	5% CS					
Dataset	PCCC	COPKM	CSC	DILS	LCC	KMEANS
Appendicitis	0.1	**0.0**	5.1	501.4	6.4	0.2
Breast Cancer	**0.3**	–	5.3	1,818.9	104.4	0.2
Bupa	**0.4**	–	2.6	1,658.8	18.9	0.2
Circles	**0.1**	–	1.8	1,346.8	8.6	0.1
Ecoli	1.4	**0.4**	2.0	1,447.1	41.9	0.1
Glass	0.4	**0.2**	1.7	969.1	28.9	0.2
Haberman	**0.4**	–	4.4	1,331.1	9.2	0.2
Hayesroth	0.3	**0.0**	1.7	716.5	7.3	0.2
Heart	**0.6**	–	4.1	1,391.3	22.4	0.2
Ionosphere	**0.4**	–	5.8	1,810.6	71.3	0.2
Iris	0.6	**0.0**	6.4	615.5	6.2	0.3
Led7Digit	1.4	**0.4**	6.1	1,810.3	–	0.2
Monk2	**0.7**	–	4.9	1,801.8	23.6	0.1
Moons	0.3	**0.0**	9.0	1,259.3	6.3	0.2
Movement Libras	**2.1**	5.9	7.5	1,809.3	853.1	0.3
Newthyroid	0.5	**0.0**	4.0	980.6	11.0	0.2
Saheart	**0.6**	–	8.1	1,811.1	39.0	0.2
Sonar	**0.5**	–	5.8	1,480.5	73.0	0.2
Soybean	0.3	**0.0**	1.6	229.7	17.2	0.2
Spectfheart	**0.4**	–	6.8	1,809.9	64.6	0.2
Spiral	**0.4**	–	4.2	1,280.8	7.7	0.3
Tae	0.4	**0.0**	2.8	670.0	8.7	0.2
Vehicle	**2.2**	–	15.3	1,826.6	274.1	0.1
Wine	0.2	**0.1**	5.3	906.4	17.7	0.2
Zoo	0.5	**0.1**	1.4	456.4	23.4	0.3
Sum	**15.8**	21,607.3*	123.5	31,739.7	3,545.2*	5.0

*Nan values (–) are replaced with 1,800 before computing the sum.

Table W12: Average running times (in seconds) of the PCCC algorithm and the four state-of-the-art algorithms (COPKM, CSC, DILS, LCC) for the constraint sets of size 5% CS. The lowest values are stated in bold. The column KMEANS reports the average running time of the unconstrained k-means algorithm. The hyphen indicates that the respective algorithm returned no solution within the time limit of 1,800 seconds.

	10% CS					
Dataset	PCCC	COPKM	CSC	DILS	LCC	KMEANS
Appendicitis	**0.2**	–	1.5	488.8	7.4	0.2
Breast Cancer	**0.2**	–	6.9	1,808.1	445.1	0.2
Bupa	**0.3**	–	4.4	1,795.4	224.0	0.1
Circles	**0.2**	–	2.9	1,397.8	246.7	0.2
Ecoli	1.5	**0.4**	5.1	1,525.9	34.6	0.2
Glass	**0.8**	1.9	5.3	972.2	42.8	0.2
Haberman	0.2	**0.1**	2.7	1,456.0	176.9	0.2
Hayesroth	**0.4**	–	2.7	734.2	11.7	0.2
Heart	**0.1**	–	7.4	1,464.7	117.9	0.3
Ionosphere	**0.3**	–	4.4	1,809.2	1,815.1	0.2
Iris	0.5	**0.0**	3.8	647.8	6.8	0.2
Led7Digit	3.4	**0.5**	4.9	1,808.5	107.0	0.2
Monk2	**0.2**	3.3	3.3	1,809.3	631.6	0.2
Moons	**0.3**	–	4.6	1,396.1	46.1	0.2
Movement Libras	5.3	6.3	**4.9**	1,806.2	1,007.9	0.3
Newthyroid	0.4	**0.1**	2.2	977.6	21.6	0.2
Saheart	**0.2**	2.7	7.0	1,812.8	852.4	0.2
Sonar	**0.3**	–	3.6	1,516.7	269.5	0.2
Soybean	0.2	**0.0**	1.0	246.6	16.4	0.2
Spectfheart	**0.3**	–	5.1	1,809.2	267.0	0.2
Spiral	**0.2**	–	4.7	1,396.3	188.0	0.2
Tae	**0.5**	–	3.7	696.7	11.5	0.3
Vehicle	**0.7**	–	14.3	1,811.9	–	0.2
Wine	0.3	**0.1**	3.5	912.2	19.5	0.2
Zoo	0.4	**0.1**	1.4	481.9	19.1	0.3
Sum	**17.4**	23,415.6*	111.5	32,581.7	8,386.6*	5.3

*Nan values (–) are replaced with 1,800 before computing the sum.

Table W13: Average running times (in seconds) of the PCCC algorithm and the four state-of-the-art algorithms (COPKM, CSC, DILS, LCC) for the constraint sets of size 10% CS. The lowest values are stated in bold. The column KMEANS reports the average running time of the unconstrained k-means algorithm. The hyphen indicates that the respective algorithm returned no solution within the time limit of 1,800 seconds.

	15% CS					
Dataset	PCCC	COPKM	CSC	DILS	LCC	KMEANS
Appendicitis	**0.2**	–	5.3	567.2	16.7	0.2
Breast Cancer	**0.1**	36.1	5.5	1,815.7	27.6	0.2
Bupa	**0.1**	6.4	2.2	1,805.8	1,953.1	0.2
Circles	**0.1**	2.8	5.2	1,552.0	1,850.0	0.3
Ecoli	**1.2**	–	8.0	1,787.9	238.9	0.2
Glass	**0.7**	–	1.9	1,090.4	537.3	0.2
Haberman	**0.1**	1.7	10.7	1,705.6	167.4	0.2
Hayesroth	**0.3**	–	3.4	782.7	59.2	0.2
Heart	**0.3**	1.9	5.1	1,625.7	501.0	0.2
Ionosphere	**0.2**	5.0	2.0	1,807.2	809.4	0.2
Iris	0.6	**0.0**	7.6	759.5	9.5	0.3
Led7Digit	**5.4**	–	12.2	1,817.7	–	0.2
Monk2	**0.3**	15.2	8.3	1,811.8	6.6	0.2
Moons	**0.1**	2.8	5.4	1,568.5	46.7	0.2
Movement Libras	**7.7**	8.8	7.9	1,815.2	1,513.9	0.2
Newthyroid	**0.1**	**0.1**	6.1	1,114.6	192.6	0.2
Saheart	**0.3**	15.5	5.9	1,816.4	–	0.2
Sonar	**0.4**	–	7.3	1,605.9	1,433.7	0.2
Soybean	0.1	**0.0**	0.9	236.1	19.4	0.2
Spectfheart	**0.4**	6.5	6.8	1,812.0	531.7	0.2
Spiral	**0.1**	–	5.5	1,626.3	91.5	0.2
Tae	**0.5**	–	1.9	797.8	83.3	0.2
Vehicle	**0.4**	92.7	16.9	1,847.4	–	0.2
Wine	0.4	**0.1**	3.7	1,027.0	63.1	0.2
Zoo	0.6	**0.1**	6.0	508.5	20.4	0.2
Sum	**20.6**	14,595.9*	151.4	34,704.9	15,573.0*	5.2

*Nan values (–) are replaced with 1,800 before computing the sum.

Table W14: Average running times (in seconds) of the PCCC algorithm and the four state-of-the-art algorithms (COPKM, CSC, DILS, LCC) for the constraint sets of size 15% CS. The lowest values are stated in bold. The column KMEANS reports the average running time of the unconstrained k-means algorithm. The hyphen indicates that the respective algorithm returned no solution within the time limit of 1,800 seconds.

	20% CS					
Dataset	PCCC	COPKM	CSC	DILS	LCC	KMEANS
Appendicitis	**0.2**	–	4.4	606.1	42.8	0.3
Breast Cancer	**0.4**	65.7	5.4	1,847.9	–	0.2
Bupa	**0.2**	11.4	3.5	1,811.6	5.5	0.2
Circles	**0.3**	6.3	4.9	1,807.2	–	0.3
Ecoli	**0.7**	–	7.3	1,806.4	1,360.9	0.2
Glass	**0.4**	–	1.7	1,239.5	1,018.3	0.2
Haberman	**0.3**	4.3	8.7	1,803.4	7.4	0.2
Hayesroth	**0.1**	–	6.4	865.3	68.4	0.2
Heart	**0.2**	4.3	7.2	1,810.7	6.2	0.3
Ionosphere	**0.3**	10.3	2.6	1,815.9	–	0.2
Iris	0.4	**0.0**	5.4	814.4	16.7	0.3
Led7Digit	**2.3**	–	5.0	1,826.6	1,843.0	0.3
Monk2	**0.5**	24.5	5.9	1,818.8	–	0.3
Moons	**0.1**	6.3	4.0	1,804.3	2.9	0.2
Movement Libras	10.0	–	**6.1**	1,815.9	1,850.7	0.3
Newthyroid	0.3	**0.2**	2.8	1,357.8	546.0	0.2
Saheart	**0.4**	28.1	6.2	1,817.4	–	0.2
Sonar	**0.4**	1.5	6.6	1,777.1	19.5	0.4
Soybean	0.4	**0.0**	2.2	243.8	29.0	0.3
Spectfheart	**0.3**	7.9	5.7	1,815.4	760.2	0.2
Spiral	**0.5**	–	4.8	1,811.0	7.5	0.2
Tae	**0.3**	–	5.9	835.5	693.2	0.2
Vehicle	**0.4**	157.0	14.0	1,840.1	–	0.4
Wine	0.4	**0.1**	6.5	1,115.9	658.8	0.2
Zoo	0.5	**0.1**	3.9	539.5	28.5	0.2
Sum	**20.1**	14,728.0*	137.2	36,647.4	19,765.6*	6.3

*Nan values (–) are replaced with 1,800 before computing the sum.

Table W15: Average running times (in seconds) of the PCCC algorithm and the four state-of-the-art algorithms (COPKM, CSC, DILS, LCC) for the constraint sets of size 20% CS. The lowest values are stated in bold. The column KMEANS reports the average running time of the unconstrained k-means algorithm. The hyphen indicates that the respective algorithm returned no solution within the time limit of 1,800 seconds.