

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)	-	644.0	1003.0	832.0	993.5	658.0	907.0	639.0	526.0	401.5	755.5	582.0	886.0	678.5	832.5	932.0	651.0	604.0	1540.0	1182.0	1263.0	597.0	592.0	908.5	608.0	1628.5	1174.0	1157.5	1174.0	1166.0	1102.0	381.5	801.0			
Self-Training (C45) (2)	896.0	-	1176.0	956.5	1012.0	716.5	1095.0	858.0	618.5	849.5	903.5	338.5	1041.0	905.0	968.0	1096.5	1194.5	949.0	374.0	1510.0	1518.0	1284.0	1412.0	884.5	389.0	1108.0	881.5	1510.0	1518.0	1342.0	1410.0	1270.0	1163.5	803.0	971.5	
Self-Training (NB) (3)	537.0	364.0	-	543.0	596.0	307.5	339.0	414.5	1531.0	492.0	540.0	308.0	215.5	542.0	507.0	438.0	481.0	563.0	436.0	1283.0	1029.0	1083.5	1098.0	435.5	313.0	334.0	417.0	1275.5	1015.0	1105.0	1105.0	311.0	709.0	431.0	544.0	
Self-Training (SMO) (4)	708.0	603.5	997.0	-	879.5	616.0	918.0	918.0	568.5	666.0	717.5	533.5	858.5	745.5	691.5	746.0	901.0	657.0	637.0	1447.0	1228.0	1184.0	1366.0	671.0	544.0	909.0	624.5	1436.0	1224.0	1449.0	1389.0	1141.0	970.0	619.5	868.0	
Co-Training (NN) (5)	491.5	528.0	889.0	605.5	-	570.0	794.0	495.0	429.0	373.5	524.0	455.0	789.0	572.5	635.5	556.0	838.0	569.0	436.0	1449.0	1127.0	1000.0	1165.0	448.0	457.0	815.0	513.0	449.0	1124.0	1087.0	1171.0	1059.5	948.5	281.5	662.5	
Co-Training (C45) (6)	824.0	688.8	1142.5	923.0	970.0	-	1057.0	811.0	626.0	818.8	876.6	814.0	1031.0	901.0	824.0	971.0	1188.0	919.0	588.5	1814.0	1331.0	1331.0	1416.0	889.0	901.0	1072.5	898.6	1312.0	1243.0	1311.0	1407.0	1266.5	1052.5	671.0	990.0	
Co-Training (NB) (7)	633.0	485.0	1283.0	628.0	746.0	483.0	-	586.0	426.5	588.5	624.0	490.0	462.5	656.0	667.5	582.5	638.0	656.0	810.0	1386.0	1111.0	1974.0	1188.5	565.0	482.0	816.5	594.5	1383.0	1109.0	1410.0	1201.0	1109.8	808.0	926.0	680.0	
Co-Training (SMO) (8)	901.0	682.0	1065.5	967.0	1045.0	699.0	954.0	-	586.0	840.5	919.0	611.0	924.0	1026.0	824.0	884.0	1032.0	814.0	696.0	1513.0	1352.0	1254.0	1433.0	814.0	613.0	985.0	818.0	1302.0	1350.0	1249.0	1461.0	1165.0	1164.0	760.5	900.0	
Demorenic-Exp (9)	1014.0	921.5	1357.0	971.5	1111.0	915.0	1131.5	954.0	-	970.0	1021.0	971.5	1299.0	991.0	1059.0	1164.5	1399.0	1071.0	742.0	1540.0	1494.0	1417.0	1436.0	1031.0	898.0	1331.0	974.5	1340.0	1347.0	1456.0	1440.0	1524.0	1212.0	566.0	1159.0	
SFTRFD (10)	1138.5	690.5	1048.0	839.0	1111.5	724.5	951.5	709.5	570.0	-	1093.0	619.0	917.0	761.0	887.5	731.0	975.0	794.0	645.5	1540.0	1206.0	1285.0	1283.5	727.5	625.0	947.5	667.5	1479.0	1285.0	1184.0	1296.0	1191.5	1150.5	479.5	832.0	
IT-Training (NN) (11)	699.5	636.5	1004.0	822.5	1036.0	663.5	916.0	621.0	519.0	447.0	-	665.0	889.5	631.0	631.0	829.5	703.5	599.0	596.0	627.0	1511.0	1188.0	1186.0	1267.0	626.0	571.0	907.0	551.0	1327.0	1188.0	1188.0	1282.0	1174.0	1166.0	462.0	824.5
IT-Training (C45) (12)	959.0	1201.5	1214.0	1006.5	1085.0	1143.0	1113.0	929.0	748.5	921.0	975.0	-	1079.0	973.0	1030.0	1220.0	1270.0	1032.0	1054.0	1523.0	1329.0	1382.0	1430.5	969.5	817.5	1173.0	957.0	1329.0	1518.0	1382.0	1429.0	1520.0	1369.5	871.0	1162.5	
IT-Training (NB) (13)	654.0	499.0	1324.5	681.5	751.0	696.0	1137.5	616.0	285.0	623.0	644.5	410.0	-	677.0	706.0	612.0	1026.0	698.0	810.0	1413.0	1178.5	1426.0	1220.0	594.0	444.5	1134.5	628.0	1413.0	1162.0	1486.0	1224.0	1118.0	829.0	683.5	722.5	
IT-Training (SMO) (14)	867.5	633.0	968.0	739.5	967.5	639.0	884.0	314.0	549.0	719.0	969.0	367.0	861.0	-	786.0	715.5	889.0	699.0	620.0	1496.0	1308.0	1173.0	1463.0	758.5	573.0	872.0	609.5	1492.0	1299.0	1193.0	1465.0	1097.0	982.0	711.5	888.0	
DE-IT-Training (NN) (15)	707.5	632.0	1033.0	845.5	904.5	638.0	872.5	710.0	445.0	623.5	715.5	310.0	833.0	699.0	-	723.5	682.5	533.5	1501.0	1221.0	1164.5	1272.0	1265.5	527.0	913.0	638.0	1366.0	1229.0	1193.5	1287.0	1139.0	995.5	529.0	743.0		
DE-IT-Training (C45) (16)	856.5	603.5	1104.0	751.0	984.0	566.0	957.5	706.0	320.5	809.0	836.5	320.0	873.0	955.5	769.5	-	1087.5	791.0	520.0	1511.0	1374.0	1296.5	1336.0	726.5	329.0	972.0	743.0	1599.0	1376.0	1284.0	1366.0	1283.0	1045.0	754.0	790.0	
DE-IT-Training (NB) (17)	698.0	345.5	1059.0	570.0	702.0	382.0	702.0	508.0	141.0	605.0	601.0	270.0	314.0	596.0	517.5	452.5	661.5	449.0	1200.0	1178.5	1297.0	1203.0	488.5	283.0	611.0	687.0	1408.0	1167.0	1348.0	1209.0	1135.0	763.0	699.0	530.0		
DE-IT-Training (SMO) (18)	909.0	591.0	1035.0	848.0	1040.0	695.0	884.0	749.0	442.0	836.0	889.0	508.0	842.0	841.0	996.5	745.0	978.5	-	615.0	1557.0	1301.0	1233.5	1413.0	862.0	515.0	914.0	720.5	1533.0	1305.0	1396.5	1223.5	1083.5	721.0	888.5		
CoForest (19)	936.0	966.0	1104.0	953.0	1084.0	980.5	1030.0	844.0	798.0	894.5	913.0	889.5	1030.0	865.0	948.0	1020.0	1091.0	925.0	-	1399.0	1241.0	1198.0	1268.0	901.0	908.0	1053.5	867.5	1386.5	1242.0	1301.0	1285.0	1274.0	1017.5	526.0	1034.0	
Rasco (NN) (20)	309	300	2097.0	610	910	360	154.0	229	400	30	30	187.0	129	440	280	260	1500.0	30	111.0	225.0	355.0	301.0	277.0	180	129.5	30	609.5	224	311.0	360	382	281.0	43	113.0		
Rasco (C45) (21)	358.0	21.0	520.0	312.0	413.0	9.0	429.0	187.0	46.0	314.0	364.5	13.0	364.5	232.0	313.0	165.0	363.5	239.0	299.0	1242.0	1210.0	922.0	1210.0	987.0	289.0	165.0	1099.0	327.5	1204.0	912.0	670.0	988.5	694.0	547.0	381.0	318.5
Rasco (NB) (22)	356.0	201.0	456	386.0	440.0	202	466.0	286.0	637.0	335.0	345.0	188.0	114.0	367.0	320.0	243.5	388.0	366.5	342.0	1215.0	922.0	1210.0	922.0	987.0	289.0	165.0	1099.0	327.5	1204.0	912.0	670.0	988.5	694.0	547.0	381.0	318.5
Rasco (SMO) (23)	294	128.0	444.0	196	355.0	124.0	381.5	87.0	104.0	266.5	294.0	108.5	320.0	367.0	268.0	181.0	339.0	129.0	1292.0	1298.0	836.0	833.0	-	987.0	289.0	165.0	1099.0	327.5	1204.0	912.0	670.0	988.5	694.0	547.0	381.0	318.5
Co-Bagging (NN) (24)	943.0	655.5	1104.5	869.0	1091.0	677.0	975.0	726.0	454.0	812.5	920.0	570.5	891.0	781.5	974.5	813.5	1051.5	678.0	635.0	1559.0	1263.0	1253.0	1316.0	224.0	540.0	1004.5	691.5	1536.0	1256.0	1266.0	1283.0	1101.5	686.5	881.0		
Co-Bagging (C45) (25)	948.0	1096.0	1225.0	996.0	1085.0	1124.0	1108.0	927.0	732.0	915.0	969.0	722.5	1095.5	967.0	1003.0	1211.0	1237.0	1025.0	632.0	1522.0	1522.0	1375.0	1456.0	939.0	1115.0	962.0	1528.0	1516.0	1386.0	1461.0	1310.0	1141.5	871.5	1073.0		
Co-Bagging (NB) (26)	631.5	482.0	1186.0	631.0	725.0	447.5	723.5	585.0	203.0	592.5	631.0	367.0	405.5	668.0	627.0	569.0	889.0	626.0	486.5	1414.5	1174.0	1431.0	1228.0	535.5	385.0	616.0	408.0	1174.0	1433.0	1244.0	1122.0	768.0	517.0	653.5		
Co-Bagging (SMO) (27)	932.0	688.5	1069.0	918.5	1027.0	663.5	948.5	667.0	562.5	823.5	989.0	583.0	814.0	693.0	814.0	983.0	764.5	672.5	1551.0	1480.0	1412.5	1443.0	848.5	978.0	924.0	1044.0	1634.0	1417.0	1226.0	873.5	1123.0	1005.5	911.0	913.0		
Rel-Rasco (NN) (28)	11.5	30.0	261.5	84.0	101.0	28.0	157.0	37.0	0.0	6.0	13.0	15.0	125.0	48.0	34.0	31.0	132.0	5.0	133.5	301.5	248.0	336.0	355.0	4.0	12.0	132.0	6.0	-	233.0	358.0	388.0	295.0	8.0	151.0		
Rel-Rasco (C45) (29)	369.0	221.0	625.0	316.0	416.0	134.0	431.0	150.0	63.0	333.0	352.0	22.0	376.0	211.0	311.0	164.0	314.0	231.0	298.0	1316.0	849.0	668.0	940.0	282.0	43.0	366.0	223.0	1407.0	666.5	962.0	699.0	545.5	289.5	420.0		
Rel-Rasco (NB) (30)	382.5	198.0	439.0	391.0	453.0	206.0	130.0	291.0	54.0	366.0	372.0	158.0	54.0	345.0	346.5	246.0	1																			

	(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	$\alpha = 0.9$		$\alpha = 0.95$	
	+	$\pm$	+	$\pm$
Self-Training (NN)	12	31	11	31
Self-Training (C45)	18	31	17	32
Self-Training (NB)	8	11	8	16
Self-Training (SMO)	11	30	9	33
Co-Training (NN)	9	18	9	21
Co-Training (C45)	17	31	15	32
Co-Training (NB)	10	25	10	26
Co-Training (SMO)	15	34	14	34
Democratic-Co	28	34	23	34
SETRED	15	32	14	33
TriTraining (NN)	12	28	11	31
TriTraining (C45)	26	34	23	34
TriTraining (NB)	13	28	13	28
TriTraining (SMO)	12	30	10	33
DE-TriTraining (NN)	12	28	10	31
DE-TriTraining (C45)	14	28	12	29
DE-TriTraining (NB)	10	19	10	23
DE-TriTraining (SMO)	14	31	12	31
CoForest	20	34	18	34
Rasco (NN)	0	1	0	1
Rasco (C45)	2	8	2	9
Rasco (NB)	4	8	2	9
Rasco (SMO)	2	6	2	8
Co-Bagging (NN)	16	31	14	33
Co-Bagging (C45)	26	34	21	34
Co-Bagging (NB)	10	24	10	25
Co-Bagging (SMO)	13	33	12	34
Rel-Rasco (NN)	0	1	0	1
Rel-Rasco (C45)	2	8	2	9
Rel-Rasco (NB)	4	8	2	9
Rel-Rasco (SMO)	2	6	2	8
CLCC	2	9	2	9
APSSC	9	16	5	18
SNNRCE	19	33	19	34
ADE-CoForest	11	29	9	30

Table 3: Wilcoxon test summary results