0		
Democratic-Cap (9)	1058.0	866.5	1374.0	961.0	1024.0	819.0	1243.0	722.0	-	1042.5	1045.0	745.0	1089.0	876.0	1090.0	1002.0	1252.5	985.0	794.5	1319.0	1447.0	1341.0	1333.0	947.0	781.0	1191.5	884.0	1533.0	1443.0	1460.0	1397.0	1362.0	1210.5	1684.5	1098.0		
SFTRFD (10)	961.5	691.0	1017.0	767.0	987.0	594.0	864.0	604.0	497.5	-	1038.5	477.5	865.0	638.5	828.5	639.5	873.0	563.0	590.0	1524.0	1190.0	1173.0	1227.0	635.0	512.0	848.5	502.5	1535.0	1215.0	1144.0	1232.0	1137.0	1100.5	904.0	800.5		
IT-Training (NN) (11)	373.5	567.0	949.0	748.0	664.5	540.0	837.0	597.0	431.0	611.5	-	433.0	795.5	610.0	611.5	289.0	801.0	472.0	994.0	1443.0	1147.0	1107.0	1175.0	385.5	438.0	783.0	448.0	1461.0	1167.0	1090.0	1191.0	1131.5	989.0	599.0	744.0		
IT-Training (C45) (12)	1069.5	1022.5	1250.0	1069.0	1071.0	982.5	1152.0	990.0	740.0	1062.5	1052.0	-	1099.0	978.0	1110.5	1155.5	1223.0	1012.0	730.0	1312.0	1530.0	1376.0	1376.0	1022.0	795.5	1068.0	948.0	1526.0	1528.0	1329.0	1339.0	1396.5	1185.0	1052.0	1142.5		
IT-Training (NB) (13)	705.0	694.0	1311.0	672.5	711.0	476.0	1104.5	696.5	396.0	676.0	745.5	441.0	-	691.0	694.0	630.0	934.5	671.0	548.0	1388.0	1179.0	1387.0	1185.0	690.0	446.0	634.5	603.5	1406.0	1182.0	1373.0	1210.0	1186.0	841.0	701.0	765.0		
IT-Training (SMO) (14)	961.0	697.5	1115.0	914.5	949.0	638.0	921.0	631.0	588.0	846.5	930.0	522.0	899.0	-	791.5	833.5	916.0	681.0	684.0	1468.0	1340.0	1228.0	1420.0	738.5	669.0	865.0	643.5	1403.0	1364.0	1226.5	1220.0	1194.5	1044.0	807.0	891.0		
DE-IT-Training (NN) (15)	767.0	659.0	1039.0	865.5	793.5	535.0	873.0	653.0	450.0	711.5	925.5	429.5	791.0	693.5	-	632.5	871.0	463.5	272.0	1513.0	1216.0	1198.0	1212.0	471.0	472.0	796.0	621.0	1514.0	1239.0	1175.0	1226.0	1299.0	1006.0	446.5	796.5		
DE-IT-Training (C45) (16)	919.0	970.0	1091.0	860.0	957.0	481.0	969.0	728.0	433.0	569.0	951.0	384.0	910.0	714.0	852.5	-	1023.0	717.0	579.0	1510.0	1369.0	1289.0	1303.0	779.0	387.0	926.5	740.0	1510.0	1398.0	1276.0	1314.0	1265.0	1074.0	891.0	831.5		
DE-IT-Training (NB) (17)	696.0	363.0	1097.0	636.5	697.5	394.5	764.5	582.0	257.5	667.0	730.0	317.0	601.5	564.0	608.0	462.0	555.0	485.0	1418.0	1196.0	1335.0	1178.0	1367.0	372.5	653.0	610.5	1424.0	1203.0	1328.5	1209.0	1233.0	825.0	680.0	660.5			
DE-IT-Training (SMO) (18)	1024.0	912.5	1105.0	883.0	994.0	619.0	933.0	898.5	592.0	977.0	1068.0	628.0	869.0	894.0	1021.5	823.0	930.0	-	688.0	1321.0	1313.0	1344.0	1344.0	873.5	555.0	809.0	723.0	1518.0	1193.0	1399.5	1234.0	1144.0	1006.0	914.5			
CoForest (19)	943.5	879.0	1060.0	935.0	989.0	880.0	1020.5	786.0	785.5	895.0	946.0	810.0	995.0	856.0	968.0	965.0	1055.0	872.0	802.0	1374.0	1241.5	1196.0	1229.0	866.5	784.0	953.0	813.0	1377.0	1253.0	1185.0	1241.0	1288.5	1022.0	965.5	1109.0		
Racco (NN) (20)	319.0	344.0	301.0	111.0	83.0	277.0	200.0	48.0	30.0	164.0	39.0	179.0	152.0	22.0	30.0	30.0	122.0	13.0	166.0	1074.0	1244.0	802.0	431.0	33.0	40.0	138.5	45.0	832.0	485.0	411.0	414.0	483.0	366.0	444.0	187.0		
Racco (C45) (21)	375.0	6.0	528.5	332.0	392.0	2.0	414.0	187.0	93.0	350.0	393.0	10.0	361.0	200.0	324.0	171.0	344.0	227.0	298.5	1061.0	1021.0	1188.0	623.0	790.0	287.0	2.0	337.0	223.0	1154.0	805.5	643.5	804.0	786.0	562.0	417.0		
Racco (NB) (22)	410.0	213.0	489.5	406.0	411.0	197.0	210.0	328.0	1097.0	397.0	439.0	184.0	192.5	313.0	312.0	251.0	265.0	264.0	344.0	1148.0	917.0	1169.0	923.0	603.0	431.0	919.5	301.0	148.0	1153.0	1335.0	1469.0	925.0	548.0	921.0	760.0	568.0	416.0
Racco (SMO) (23)	339.0	139.0	498.0	324.0	384.0	198.0	399.5	138.0	132.0	313.0	366.0	199.0	388.0	383.0	294.0	182.0	302.0	141.0	312.0	1109.0	960.0	1088.0	1088.0	588.0	109.0	369.0	118.5	1438.0	899.0	838.0	914.0	669.0	318.0	391.0	389.0		
Co-Bagging (NN) (24)	1020.0	665.0	1132.5	837.0	1051.5	610.5	1005.0	699.5	537.5	905.0	1099.5	518.0	950.0	746.5	1069.0	761.0	1064.0	665.5	673.5	1555.0	1253.0	1280.0	1302.0	810.0	549.0	620.5	620.5	1536.0	1265.0	1288.5	1320.0	1288.5	1145.0	1127.5	965.5		
Co-Bagging (C45) (25)	1043.0	964.0	1243.0	1008.0	1036.0	1036.5	1131.0	949.0	759.0	1028.0	1047.0	691.5	1094.0	931.0	1068.0	1153.0	1227.5	985.0	701.0	1590.0	1538.0	1536.0	1440.0	1023.0	-	1078.0	939.0	1530.0	1522.0	1396.0	1446.0	1329.0	1173.0	1042.0	1119.0		
Co-Bagging (NB) (26)	729.5	562.5	1330.0	707.0	757.0	493.5	864.5	638.5	348.5	691.5	757.0	387.0	665.5	620.0	689.0	613.5	887.0	618.0	532.0	1404.5	1293.0	1423.0	1214.0	591.0	407.0	867.0	818.0	1414.0	1217.0	1368.0	1238.5	1224.0	878.0	707.0	753.0		
Co-Bagging (SMO) (27)	1041.0	688.0	1060.0	887.0	999.5	612.0	959.5	679.0	601.0	1053.5	1037.0	597.0	881.5	811.8	911.0	445.0	928.5	762.0	699.0	1456.0	1369.5	1319.5	1369.5	619.5	601.0	867.0	-	1484.0	1340.0	1172.0	1388.0	1149.0	1092.0	994.5	924.5		
Rel-Racco (NN) (28)	19.0	29.0	288.0	104.0	67.0	28.0	182.5	65.5	7.0	5.0	79.0	14.0	134.0	82.0	26.0	30.0	116.0	22.0	163.0	652.0	386.0	371.0	405.0	4.0	16.0	126.0	56.0	-	394.0	386.0	400.0	471.0	312.0	29.0	181.0		
Rel-Racco (C45) (29)	363.0	9.5	419.0	311.0	388.0	4.0	401.5	179.0	32.0	333.0	374.0	12.0	357.5	116.0	301.0	112.0	333.0	203.0	294.0	1039.0	844.5	618.0	841.0	626.0	8.0	333.0	209.0	1091.0	638.0	683.0	688.0	683.0	312.0	463.0			
Rel-Racco (NB) (30)	428.0	202.0	476.0	418.0	426.0	193.5	148.0	324.0	46.0	596.0	450.0	156.0	112.0	319.0	367.0	265.0	211.5	292.0	370.0	1127.0	886.5	906.0	904.0	620.0	150.0	117.0	318.0	1095.0	960.0	-	915.0	786.0	757.0	405.0	433.0		
Rel-Racco (SMO) (31)	325.0	124.5	471.0	194.0	368.0	114.0	379.0	199.0	127.5	398.0	348.0	101.0	330.0	65.0	259.0	171.0	340.0	416.5	299.0	1098.0	976.0	619.0	722.5	251.5	94.0	391.5	97.0	1440.0	776.5	625.0	859.0	687.0	476.0	366.0	365.0		
Rel-C (C45) (32)	392.0	242.0	576.0	371.0	422.0	229.0	352.0	350.0	123.0	348.0	408.5	263.5	353.5	318.5	290.0	220.0	294.0	241.0	291.5	1059.0	614.0	799.0	810.0	620.0	211.0	916.0	359.0	1099.0	824.0	782.0	857.0	621.0	31				

	(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		•	•	•	•	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
Self-Training (SMO) (4)			-			o	o	o	o		o							o	o	•	•	•	•	o	o			•	•	•	•	•	•	•	•	•	
Co-Training (NN) (5)				-		o	o	o	o		•	o	o		•	•	•	•	•	•	•	•	•	o	o			•	•	•	•	•	•	•	•	•	
Co-Training (C45) (6)			•		-	•	•				•	o	o		•	•	•	•	•	•	•	•	•	o	o	•	•	•	•	•	•	•	•	•	•	•	
Co-Training (NB) (7)		o	•			o	-		o		o	o	o		•	•	•	•	•	•	•	•	•	o	o			•	•	•	•	•	•	•	•	•	
Co-Training (SMO) (8)			•	•	•	•		-			•	o						•	•	•	•	•	•	o	o			•	•	•	•	•	•	•	•	•	
Democratic-Co (9)	•		•	•	•		•		-	•	•	o		•	•	•	•	•	•	•	•	•	•	o	o	•	•	•	•	•	•	•	•	•	•	•	
SETRFD (10)			•	•	•				o	-	•	o					o		•	•	•	•	•	o	o		o	•	•	•	•	•	•	•	•	•	
TriTraining (NN) (11)			•	•	•				o	-	•	o					o		•	•	•	•	•	o	o		o	•	•	•	•	•	•	•	•	•	
TriTraining (C45) (12)	•	•	•	•	•	•	•	•	•	•	•	-	•	•	•	•	•	•	•	•	•	•	•	o	o		•	•	•	•	•	•	•	•	•	•	
TriTraining (NB) (13)	o	•	•	•	•	o	•		o		o	-					o		•	•	•	•	•	o	o			•	•	•	•	•	•	•	•	•	
TriTraining (SMO) (14)			•										-				•		•	•	•	•	•					•	•	•	•	•	•	•	•	•	
DE-TriTraining (NN) (15)			•						o		o			-			o	o	•	•	•	•	•	o	o			•	•	•	•	•	•	•	•	•	
DE-TriTraining (C45) (16)			•			o			o		o					-	•		•	•	•	•	•	o	o			•	•	•	•	•	•	•	•	•	
DE-TriTraining (NB) (17)		o	•			o			o		o	-				o		•	•	•	•	•	•	o	o			•	•	•	•	•	•	•	•	•	
DE-TriTraining (SMO) (18)	•		•		•				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	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	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	o	o	o
Co-Bagging (NN) (24)	•	•	•	•	•	•	•	•	•	•	•	o		•	•	•	•	•	•	•	•	•	•	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	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	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	o	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	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
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
SNNRCE (34)	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
ADE-CoForest (35)						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)	11	25	10	28
Self-Training (C45)	22	32	16	33
Self-Training (NB)	8	13	8	16
Self-Training (SMO)	10	28	9	31
Co-Training (NN)	10	23	10	25
Co-Training (C45)	23	32	17	32
Co-Training (NB)	10	25	10	26
Co-Training (SMO)	14	33	13	34
Democratic-Co	26	34	24	34
SETRED	14	29	13	30
TriTraining (NN)	10	23	9	27
TriTraining (C45)	31	34	28	34
TriTraining (NB)	11	28	11	29
TriTraining (SMO)	12	33	11	34
DE-TriTraining (NN)	11	26	11	29
DE-TriTraining (C45)	13	29	12	30
DE-TriTraining (NB)	10	25	10	26
DE-TriTraining (SMO)	17	31	16	32
CoForest	18	34	14	34
Rasco (NN)	0	1	0	1
Rasco (C45)	2	8	2	9
Rasco (NB)	2	7	2	9
Rasco (SMO)	2	8	2	8
Co-Bagging (NN)	18	31	18	32
Co-Bagging (C45)	28	34	26	34
Co-Bagging (NB)	10	28	10	29
Co-Bagging (SMO)	16	33	15	34
Rel-Rasco (NN)	0	1	0	1
Rel-Rasco (C45)	2	8	2	8
Rel-Rasco (NB)	3	8	2	9
Rel-Rasco (SMO)	2	8	2	8
CLCC	2	9	2	9
APSSC	9	16	6	17
SNNRCE	11	27	10	29
ADE-CoForest	10	28	9	29

Table 3: Wilcoxon test summary results