

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)	-	628.0	1033.5	823.0	914.5	797.0	868.0	685.0	838.0	397.5	669.0	938.0	889.5	731.0	699.0	641.5	871.0	623.0	602.0	1395.0	1043.0	1007.0	1074.0	648.5	583.0	912.0	728.0	1392.5	1073.0	1015.0	1083.0	982.5	1050.0	564.5	743.5
Self-Training (C45) (2)	912.0	-	950.5	1002.0	923.5	1069.0	921.0	727.0	782.0	841.5	431.0	1051.0	930.0	883.0	973.5	1146.0	974.0	624.0	1463.5	1452.5	1186.0	1242.0	876.5	523.5	1088.0	924.0	1478.5	1466.5	1187.0	1269.0	1061.5	1063.0	808.5	918.0	
Self-Training (NB) (3)	366.5	293.5	-	353.0	378.0	413.5	296.5	394.0	138.0	433.0	440.5	294.0	292.5	324.0	384.0	416.0	341.5	346.0	403.0	1058.0	931.0	944.0	303.0	355.0	285.0	318.0	830.0	1106.5	836.0	397.5	883.0	972.5	692.0	488.0	497.0
Self-Training (SMO) (4)	715.0	534.5	1005.0	-	858.0	683.0	872.5	571.0	519.5	628.0	672.5	435.0	866.0	617.5	649.0	677.5	921.0	688.0	590.0	1270.0	1042.0	981.0	1187.0	684.0	440.0	883.5	679.5	1282.0	1060.0	984.0	1219.5	899.0	906.0	638.0	780.0
Co-Training (NN) (5)	570.5	538.0	962.0	682.0	-	689.5	823.5	636.5	462.0	307.5	651.5	448.0	835.0	690.0	609.5	602.0	821.0	593.0	499.0	1267.0	1383.0	960.0	1036.0	576.0	492.0	889.5	683.0	1337.5	1021.5	948.5	1062.0	898.0	913.0	547.0	708.0
Co-Training (C45) (6)	743.0	561.5	1074.5	720.0	795.5	-	891.0	796.5	516.5	652.0	659.5	291.0	904.0	776.0	703.0	691.0	922.5	752.5	540.0	1405.0	1305.0	1067.0	1230.5	725.5	347.5	817.0	854.0	1301.0	1383.5	1077.5	1211.0	972.0	947.0	656.0	778.0
Co-Training (NB) (7)	614.0	471.0	1263.5	667.5	716.5	649.0	-	607.0	307.5	546.0	660.0	441.0	833.5	677.0	623.0	882.0	687.5	622.0	519.0	1256.0	882.0	1024.5	1072.0	615.0	437.5	855.5	721.5	1271.5	1041.5	1058.0	1054.0	889.0	823.5	836.5	632.0
Co-Training (SMO) (8)	816.0	619.0	1046.0	969.0	980.5	743.5	878.0	-	575.5	725.0	716.0	522.0	911.0	885.0	778.0	763.0	947.0	783.0	656.0	1351.0	1096.0	1003.0	1227.0	814.5	528.5	1214.0	830.0	1356.0	1146.0	987.0	1280.0	1068.0	975.5	703.0	863.0
Democratic99 (9)	1095.0	819.0	1392.0	965.5	1076.0	968.5	1174.5	964.5	-	309.0	931.5	684.5	1159.5	980.0	938.5	1095.5	1220.5	928.5	750.0	1476.0	1369.0	1210.0	1286.5	908.5	432.0	1266.0	1009.5	1436.0	1388.0	1245.5	1249.0	1154.0	1105.5	926.0	990.0
SF-PRED (10)	1147.5	793.0	1087.0	857.0	1077.5	833.0	939.0	790.0	631.0	-	876.0	612.5	947.0	806.0	829.0	776.0	953.0	774.0	683.0	1423.0	1099.0	1059.0	1120.0	814.0	656.0	969.5	771.0	1423.0	1119.0	1057.0	1136.5	1089.0	1098.0	779.5	856.0
Tf-Training (NN) (11)	816.0	698.5	1099.5	867.5	988.5	881.5	925.0	824.0	588.5	609.0	-	356.0	936.0	826.0	755.5	693.5	959.0	749.0	685.0	1399.0	1098.0	1074.0	1159.0	728.0	634.0	986.0	723.5	1440.0	1144.0	1063.0	1126.5	989.5	1083.5	714.5	780.5
Tf-Training (C45) (12)	1092.0	1054.0	1276.0	1059.0	1092.0	1249.0	1119.0	1018.0	855.5	927.5	945.0	-	1102.0	1056.0	992.0	1124.5	1201.0	1047.0	728.5	1510.0	1379.0	1235.5	1333.0	1062.0	911.0	1148.0	1017.5	1315.0	1310.0	1193.0	1346.0	1124.0	1139.0	913.5	1012.5
Tf-Training (NB) (13)	650.5	489.0	1222.5	674.0	705.0	636.0	850.5	629.0	360.5	593.0	604.0	438.0	-	676.0	630.0	615.0	792.5	625.0	487.0	1256.5	889.5	1076.5	1095.0	631.0	459.0	1149.5	725.0	1284.0	1052.5	1107.5	1043.0	884.0	822.0	579.0	662.0
Tf-Training (SMO) (14)	809.0	659.0	1013.0	822.5	850.0	709.0	863.0	599.5	541.0	1143.0	714.0	284.0	864.0	-	747.0	682.0	889.0	864.5	606.0	1422.0	1088.0	971.0	1223.0	782.0	609.0	963.0	749.0	1339.0	1143.0	981.0	1238.0	893.0	918.0	617.0	834.0
DE-Tf-Training (NN) (15)	841.0	602.0	1056.0	856.0	930.5	782.0	917.0	761.0	545.5	656.0	784.5	463.0	910.0	738.0	-	804.5	926.0	698.5	657.0	1413.0	1132.0	1022.0	1133.0	609.0	540.0	917.0	796.5	1406.5	1161.0	1035.0	1126.0	1013.0	1027.0	703.0	778.0
DE-Tf-Training (C45) (16)	898.5	641.5	1124.0	807.5	938.0	794.0	958.0	777.0	441.5	764.0	791.5	360.5	925.0	803.0	745.5	-	1016.0	844.5	568.0	1435.0	1224.0	1059.5	1134.0	812.0	429.0	949.0	846.0	1407.0	1279.0	1033.0	1145.0	1033.5	1020.0	782.0	711.0
DE-Tf-Training (NB) (17)	698.0	394.0	1118.5	619.0	719.0	517.5	797.5	583.0	319.5	387.0	581.0	339.0	747.5	611.0	559.0	324.0	-	389.0	481.0	1264.5	1021.0	973.0	1039.0	437.0	349.0	814.0	687.5	1257.0	1064.0	1030.0	1031.0	882.0	781.5	562.0	588.0
DE-Tf-Training (SMO) (18)	917.0	611.0	1029.0	796.0	947.0	747.5	863.0	702.0	486.5	711.0	736.0	438.0	861.0	655.5	786.5	640.5	-	624.5	480.0	1108.0	1042.0	1163.5	810.5	468.0	881.0	804.0	1418.0	1148.0	1145.0	1174.0	967.0	1045.0	800.0	833.5	
CoForest (19)	938.0	919.0	1137.0	950.0	1041.0	1000.0	1023.0	884.0	804.0	857.0	855.0	811.5	998.0	935.0	883.0	972.0	1059.0	915.5	-	1329.0	1131.0	1096.0	1156.0	858.0	847.0	1067.5	899.0	1336.0	1186.0	1100.0	1115.0	1075.0	941.0	827.0	983.0
Racco (NN) (20)	30.0	76.8	436.5	240.0	218.0	138.5	284.0	189.0	66.0	92.0	141.0	30.0	283.8	138.3	122.0	105.0	249.5	31.0	211.0	-	229.0	392.0	468.0	32.0	30.0	438.0	292.0	832.0	397.0	413.0	329.0	383.0	425.0	384.0	283.0
Racco (C45) (21)	497.0	87.5	692.0	498.0	557.0	235.0	503.0	444.0	231.0	441.0	442.0	61.0	955.5	452.0	408.0	316.0	519.0	377.0	354.0	1111.0	-	129.0	635.0	852.0	435.0	55.0	855.0	474.0	1164.0	803.0	855.0	735.0	703.0	628.0	527.0
Racco (NB) (22)	533.0	344.0	811.0	559.0	580.0	473.0	515.5	539.0	275.0	481.0	466.0	368.5	463.5	569.0	518.0	480.5	565.0	498.0	444.0	1148.0	905.0	-	966.0	456.0	316.0	528.0	616.0	1168.0	925.0	549.0	956.0	750.0	715.0	662.0	661.0
Racco (SMO) (23)	411.0	233.0	637.0	289.0	504.0	397.5	469.0	358.0	237.5	365.0	381.0	152.0	375.0	392.0	352.0	311.0	501.0	319.5	384.0	1072.0	688.0	551.0	-	324.0	154.5	494.0	370.0	1096.0	791.0	582.0	707.5	638.0	613.0	377.0	472.0
Co-Bagging (NN) (24)	891.5	663.5	1085.0	896.0	909.0	814.5	926.0	725.5	541.5	726.0	812.0	538.0	909.0	768.0	876.0	728.0	996.5	725.5	629.0	1458.0	1105.0	1029.0	1208.0	545.0	343.0	754.0	1474.0	1192.0	1089.0	1190.0	1046.5	1023.0	1092.5	882.5	
Co-Bagging (C45) (25)	957.0	961.5	1282.0	1045.0	1048.0	1137.5	1102.5	1011.5	808.0	884.0	906.0	574.0	1081.0	1016.0	945.0	1056.0	1181.0	1017.0	683.0	1501.0	1485.0	1224.0	1330.5	995.0	-	1109.0	1066.0	1506.0	1524.0	1182.5	1334.0	1081.5	1086.0	885.5	967.0
Co-Bagging (NB) (26)	628.0	482.0	1108.0	646.5	800.5	603.0	828.5	626.0	333.0	600.5	654.0	322.0	898.5	647.0	628.0	591.0	688.5	604.0	422.5	1292.0	1000.0	989.0	1091.0	897.0	376.0	-	1109.0	1066.0	1384.0	886.0	1059.0	966.0	831.0	628.0	
Co-Bagging (SMO) (27)	812.0	561.0	960.0	805.5	847.0	716.0	818.5	585.0	539.5	769.0	711.5	467.5	815.0	781.0	694.5	639.0	854.5	681.0	641.0	1288.0	1066.0	924.0	1162.0	806.0	479.0	539.0	-	1307.0	1083.0	942.0	1140.0	879.0	904.0	739.5	757.5
Rel-Racco (NN) (28)	92.5	60.5	433.5	258.0	192.5	139.0	268.5	184.0	35.0	62.0	133.0	27.0	256.0	133.5	133.0	133.0	283.0	122.0	204.0	653.0	276.0	374.0	441.0	66.0	34.0	256.0	233.0	-	380.0	399.5	271.0	442.0	41.0	302.0	
Rel-Racco (C45) (29)	367.0	443.5	639.0	350.0	418.5	166.5	387.5	394.0	210.0	321.0	406.0	30.0	487.5	307.0	379.0	211.0	410.0	340.0	354.0	1063.0	624.0	613.0	801.0	388.0	16.0	333.0	462.0	1096.0	-	633.0	958.5	688.0	668.0	361.0	669.0
Rel-Racco (NB) (30)	628.0	353.0	912.5	556.0	591.5	462.4	427.0	398.0	239.5	483.0	477.0	292.0	432.5	360.0	369.0	652.0																			

	(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)	-		•						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		
Co-Training (NN) (5)									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		
Co-Training (SMO) (8)			•					-				o							•	•	•	•	•		o			•	•	•	•	•	•	•	•	o		
Democratic-Co (9)	•		•		•		•		-				•	•	•	•	•	•			•	•	•	•	•		•	•	•	•	•	•	•	•	•			
SETRFD (10)	•		•		•		•			-										•	•	•	•	•				•	•	•	•	•	•	•	•	•		
TriTraining (NN) (11)			•		•		•				-									•	•	•	•	•				•	•	•	•	•	•	•	•	•		
TriTraining (C45) (12)		•	•	•	•	•	•	•	•			-	•	•	•	•	•	•			•	•	•	•	•		•	•	•	•	•	•	•	•	•	•		
TriTraining (NB) (13)		o	•						o			-							o	•	•	•	•	•		o	•			•	•	•	•	•	•	•		
TriTraining (SMO) (14)			•									o		-						•	•	•	•	•		o	•			•	•	•	•	•	•	•		
DE-TriTraining (NN) (15)			•									o		-						•	•	•	•	•		o	•			•	•	•	•	•	•	•		
DE-TriTraining (C45) (16)		o	•						o							-	•			o	•	•	•	•	•		o			•	•	•	•	•	•	•		
DE-TriTraining (NB) (17)		o	•						o							o	-	-		o	•	•	•	•	•	o	o			•	•	•	•	•	•	o		
DE-TriTraining (SMO) (18)		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	o	o	
Rasco (NB) (22)	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	
Co-Bagging (NN) (24)			•	•	•	•	•	•	•				•	•	•	•	•	•			•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	
Co-Bagging (C45) (25)			•	•	•	•	•	•	•				•	•	•	•	•	•			•	•	•	•	•		-	•	•	•	•	•	•	•	•	•	•	
Co-Bagging (NB) (26)		o	•						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
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
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
CLCC (32)		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
SNRCE (34)			•		•		•													•	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•	o
ADE-CoForest (35)			•									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	30	10	32
Self-Training (C45)	19	32	17	33
Self-Training (NB)	2	11	2	12
Self-Training (SMO)	9	29	7	32
Co-Training (NN)	6	26	5	28
Co-Training (C45)	11	30	9	32
Co-Training (NB)	10	27	9	28
Co-Training (SMO)	11	32	8	32
Democratic-Co	26	34	19	34
SETRED	15	34	13	34
TriTraining (NN)	13	34	11	34
TriTraining (C45)	28	34	26	34
TriTraining (NB)	10	29	10	29
TriTraining (SMO)	9	31	7	32
DE-TriTraining (NN)	11	31	11	33
DE-TriTraining (C45)	12	29	12	30
DE-TriTraining (NB)	9	25	8	28
DE-TriTraining (SMO)	11	30	10	30
CoForest	19	34	16	34
Rasco (NN)	0	1	0	1
Rasco (C45)	2	10	2	11
Rasco (NB)	3	12	2	18
Rasco (SMO)	2	9	2	10
Co-Bagging (NN)	12	31	11	34
Co-Bagging (C45)	27	34	23	34
Co-Bagging (NB)	8	24	7	27
Co-Bagging (SMO)	7	31	6	32
Rel-Rasco (NN)	0	1	0	1
Rel-Rasco (C45)	2	10	2	10
Rel-Rasco (NB)	3	14	2	16
Rel-Rasco (SMO)	2	10	2	10
CLCC	2	20	2	23
APSSC	2	20	2	22
SNNRCE	16	34	14	34
ADE-CoForest	7	30	7	32

Table 3: Wilcoxon test summary results