

## Supplementary material

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	method	precision	wLap	C2	Gain	Corr	RSS
rules	Forward	14.59	13.88	11.64	5.82	5.48	3.62
rules	Backward	20.57	19.19	15.07	6.07	5.05	3.79
conditions	Forward	3.19	3.29	3.46	2.87	2.74	2.63
conditions	Backward	3.11	3.23	3.36	2.83	2.78	2.55
actions	Forward	1.58	1.60	1.45	0.95	0.91	0.80
actions	Backward	2.59	2.70	2.78	2.37	2.26	2.00
rule precision source	Forward	0.94	0.94	0.93	0.84	0.82	0.77
rule precision source	Backward	0.88	0.89	0.89	0.81	0.81	0.78
rule precision target	Forward	0.92	0.93	0.92	0.84	0.83	0.83
rule precision target	Backward	0.95	0.95	0.93	0.85	0.84	0.80
rule coverage source	Forward	0.28	0.31	0.43	0.60	0.63	0.69
rule coverage source	Backward	0.31	0.36	0.44	0.62	0.61	0.61
rule coverage target	Forward	0.26	0.30	0.42	0.58	0.59	0.58
rule coverage target	Backward	0.29	0.32	0.42	0.58	0.60	0.66
significant FDR source	Forward	0.83	0.83	0.78	0.75	0.73	0.72
significant FDR source	Backward	0.92	0.96	0.97	0.98	0.98	0.97
significant FDR target	Forward	0.77	0.80	0.74	0.64	0.65	0.58
significant FDR target	Backward	0.97	0.98	0.96	0.96	0.95	0.96

Table 1: Quantitative characteristic of the induced sets of action rules. Average values over 16 benchmark data sets

To better illustrate the results from Table 1, figures 1 and 2 present the plots of the average number of conditions and elementary actions induced by the SCARI algorithm. Figures 3 and 4 give information about the average value of precision and coverage of generated action rules. In figures, the source class is represented by the filled circles and rectangles.

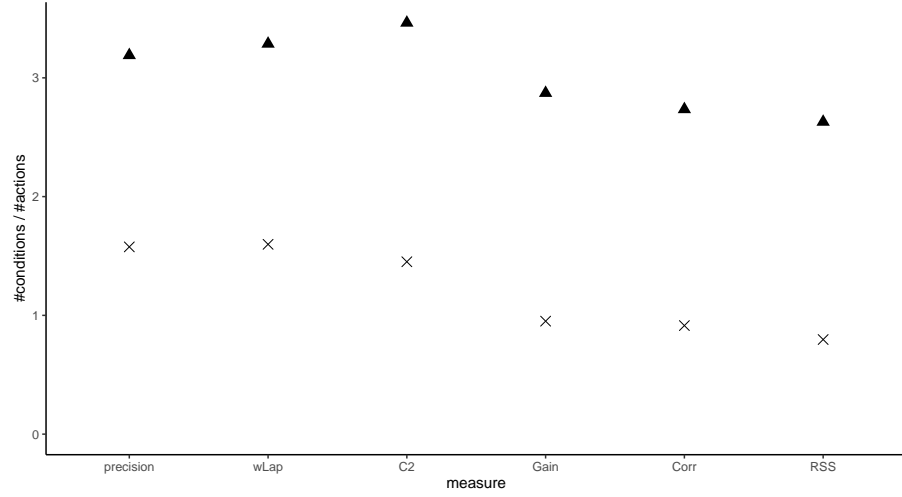


Figure 1: The average number of elementary actions (crosses) and elementary conditions (triangles) induced by the Forward version of the algorithm.

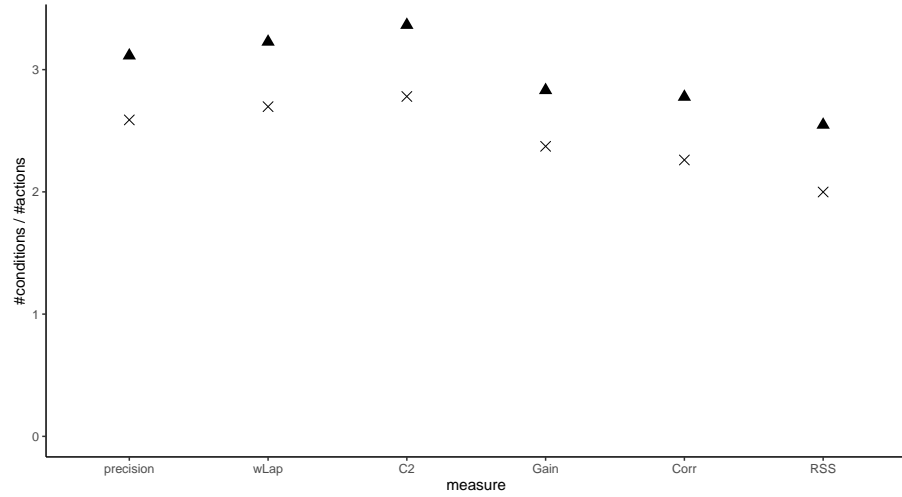


Figure 2: The average number of elementary actions (crosses) and elementary conditions (triangles) induced by the Backward version of the algorithm.

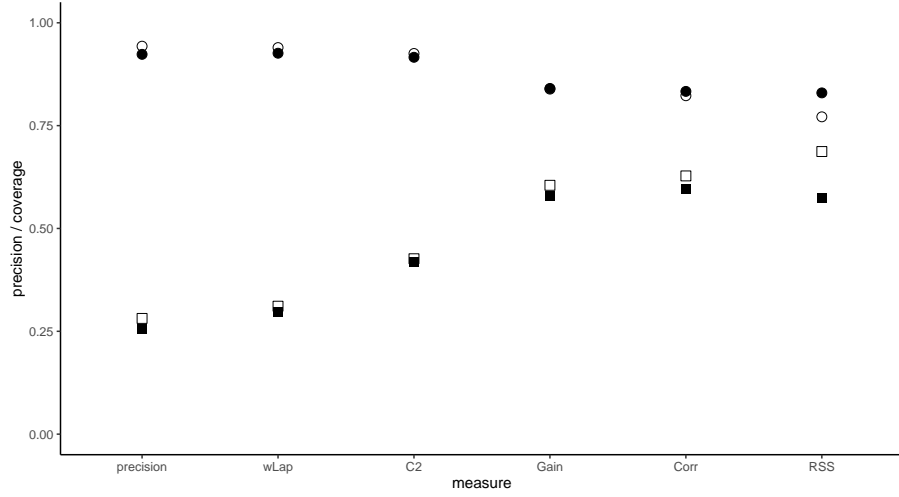


Figure 3: Average precision (circles) and coverage (squares) of the induced action rules. Forward version of the algorithm.

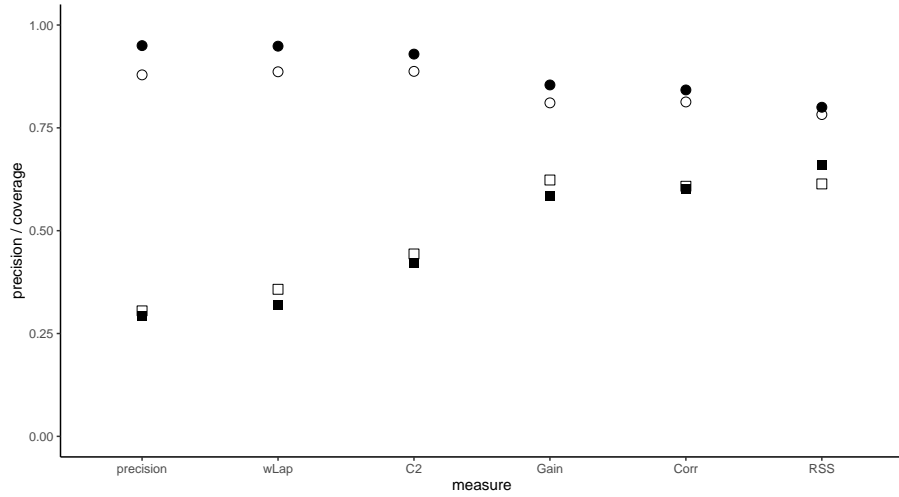


Figure 4: Average precision (circles) and coverage (squares) of the induced action rules. Backward version of the algorithm.

Data set	SCARI-F(C2)	SCARI-B(C2)
car-reduced	0.76	2.78
credit-a	1.06	0.88
credit-g	3.35	3.09
diabetes-c	4.58	3.20
echocardiogram	0.33	0.07
heart-c	0.61	0.29
heart-statlog	0.35	0.30
hepatitis	0.25	0.17
horse-colic	0.34	0.36
hungarian-heart	0.25	0.34
iris-reduced	0.01	0.01
monk1	0.18	0.4
mushroom	4.13	0.76
tic-tac-toe	0.30	0.50
titanic	0.31	1.06
vote	0.04	0.05

Table 2: Running time in seconds. The calculations were made on standard personal computer (Intel(R) Core(TM) i5-6300U 2.50 GHz; 12GB RAM).