2 Detailed Results

In the following, we present the datasets and results in detail. Tables 2 and 3 show the characteristics of the datasets used in the experiments (number of features, the number of objects in each class, and the total number of objects in the datasets).

Tables 4-7, 8-11, and 12-15 display, respectively, ROC AUC, AdjustedPrec@n, and MCC values for Type I experiments for each of the algorithms equipped with their best parameter value according to the different model selection methods (Cross-validation, SDS, Uniform Objects, Perturbation). Tables 16-19, 20-23, and 24-27 display, respectively, ROC AUC, AdjustedPrec@n, and MCC values for Type II experiments for each of the algorithms equipped with their best parameter value according to the different model selection methods (Cross-validation, SDS, Uniform Objects, Perturbation). The highest achieved values for each dataset are shown in bold, and we visualize the distribution of the table values in Figures 4-23.

Tables 28 and 29 display, respectively, ROC AUC and AdjustedPrec@n values for the different approaches to guide the selection of the base models combined into the ensemble. The highest achieved values for each dataset are shown in bold.

Finally, Figure 3 show the complete critical difference diagrams (ROC AUC, AdjustedPrec@n, and MCC) with average ranks of the methods equipped with their best parameter value according to the different practical model selection methods (SDS, Uniform Objects, Perturbation).

Table 2: Description of the datasets used in the experiments.

	Features	Class Size											Total
Abalone	10	1407	1323	1447	-	-	-	-	-	-	-	-	4177
Arrhythmia	278	237	183	-	-	-	-	-	-	-	-	-	420
Artificial-characters	7	591	593	699	295	432	493	399	571	497	293	-	4863
Balancescale	4	288	49	288	-	-	-	-	-	-	-	-	625
Ball-bearing	32	913	3237	-	-	-	-	-	-	-	-	-	4150
Biomed	5	127	67	-	-	-	-	-	-	-	-	-	194
Breast	9	238	225	-	-	-	-	-	-	-	-	-	463
Cancer	33	151	47	-	-	-	-	-	-	-	-	-	198
Car-evaluation	6	384	69	1210	65	-	-	-	-	-	-	-	1728
Cardiotocography	34	1648	292	175	-	-	-	-	-	-	-	-	2115
Cellcycle	17	47	31	18	121	-	-	-	-	-	-	-	217
Cnae	856	112	120	118	116	116	114	117	120	119	-	-	1052
Colon	1908	22	40	-	-	-	-	-	-	-	-	-	62
Delft	64	[71, 376]	[229, 1124]	-	-	-	-	-	-	-	-	-	[300, 1500]
Dermatology	34	112	61	72	49	52	20	-	-	-	-	-	366
Diabetes	8	500	268	-	-	-	-	-	-	-	-	-	768
Ecoli	7	143	77	2	2	35	20	5	52	-	-	-	336
Flare	12	32	70	130	72	30	87	-	-	-	-	-	421
Glass	9	69	76	17	13	9	29	-	-	-	-	-	213
Hayes-roth	4	28	25	31	-	-	-	-	-	-	-	-	84
Heart	13	137	160	-	-	-	-	-	-	-	-	-	297
Hepatitis	19	123	32	-	-	-	-	-	-	-	-	-	155
Housing	13	458	48	-	-	-	-	-	-	-	-	-	506
Imports	25	71	88	-	-	-	-	-	-	-	-	-	159
Ionosphere	32	225	125	-	-	-	-	-	-	-	-	-	350
Iris	4	48	50	49	-	-	-	-	-	-	-	-	147
Led	7	7	10	16	6	9	9	8	8	7	5	-	85
Liver	6	142	199	-	-	-	-	-	-	-	-	-	341
Lung-cancer	56	9	13	10	-	-	-	-	-	-	-	-	32
Multiple-features	649	200	199	200	200	199	200	199	198	199	200	-	1994
Optdigits	62	554	554	562	571	557	572	568	558	558	566	-	5620
Pageblocks	10	4884	509	-	-	-	-	-	-	-	-	-	5393
Sat	36	1072	479	961	415	470	1038	-	-	-	-	-	4435
Seeds	7	70	70	70	-	-	-	-	-	-	-	-	210
Semeion	256	161	158	162	159	159	161	159	161	158	155	-	1593
Sonar	60	111	97	-	-	-	-	-	-	-	-	-	208
Soybean-small	21	10	10	10	17	-	-	-	-	-	-	-	47
Spectf	44	55	212	-	-	-	-	-	-	-	-	-	267
Survival	3	207	76	-	-	-	-	-	-	-	-	-	283
Synthetic	[20, 39]	[1613, 7529]	[41, 201]	-	-	-	-	-	-	-	-	-	[1654, 7730]
Systhetic-control	60	100	100	100	100	100	100	-	-	-	-	-	600
Texture	40	497	497	498	497	497	498	498	498	498	497	498	5473
User-knowledge	5	102	129	122	24	26	-	-	-	-	-	-	403
Vehicle	18	212	217	218	199	-	-	-	-	-	-	-	846
Vertebra-column	6	60	100	150	-	-	-	-	-	-	-	-	310
Vowels	10	48	48	48	48	48	48	48	48	48	48	48	528
Waveform	21	1657	1647	1696	-	-	-	-	-	-	-	-	5000
Wine	13	59	71	48	-	-	-	-	-	-	-	-	178
Yeastgalactose	80	83	15	93	14	-	-	-	-	-	-	-	205
Zoo	16	19	12	5	5	4	6	8	-	-	-	-	59

Table 3: Synthetic and Delft dataset variants. Both sets are aggregated and reported in the results as Synthetic and Delft respectively, as they are obtained from a single source.

	Features	Inliers	Outliers	Total
Delft1x3	64	71	229	300
Delft2x2	64	100	300	400
Delft3x2	64	137	463	600
Delft5x1	64	133	367	500
Delft5x3	64	376	1124	1500
Gauss20d4c	20	3364	89	3453
Gauss20d6c	20	4719	124	4843
Gauss22d5c	22	3978	100	4078
Gauss22d6c	22	4692	102	4794
Gauss22d9c	22	6841	194	7035
Gauss23d4c	23	3323	83	3406
Gauss23d9c	23	7182	177	7359
Gauss24d2c	24	1847	52	1899
Gauss24d3c	24	2580	69	2649
Gauss24d4c	24	3405	83	3488
Gauss24d7c	24	5653	141	5794
Gauss25d5c	25	3672	97	3769
Gauss25d9c	25	6982	179	7161
Gauss26d4c	26	3268	66	3334
Gauss27d5c	27	4113	84	4197
Gauss27d6c	27	4871	129	5000
Gauss28d4c	28	3377	98	3475
Gauss28d7c	28	5689	143	5832
Gauss29d3c	29	2579	59	2638
Gauss30d4c	30	3042	83	3125
Gauss31d4c	31	2750	74	2824
Gauss33d3c	33	2215	52	2267
Gauss33d5c	33	3630	92	3722
Gauss35d6c	35	4134	99	4233
Gauss36d8c	36	5998	135	6133
Gauss36d9c	36	6838	173	7011
Gauss37d3c	37	2409	51	2460
Gauss38d9c	38	7529	201	7730
Gauss39d2c	39	1613	41	1654
Gauss39d5c	39	4238	116	4354

Table 4: Detailed results of the methods with the parameters selected using Cross-validation over all datasets of the Type I experiments (single source-class inliers) with respect to ROC AUC. We visualize the distribution of these values in Figure 4(a).

ROC AUC	ABOD	Auto Enc.	GLOSH	GMM	iForest	KNN G.	SVDD	KNN L.	LOCI	LOF	LP	Parzen	SOD	DSVDD
Abalone	0.7	0.73	0.66	0.73	0.75	0.74	**0.76**	0.67	**0.76**	0.68	0.74	0.74	0.68	0.68
Arrhythmia	0.72	0.77	0.73	0.72	**0.79**	0.73	0.74	0.72	0.72	0.71	0.71	0.5	0.76	0.74
Artificial-characters	0.84	0.91	0.87	**0.92**	0.78	0.86	0.89	0.85	0.85	0.87	0.88	0.87	0.85	0.9
Balancescale	0.82	0.92	0.86	**0.95**	0.76	0.84	0.91	0.86	0.82	0.87	0.89	0.8	0.67	0.87
Ball-bearing	0.93	**1**	0.98	**1**	**1**	0.97	0.97	0.97	0.95	0.99	0.97	0.97	**1**	0.99
Biomed	0.62	0.67	0.68	0.73	0.75	**0.85**	0.81	0.84	0.73	0.74	0.68	0.79	0.76	0.82
Breast	0.97	0.84	**0.99**	0.9	0.98	0.98	0.98	0.94	**0.99**	**0.99**	0.93	**0.99**	0.96	0.91
Cancer	0.64	0.56	0.61	0.51	0.44	0.72	0.75	**0.83**	0.66	0.71	0.6	0.7	0.76	0.57
Car-evaluation	0.9	0.95	0.97	**0.99**	0.93	0.97	**0.99**	0.97	**0.99**	0.98	**0.99**	0.93	0.94	0.93
Cardiotocography	0.59	**0.99**	0.65	0.98	0.9	0.64	0.65	0.65	0.63	0.67	0.68	0.66	0.79	0.98
Cellcycle	0.79	0.66	0.8	0.65	0.66	**0.83**	0.68	0.75	0.81	**0.83**	0.72	0.79	0.6	0.78
Cnae	0.73	0.71	0.77	0.87	0.45	0.77	0.8	0.79	0.8	0.81	0.77	0.5	**0.91**	0.63
Colon	0.59	**0.73**	**0.73**	0.64	0.72	0.66	0.59	0.58	0.67	0.66	0.61	0.5	0.62	0.59
Delft	0.72	0.8	**0.96**	**0.96**	0.63	0.92	**0.96**	0.93	0.88	0.94	**0.96**	0.93	0.94	0.72
Dermatology	0.93	0.94	0.96	**0.99**	0.94	0.97	0.98	0.93	0.94	0.94	0.98	0.96	0.98	0.97
Diabetes	0.63	0.63	0.63	0.62	0.64	0.65	**0.67**	0.6	0.66	0.66	0.65	0.66	0.53	0.66
Ecoli	0.88	0.96	0.9	0.89	**0.97**	0.89	0.81	0.89	0.9	0.88	0.87	0.9	0.71	0.88
Flare	0.75	0.78	0.77	0.78	0.67	0.77	**0.82**	0.78	0.77	0.79	**0.82**	0.78	0.77	0.79
Glass	0.79	**0.84**	0.73	0.79	0.68	0.71	0.83	0.72	0.78	0.72	0.81	0.74	0.82	0.81
Hayes-roth	0.61	**0.79**	0.75	0.69	0.71	0.66	0.73	0.7	0.71	0.72	0.67	0.63	0.67	0.72
Heart	0.61	0.81	0.62	0.85	**0.9**	0.6	0.55	0.53	0.63	0.62	0.55	0.6	0.7	0.73
Hepatitis	0.41	0.65	0.36	**0.84**	0.83	0.39	0.51	0.19	0.49	0.37	0.49	0.39	0.65	0.7
Housing	0.7	0.81	0.64	0.87	**0.88**	0.69	0.72	0.61	0.63	0.65	0.68	0.7	0.78	0.83
Imports	0.67	0.82	0.82	0.84	0.81	0.54	0.86	0.55	0.75	0.87	**0.88**	0.87	0.75	0.82
Ionosphere	0.95	**0.99**	0.98	0.97	0.87	0.98	0.98	0.91	0.86	0.96	0.97	0.98	0.98	0.96
Iris	0.99	0.99	0.96	0.99	0.98	0.97	**1**	0.99	0.98	0.99	**1**	0.99	0.99	0.97
Led	0.81	0.78	0.82	0.91	0.84	0.92	**0.93**	0.86	0.79	0.82	**0.93**	**0.93**	0.84	0.71
Liver	0.6	**0.71**	0.59	0.6	0.6	0.6	0.54	0.53	0.59	0.6	0.52	0.6	0.46	0.54
Lung-cancer	0.75	**0.86**	0.76	0.78	0.67	0.65	0.71	0.78	0.83	0.82	0.71	0.71	0.76	0.6
Multiple-features	0.98	0.98	0.98	**0.99**	0.98	**0.99**	**0.99**	0.96	0.97	0.98	0.82	0.5	0.97	0.95
Optdigits	0.98	0.99	**1**	0.99	0.98	**1**	**1**	0.98	0.98	**1**	**1**	**1**	0.98	0.97
Pageblocks	0.52	0.92	0.83	**0.96**	0.92	0.63	0.86	0.9	0.91	0.94	0.8	0.68	0.76	0.74
Sat	0.95	0.91	0.95	0.87	**0.96**	0.95	**0.96**	0.91	0.95	0.93	0.95	**0.96**	0.95	0.91
Seeds	**0.99**	**0.99**	**0.99**	**0.99**	**0.99**	0.97	0.97	0.97	0.97	0.98	0.97	0.98	0.97	0.97
Semeion	0.94	0.93	**0.97**	**0.97**	0.95	**0.97**	0.96	0.91	0.94	0.96	**0.97**	0.96	**0.97**	0.78
Sonar	0.61	0.66	0.66	0.75	0.61	0.71	0.75	0.64	0.69	0.71	0.74	0.75	**0.81**	0.64
Soybean-small	**1**	**1**	**1**	**1**	0.98	**1**	**1**	0.93	**1**	**1**	**1**	**1**	**1**	**1**
Spectf	**0.85**	0.79	**0.85**	0.83	0.82	0.84	0.84	0.83	**0.85**	0.84	0.76	0.84	0.79	0.73
Survival	0.64	0.58	0.64	0.67	0.7	**0.77**	**0.77**	0.69	0.62	0.74	0.72	0.75	0.69	0.48
Systhetic-control	0.94	0.95	0.99	0.99	0.95	0.99	0.97	0.99	0.98	**1**	0.99	0.96	**1**	0.96
Texture	0.97	**1**	0.99	**1**	0.97	0.99	**1**	0.99	0.98	**1**	0.99	**1**	0.99	0.98
User-knowledge	0.91	0.94	0.91	0.94	0.86	0.91	0.93	0.87	0.89	0.88	0.92	0.93	0.94	**0.95**
Vehicle	0.75	0.86	0.74	**0.92**	0.78	0.75	0.79	0.74	0.74	0.74	0.79	0.76	0.85	0.86
Vertebra-column	0.89	0.9	0.87	0.86	0.87	0.89	**0.92**	0.9	0.9	0.9	0.89	0.9	0.9	0.83
Vowels	0.99	**1**	0.99	**1**	0.91	0.99	**1**	0.97	0.99	0.99	**1**	**1**	0.98	0.99
Waveform	0.89	0.87	0.88	0.87	**0.9**	0.88	**0.9**	0.84	0.89	0.87	0.89	**0.9**	0.81	0.73
Wine	0.84	0.88	0.82	0.92	0.91	0.82	0.85	0.84	0.82	0.82	0.79	0.82	0.88	**0.93**
Yeastgalactose	0.99	0.93	**1**	0.99	0.98	**1**	**1**	0.99	0.99	0.99	**1**	**1**	0.98	0.97
Zoo	0.95	**1**	0.89	**1**	**1**	0.87	**1**	0.81	0.82	0.87	**1**	**1**	**1**	0.84
	0.8	0.85	0.83	**0.87**	0.83	0.82	0.85	0.81	0.83	0.84	0.83	0.81	0.83	0.82

Table 5: Detailed results of the methods with the parameters selected using Self-Adaptive Data Shifting (SDS) over all datasets of the Type I experiments (single source-class inliers) with respect to ROC AUC. We visualize the distribution of these values in Figure 9(a).

ROC AUC	ABOD	Auto Enc.	GLOSH	GMM	iForest	KNN G.	SVDD	KNN L.	LOCI	LOF	LP	Parzen	SOD	DSVDD
Abalone	0.71	0.65	0.59	0.65	**0.75**	0.62	0.71	0.58	0.74	0.61	0.73	0.62	0.66	0.65
Arrhythmia	0.72	0.7	0.74	0.74	0.74	0.74	0.73	0.69	0.71	0.73	0.5	0.5	**0.75**	**0.75**
Artificial-characters	0.84	0.89	0.87	**0.91**	0.78	0.87	0.89	0.86	0.85	0.87	0.88	0.86	0.83	0.89
Balancescale	0.82	0.93	0.83	**0.95**	0.75	0.82	0.91	0.7	0.74	0.86	0.87	0.8	0.64	0.83
Ball-bearing	0.93	**1**	0.97	**1**	**1**	0.97	0.97	0.97	0.95	0.98	0.97	0.97	**1**	0.99
Biomed	0.6	0.7	0.54	0.71	0.72	0.58	0.73	0.64	0.69	0.62	0.66	**0.79**	0.51	0.77
Breast	0.96	0.81	0.89	0.93	**0.98**	0.79	0.95	0.92	**0.98**	0.89	0.93	0.88	0.96	0.86
Cancer	0.64	0.55	0.68	**0.72**	0.59	0.66	0.71	0.68	0.66	0.68	0.67	0.66	0.63	0.53
Car-evaluation	0.9	0.94	0.87	**0.99**	0.84	0.94	**0.99**	0.94	0.97	**0.99**	**0.99**	0.93	0.92	0.93
Cardiotocography	0.58	**0.98**	0.66	0.97	0.86	0.64	0.6	0.58	0.64	0.59	0.68	0.56	0.69	0.97
Cellcycle	**0.78**	0.71	0.77	0.62	0.67	0.74	0.64	0.54	0.75	0.64	0.62	0.66	0.6	0.68
Cnae	0.74	0.68	0.74	**0.86**	0.4	0.73	0.76	0.7	0.74	0.73	0.74	0.5	0.76	0.49
Colon	0.59	0.44	**0.69**	0.66	0.61	0.66	0.59	0.61	0.66	0.66	0.5	0.5	0.59	0.49
Delft	0.7	0.77	0.92	0.95	0.67	0.92	**0.96**	0.93	0.87	0.94	0.95	0.86	0.9	0.65
Dermatology	0.91	0.91	0.96	**0.99**	0.84	0.97	0.98	0.92	0.94	0.94	0.98	0.97	**0.99**	0.87
Diabetes	0.64	0.55	**0.65**	0.6	0.64	0.64	0.62	0.57	0.63	0.64	0.64	0.63	0.6	0.58
Ecoli	0.88	0.81	0.89	0.74	**0.96**	0.88	0.84	0.9	0.9	0.9	0.86	0.87	0.6	0.87
Flare	0.76	0.75	0.7	**0.79**	0.72	0.74	0.78	0.69	0.76	0.72	0.76	0.75	**0.79**	0.74
Glass	0.78	0.76	0.71	0.8	0.62	0.58	0.8	0.61	0.73	0.65	0.81	0.71	**0.84**	0.71
Hayes-roth	0.59	0.53	0.65	0.63	0.61	0.69	0.67	0.71	0.68	0.69	**0.74**	0.63	0.68	0.55
Heart	0.61	0.62	0.53	0.77	**0.85**	0.6	0.55	0.59	0.53	0.57	0.54	0.61	0.64	0.68
Hepatitis	0.44	0.65	0.63	**0.88**	**0.88**	0.45	0.38	0.55	0.56	0.56	0.33	0.39	0.72	0.75
Housing	0.69	0.75	0.55	**0.88**	0.84	0.66	0.72	0.56	0.65	0.58	0.66	0.66	0.73	0.76
Imports	0.66	0.56	0.58	0.68	0.63	0.61	0.74	0.56	0.73	0.59	0.71	0.68	**0.76**	0.73
Ionosphere	0.94	0.97	**0.98**	0.97	0.93	**0.98**	**0.98**	0.9	0.85	0.96	0.97	**0.98**	0.96	0.96
Iris	0.99	**1**	0.98	0.98	0.98	0.98	**1**	0.99	0.98	0.98	**1**	0.99	0.98	0.94
Led	0.93	0.78	0.85	0.93	0.79	0.88	0.94	0.85	0.71	0.81	**0.96**	0.93	0.74	0.6
Liver	0.61	0.56	0.57	0.58	0.63	0.61	0.58	0.46	**0.65**	0.63	0.57	0.61	0.58	0.59
Lung-cancer	0.75	**0.85**	0.73	0.76	0.57	0.75	0.75	0.72	0.74	0.75	0.71	0.75	0.68	0.48
Multiple-features	0.97	0.94	0.97	**0.99**	0.98	**0.99**	0.98	0.94	0.97	0.96	0.55	0.5	0.97	0.91
Optdigits	0.98	0.99	**1**	0.99	0.98	**1**	**1**	0.98	0.98	**1**	**1**	**1**	0.98	0.96
Pageblocks	0.52	0.9	0.74	0.84	**0.92**	0.63	0.8	0.83	0.78	**0.92**	0.77	0.62	0.71	0.74
Sat	0.95	0.87	0.94	0.85	**0.96**	0.94	0.95	0.89	0.93	0.91	0.95	0.95	0.95	0.9
Seeds	0.98	**0.99**	0.93	**0.99**	**0.99**	0.98	0.98	0.94	0.97	0.96	0.98	0.98	0.98	0.95
Semeion	0.94	0.88	**0.97**	**0.97**	0.86	**0.97**	0.96	0.91	0.94	0.95	**0.97**	0.96	0.96	0.61
Sonar	0.6	0.63	0.65	0.74	0.66	0.66	0.72	0.57	0.64	0.6	0.7	0.63	**0.75**	0.64
Soybean-small	**1**	0.88	**1**	**1**	**1**	**1**	**1**	0.93	**1**	**1**	**1**	**1**	0.88	0.82
Spectf	0.85	0.71	0.84	0.7	0.82	0.83	0.84	0.81	**0.86**	0.8	0.57	0.83	0.8	0.79
Survival	0.64	0.54	0.63	0.69	0.7	0.61	**0.76**	0.69	0.63	0.71	0.72	0.65	0.63	0.48
Systhetic-control	0.94	0.91	0.99	0.9	0.96	0.99	0.97	0.99	0.97	**1**	0.5	0.96	0.99	0.85
Texture	0.97	**1**	0.99	**1**	0.97	0.99	**1**	0.99	0.98	**1**	0.99	0.99	0.99	0.98
User-knowledge	0.91	0.93	0.9	0.94	0.87	0.93	0.94	0.83	0.9	0.9	0.93	0.93	**0.95**	0.92
Vehicle	0.74	0.85	0.68	**0.92**	0.79	0.76	0.78	0.73	0.77	0.72	0.8	0.74	0.85	0.8
Vertebra-column	0.89	0.89	0.89	**0.92**	0.88	0.9	0.91	0.85	0.87	0.88	0.9	0.89	0.84	0.75
Vowels	0.99	0.98	0.98	0.99	0.92	0.99	**1**	0.95	0.98	0.98	**1**	0.99	0.99	0.96
Waveform	0.89	0.86	0.87	0.86	**0.9**	0.87	0.88	0.83	0.89	0.85	0.88	**0.9**	0.63	0.7
Wine	0.85	0.88	0.75	**0.96**	0.9	0.82	0.73	0.8	0.81	0.81	0.8	0.83	0.77	0.8
Yeastgalactose	0.99	0.98	**1**	0.98	0.91	0.99	**1**	0.96	0.99	0.99	**1**	**1**	0.99	0.88
Zoo	0.87	**1**	0.98	**1**	0.96	0.99	**1**	0.92	0.89	0.84	**1**	**1**	0.91	0.74
	0.8	0.8	0.8	**0.85**	0.81	0.81	0.83	0.78	0.81	0.81	0.79	0.79	0.8	0.76

Table 6: Detailed results of the methods with the parameters selected using Uniform Objects over all datasets of the Type I experiments (single source-class inliers) with respect to ROC AUC. We visualize the distribution of these values in Figure 9(b).

ROC AUC	ABOD	Auto Enc.	GLOSH	GMM	iForest	KNN G.	SVDD	KNN L.	LOCI	LOF	LP	Parzen	SOD	DSVDD
Abalone	0.71	0.65	0.59	0.66	**0.75**	0.63	0.72	0.61	0.74	0.61	0.61	0.73	0.65	0.66
Arrhythmia	0.72	0.7	0.71	0.74	0.73	0.73	**0.75**	0.62	0.73	0.73	0.5	0.5	0.71	0.62
Artificial-characters	0.84	0.89	0.87	**0.92**	0.78	0.86	0.78	0.85	0.84	0.87	0.88	0.83	0.84	0.88
Balancescale	0.82	0.88	0.86	**0.94**	0.8	0.85	0.87	0.86	0.78	0.85	0.89	0.77	0.64	0.85
Ball-bearing	0.93	0.97	0.97	**1**	**1**	0.97	0.73	0.97	0.93	0.98	0.97	0.91	**1**	0.99
Biomed	0.6	0.7	0.59	0.72	0.7	0.58	0.67	**0.78**	0.69	0.64	0.7	0.7	0.6	0.7
Breast	0.96	0.82	0.95	0.8	0.98	0.94	0.96	0.89	**0.99**	0.83	0.93	0.98	0.95	0.79
Cancer	0.64	0.54	0.68	**0.72**	0.6	0.62	0.6	0.65	0.66	0.68	0.63	0.67	0.6	0.54
Car-evaluation	0.9	0.88	0.96	**0.99**	0.94	0.98	0.91	0.97	**0.99**	0.93	0.88	0.93	0.91	0.93
Cardiotocography	0.58	0.97	0.58	**0.98**	0.9	0.58	0.51	0.59	0.58	0.64	0.68	0.53	0.69	0.87
Cellcycle	0.78	0.67	**0.82**	0.66	0.61	0.81	0.7	0.77	0.76	0.78	0.64	0.78	0.6	0.7
Cnae	0.74	0.69	0.77	0.87	0.38	0.76	0.78	0.72	0.74	0.77	0.73	0.5	**0.88**	0.5
Colon	0.59	0.61	0.61	0.61	**0.7**	0.61	0.58	0.55	0.66	0.69	0.5	0.5	0.59	0.57
Delft	0.7	0.75	0.78	**0.96**	0.64	0.84	0.78	0.88	0.87	0.9	0.91	0.64	0.89	0.56
Dermatology	0.91	0.91	0.95	**0.99**	0.94	0.96	0.94	0.84	0.94	0.88	0.98	0.82	0.96	0.81
Diabetes	**0.64**	0.53	0.62	0.61	**0.64**	**0.64**	0.5	0.57	0.63	**0.64**	0.62	0.61	0.58	0.53
Ecoli	0.88	0.71	0.88	0.73	**0.95**	0.88	0.86	0.9	0.87	0.89	0.87	0.89	0.59	0.9
Flare	0.76	0.73	0.71	**0.79**	0.67	0.73	**0.79**	0.71	0.74	0.74	**0.79**	0.76	**0.79**	0.73
Glass	0.78	0.77	0.71	0.77	0.66	0.69	0.7	0.67	0.69	0.72	0.79	0.76	**0.82**	0.61
Hayes-roth	0.59	0.7	0.66	0.51	0.6	0.6	0.52	0.69	**0.73**	0.71	0.61	0.6	0.72	0.61
Heart	0.61	0.57	0.56	0.75	**0.85**	0.6	0.59	0.56	0.54	0.46	0.54	0.6	0.71	0.67
Hepatitis	0.44	0.69	0.32	0.88	**0.89**	0.45	0.55	0.54	0.41	0.39	0.35	0.4	0.67	0.6
Housing	0.69	0.78	0.62	**0.85**	0.8	0.68	0.6	0.56	0.71	0.58	0.66	0.6	0.66	0.72
Imports	0.66	0.56	0.61	0.69	0.63	0.69	0.59	0.56	0.73	0.56	0.63	0.63	**0.82**	0.77
Ionosphere	0.94	0.97	0.96	**0.98**	0.93	0.94	0.88	0.9	0.81	0.9	0.9	0.94	0.97	0.95
Iris	0.99	**1**	0.98	0.99	0.98	0.98	0.99	0.98	0.98	0.98	0.99	0.98	0.98	0.92
Led	0.93	0.7	0.84	0.91	0.77	0.88	**0.95**	0.83	0.71	0.86	0.93	0.93	0.78	0.65
Liver	0.61	0.55	0.63	0.6	0.63	0.61	0.43	0.56	0.63	0.6	0.57	0.6	**0.66**	0.57
Lung-cancer	0.75	**0.85**	0.73	0.72	0.64	0.75	0.75	0.64	0.74	0.75	0.71	0.65	0.68	0.55
Multiple-features	0.97	0.96	0.93	**0.99**	0.98	0.98	0.79	0.94	0.97	0.92	0.5	0.5	0.97	0.73
Optdigits	0.98	0.99	**1**	0.99	0.97	**1**	0.96	0.98	0.98	**1**	0.92	0.99	0.98	0.94
Pageblocks	0.52	0.78	0.81	**0.96**	0.91	0.63	0.76	0.8	0.91	0.93	0.78	0.64	0.75	0.67
Sat	0.95	0.84	0.93	0.85	**0.96**	0.94	0.87	0.85	0.94	0.9	0.95	0.95	0.95	0.89
Seeds	0.98	0.98	0.93	**0.99**	0.98	0.97	0.97	0.91	0.97	0.93	0.98	0.98	0.98	0.86
Semeion	0.94	0.88	0.96	**0.97**	0.94	0.96	0.95	0.92	0.94	0.96	0.96	0.95	0.96	0.66
Sonar	0.6	0.63	0.55	0.64	0.63	0.64	0.56	0.59	0.59	0.56	0.49	0.57	**0.81**	0.51
Soybean-small	**1**	0.88	**1**	**1**	0.96	**1**	**1**	0.96	**1**	**1**	**1**	**1**	**1**	0.82
Spectf	0.85	0.82	0.84	0.83	0.82	0.84	**0.86**	0.81	**0.86**	0.84	0.57	0.84	0.79	0.76
Survival	0.64	0.5	0.63	0.63	0.69	0.62	0.59	0.6	0.62	**0.73**	0.68	0.65	0.63	0.5
Systhetic-control	0.94	0.91	**0.99**	**0.99**	0.96	0.98	0.92	**0.99**	0.98	**0.99**	0.5	0.96	**0.99**	0.78
Texture	0.97	0.99	0.99	0.99	0.96	0.98	0.96	0.99	0.98	**1**	0.95	0.96	0.99	0.97
User-knowledge	0.91	**0.96**	0.91	0.94	0.89	0.91	0.88	0.86	0.9	0.9	0.85	0.92	**0.96**	0.94
Vehicle	0.74	0.74	0.72	**0.92**	0.79	0.74	0.56	0.69	0.76	0.69	0.78	0.66	0.83	0.73
Vertebra-column	0.89	0.84	0.88	0.85	0.82	0.9	**0.92**	0.82	0.89	0.89	0.9	0.89	0.81	0.75
Vowels	**0.99**	0.96	**0.99**	**0.99**	0.91	**0.99**	0.82	0.97	**0.99**	0.98	0.93	0.96	0.98	0.95
Waveform	0.89	0.86	0.88	0.88	**0.9**	0.88	0.89	0.84	0.89	0.87	0.86	**0.9**	0.75	0.71
Wine	0.85	0.87	0.82	**0.93**	0.9	0.81	0.83	0.76	0.81	0.8	0.8	0.83	0.72	0.73
Yeastgalactose	0.99	0.98	0.98	0.96	0.97	**1**	**1**	0.93	0.99	0.99	**1**	**1**	0.98	0.83
Zoo	0.87	**1**	0.94	**1**	0.94	0.99	**1**	0.92	0.93	0.84	**1**	0.98	0.94	0.72
	0.8	0.8	0.8	**0.85**	0.82	0.81	0.78	0.78	0.81	0.8	0.77	0.77	0.81	0.74

Table 7: Detailed results of the methods with the parameters selected using Perturbation over all datasets of the Type I experiments (single source-class inliers) with respect to ROC AUC. We visualize the distribution of these values in Figure 9(c).

ROC AUC	ABOD	Auto Enc.	GLOSH	GMM	iForest	KNN G.	SVDD	KNN L.	LOCI	LOF	LP	Parzen	SOD	DSVDD
Abalone	0.71	0.64	0.64	0.67	**0.75**	0.65	0.63	0.61	0.74	0.61	0.61	0.73	0.64	0.67
Arrhythmia	0.72	0.7	0.74	0.74	0.74	0.73	0.75	0.69	0.73	0.72	0.5	0.5	**0.78**	0.66
Artificial-characters	0.84	0.9	0.87	**0.92**	0.79	0.86	0.82	0.86	0.85	0.87	0.88	0.86	0.83	0.89
Balancescale	0.82	0.86	0.85	**0.93**	0.79	0.83	0.86	0.85	0.82	0.86	0.85	0.8	0.64	0.82
Ball-bearing	0.93	0.99	0.97	**1**	**1**	0.97	0.94	0.97	0.95	0.99	0.97	0.94	**1**	0.99
Biomed	0.6	0.7	0.58	**0.71**	0.7	0.58	0.7	0.61	0.62	0.64	0.7	0.66	0.6	0.68
Breast	0.96	0.82	0.76	0.77	**0.98**	0.81	0.97	0.73	**0.98**	0.7	0.93	0.89	0.94	0.82
Cancer	0.64	0.54	0.68	**0.72**	0.59	0.66	0.58	0.65	0.69	0.68	0.63	0.66	0.62	0.54
Car-evaluation	0.9	0.9	0.97	**0.99**	0.94	0.97	0.91	0.97	**0.99**	0.93	0.88	0.93	0.92	0.93
Cardiotocography	0.58	0.97	0.66	**0.98**	0.88	0.64	0.61	0.65	0.63	0.63	0.68	0.54	0.74	0.97
Cellcycle	**0.78**	0.67	0.64	0.65	0.58	0.6	0.69	0.65	0.73	0.7	0.64	**0.78**	0.64	0.74
Cnae	0.74	0.67	0.72	0.87	0.38	0.71	0.78	0.69	0.76	0.74	0.72	0.5	**0.88**	0.5
Colon	0.59	**0.75**	0.7	0.61	**0.75**	0.59	0.58	0.7	0.66	0.63	0.5	0.5	0.64	0.39
Delft	0.7	0.84	0.94	**0.96**	0.64	0.91	0.85	0.92	0.89	0.92	0.91	0.86	0.86	0.64
Dermatology	0.91	0.91	0.95	**0.99**	0.88	0.96	0.95	0.9	0.94	0.93	0.97	0.93	**0.99**	0.88
Diabetes	0.64	0.59	**0.66**	0.58	0.65	0.64	0.54	0.59	0.64	0.65	0.62	0.63	0.6	0.56
Ecoli	0.88	0.81	0.88	0.74	**0.97**	0.88	0.84	0.9	0.85	0.6	0.86	0.89	0.59	0.86
Flare	0.76	0.75	0.71	0.78	0.69	0.78	0.8	0.74	0.75	0.72	**0.81**	0.77	0.77	0.71
Glass	0.78	0.75	0.7	0.79	0.6	0.7	0.71	0.62	0.69	0.64	0.8	0.8	**0.83**	0.72
Hayes-roth	0.59	0.7	0.63	**0.77**	0.54	0.53	0.53	0.63	0.67	0.69	0.51	0.57	0.58	0.61
Heart	0.61	0.62	0.56	0.75	**0.85**	0.61	0.63	0.55	0.57	0.59	0.54	0.61	0.73	0.64
Hepatitis	0.44	0.65	0.63	0.88	**0.89**	0.45	0.4	0.54	0.41	0.35	0.35	0.39	0.68	0.64
Housing	0.69	0.72	0.61	**0.88**	0.86	0.66	0.61	0.57	0.71	0.66	0.66	0.66	0.66	0.75
Imports	0.66	0.61	**0.82**	0.69	0.67	0.55	0.59	0.74	0.64	0.6	0.63	0.76	0.79	0.79
Ionosphere	0.94	**0.99**	0.96	0.98	0.9	0.97	0.9	0.89	0.85	0.92	0.9	0.94	0.97	0.95
Iris	0.99	**1**	0.98	0.99	0.96	0.99	0.99	0.98	0.98	0.98	0.99	0.99	0.98	0.92
Led	0.93	0.71	0.73	0.9	0.76	0.87	**0.95**	0.83	0.67	0.87	0.93	0.93	0.82	0.65
Liver	0.61	0.62	0.57	0.58	0.63	0.61	0.47	0.56	**0.65**	0.63	0.57	0.61	0.59	0.57
Lung-cancer	0.75	**0.82**	0.63	0.72	0.74	0.67	0.75	0.72	0.74	0.75	0.71	0.65	0.57	0.58
Multiple-features	0.97	0.96	0.96	**0.99**	0.96	**0.99**	0.95	0.94	0.97	0.97	0.5	0.5	0.97	0.87
Optdigits	0.98	0.99	**1**	0.99	0.97	**1**	0.99	0.98	0.98	**1**	0.92	**1**	0.98	0.95
Pageblocks	0.52	0.88	0.65	0.88	0.92	0.62	0.81	0.91	0.91	**0.94**	0.78	0.64	0.72	0.75
Sat	**0.95**	0.86	0.93	0.85	**0.95**	0.94	0.89	0.9	0.93	0.9	**0.95**	**0.95**	**0.95**	0.89
Seeds	0.98	0.98	0.92	**0.99**	0.98	0.98	0.96	0.94	0.97	0.93	0.98	0.98	0.98	0.93
Semeion	0.94	0.9	0.96	**0.97**	0.9	0.95	0.95	0.9	0.93	0.96	0.96	0.86	0.93	0.59
Sonar	0.6	0.65	0.65	0.64	0.67	0.66	0.58	0.57	0.58	0.61	0.58	0.63	**0.75**	0.57
Soybean-small	**1**	**1**	0.95	**1**	0.96	0.95	**1**	0.96	**1**	**1**	**1**	**1**	0.83	0.88
Spectf	**0.85**	0.82	**0.85**	0.83	0.82	0.83	**0.85**	0.82	0.84	0.83	0.57	0.84	0.78	0.66
Survival	0.64	0.5	0.63	0.67	0.72	0.67	0.65	0.65	0.63	**0.73**	0.69	0.65	0.56	0.52
Systhetic-control	0.94	0.89	**0.99**	**0.99**	0.94	0.98	0.93	**0.99**	0.98	**0.99**	0.5	0.96	0.98	0.78
Texture	0.97	0.99	0.99	0.99	0.97	0.99	0.96	0.99	0.98	**1**	0.96	0.97	0.99	0.97
User-knowledge	0.91	**0.95**	0.88	0.94	0.81	0.88	0.88	0.84	0.88	0.87	0.86	0.92	**0.95**	0.94
Vehicle	0.74	0.74	0.7	**0.92**	0.79	0.73	0.61	0.71	0.77	0.7	0.78	0.71	0.84	0.81
Vertebra-column	0.89	0.84	0.88	0.85	0.86	0.9	**0.92**	0.86	0.89	0.89	0.9	0.89	0.85	0.74
Vowels	**0.99**	0.97	**0.99**	**0.99**	0.9	**0.99**	0.89	0.98	0.97	0.98	0.97	**0.99**	0.95	0.97
Waveform	0.89	0.86	0.88	0.87	0.89	0.88	0.88	0.84	0.88	0.87	0.86	**0.9**	0.75	0.71
Wine	0.85	0.87	0.83	**0.93**	0.91	0.84	0.71	0.77	0.82	0.81	0.8	0.82	0.85	0.85
Yeastgalactose	0.99	0.96	**1**	0.96	0.87	**1**	**1**	0.93	0.98	0.99	**1**	**1**	0.98	0.84
Zoo	0.87	0.98	0.89	**1**	0.96	**1**	**1**	0.95	0.91	0.84	**1**	0.98	0.91	0.78
	0.8	0.81	0.8	**0.85**	0.81	0.8	0.79	0.79	0.81	0.8	0.77	0.79	0.8	0.76

Table 8: Detailed results of the methods with the parameters selected using Cross-validation over all datasets of the Type I experiments (single source-class inliers) with respect to AdjustedPrec@n. We visualize the distribution of these values in Figure 4(b).

AdjustedPrec@n	ABOD	Auto Enc.	GLOSH	GMM	iForest	KNN G.	SVDD	KNN L.	LOCI	LOF	LP	Parzen	SOD	DSVDD
Abalone	0.29	0.3	0.21	0.32	0.32	0.32	**0.36**	0.18	0.35	0.25	0.34	0.31	0.24	0.26
Arrhythmia	0.31	0.41	0.31	0.26	**0.56**	0.31	0.36	0.26	0.31	0.31	0.31	-0.03	0.46	0.32
Artificial-characters	0.31	0.37	0.33	**0.39**	0.25	0.31	**0.39**	0.28	0.36	0.32	0.37	0.32	0.21	0.38
Balancescale	0.35	0.59	0.47	**0.83**	0.4	0.49	0.6	0.5	0.42	0.51	0.54	0.4	0.28	0.51
Ball-bearing	0.75	0.95	0.87	**0.97**	0.96	0.86	0.87	0.8	0.74	0.89	0.86	0.86	0.95	0.9
Biomed	0.24	0.3	0.3	0.36	0.36	**0.59**	0.53	0.53	0.47	0.36	0.3	0.53	0.47	0.57
Breast	0.83	0.61	0.89	0.67	**0.93**	0.89	0.89	0.78	0.89	0.91	0.78	0.89	0.8	0.7
Cancer	0.21	0.13	0.13	-0.01	-0.01	0.21	0.28	**0.42**	0.13	0.21	0.28	0.21	0.35	0.12
Car-evaluation	0.58	0.78	0.69	0.87	0.61	0.65	**0.9**	0.65	0.82	0.66	0.86	0.63	0.48	0.63
Cardiotocography	0.13	0.84	0.19	**0.91**	0.6	0.14	0.14	0.16	0.15	0.2	0.24	0.2	0.36	0.86
Cellcycle	0.45	0.3	0.38	0.43	0.38	0.4	0.36	0.47	0.43	**0.5**	0.36	0.4	0.14	0.42
Cnae	0.34	0.42	0.37	0.6	0.03	0.39	0.44	0.45	0.46	0.41	0.39	-0.04	**0.66**	0.18
Colon	-0.12	**0.62**	0.25	0.06	0.06	0.06	-0.12	0.25	0.06	0.06	0.06	0.25	0.06	0.18
Delft	0.28	0.48	**0.75**	0.74	0.14	0.61	0.74	0.68	0.64	0.66	0.74	0.66	0.7	0.28
Dermatology	0.7	0.66	0.73	**0.9**	0.72	0.77	0.86	0.71	0.79	0.72	0.83	0.77	0.86	0.81
Diabetes	0.22	0.16	0.22	0.09	0.18	0.22	0.23	0.15	**0.26**	0.25	0.25	0.23	0.08	0.21
Ecoli	0.65	**0.76**	**0.76**	**0.76**	**0.76**	**0.76**	0.29	**0.76**	**0.76**	**0.76**	**0.76**	**0.76**	0.29	0.46
Flare	0.34	0.41	**0.43**	**0.43**	0.16	0.41	0.4	0.35	0.41	**0.43**	0.39	0.38	0.39	0.41
Glass	0.31	0.42	0.45	0.33	0.27	0.43	0.43	0.33	0.31	0.33	**0.47**	0.33	0.36	0.37
Hayes-roth	0.06	0.35	**0.53**	0.15	0.14	0.24	0.25	0.25	0.35	0.43	0.15	0.06	0.34	0.24
Heart	0.15	0.45	0.15	0.62	**0.66**	0.15	0.11	-0.02	0.18	0.18	0.11	0.15	0.28	0.32
Hepatitis	-0.25	0.17	-0.25	0.38	**0.58**	-0.25	0.17	-0.25	-0.25	-0.25	-0.25	-0.25	-0.04	0.12
Housing	0.15	0.33	0.15	0.33	**0.57**	0.27	0.15	0.15	0.27	0.08	0.21	0.08	0.15	0.34
Imports	0.22	0.48	0.48	0.61	0.48	0.09	0.61	-0.04	0.35	**0.74**	0.61	0.61	0.35	0.56
Ionosphere	0.69	**0.88**	0.81	0.81	0.5	0.81	0.81	0.63	0.5	0.81	0.81	0.81	**0.88**	0.8
Iris	**0.95**	0.89	0.79	0.89	0.84	0.84	**0.95**	0.89	0.84	0.89	**0.95**	0.84	**0.95**	0.82
Led	0.41	0.17	-0.05	0.22	0.48	0.54	0.65	0.37	0.16	0.21	**0.69**	**0.69**	0.01	0.13
Liver	0.14	**0.33**	0.14	0.14	0.2	0.2	0.08	0.02	0.2	0.2	0.02	0.2	0.02	0.07
Lung-cancer	0.47	0.47	**0.75**	0.47	0.47	0.47	0.47	0.47	0.47	0.06	0.47	0.47	0.47	0.07
Multiple-features	0.79	0.79	0.86	**0.93**	0.86	0.88	0.88	0.7	0.81	0.86	0.62	0.02	0.76	0.66
Optdigits	0.85	0.92	0.94	0.89	0.83	0.94	0.94	0.79	0.88	0.94	**0.95**	0.93	0.82	0.75
Pageblocks	0.03	0.63	0.32	**0.66**	0.56	0.18	0.24	0.57	0.52	**0.66**	0.18	0.01	0.26	0.5
Sat	0.74	0.63	0.75	0.51	0.75	0.76	0.75	0.59	0.72	0.68	0.74	**0.77**	0.69	0.58
Seeds	0.89	0.89	0.86	**0.93**	**0.93**	0.79	0.82	0.82	0.86	0.79	0.82	0.82	0.82	0.83
Semeion	0.71	0.62	0.79	0.8	0.69	0.79	0.78	0.59	0.77	0.77	**0.81**	0.74	0.8	0.28
Sonar	0.07	0.36	0.26	0.26	0.07	0.26	0.41	0.22	0.31	0.36	0.36	0.41	**0.51**	0.23
Soybean-small	**1**	**1**	**1**	**1**	0.84	**1**	**1**	0.68	**1**	**1**	**1**	**1**	**1**	0.97
Spectf	0.43	0.43	0.43	0.31	0.2	**0.54**	0.43	0.43	**0.54**	0.43	0.31	0.43	0.08	0.17
Survival	0.13	0.13	0.18	0.23	0.18	**0.36**	**0.36**	0.32	0.18	0.27	**0.36**	**0.36**	0.27	-0.03
Systhetic-control	0.63	0.66	0.92	0.88	0.65	0.88	0.8	0.9	0.84	**0.96**	0.89	0.76	0.92	0.71
Texture	0.83	**0.96**	0.93	0.95	0.8	0.92	0.93	0.86	0.87	0.94	0.9	0.94	0.92	0.81
User-knowledge	0.47	**0.67**	0.43	0.55	0.48	0.51	0.62	0.43	0.51	0.36	0.57	0.52	0.62	0.64
Vehicle	0.31	0.52	0.41	**0.69**	0.39	0.42	0.43	0.33	0.39	0.34	0.41	0.39	0.56	0.5
Vertebra-column	0.56	0.55	0.44	0.49	0.45	0.54	0.59	0.57	0.62	0.55	0.52	0.58	**0.65**	0.48
Vowels	0.88	0.93	0.9	**0.98**	0.54	0.92	0.97	0.8	0.86	0.85	0.93	0.96	0.85	0.83
Waveform	0.59	0.51	0.56	0.52	0.6	0.56	**0.61**	0.47	0.59	0.52	0.56	**0.61**	0.43	0.26
Wine	0.51	0.67	0.47	**0.71**	0.67	0.43	0.52	0.52	0.43	0.47	0.38	0.47	**0.71**	0.69
Yeastgalactose	0.88	0.79	**0.97**	0.88	0.88	**0.97**	**0.97**	0.86	0.88	0.88	**0.97**	**0.97**	0.88	0.81
Zoo	0.82	**1**	0.63	**1**	**1**	0.63	**1**	0.56	0.63	0.56	**1**	**1**	**1**	0.5
	0.45	0.57	0.52	**0.59**	0.51	0.52	0.56	0.47	0.51	0.52	0.53	0.5	0.51	0.47

Table 9: Detailed results of the methods with the parameters selected using Self-Adaptive Data Shifting (SDS) over all datasets of the Type I experiments (single source-class inliers) with respect to AdjustedPrec@n. We visualize the distribution of these values in Figure 10(a).

AdjustedPrec@n	ABOD	Auto Enc.	GLOSH	GMM	iForest	KNN G.	SVDD	KNN L.	LOCI	LOF	LP	Parzen	SOD	DSVDD
Abalone	0.31	0.19	0.09	0.18	**0.34**	0.15	0.31	0.05	0.3	0.11	0.3	0.15	0.2	0.2
Arrhythmia	0.31	0.26	**0.36**	**0.36**	0.31	**0.36**	0.31	0.26	0.31	**0.36**	-0.03	-0.03	**0.36**	0.34
Artificial-characters	0.31	0.36	0.33	**0.39**	0.24	0.32	0.38	0.32	0.35	0.33	0.36	0.31	0.18	0.36
Balancescale	0.35	**0.6**	0.4	**0.6**	0.38	0.39	0.56	0.39	0.39	0.52	0.54	0.42	0.29	0.44
Ball-bearing	0.75	0.96	0.86	**0.97**	0.96	0.86	0.85	0.82	0.75	0.87	0.87	0.86	0.96	0.9
Biomed	0.24	0.42	0.06	0.36	0.36	0.18	0.47	0.3	0.3	0.24	0.36	**0.53**	0.01	0.46
Breast	0.83	0.52	0.63	0.83	**0.87**	0.48	0.83	0.76	0.8	0.67	0.76	0.63	0.85	0.64
Cancer	0.13	**0.28**	**0.28**	0.13	-0.01	0.21	0.13	0.21	**0.28**	0.13	**0.28**	0.21	0.21	0.03
Car-evaluation	0.58	0.72	0.28	0.84	0.38	0.59	0.87	0.6	0.68	0.83	**0.89**	0.62	0.51	0.53
Cardiotocography	0.13	**0.84**	0.17	**0.84**	0.54	0.16	0.12	0.13	0.17	0.14	0.24	0.09	0.22	0.8
Cellcycle	**0.45**	0.29	0.36	0.43	0.33	0.29	0.36	0.07	0.38	0.19	0.33	0.36	0.33	0.29
Cnae	0.33	0.27	0.31	**0.58**	0.05	0.31	0.33	0.29	0.3	0.24	0.32	-0.04	0.28	0.02
Colon	-0.12	-0.12	**0.25**	0.06	0.06	0.06	-0.12	0.06	0.06	0.06	**0.25**	**0.25**	-0.12	0.03
Delft	0.24	0.44	0.67	0.73	0.15	0.63	**0.75**	0.69	0.63	0.66	0.73	0.55	0.62	0.16
Dermatology	0.7	0.67	0.8	**0.91**	0.41	0.77	0.86	0.64	0.77	0.73	0.82	0.77	0.88	0.48
Diabetes	0.22	0.03	0.21	0.11	0.21	0.22	0.23	0.09	0.16	0.23	**0.28**	0.21	0.15	0.11
Ecoli	**0.76**	0.29	**0.76**	0.17	**0.76**	0.65	0.41	0.65	**0.76**	**0.76**	0.65	**0.76**	0.17	0.41
Flare	0.37	0.37	0.38	**0.47**	0.19	0.36	0.45	0.37	0.42	0.36	0.46	0.37	0.42	0.26
Glass	0.31	0.31	0.29	**0.42**	0.15	0.11	0.27	0.23	0.24	0.27	0.36	0.33	0.4	0.29
Hayes-roth	-0.03	-0.13	0.25	0.24	0.16	0.34	0.15	**0.35**	0.25	0.15	0.34	0.05	0.34	0.02
Heart	0.15	0.21	-0.02	0.45	**0.59**	0.18	0.15	0.11	0.04	0.15	0.11	0.18	0.21	0.25
Hepatitis	-0.25	-0.25	-0.04	0.38	**0.58**	-0.04	-0.25	-0.04	-0.04	0.17	-0.25	-0.25	-0.04	0.21
Housing	0.08	0.21	0.08	0.39	**0.45**	0.08	0.21	0.21	0.08	0.02	0.15	0.21	0.08	0.21
Imports	0.22	0.09	0.09	0.22	-0.04	0.09	**0.48**	0.22	0.35	0.09	0.35	0.22	**0.48**	0.35
Ionosphere	0.69	0.81	0.81	**0.88**	0.69	0.81	0.81	0.56	0.5	0.81	0.81	0.81	0.81	0.78
Iris	0.95	0.95	0.95	0.89	0.89	0.89	**1**	0.89	0.84	0.89	**1**	0.95	0.84	0.78
Led	0.58	0.42	0.06	0.48	0.48	0.17	0.65	0.52	-0.05	0.06	**0.69**	0.58	0.12	-0.04
Liver	0.2	0.14	0.14	0.02	0.2	0.08	0.14	-0.1	**0.33**	0.26	0.02	0.2	0.14	0.19
Lung-cancer	**0.47**	**0.47**	0.22	**0.47**	0.06	**0.47**	**0.47**	0.06	**0.47**	**0.47**	**0.47**	**0.47**	0.06	0.06
Multiple-features	0.79	0.72	0.77	**0.94**	0.86	0.88	0.83	0.59	0.82	0.76	0.12	0.02	0.79	0.57
Optdigits	0.85	0.91	0.94	0.91	0.84	0.94	**0.95**	0.79	0.86	0.92	**0.95**	0.92	0.8	0.69
Pageblocks	0.03	0.55	0.24	0.56	0.56	0.18	0.1	0.51	0.02	**0.61**	0.25	0.13	0.28	0.5
Sat	0.74	0.48	0.71	0.45	0.74	0.72	0.7	0.53	0.69	0.6	**0.75**	**0.75**	0.69	0.54
Seeds	0.86	**0.96**	0.68	0.89	0.93	0.79	0.82	0.75	0.79	0.75	0.86	0.86	0.89	0.74
Semeion	0.71	0.57	0.77	0.8	0.47	0.8	0.78	0.58	0.76	0.69	**0.81**	0.73	0.79	0.09
Sonar	0.12	0.22	0.22	0.31	0.22	0.22	0.26	0.12	0.12	0.12	0.22	0.22	**0.36**	0.2
Soybean-small	**1**	0.84	**1**	**1**	**1**	**1**	**1**	0.68	**1**	**1**	**1**	**1**	0.68	0.46
Spectf	0.43	0.08	0.43	0.31	0.2	0.31	0.43	0.31	**0.54**	0.2	0.08	0.43	0.2	0.31
Survival	0.09	0	0.13	0.18	0.23	0.13	0.32	0.32	0.04	0.23	**0.36**	0.23	0.18	-0.03
Systhetic-control	0.64	0.59	0.91	0.59	0.67	0.9	0.8	0.91	0.8	**0.95**	0.03	0.76	0.89	0.45
Texture	0.83	**0.95**	0.91	**0.95**	0.8	0.92	0.93	0.86	0.87	0.93	0.9	0.87	0.91	0.77
User-knowledge	0.52	0.57	0.47	0.62	0.52	0.48	**0.63**	0.39	0.56	0.39	0.55	0.57	**0.63**	0.54
Vehicle	0.28	0.49	0.21	**0.65**	0.41	0.43	0.39	0.32	0.42	0.3	0.43	0.34	0.48	0.4
Vertebra-column	0.56	0.5	0.57	0.58	0.5	0.57	0.57	0.44	0.51	0.48	**0.6**	0.56	0.45	0.32
Vowels	0.83	0.78	0.77	0.94	0.55	0.92	**0.96**	0.72	0.86	0.76	0.92	0.89	0.86	0.7
Waveform	0.59	0.5	0.52	0.5	**0.6**	0.52	0.54	0.43	0.57	0.48	0.55	**0.6**	0.06	0.24
Wine	0.47	0.67	0.33	**0.79**	0.63	0.38	0.31	0.38	0.43	0.42	0.38	0.47	0.42	0.49
Yeastgalactose	0.88	0.86	0.88	0.92	0.79	0.88	**0.97**	0.83	0.88	0.88	**0.97**	**0.97**	0.86	0.62
Zoo	0.82	**1**	**1**	**1**	**1**	**1**	**1**	0.56	0.82	0.74	**1**	**1**	0.66	0.41
	0.46	0.47	0.46	**0.57**	0.47	0.47	0.52	0.42	0.47	0.47	0.49	0.47	0.45	0.38

Table 10: Detailed results of the methods with the parameters selected using Uniform Objects over all datasets of the Type I experiments (single source-class inliers) with respect to AdjustedPrec@n. We visualize the distribution of these values in Figure 10(b).

AdjustedPrec@n	ABOD	Auto Enc.	GLOSH	GMM	iForest	KNN G.	SVDD	KNN L.	LOCI	LOF	LP	Parzen	SOD	DSVDD
Abalone	0.31	0.2	0.09	0.21	**0.33**	0.17	0.29	0.1	0.31	0.12	0.14	0.31	0.22	0.19
Arrhythmia	0.31	0.26	0.31	**0.46**	0.31	0.41	0.36	0.12	0.36	0.26	-0.03	-0.03	0.31	0.2
Artificial-characters	0.31	0.34	0.3	**0.39**	0.22	0.31	0.15	0.32	0.37	0.31	0.33	0.27	0.2	0.33
Balancescale	0.35	0.49	0.43	**0.8**	0.45	0.49	0.4	0.5	0.46	0.49	0.42	0.42	0.32	0.44
Ball-bearing	0.75	0.81	0.87	**0.97**	0.95	0.86	0.26	0.78	0.76	0.89	0.87	0.68	0.94	0.86
Biomed	0.24	0.42	0.12	0.36	0.36	0.18	0.3	**0.53**	0.3	0.24	0.36	0.36	0.18	0.37
Breast	0.83	0.57	0.78	0.48	**0.93**	0.76	0.8	0.67	0.89	0.54	0.78	0.89	0.76	0.47
Cancer	0.13	0.21	**0.28**	0.13	0.06	**0.28**	0.13	0.21	**0.28**	0.13	**0.28**	**0.28**	0.13	0.02
Car-evaluation	0.58	0.58	0.67	**0.87**	0.58	0.76	0.59	0.64	0.82	0.64	0.56	0.62	0.37	0.57
Cardiotocography	0.13	0.74	0.12	**0.91**	0.61	0.08	-0.02	0.11	0.12	0.14	0.24	0.01	0.24	0.52
Cellcycle	0.45	0.29	0.39	0.43	0.38	0.43	0.31	0.27	0.43	**0.54**	0.36	0.36	0.25	0.24
Cnae	0.33	0.28	0.38	**0.6**	-0.03	0.39	0.44	0.3	0.29	0.34	0.36	-0.04	0.59	0.06
Colon	-0.12	**0.25**	-0.12	0.06	**0.25**	-0.12	-0.12	0.06	0.06	0.06	**0.25**	**0.25**	-0.12	0.14
Delft	0.24	0.33	0.51	**0.74**	0.12	0.52	0.33	0.55	0.58	0.61	0.59	0.16	0.6	0.05
Dermatology	0.7	0.67	0.72	**0.91**	0.75	0.72	0.75	0.48	0.73	0.58	0.82	0.56	0.73	0.33
Diabetes	0.22	0.05	0.21	0.09	0.19	0.23	0.02	0.08	0.18	0.18	**0.25**	0.21	0.12	0.06
Ecoli	**0.76**	0.17	**0.76**	0.17	0.53	0.65	0.53	0.65	**0.76**	**0.76**	**0.76**	**0.76**	0.17	0.65
Flare	0.37	0.41	0.34	**0.45**	0.13	0.36	0.29	0.39	0.38	0.42	0.28	0.43	0.42	0.26
Glass	0.31	0.31	0.26	**0.42**	0.26	0.22	0.19	0.16	0.33	0.33	0.32	0.29	0.36	0.13
Hayes-roth	-0.03	0.17	0.26	-0.03	-0.03	0.06	-0.12	0.26	0.25	**0.43**	0.06	0.15	0.34	0.18
Heart	0.15	0.11	0.11	0.28	**0.59**	0.18	0.15	0.08	0.08	-0.06	0.04	0.15	0.32	0.25
Hepatitis	-0.25	0.38	-0.25	0.38	**0.58**	-0.04	-0.04	-0.04	-0.04	-0.25	-0.25	-0.25	-0.04	0.17
Housing	0.08	0.21	0.15	**0.33**	**0.33**	0.15	0.15	0.21	0.08	-0.04	0.15	0.02	0.02	0.16
Imports	0.22	0.09	0.09	0.35	-0.04	0.35	0.09	0.22	0.35	0.09	0.22	0.09	**0.61**	0.4
Ionosphere	0.69	0.75	0.81	**0.88**	0.69	0.69	0.69	0.63	0.44	0.63	0.75	0.75	**0.88**	0.8
Iris	**0.95**	**0.95**	**0.95**	**0.95**	0.84	**0.95**	**0.95**	0.84	0.89	0.89	**0.95**	0.84	0.84	0.73
Led	0.58	0.1	0.06	0.06	0.29	0.44	**0.69**	0.37	-0.05	0.26	**0.69**	0.58	0.01	0.11
Liver	**0.2**	0.02	0.14	0.14	0.14	0.08	-0.1	0.14	**0.2**	**0.2**	0.02	**0.2**	**0.2**	0.07
Lung-cancer	**0.47**	**0.47**	0.22	**0.47**	0.06	**0.47**	**0.47**	0.19	**0.47**	**0.47**	**0.47**	**0.47**	0.06	0.1
Multiple-features	0.79	0.76	0.66	**0.91**	0.84	0.84	0.35	0.62	0.78	0.66	0.02	0.02	0.76	0.23
Optdigits	0.85	0.91	0.93	0.91	0.79	**0.94**	0.71	0.79	0.87	0.93	0.83	0.88	0.81	0.65
Pageblocks	0.03	0.2	0.32	**0.65**	0.45	0.18	0.34	0.49	0.52	0.63	0.25	0.02	0.3	0.37
Sat	0.74	0.47	0.67	0.46	0.74	0.71	0.49	0.44	0.7	0.56	**0.75**	0.73	0.69	0.52
Seeds	0.86	0.89	0.68	**0.96**	0.89	0.75	0.86	0.61	0.79	0.71	0.89	0.82	0.89	0.54
Semeion	0.71	0.57	0.79	0.79	0.68	0.78	0.68	0.58	0.73	0.74	**0.8**	0.72	**0.8**	0.12
Sonar	0.12	0.22	0.02	0.12	0.12	0.17	0.02	0.22	0.07	-0.03	-0.08	0.02	**0.51**	-0.02
Soybean-small	**1**	0.84	**1**	**1**	0.84	**1**	**1**	0.84	**1**	**1**	**1**	**1**	**1**	0.54
Spectf	0.43	0.43	0.31	0.31	0.2	0.43	**0.54**	0.43	**0.54**	0.43	0.08	**0.54**	0.08	0.24
Survival	0.09	0	0.13	0.09	0.18	0.13	0.18	0.18	0.09	**0.32**	0.27	0.23	0.13	0.02
Systhetic-control	0.64	0.59	0.9	0.87	0.65	0.85	0.54	0.88	0.82	**0.93**	0.03	0.73	0.91	0.3
Texture	0.83	0.9	0.92	**0.93**	0.77	0.89	0.7	0.84	0.86	0.92	0.67	0.77	0.91	0.73
User-knowledge	0.52	**0.7**	0.45	0.53	0.52	0.51	0.35	0.37	0.51	0.46	0.37	0.52	0.69	0.59
Vehicle	0.28	0.37	0.37	**0.65**	0.44	0.38	0.05	0.25	0.4	0.23	0.43	0.2	0.52	0.23
Vertebra-column	0.56	0.42	0.48	0.46	0.43	0.56	0.58	0.38	0.56	0.52	**0.6**	0.56	0.41	0.3
Vowels	0.83	0.62	0.86	0.85	0.51	**0.88**	0.23	0.77	0.87	0.76	0.48	0.68	0.77	0.64
Waveform	0.59	0.5	0.54	0.53	**0.61**	0.54	0.59	0.47	0.59	0.5	0.49	0.6	0.31	0.25
Wine	0.47	0.59	0.52	**0.71**	0.67	0.38	0.47	0.38	0.43	0.47	0.38	0.47	0.39	0.37
Yeastgalactose	0.88	0.86	0.71	0.81	0.88	0.88	**0.97**	0.57	0.88	0.88	**0.97**	**0.97**	0.88	0.55
Zoo	0.82	**1**	**1**	**1**	**1**	**1**	**1**	0.66	0.82	0.74	**1**	0.82	0.82	0.29
	0.46	0.46	0.45	**0.55**	0.47	0.49	0.4	0.42	0.49	0.46	0.43	0.43	0.46	0.33

Table 11: Detailed results of the methods with the parameters selected using Perturbation over all datasets of the Type I experiments (single source-class inliers) with respect to AdjustedPrec@n. We visualize the distribution of these values in Figure 10(c).

AdjustedPrec@n	ABOD	Auto Enc.	GLOSH	GMM	iForest	KNN G.	SVDD	KNN L.	LOCI	LOF	LP	Parzen	SOD	DSVDD
Abalone	0.31	0.16	0.18	0.22	**0.33**	0.19	0.15	0.1	0.31	0.12	0.17	0.31	0.19	0.23
Arrhythmia	0.31	0.26	0.36	**0.46**	0.31	0.41	0.36	0.26	0.36	0.26	-0.03	-0.03	0.36	0.2
Artificial-characters	0.31	0.37	0.32	**0.39**	0.23	0.32	0.2	0.32	0.37	0.34	0.33	0.3	0.18	0.35
Balancescale	0.35	0.42	0.42	**0.78**	0.42	0.43	0.39	0.46	0.44	0.45	0.36	0.42	0.32	0.39
Ball-bearing	0.75	0.96	0.86	**0.97**	0.96	0.86	0.72	0.82	0.75	0.89	0.87	0.75	0.94	0.89
Biomed	0.24	0.42	0.12	0.3	0.36	0.18	**0.47**	0.24	0.24	0.42	0.36	0.3	0.12	0.28
Breast	0.83	0.54	0.39	0.43	**0.93**	0.52	0.8	0.39	0.8	0.33	0.76	0.63	0.74	0.54
Cancer	0.13	0.21	**0.28**	0.13	0.06	0.21	**0.28**	0.21	0.21	0.21	**0.28**	0.21	0.21	0.05
Car-evaluation	0.58	0.6	0.7	**0.86**	0.59	0.68	0.64	0.7	0.82	0.64	0.48	0.62	0.37	0.6
Cardiotocography	0.13	0.74	0.17	**0.91**	0.61	0.16	0.15	0.17	0.15	0.12	0.24	0.07	0.31	0.81
Cellcycle	**0.45**	0.29	0.36	0.43	0.22	0.13	0.28	0.25	0.31	0.24	0.36	0.4	0.25	0.31
Cnae	0.33	0.27	0.28	0.6	0.04	0.27	0.43	0.24	0.33	0.27	0.29	-0.04	**0.64**	0.06
Colon	-0.12	**0.44**	**0.44**	0.06	0.25	-0.12	-0.12	0.25	0.06	0.06	0.25	0.25	-0.12	-0.09
Delft	0.24	0.55	0.73	**0.74**	0.13	0.62	0.5	0.65	0.64	0.63	0.59	0.47	0.51	0.15
Dermatology	0.7	0.67	0.74	**0.91**	0.47	0.77	0.73	0.61	0.77	0.71	0.82	0.68	0.88	0.45
Diabetes	0.22	0.13	**0.28**	0.06	0.21	0.23	0.08	0.09	0.21	0.25	0.25	0.21	0.15	0.04
Ecoli	**0.76**	0.29	**0.76**	0.17	**0.76**	0.65	0.41	0.65	0.53	0.06	0.65	**0.76**	0.17	0.46
Flare	0.37	0.42	0.29	**0.47**	0.12	0.33	0.34	0.33	0.38	0.25	0.3	0.41	0.37	0.26
Glass	0.31	0.39	0.21	**0.44**	0.12	0.33	0.18	0.16	0.16	0.09	0.36	0.29	0.36	0.3
Hayes-roth	-0.03	0.17	0.35	**0.42**	-0.14	0.05	-0.12	0.15	0.16	0.25	-0.03	0.06	0.14	0.13
Heart	0.15	0.21	0.01	0.28	**0.59**	0.11	0.21	0.04	0.15	0.15	0.04	0.18	0.35	0.2
Hepatitis	-0.25	-0.25	-0.04	0.38	**0.58**	-0.04	-0.25	-0.04	-0.04	-0.25	-0.25	-0.25	-0.04	0.04
Housing	0.08	0.21	0.08	0.39	**0.51**	0.08	0.08	0.15	0.08	0.02	0.15	0.21	0.02	0.27
Imports	0.22	0.22	**0.48**	0.35	0.09	-0.04	0.09	**0.48**	0.09	0.09	0.22	0.35	0.35	0.45
Ionosphere	0.69	**0.88**	0.81	**0.88**	0.56	0.81	0.69	0.63	0.5	0.75	0.75	0.75	**0.88**	0.78
Iris	**0.95**	**0.95**	**0.95**	**0.95**	0.84	**0.95**	**0.95**	0.84	0.84	0.89	**0.95**	**0.95**	0.84	0.72
Led	0.58	0.06	-0.05	-0.05	0.43	0.33	**0.69**	0.48	-0.05	0.37	**0.69**	0.58	0.12	0.04
Liver	0.2	0.2	0.14	0.08	0.2	0.08	-0.1	0.14	**0.33**	0.26	0.02	0.2	0.14	0.13
Lung-cancer	**0.47**	**0.47**	**0.47**	**0.47**	**0.47**	**0.47**	**0.47**	**0.47**	**0.47**	**0.47**	**0.47**	**0.47**	0.06	0.2
Multiple-features	0.79	0.76	0.73	**0.91**	0.77	0.88	0.61	0.61	0.79	0.8	0.02	0.02	0.77	0.43
Optdigits	0.85	0.91	0.94	0.91	0.81	**0.95**	0.86	0.8	0.88	0.94	0.83	0.92	0.8	0.66
Pageblocks	0.03	0.52	0.17	0.54	0.53	0.15	0.34	0.56	0.52	**0.67**	0.25	0.02	0.31	0.5
Sat	0.74	0.47	0.67	0.46	0.73	0.72	0.5	0.53	0.68	0.56	**0.75**	**0.75**	0.69	0.52
Seeds	0.86	0.89	0.61	**0.96**	0.89	0.79	0.82	0.75	0.79	0.71	0.89	0.86	0.89	0.7
Semeion	0.71	0.56	0.74	0.79	0.51	0.72	0.7	0.56	0.68	0.74	**0.8**	0.54	0.72	0.07
Sonar	0.12	0.12	0.22	0.12	0.22	0.22	0.07	0.12	0.17	0.02	0.07	0.22	**0.26**	0.11
Soybean-small	**1**	**1**	0.68	**1**	0.84	0.84	**1**	0.84	**1**	**1**	**1**	**1**	0.55	0.74
Spectf	0.43	0.43	0.31	0.31	0.2	0.43	0.43	0.31	0.43	0.31	0.08	**0.54**	0.2	0.11
Survival	0.09	0	0.13	0.23	0.23	0.18	0.23	0.18	0.04	**0.32**	0.27	0.23	0.04	0.02
Systhetic-control	0.64	0.53	0.86	0.87	0.63	0.85	0.57	0.88	0.83	**0.92**	0.03	0.76	0.81	0.31
Texture	0.83	0.9	0.92	**0.93**	0.79	0.91	0.7	0.85	0.86	0.92	0.71	0.8	0.91	0.76
User-knowledge	0.52	0.68	0.38	0.56	0.47	0.47	0.41	0.34	0.57	0.34	0.35	0.52	**0.69**	0.56
Vehicle	0.28	0.37	0.31	**0.65**	0.42	0.35	0.08	0.28	0.42	0.27	0.43	0.28	0.52	0.4
Vertebra-column	0.56	0.42	0.48	0.46	0.52	0.59	**0.61**	0.47	0.56	0.5	0.6	0.56	0.56	0.3
Vowels	0.83	0.78	**0.91**	0.89	0.51	0.88	0.41	0.8	0.82	0.83	0.66	0.85	0.72	0.72
Waveform	0.59	0.5	0.54	0.52	**0.6**	0.54	0.56	0.47	0.57	0.51	0.49	**0.6**	0.31	0.25
Wine	0.47	0.59	0.52	**0.71**	0.67	0.42	0.36	0.34	0.43	0.51	0.38	0.47	0.62	0.57
Yeastgalactose	0.88	0.77	**0.97**	0.81	0.57	**0.97**	**0.97**	0.6	0.88	0.88	**0.97**	**0.97**	0.75	0.58
Zoo	0.82	0.82	0.74	**1**	**1**	**1**	**1**	0.74	0.74	0.74	**1**	0.82	0.61	0.4
	0.46	0.47	0.47	**0.55**	0.47	0.47	0.43	0.43	0.47	0.45	0.43	0.45	0.44	0.37

Table 12: Detailed results of the methods with the parameters selected using Cross-validation over all datasets of the Type I experiments (single source-class inliers) with respect to MCC. We visualize the distribution of these values in Figure 4(c).

MCC	ABOD	Auto Enc.	GLOSH	GMM	iForest	KNN G.	SVDD	KNN L.	LOCI	LOF	LP	Parzen	SOD	DSVDD
Abalone	0.25	**0.37**	0.25	0.31	0.35	0.32	0.32	0.28	**0.37**	0.28	0.29	**0.37**	0.3	0.24
Arrhythmia	0.27	0.37	0.33	0	**0.4**	0.33	0	0.3	0.33	0.3	0	0	0.22	0.27
Artificial-characters	0.35	0.52	0.43	**0.55**	0.26	0.43	0.41	0.38	0.4	0.44	0.4	0.26	0.38	0.49
Balancescale	0.46	0.61	0.54	**0.64**	0.44	0.52	0.34	0.54	0.42	0.51	0.39	0.45	0.36	0.54
Ball-bearing	0.63	**0.96**	0.87	**0.96**	**0.96**	0.84	0.62	0.81	0.73	0.87	0.07	0.5	0.95	0.88
Biomed	0.32	0.15	0.35	0.32	0.32	0.35	0.1	0.45	0.34	0.37	0.11	0.08	0.21	**0.54**
Breast	0.78	0.55	**0.92**	0.39	0.86	**0.92**	0.79	0.77	**0.92**	0.91	0.8	0.9	0.78	0.71
Cancer	0.24	0.03	0.23	0	0.04	0.21	0.27	0.23	0.27	0.31	0	0.19	**0.36**	0.12
Car-evaluation	0.59	0.74	0.82	**0.91**	0.51	0.69	0.26	0.66	0.76	0.74	0.63	0.66	0.6	0.61
Cardiotocography	0.08	0.79	0.15	**0.91**	0.56	0.11	0.19	0.17	0.11	0.19	0.15	0	0.32	0.84
Cellcycle	0.29	0.18	0.4	0.31	0.23	0.47	0.22	0.28	0.26	0.37	0.47	**0.52**	0.24	0.26
Cnae	0.13	0.4	0.18	**0.58**	-0.06	0.17	0.23	0.23	0.17	0.26	0.24	0	0.44	0.17
Colon	0.1	0	-0.04	0	0.24	-0.17	0	-0.17	0.14	0.29	0	0	**0.32**	0.04
Delft	0.17	0.34	**0.75**	0.3	0.08	0.57	0.12	0.71	0.58	0.72	0.18	0.32	0.69	0.19
Dermatology	0.6	0.31	0.71	0.35	0.61	0.77	0.51	0.66	0.67	0.68	0.62	0.58	**0.87**	0.37
Diabetes	0.14	0.14	0.14	0.04	0.16	0.16	0.09	0.15	0.08	0.16	**0.24**	0.16	0.03	0.19
Ecoli	0.48	0	0.76	0.68	0.72	0.64	0.36	0.72	**0.79**	0.68	0.55	0.76	0.26	0.41
Flare	0.29	**0.43**	0.31	0.4	0.18	0.36	0.38	0.29	0.34	0.33	0.39	0.37	**0.43**	0.38
Glass	0.32	0.04	0.26	0.27	0.22	0.26	0.09	0.29	0.15	0.24	0.22	0.27	**0.34**	0.23
Hayes-roth	0.3	0.34	**0.4**	0.1	0.19	0.35	0.14	0.34	0.34	0.28	0.05	0.27	0.34	0.17
Heart	0.11	0.18	0.09	0.09	**0.64**	0.1	0.08	0.13	0.11	0.03	0.1	0.08	0.15	0.33
Hepatitis	-0.09	0.13	-0.13	0.17	0.33	-0.13	0	-0.2	-0.13	-0.13	0	-0.22	-0.04	**0.34**
Housing	0.07	0.28	0.01	0.32	**0.47**	0.07	0.15	0.12	0.18	0.08	0.05	0.09	0.15	0.31
Imports	0.24	0	0.48	0	**0.54**	0.18	0	0.27	0.34	0.34	0	0	0.32	0.48
Ionosphere	0.61	0.79	**0.85**	0.64	0.49	0.82	0.57	0.63	0.45	0.81	0.69	0.68	0.78	0.77
Iris	**0.92**	0.61	0.79	0.87	0.79	0.78	**0.92**	0.87	0.83	0.89	0.87	0.52	0.9	0.73
Led	0.3	0.1	0.28	0	0.32	0.21	0.32	0.23	0.19	0.3	0.52	**0.53**	0.28	0
Liver	-0.21	0.11	-0.21	**0.15**	-0.16	-0.15	0	-0.21	-0.21	-0.21	0	-0.02	-0.01	0.1
Lung-cancer	0.08	0	**0.5**	0	0.05	0.2	0.21	0.37	0.24	0.29	0	0.39	0.22	-0.07
Multiple-features	0.75	0.77	0.85	0	**0.86**	**0.86**	0.51	0.68	0.77	0.83	0	0	0.73	0.59
Optdigits	0.83	0.92	**0.94**	0.67	0.83	**0.94**	0.26	0.78	0.86	0.93	0.06	0.74	0.82	0.73
Pageblocks	0.17	0.62	0.32	**0.66**	0.59	0.18	0.2	0.59	0.49	0.62	0.19	0.17	0.25	0.48
Sat	0.68	0.65	0.72	0.41	0.69	0.7	0.49	0.59	0.66	0.64	0.42	**0.75**	0.69	0.59
Seeds	0.84	0.6	0.82	0.84	**0.85**	0.71	0.78	0.79	0.82	0.77	0.69	0.72	0.8	0.77
Semeion	0.61	0.09	0.75	0	0.7	0.76	0.16	0.5	0.61	0.74	0	0.67	**0.79**	0.16
Sonar	-0.04	0.15	0.24	0.25	0.05	0.2	0	0.12	0.13	0.2	0.24	0.12	**0.38**	0.18
Soybean-small	0.92	0.12	0.94	0	0.92	0.79	0.38	0.9	0.94	0.92	0.12	0.77	**1**	0.07
Spectf	0.42	0	0.4	0	**0.49**	0.47	0.21	0.47	**0.49**	0.45	0	0.47	0.38	0.07
Survival	0.09	0.01	0	**0.25**	0.15	0.16	0.11	0.07	0.09	0.11	0.06	0.14	0.21	-0.06
Systhetic-control	0.74	0	0.88	0	0.68	0.88	0.44	0.91	0.85	**0.95**	0	0.65	0.91	0.35
Texture	0.76	**0.95**	0.93	0.94	0.75	0.91	0.87	0.86	0.84	0.94	0.89	0.46	0.91	0.8
User-knowledge	0.49	**0.69**	0.51	**0.69**	0.49	0.57	0.3	0.48	0.5	0.51	0.32	0.2	0.66	0.55
Vehicle	0.31	0.51	0.31	**0.66**	0.38	0.31	0.39	0.28	0.25	0.31	0.31	0.15	0.55	0.5
Vertebra-column	0.5	0.34	0.56	0.24	0.53	0.55	0.53	0.62	**0.65**	0.64	0.22	0.53	0.63	0.48
Vowels	0.85	0.23	0.85	0.62	0.45	**0.91**	0.47	0.74	0.79	0.82	0.54	0.41	0.83	0.66
Waveform	0.56	0.56	0.59	0.57	**0.6**	0.58	0.59	0.52	**0.6**	0.58	0.48	0.59	0.46	0.38
Wine	0.5	0.58	0.54	0.42	**0.73**	0.51	0.51	0.53	0.53	0.54	0.35	0.54	0.61	0.36
Yeastgalactose	0.87	0.32	0.91	0.22	0.91	0.91	0.58	0.79	0.9	0.84	0.62	**0.94**	0.89	0.34
Zoo	0.5	0.2	0.67	0.25	**0.72**	0.6	0.11	0.5	0.5	0.58	0.36	0.59	0.53	0.16
	0.41	0.36	**0.49**	0.37	0.47	0.47	0.32	0.45	0.46	**0.49**	0.28	0.37	**0.49**	0.38

Table 13: Detailed results of the methods with the parameters selected using Self-Adaptive Data Shifting (SDS) over all datasets of the Type I experiments (single source-class inliers) with respect to MCC. We visualize the distribution of these values in Figure 11(a).

MCC	ABOD	Auto Enc.	GLOSH	GMM	iForest	KNN G.	SVDD	KNN L.	LOCI	LOF	LP	Parzen	SOD	DSVDD
Abalone	0.25	0.23	0.18	0.22	**0.36**	0.23	0.29	0.17	0.35	0.19	0.31	0.17	0.24	0.22
Arrhythmia	0.33	0.24	0.37	0	0.31	0.37	0.31	0.28	0.35	0.35	0	0	**0.38**	0.29
Artificial-characters	0.36	0.5	0.42	**0.55**	0.26	0.43	0.44	0.4	0.4	0.44	0.43	0.41	0.36	0.47
Balancescale	0.4	0.58	0.56	**0.74**	0.4	0.57	0.34	0.52	0.35	0.57	0.38	0.48	0.43	0.46
Ball-bearing	0.63	**0.93**	0.86	0.84	0.87	0.85	0.83	0.83	0.73	0.9	0.09	0.55	0.89	0.79
Biomed	0.11	0.32	0.25	0.22	0.31	0.14	0.33	0.29	0.31	**0.35**	0.13	0.16	0.15	0.3
Breast	0.7	0.45	0.61	0.52	**0.82**	0.41	0.66	0.73	0.81	0.6	0.71	0.56	0.76	0.53
Cancer	0.23	0.02	0.22	0.27	0.19	0.21	0.16	0.2	**0.3**	0.18	0.14	0.19	0.23	0.07
Car-evaluation	0.54	0.69	0.56	**0.88**	0.3	0.78	0.31	0.78	0.58	0.75	0.57	0.63	0.61	0.57
Cardiotocography	0.08	0.78	0.13	**0.83**	0.44	0.13	0.12	0.1	0.1	0.12	0.15	0	0.17	0.76
Cellcycle	0.28	0.22	0.33	**0.37**	0.27	0.34	0.26	0.04	0.12	0.11	0.34	0.26	0.18	0.23
Cnae	0.13	0.12	0.14	**0.51**	-0.09	0.14	0.29	0.14	0.11	0.19	0.32	0	0.24	0
Colon	0.1	-0.11	0.24	0	0.16	0	0	0.2	0.1	**0.4**	0	0	0.12	-0.03
Delft	0.17	0.36	0.56	0.35	0.16	0.54	0.25	0.63	0.49	**0.67**	0.22	0.47	0.55	0.16
Dermatology	0.57	0.62	0.75	0.46	0.4	0.69	0.31	0.6	0.65	0.65	0.43	0.63	**0.85**	0.48
Diabetes	0.16	-0.01	**0.26**	0.07	0.14	0.17	0.23	0.11	0.06	0.17	0.22	0.13	0.1	0.09
Ecoli	0.48	0.29	0.76	0.37	0.75	0.52	0.52	0.72	0.75	**0.79**	0.65	0.52	0.11	0.43
Flare	0.32	0.39	0.25	0.38	0.18	0.26	0.21	0.18	0.27	0.24	0.34	0.28	**0.42**	0.3
Glass	0.28	0.35	0.23	0.25	0.12	0.11	0.16	0.08	0.22	0.11	0.24	0.28	**0.44**	0.33
Hayes-roth	0.23	0.18	0.27	**0.37**	0.07	0.22	0.01	0.27	0.28	0.29	0.16	0.19	0.25	0
Heart	0.11	0.12	0.08	0.28	**0.52**	0.02	0.17	0.11	-0.01	0	0.14	0.16	0.11	0.23
Hepatitis	-0.13	**0.37**	0.08	0.33	0.31	-0.17	-0.25	0.05	0.05	0.17	-0.1	-0.22	-0.17	0.22
Housing	0.19	0.23	0.07	**0.36**	0.31	0.09	0.17	0.06	0.23	0.07	0.11	0.12	0.18	0.26
Imports	0.18	-0.06	0.08	**0.44**	0.04	0.18	0.13	0.25	0.34	0.13	0.13	0.35	0.43	0.36
Ionosphere	0.61	0.53	**0.73**	0.42	0.64	0.71	0.5	0.69	0.56	0.71	0.5	0.61	0.67	0.68
Iris	0.86	0.79	0.75	0.71	0.84	0.81	0.63	0.79	0.73	**0.87**	0.82	0.76	0.76	0.6
Led	0.35	0.35	0.26	0.05	0.25	0.16	0.3	0.1	0.11	0.24	0.47	**0.58**	0.13	0.09
Liver	-0.16	0.04	0.06	**0.18**	-0.01	-0.01	0.05	-0.11	0.01	0.07	0.14	0.09	0.16	0.09
Lung-cancer	0.08	0	0.33	0	-0.14	0.2	0	0.37	0.17	0.13	0	**0.6**	0.53	0
Multiple-features	0.74	0.65	0.79	0	**0.87**	0.85	0.75	0.63	0.72	0.71	0	0	0.76	0.53
Optdigits	0.8	0.88	0.91	0.87	0.82	**0.93**	0.63	0.78	0.75	0.9	0.11	0.9	0.8	0.64
Pageblocks	0.01	0.45	0.2	**0.51**	0.48	0.14	0.22	0.39	0.17	0.45	0.18	0.03	0.23	0.4
Sat	0.67	0.46	0.66	0.46	**0.7**	0.66	0.69	0.53	0.64	0.57	0.49	0.69	0.67	0.54
Seeds	0.81	0.82	0.75	0.84	**0.9**	0.81	0.72	0.79	0.79	0.75	0.74	0.75	0.77	0.71
Semeion	0.32	0.5	0.52	0	0.4	0.47	0.07	0.33	0.12	0.5	0	0.42	**0.76**	0.08
Sonar	-0.08	0.07	0.05	**0.31**	0.28	0.12	0.25	0.19	0.18	0.08	0.23	0.12	0.29	0.21
Soybean-small	**1**	0.12	**1**	0.12	0.85	0.81	0	0.81	0.85	0.92	0	0.71	0.41	0.3
Spectf	0.41	0.26	0.43	0	0.49	0.34	-0.07	0.35	0.34	0.44	0	0.43	**0.51**	0.3
Survival	0.16	0.19	0.16	0.11	0.22	0.16	0.27	0.18	0.09	**0.33**	0.22	0.19	0.03	-0.02
Systhetic-control	0.73	0.57	**0.91**	0	0.7	0.86	0.29	0.88	0.84	0.89	0	0.5	0.84	0.35
Texture	0.74	**0.92**	0.88	**0.92**	0.74	0.87	0.82	0.84	0.84	0.91	0.87	0.76	0.87	0.73
User-knowledge	0.49	0.62	0.54	0.37	0.5	0.56	0.29	0.35	0.49	0.54	0.3	0.45	**0.66**	0.53
Vehicle	0.28	0.5	0.27	**0.65**	0.39	0.3	0.4	0.3	0.28	0.27	0.34	0.2	0.5	0.42
Vertebra-column	0.61	0.53	0.55	**0.64**	0.5	0.57	0.58	0.53	0.57	0.55	0.39	0.57	0.53	0.28
Vowels	0.78	0.79	0.72	0.77	0.49	**0.87**	0.51	0.73	0.73	0.78	0.66	0.85	0.86	0.66
Waveform	0.54	0.58	0.59	0.54	**0.6**	0.58	0.44	0.5	0.56	0.54	0.33	0.58	0.25	0.29
Wine	0.49	0.58	0.37	**0.73**	0.61	0.47	0.36	0.46	0.43	0.44	0.41	0.51	0.28	0.43
Yeastgalactose	0.89	0.75	**0.91**	0.19	0.76	**0.91**	0.21	0.76	0.8	0.78	0.28	0.77	0.89	0.36
Zoo	0.67	0.36	**0.78**	0.42	0.65	0.72	0	0.48	0.65	0.43	0.28	0.46	0.51	0.23
	0.4	0.41	**0.46**	0.4	0.43	0.43	0.31	0.42	0.42	0.45	0.28	0.38	0.44	0.35

Table 14: Detailed results of the methods with the parameters selected using Uniform Objects over all datasets of the Type I experiments (single source-class inliers) with respect to MCC. We visualize the distribution of these values in Figure 11(b).

MCC	ABOD	Auto Enc.	GLOSH	GMM	iForest	KNN G.	SVDD	KNN L.	LOCI	LOF	LP	Parzen	SOD	DSVDD
Abalone	0.17	0.03	0.01	0.03	**0.3**	0.04	0.18	0.13	0.29	0.08	0.18	0.1	0.1	0.11
Arrhythmia	0.31	0.25	0.22	0	0.18	0.22	**0.33**	0.22	0.26	0.19	0	0	0.22	0.22
Artificial-characters	0.26	0.36	0.26	**0.46**	0.19	0.25	0.27	0.33	0.29	0.33	0.45	0.22	0.27	0.35
Balancescale	0.46	0.53	0.55	**0.77**	0.46	0.61	0.53	0.58	0.46	0.51	0.61	0.45	0.36	0.48
Ball-bearing	0.39	0.34	0.26	**0.96**	0.95	0.24	0.27	0.39	0.35	0.33	0.09	0.25	0.65	0.69
Biomed	0.27	0.19	0.27	0.3	0.35	0.39	0.17	0.22	**0.44**	0.22	0.2	0.39	0.3	0.29
Breast	0.69	0.5	0.72	0.3	0.86	0.68	0.8	0.53	0.87	0.5	0.75	**0.88**	0.77	0.41
Cancer	0.21	0.17	0.21	0.32	0.06	0.15	**0.37**	0.21	0.21	0.04	0.14	0.26	0	0.03
Car-evaluation	0.57	0.64	0.81	**0.9**	0.51	0.85	0.67	0.76	0.81	0.74	0.63	0.7	0.54	0.63
Cardiotocography	0.01	**0.64**	0.01	0.57	0.11	0.01	0.05	0.02	0.04	0.05	0.14	0.04	0.04	0.27
Cellcycle	0.29	0.15	**0.4**	0.38	0.11	0.33	0.35	0.31	0.34	0.26	0.35	0.39	0.19	0.21
Cnae	0.07	0.05	0.05	**0.57**	-0.02	0.05	0.2	0.09	0.09	0.08	0.13	0	0.13	-0.03
Colon	0.1	-0.11	0.2	0	**0.35**	0.2	0.18	0.1	-0.04	0.16	0	0	0.21	0.1
Delft	0.2	0.32	0.32	0.45	0.04	0.36	0.38	0.48	0.45	0.48	**0.55**	0.16	0.32	0.1
Dermatology	0.22	0.7	0.2	0.69	0.4	0.33	0.36	0.25	0.31	0.44	**0.76**	0.25	0.66	0.4
Diabetes	0.02	0.06	-0.04	0	0.18	0.01	-0.03	0.01	0.07	0.01	**0.19**	0.06	0	0.02
Ecoli	0.55	0.25	**0.76**	0.34	0.58	0.52	0.61	0.72	0.5	**0.76**	0.55	0.72	-0.01	0.46
Flare	0.31	0.3	0.24	0.41	0.11	0.25	0.38	0.29	0.26	0.31	0.36	0.28	**0.44**	0.27
Glass	0.24	0.4	0.25	0.24	0.25	0.16	0.18	0.17	0.16	0.19	0.39	**0.42**	0.27	0.08
Hayes-roth	0.3	0.4	0.37	-0.05	0.28	0.37	0.09	0.26	0.39	**0.42**	0.19	0.34	0.31	0.2
Heart	0.2	0	0.06	0.27	**0.37**	0.05	0.03	0.13	-0.08	0.06	0.15	0.09	-0.09	0.15
Hepatitis	-0.09	0.29	-0.09	**0.38**	0	-0.09	0	-0.13	-0.09	-0.09	-0.17	-0.09	-0.09	0.2
Housing	0.06	0.09	0.05	0.19	**0.22**	0.05	0.05	0.12	0.18	0.07	0.12	0.06	0.09	0.12
Imports	-0.04	-0.04	-0.04	**0.41**	0.22	0.08	0.13	0.05	0.34	0.16	0.22	0.08	0.28	0.29
Ionosphere	0.55	0.73	**0.81**	0.79	0.69	0.7	0.62	0.63	0.36	0.68	0.72	0.78	**0.81**	0.77
Iris	0.86	**0.95**	0.75	0.92	0.79	0.76	0.84	0.78	0.79	0.85	0.92	0.84	0.78	0.68
Led	0.32	0.05	0.37	0	0.23	0.25	0.45	0.23	0.14	0.2	0.57	**0.61**	0.27	0.13
Liver	-0.16	0.01	-0.21	-0.11	-0.04	-0.11	-0.04	0.08	-0.04	-0.1	0.14	-0.11	**0.27**	0.11
Lung-cancer	0.03	0	**0.47**	0	0.22	0.33	0	0.28	0	0	0	**0.47**	0.26	-0.04
Multiple-features	0.37	**0.73**	0.36	0	0.2	0.41	0.34	0.38	0.47	0.36	0	0	0.33	0.14
Optdigits	**0.67**	0.43	0.55	0.5	0.28	0.52	0.61	0.55	0.62	0.58	0.1	0.55	0.44	0.47
Pageblocks	0.04	0.22	0.19	0.32	0.49	0.19	0.19	0.51	0.17	**0.6**	0.19	0.18	0.13	0.19
Sat	0.53	0.24	0.25	0.2	**0.64**	0.25	0.39	0.26	0.53	0.28	0.49	0.33	0.39	0.33
Seeds	0.78	0.78	0.78	**0.87**	**0.87**	0.72	0.71	0.66	0.78	0.8	0.76	0.8	0.64	0.53
Semeion	0.43	0.5	0.34	0	0.27	0.41	**0.68**	0.39	0.37	0.39	0.04	0.4	0.47	0.17
Sonar	0	0.07	0.09	0.17	0.1	0.09	-0.04	0.2	-0.08	-0.09	-0.13	-0.08	**0.35**	0.05
Soybean-small	**1**	0	0.94	0	0.92	0.75	0.38	0.69	0.9	0.92	0.29	0.79	0.69	0.18
Spectf	0.41	0.21	0.47	0	0.42	0.34	**0.5**	0.38	0.34	0.38	0	0.36	0.32	0.33
Survival	0.09	0.05	0.14	0.04	0.13	0.07	0.13	**0.2**	0.07	0.08	0.11	0.07	0.17	0.05
Systhetic-control	0.72	0.57	0.87	0	0.67	0.87	0.66	0.85	0.83	**0.88**	0	0.75	0.84	0.31
Texture	0.43	0.65	0.58	0.65	0.59	0.54	0.6	0.58	0.65	**0.68**	0.54	0.47	0.54	0.56
User-knowledge	0.49	**0.74**	0.55	0.69	0.47	0.53	0.52	0.42	0.53	0.53	0.45	0.56	0.64	0.61
Vehicle	0.17	0.15	0.21	**0.45**	0.11	0.15	0.23	0.22	0.2	0.23	0.43	0.12	0.27	0.27
Vertebra-column	0.36	0.36	0.45	0.36	0.4	0.49	**0.63**	0.39	0.5	0.44	0.39	0.38	0.35	0.3
Vowels	0.74	0.61	**0.78**	0.77	0.46	0.77	0.4	0.63	0.77	0.72	0.51	0.6	0.72	0.62
Waveform	0.41	0.49	0.49	0.5	**0.57**	0.49	0.46	0.48	0.18	0.49	0.55	0.47	0.13	0.32
Wine	0.46	0.51	0.38	**0.66**	0.53	0.4	0.49	0.3	0.49	0.35	0.44	0.5	-0.05	0.25
Yeastgalactose	0.91	0.79	0.83	0.36	0.84	0.93	0.59	0.63	0.87	0.71	0.71	0.91	**0.94**	0.41
Zoo	0.67	0.36	**0.8**	0.42	0.61	0.72	0.2	0.6	0.53	0.5	0.36	0.55	0.63	0.09
	0.35	0.34	0.37	0.36	**0.38**	0.36	0.35	0.36	0.36	0.36	0.32	0.35	0.35	0.28

Table 15: Detailed results of the methods with the parameters selected using Perturbation over all datasets of the Type I experiments (single source-class inliers) with respect to MCC. We visualize the distribution of these values in Figure 11(c).

MCC	ABOD	Auto Enc.	GLOSH	GMM	iForest	KNN G.	SVDD	KNN L.	LOCI	LOF	LP	Parzen	SOD	DSVDD
Abalone	0.21	0.11	0.16	0.1	**0.3**	0.11	0.18	0.13	0.29	0.14	0.18	0.12	0.1	0.12
Arrhythmia	0.31	0.25	0.37	0	0.32	0.34	0.3	0.22	0.26	0.32	0	0	**0.42**	0.26
Artificial-characters	0.27	0.44	0.33	**0.48**	0.22	0.38	0.33	0.34	0.33	0.34	0.45	0.36	0.33	0.42
Balancescale	0.44	0.53	0.55	**0.77**	0.52	0.59	0.52	0.55	0.45	0.51	0.52	0.47	0.42	0.43
Ball-bearing	0.39	0.89	0.71	**0.96**	**0.96**	0.72	0.59	0.75	0.56	0.87	0.09	0.44	0.94	0.88
Biomed	0.21	0.27	0.31	0.3	0.35	0.38	0.24	0.19	**0.44**	0.3	0.2	0.16	0.32	0.33
Breast	0.69	0.51	0.31	0.29	**0.86**	0.4	0.82	0.08	0.85	0.03	0.73	0.64	0.74	0.45
Cancer	0.24	0.17	0.31	0.32	0.23	0.22	**0.33**	0.15	0.29	0.29	0.14	0.3	0.13	-0.05
Car-evaluation	0.54	0.62	**0.85**	0.82	0.5	0.81	0.65	0.79	0.8	0.74	0.59	0.65	0.55	0.64
Cardiotocography	0.06	0.64	0.07	0.57	0.21	0.09	0.08	0.13	0.06	0.12	0.14	0.01	0.17	**0.7**
Cellcycle	0.09	0.17	0.09	0.32	0.14	0.17	0.31	0.2	0.1	0.12	0.3	**0.36**	0.08	0.17
Cnae	0.13	0.14	0.13	**0.57**	-0.02	0.11	0.25	0.13	0.16	0.18	0.21	0	0.39	-0.02
Colon	0.1	0	0.2	0	0.1	0.1	0	0.52	-0.04	**0.56**	0	0	0	-0.06
Delft	0.2	0.54	**0.67**	0.45	0.18	0.58	0.5	0.61	0.61	**0.67**	0.55	0.51	0.45	0.14
Dermatology	0.5	0.7	0.7	0.69	0.34	0.72	0.69	0.54	0.62	0.62	0.74	0.49	**0.86**	0.5
Diabetes	0.02	0.09	0.14	0.05	0.16	0.11	0.04	0.06	0.05	0.12	**0.19**	0.04	0.16	0.04
Ecoli	0.48	0.29	0.68	0.37	0.68	0.52	0.43	**0.72**	0.46	0.23	0.65	**0.72**	-0.01	0.42
Flare	0.25	0.4	0.31	0.41	0.13	0.3	0.38	0.28	0.31	0.3	0.38	0.35	**0.5**	0.22
Glass	0.26	0.26	0.21	0.29	0.11	0.19	0.18	0.12	0.17	0.23	0.22	**0.37**	**0.37**	0.32
Hayes-roth	0.21	**0.4**	0.23	0.15	0.24	0.23	0.06	0.2	0.3	0.24	0.07	0.26	0.31	0.13
Heart	0.08	0.09	0	0.27	**0.47**	-0.08	0.05	0.03	-0.11	-0.02	0.15	-0.02	0.14	0.15
Hepatitis	-0.09	0.14	-0.09	0.38	**0.54**	-0.09	-0.13	-0.13	-0.09	-0.13	-0.17	-0.09	-0.2	0.13
Housing	0.11	0.25	0.08	0.19	**0.42**	0.16	0.12	0.01	0.2	0.04	0.12	0.08	0.06	0.21
Imports	0.18	0.09	**0.54**	0.41	0.27	0.15	0.17	0.22	0.13	0.09	0.22	0.28	0.43	0.5
Ionosphere	0.66	0.79	**0.81**	0.79	0.54	**0.81**	0.72	0.52	0.52	0.68	0.72	0.78	**0.81**	0.78
Iris	0.86	0.87	0.73	**0.95**	0.78	0.76	0.89	0.77	0.8	0.87	0.92	0.89	0.78	0.65
Led	0.29	0	0.2	0	0.16	0.2	0.42	0.22	0.13	0.19	**0.52**	**0.52**	0.29	0.04
Liver	-0.16	0.08	-0.04	**0.17**	-0.01	-0.11	-0.01	-0.04	-0.11	-0.11	0.14	0.06	0.09	0.08
Lung-cancer	0.08	0	0.33	0	**0.36**	0.33	0	0.05	0.17	0.2	0	**0.36**	0.31	0.01
Multiple-features	0.63	**0.73**	0.46	0	0.5	0.5	0.5	0.46	0.54	0.56	0	0	0.58	0.44
Optdigits	0.82	0.83	**0.92**	0.79	0.7	**0.92**	0.83	0.77	0.84	**0.92**	0.1	0.89	0.76	0.63
Pageblocks	0.04	0.5	0.17	0.54	0.57	0.17	0.17	0.56	0.17	**0.63**	0.19	0.04	0.32	0.42
Sat	0.62	0.25	0.4	0.2	**0.65**	0.39	0.43	0.32	0.53	0.31	0.49	0.48	0.39	0.39
Seeds	0.78	0.71	0.73	**0.87**	**0.87**	0.76	0.77	0.63	0.78	0.76	0.78	0.83	0.73	0.72
Semeion	0.22	0.25	0.59	0	0.25	0.58	**0.68**	0.45	0.46	0.59	0.04	0.5	0.4	0.02
Sonar	0.03	0.22	0.19	0.17	0.3	0.23	0.07	-0.04	0	0.17	-0.01	0.12	**0.35**	0.11
Soybean-small	0.9	0	0.9	0	**0.92**	0.9	0.25	0.74	0.7	0.75	0	**0.92**	0.34	0.03
Spectf	0.47	0.21	**0.5**	0	0.45	0.4	0.43	0.31	0.42	0.47	0	0.47	0.35	0.12
Survival	0.05	0.05	0.07	0.05	0.19	0.12	0.03	**0.23**	0.07	0.08	0.13	0.07	0.07	0.04
Systhetic-control	0.73	0.41	0.87	0	0.58	0.86	0.64	0.88	0.82	**0.9**	0	0.81	0.73	0.29
Texture	0.52	0.65	0.58	0.65	0.62	0.55	0.61	0.6	0.67	**0.68**	0.62	0.56	0.54	0.58
User-knowledge	0.47	**0.71**	0.51	0.66	0.42	0.43	0.54	0.35	0.41	0.5	0.47	0.57	0.61	0.58
Vehicle	0.21	0.15	0.24	**0.45**	0.25	0.22	0.28	0.27	0.24	0.23	0.43	0.19	0.35	0.35
Vertebra-column	0.36	0.36	0.45	0.36	0.5	0.48	**0.65**	0.51	0.49	0.4	0.39	0.4	0.47	0.28
Vowels	0.82	0.79	0.84	0.8	0.43	**0.85**	0.51	0.69	0.8	0.79	0.6	0.76	0.78	0.69
Waveform	0.47	0.53	0.53	0.54	0.55	0.53	0.55	0.5	**0.56**	0.55	0.55	0.53	0.13	0.31
Wine	0.5	0.54	0.45	**0.66**	0.61	0.45	0.38	0.47	0.43	0.46	0.41	0.47	0.51	0.53
Yeastgalactose	0.65	0.4	**0.89**	0.36	0.53	**0.89**	0.42	0.61	0.74	0.72	0.42	**0.89**	0.75	0.36
Zoo	0.67	0.09	0.71	0.17	**0.74**	0.58	0.2	0.64	0.49	0.49	0.36	0.53	0.6	0.16
	0.36	0.37	**0.43**	0.37	0.42	0.41	0.37	0.37	0.39	0.4	0.3	0.39	0.4	0.32

Table 16: Detailed results of the methods with the parameters selected using Cross-validation over all datasets of the Type II experiments (multiple source-class inliers) with respect to ROC AUC. We visualize the distribution of these values in Figure 5(a).

ROC AUC	ABOD	Auto Enc.	GLOSH	GMM	iForest	KNN G.	SVDD	KNN L.	LOCI	LOF	LP	Parzen	SOD	DSVDD
Abalone	0.69	0.68	0.63	0.69	0.66	0.69	0.73	0.62	0.67	0.63	**0.74**	0.72	0.61	0.66
Artificial-characters	0.61	0.69	0.69	0.7	0.63	0.68	**0.72**	0.64	0.66	0.7	0.7	0.68	0.67	0.67
Balancescale	0.83	0.68	0.82	0.76	0.84	0.81	0.79	0.79	0.84	**0.85**	0.83	**0.85**	0.69	0.72
Car-evaluation	0.65	0.81	0.89	0.91	0.9	0.91	0.94	0.88	**0.95**	**0.95**	0.93	0.72	0.8	0.79
Cardiotocography	0.58	0.96	0.64	**0.99**	0.91	0.63	0.69	0.64	0.63	0.65	0.69	0.65	0.71	0.98
Cellcycle	0.78	0.83	**0.84**	0.79	0.75	**0.84**	0.78	0.77	0.73	0.77	0.76	**0.84**	0.75	0.76
Cnae	0.57	0.63	0.71	0.79	0.47	0.69	0.66	0.76	0.67	0.78	0.59	0.5	**0.85**	0.66
Dermatology	0.66	0.88	0.86	**0.9**	0.76	0.81	0.8	0.82	0.78	0.86	0.84	0.8	0.86	**0.9**
Flare	0.67	0.76	0.69	0.6	0.61	0.73	0.75	0.72	0.74	0.72	0.75	0.72	**0.78**	0.66
Glass	0.73	0.77	**0.82**	0.78	0.72	0.78	0.79	0.7	0.75	0.81	**0.82**	0.79	0.79	0.75
Hayes-roth	0.79	0.68	0.81	0.84	0.68	0.84	**0.89**	0.72	0.86	0.79	0.86	0.83	0.72	0.69
Iris	0.96	0.97	0.95	0.97	0.88	0.96	**0.98**	0.92	0.95	**0.98**	0.97	**0.98**	0.93	0.95
Led	**0.72**	0.45	0.53	0.67	0.57	0.59	0.64	0.53	0.7	0.65	0.64	0.66	0.56	0.63
Lung-cancer	0.5	0.31	0.47	0.5	0.44	0.5	0.25	0.62	0.34	**0.69**	0.5	0.5	0.5	0.52
Multiple-features	0.69	0.87	0.92	0.93	0.85	0.91	**0.96**	0.87	0.89	0.94	0.9	0.5	0.9	0.9
Optdigits	0.75	0.91	**0.99**	0.92	0.81	**0.99**	**0.99**	0.93	0.88	0.98	0.94	0.97	0.93	0.87
Sat	0.74	0.77	0.84	0.77	0.76	0.83	**0.86**	0.79	0.77	0.82	0.83	0.84	0.85	0.82
Seeds	0.9	0.92	0.94	**0.96**	0.86	0.94	0.95	0.9	0.92	**0.96**	0.95	0.95	0.93	0.93
Semeion	0.67	0.79	0.89	0.79	0.79	0.89	0.86	0.8	0.8	0.89	**0.91**	0.79	0.87	0.76
Soybean-small	0.81	0.96	0.96	**1**	**1**	0.87	0.92	0.92	0.94	**1**	0.99	0.88	**1**	0.95
Systhetic-control	0.71	0.95	0.97	0.82	0.75	0.97	0.96	0.98	0.92	**0.99**	0.97	0.91	0.89	0.9
Texture	0.78	0.93	0.96	**0.98**	0.76	0.95	0.97	0.95	0.88	**0.98**	0.82	0.87	0.96	0.91
User-knowledge	0.71	0.73	0.77	**0.83**	0.76	0.78	**0.83**	0.75	0.75	0.78	0.8	0.8	0.75	0.69
Vehicle	0.61	0.75	0.69	**0.81**	0.69	0.72	0.72	0.61	0.71	0.66	0.74	0.71	0.76	0.72
Vertebra-column	0.59	0.73	0.67	0.69	0.64	0.58	**0.87**	0.67	0.71	0.72	0.65	0.7	0.7	0.79
Vowels	0.71	0.91	0.93	0.95	0.56	0.94	**0.98**	0.91	0.94	0.94	0.97	0.97	0.94	0.83
Waveform	0.75	0.68	0.81	0.76	0.8	0.81	0.79	0.69	0.82	0.76	0.8	**0.86**	0.65	0.76
Wine	0.74	0.93	0.73	**0.99**	0.91	0.69	0.77	0.7	0.71	0.73	0.78	0.72	0.71	0.94
Yeastgalactose	0.9	**0.95**	0.9	0.9	0.89	0.92	0.93	0.85	0.9	0.89	0.91	0.93	0.93	**0.95**
Zoo	0.74	**0.99**	0.84	0.96	0.76	0.9	0.91	0.8	0.89	0.94	0.88	0.9	0.89	0.86
Synthetic	0.73 ± 0.09	0.92 ± 0.03	0.95 ± 0.02	**0.99 ± 0.02**	0.90 ± 0.03	0.91 ± 0.04	0.94 ± 0.02	0.87 ± 0.04	0.90 ± 0.03	0.95 ± 0.02	0.93 ± 0.03	0.88 ± 0.06	0.82 ± 0.04	0.72 ± 0.05
	0.72	0.8	0.81	**0.83**	0.75	0.8	0.82	0.78	0.79	**0.83**	0.82	0.78	0.8	0.8

Table 17: Detailed results of the methods with the parameters selected using Self-Adaptive Data Shifting (SDS) over all datasets of the Type II experiments (multiple source-class inliers) with respect to ROC AUC. We visualize the distribution of these values in Figure 12(a).

ROC AUC	ABOD	Auto Enc.	GLOSH	GMM	iForest	KNN G.	SVDD	KNN L.	LOCI	LOF	LP	Parzen	SOD	DSVDD
Abalone	0.72	0.7	0.62	0.66	**0.75**	0.6	0.69	0.62	0.74	0.63	0.73	0.59	0.63	0.66
Artificial-characters	0.64	0.65	0.66	0.69	0.64	**0.71**	0.66	0.66	0.66	0.68	0.66	0.69	0.69	0.64
Balancescale	0.93	0.9	0.9	0.94	0.95	0.85	**0.97**	0.83	0.92	0.89	0.95	0.95	0.78	0.77
Car-evaluation	0.65	0.73	0.65	0.89	0.75	0.79	0.85	0.79	0.71	**0.97**	0.9	0.72	0.76	0.75
Cardiotocography	0.58	0.98	0.61	**0.99**	0.91	0.64	0.64	0.62	0.62	0.63	0.68	0.52	0.56	0.97
Cellcycle	0.79	0.77	0.69	0.75	0.7	0.78	0.76	0.56	0.7	0.76	0.77	**0.81**	0.75	0.73
Cnae	0.57	0.6	0.59	**0.78**	0.31	0.6	0.6	0.61	0.67	0.63	0.55	0.5	0.69	0.56
Dermatology	0.72	**0.93**	0.87	0.92	0.77	0.88	0.89	0.78	0.83	0.84	0.88	0.88	0.84	**0.93**
Flare	0.72	0.56	0.73	0.61	0.61	0.72	0.76	0.65	**0.79**	0.64	0.76	0.74	0.62	0.7
Glass	0.74	**0.8**	0.77	0.78	0.71	0.73	0.77	0.72	0.71	0.74	0.77	0.74	0.77	0.69
Hayes-roth	0.82	0.71	0.63	0.83	0.58	0.73	0.84	0.81	0.85	**0.87**	**0.87**	0.81	0.65	0.62
Iris	0.96	0.9	0.96	0.96	0.95	0.97	0.97	0.96	0.96	0.96	0.97	**0.98**	0.93	0.87
Led	0.68	0.68	0.53	0.69	0.56	0.59	**0.72**	0.56	0.5	0.69	0.66	0.63	0.61	0.52
Lung-cancer	**0.5**	0.44	**0.5**	**0.5**	0.38	0.44	**0.5**	**0.5**	0.47	0.44	**0.5**	**0.5**	**0.5**	0.39
Multiple-features	0.69	0.8	**0.92**	0.91	0.85	0.9	0.88	0.86	0.85	**0.92**	0.9	0.5	0.87	0.86
Optdigits	0.75	0.83	**0.99**	0.91	0.81	**0.99**	0.96	0.92	0.88	0.98	**0.99**	0.97	0.92	0.8
Sat	0.82	0.74	0.86	0.78	0.87	0.86	0.86	0.81	0.78	0.83	0.87	0.87	**0.88**	0.78
Seeds	0.91	0.88	0.94	**0.96**	0.92	0.93	0.94	0.83	0.87	0.88	0.94	0.95	0.89	0.91
Semeion	0.67	0.73	0.89	0.76	0.68	**0.9**	0.84	0.77	0.78	0.88	0.87	0.77	0.85	0.69
Soybean-small	0.82	0.89	0.99	**1**	0.93	0.91	0.97	0.85	0.86	0.97	0.99	0.9	0.95	0.84
Systhetic-control	0.71	0.76	0.97	0.78	0.78	0.97	0.91	0.98	0.91	**0.99**	0.96	0.84	0.83	0.75
Texture	0.78	0.89	0.96	0.97	0.74	0.96	0.92	0.95	0.8	**0.98**	0.8	0.88	0.95	0.82
User-knowledge	0.71	0.76	0.75	**0.81**	0.74	0.78	0.78	0.7	0.73	0.74	0.73	0.77	0.67	0.67
Vehicle	0.61	0.74	0.68	**0.79**	0.69	0.73	0.67	0.6	0.65	0.65	0.71	0.59	0.75	0.71
Vertebra-column	0.69	0.73	0.69	0.72	**0.81**	0.67	0.73	0.74	0.77	0.76	0.76	0.68	0.66	0.72
Vowels	0.71	0.8	0.92	**0.95**	0.56	**0.95**	0.84	0.91	0.91	0.82	0.88	0.9	0.94	0.81
Waveform	0.75	0.52	0.77	0.73	0.8	0.77	0.79	0.69	0.76	0.72	0.79	**0.84**	0.67	0.71
Wine	0.74	0.77	0.72	**0.99**	0.98	0.72	0.67	0.73	0.7	0.73	0.68	0.68	0.6	0.83
Yeastgalactose	0.9	0.9	0.91	0.76	0.86	0.92	0.9	0.82	0.89	0.86	0.9	**0.93**	0.9	0.89
Zoo	0.73	0.9	0.89	**0.95**	0.67	0.9	0.87	0.78	0.9	0.92	0.89	0.9	0.58	0.68
Synthetic	0.73 ± 0.09	0.90 ± 0.08	0.94 ± 0.02	0.94 ± 0.09	0.89 ± 0.08	0.89 ± 0.08	**0.95 ± 0.02**	0.86 ± 0.08	0.81 ± 0.16	0.91 ± 0.08	0.88 ± 0.13	0.89 ± 0.05	0.80 ± 0.07	0.75 ± 0.05
	0.73	0.77	0.79	**0.83**	0.74	0.8	0.8	0.75	0.77	0.8	0.81	0.77	0.76	0.74

Table 18: Detailed results of the methods with the parameters selected using Uniform Objects over all datasets of the Type II experiments (multiple source-class inliers) with respect to ROC AUC. We visualize the distribution of these values in Figure 12(b).

ROC AUC	ABOD	Auto Enc.	GLOSH	GMM	iForest	KNN G.	SVDD	KNN L.	LOCI	LOF	LP	Parzen	SOD	DSVDD
Abalone	0.72	0.65	0.59	0.68	0.74	0.6	0.63	0.61	**0.75**	0.64	0.66	0.74	0.6	0.64
Artificial-characters	0.64	0.67	0.69	**0.71**	0.64	0.7	0.51	0.65	0.66	0.68	0.61	0.65	0.68	0.65
Balancescale	0.93	0.8	0.92	0.92	**0.95**	0.94	**0.95**	0.94	0.93	0.93	**0.95**	**0.95**	0.76	0.83
Car-evaluation	0.65	0.58	0.89	0.93	0.88	0.92	0.72	0.91	0.71	**0.94**	0.62	0.72	0.78	0.75
Cardiotocography	0.58	0.8	0.65	**0.98**	0.9	0.63	0.5	0.61	0.58	0.63	0.68	0.49	0.67	0.9
Cellcycle	0.79	0.75	0.69	0.77	0.71	**0.81**	0.73	0.68	0.69	0.74	0.79	0.8	0.75	0.76
Cnae	0.57	0.61	0.72	0.77	0.41	0.7	0.56	0.66	0.61	0.72	0.53	0.5	**0.83**	0.55
Dermatology	0.72	0.86	0.91	**0.93**	0.75	0.87	0.64	0.8	0.81	0.87	0.76	0.66	0.92	0.88
Flare	0.72	0.66	0.65	0.61	0.56	0.7	0.64	0.67	**0.75**	0.7	0.62	0.73	0.73	0.64
Glass	0.74	0.7	**0.79**	0.72	0.71	0.78	0.6	0.75	0.77	0.69	0.63	0.68	0.73	0.61
Hayes-roth	0.82	0.68	0.79	0.88	0.64	0.81	0.89	0.86	0.85	0.81	**0.91**	0.82	0.72	0.59
Iris	0.96	0.95	0.91	0.96	0.9	0.96	0.91	0.9	0.96	0.95	**0.98**	0.97	0.77	0.86
Led	0.68	0.64	0.53	**0.74**	0.71	0.52	0.65	0.54	0.61	0.73	0.57	0.6	0.63	0.58
Lung-cancer	0.5	0.5	0.62	0.38	**0.78**	0.5	0.25	0.25	0.38	0.56	0.5	0.5	0.5	0.64
Multiple-features	0.69	0.81	0.9	**0.93**	0.84	0.9	0.51	0.85	0.83	0.86	0.5	0.5	0.86	0.81
Optdigits	0.75	0.85	**0.99**	0.83	0.79	0.98	0.59	0.9	0.88	0.96	**0.99**	0.89	0.92	0.78
Sat	0.82	0.73	0.86	0.73	0.86	0.85	0.65	0.81	0.81	0.83	0.87	0.8	**0.88**	0.79
Seeds	0.91	0.8	0.92	**0.96**	0.89	0.94	0.77	0.81	0.89	0.9	0.87	0.95	0.9	0.87
Semeion	0.67	0.74	**0.89**	0.73	0.77	**0.89**	0.62	0.7	0.78	0.83	0.82	0.74	0.85	0.68
Soybean-small	0.82	0.89	0.91	**1**	0.88	0.78	0.84	0.93	0.84	0.94	0.88	0.7	**1**	0.76
Systhetic-control	0.71	0.62	0.86	0.67	0.76	0.88	0.59	0.98	0.83	**0.99**	0.5	0.72	0.83	0.76
Texture	0.78	0.65	0.95	0.86	0.68	0.94	0.54	0.94	0.79	**0.97**	0.56	0.61	0.96	0.78
User-knowledge	0.71	0.66	0.75	**0.79**	0.75	0.77	0.7	0.71	0.73	0.75	0.7	0.74	0.75	0.67
Vehicle	0.61	0.59	0.65	**0.75**	0.65	0.73	0.52	0.62	0.59	0.61	0.67	0.56	0.73	0.67
Vertebra-column	0.69	0.82	0.69	0.76	0.77	0.68	**0.88**	0.68	0.76	0.78	0.74	0.68	0.62	0.7
Vowels	0.71	0.72	0.67	0.79	0.57	**0.87**	0.48	0.55	0.71	0.71	0.51	0.68	**0.87**	0.77
Waveform	0.75	0.52	0.79	0.65	0.77	0.79	0.55	0.69	0.79	0.75	0.73	**0.86**	0.66	0.72
Wine	0.74	0.78	0.66	**0.99**	0.88	0.72	0.65	0.65	0.7	0.67	0.69	0.64	0.72	0.68
Yeastgalactose	0.9	0.92	0.91	0.77	0.87	**0.93**	0.6	0.81	0.91	0.88	0.82	0.89	0.92	0.82
Zoo	0.73	0.89	0.87	**0.97**	0.78	0.9	0.42	0.79	0.84	0.84	0.8	0.76	0.67	0.5
Synthetic	0.73 ± 0.09	0.83 ± 0.13	**0.93 ± 0.03**	0.92 ± 0.09	0.88 ± 0.08	0.89 ± 0.09	0.60 ± 0.08	0.85 ± 0.08	0.79 ± 0.15	0.91 ± 0.09	0.86 ± 0.13	0.79 ± 0.12	0.81 ± 0.07	0.72 ± 0.04
	0.73	0.73	0.79	**0.81**	0.76	0.8	0.64	0.74	0.76	0.8	0.72	0.72	0.77	0.72

Table 19: Detailed results of the methods with the parameters selected using Perturbation over all datasets of the Type II experiments (multiple source-class inliers) with respect to ROC AUC. We visualize the distribution of these values in Figure 12(c).

ROC AUC	ABOD	Auto Enc.	GLOSH	GMM	iForest	KNN G.	SVDD	KNN L.	LOCI	LOF	LP	Parzen	SOD	DSVDD
Abalone	0.72	0.64	0.61	0.68	**0.74**	0.6	0.67	0.61	**0.74**	0.64	0.67	**0.74**	0.6	0.69
Artificial-characters	0.64	0.64	0.67	0.7	0.65	**0.71**	0.54	0.65	0.66	0.68	0.61	0.69	0.67	0.65
Balancescale	0.93	0.8	0.92	0.91	**0.97**	0.92	0.95	0.88	0.93	0.9	0.95	0.95	0.75	0.81
Car-evaluation	0.65	0.58	0.82	0.93	0.88	0.92	0.72	0.89	0.95	**0.97**	0.64	0.72	0.79	0.75
Cardiotocography	0.58	0.9	0.62	**0.98**	0.9	0.63	0.56	0.61	0.62	0.62	0.68	0.52	0.65	**0.98**
Cellcycle	0.79	**0.8**	0.68	0.76	0.71	0.67	0.74	0.6	0.59	0.59	0.78	0.76	0.78	0.62
Cnae	0.57	0.59	0.6	0.77	0.41	0.62	0.56	0.66	0.61	0.69	0.54	0.5	**0.84**	0.56
Dermatology	0.72	0.86	0.89	0.93	0.74	0.86	0.64	0.79	0.82	0.75	0.78	0.74	0.92	**0.95**
Flare	0.72	**0.81**	0.6	0.64	0.61	0.7	0.74	0.7	0.78	0.66	0.74	0.74	0.76	0.66
Glass	0.74	0.75	0.77	0.77	0.7	0.78	0.67	0.74	**0.79**	0.77	0.64	0.71	0.78	0.72
Hayes-roth	0.82	0.68	0.74	**0.88**	0.66	0.82	**0.88**	0.83	0.86	0.78	**0.88**	0.82	0.71	0.62
Iris	0.96	0.95	0.94	0.96	0.9	0.96	**0.97**	0.9	0.96	0.95	**0.97**	**0.97**	0.77	0.92
Led	**0.68**	0.64	0.47	0.65	0.67	0.52	0.65	0.54	0.5	0.6	0.55	0.6	0.55	0.41
Lung-cancer	0.5	0.31	0.59	0.38	**0.78**	0.5	0.25	0.5	0.38	0.75	0.5	0.5	0.5	0.6
Multiple-features	0.69	0.81	0.9	**0.93**	0.84	0.9	0.56	0.85	0.83	0.86	0.5	0.5	0.86	0.86
Optdigits	0.75	0.86	**0.99**	0.9	0.73	**0.99**	0.71	0.93	0.86	0.98	**0.99**	0.96	0.91	0.79
Sat	0.82	0.73	0.86	0.73	0.87	0.85	0.62	0.81	0.8	0.83	0.87	0.85	**0.88**	0.8
Seeds	0.91	0.8	0.88	**0.96**	0.89	0.93	0.87	0.81	0.87	0.9	0.93	0.95	0.89	0.83
Semeion	0.67	0.74	0.81	0.73	0.78	0.81	0.62	0.72	0.79	0.8	**0.82**	0.67	0.76	0.58
Soybean-small	0.82	0.92	0.93	**1**	0.88	0.86	0.84	0.92	0.9	0.89	0.88	0.87	**1**	0.83
Systhetic-control	0.71	0.63	0.88	0.67	0.76	0.89	0.6	0.98	0.86	**0.99**	0.5	0.85	0.83	0.78
Texture	0.78	0.86	0.96	0.86	0.68	0.95	0.54	0.95	0.79	**0.97**	0.56	0.68	0.96	0.77
User-knowledge	0.71	0.65	0.78	**0.81**	0.74	0.8	0.68	0.71	0.73	0.78	0.66	0.74	0.72	0.64
Vehicle	0.61	0.65	0.61	**0.75**	0.66	0.73	0.5	0.61	0.65	0.6	0.67	0.59	0.73	0.69
Vertebra-column	0.69	0.82	0.69	0.79	0.81	0.68	**0.87**	0.69	0.7	0.77	0.74	0.68	0.67	0.71
Vowels	0.71	0.74	0.74	0.86	0.57	0.88	0.5	0.67	0.67	0.79	0.53	0.7	**0.91**	0.77
Waveform	0.75	0.52	0.79	0.76	0.78	0.79	0.58	0.69	0.78	0.75	0.73	**0.85**	0.66	0.71
Wine	0.74	0.76	0.68	**0.99**	0.88	0.72	0.67	0.64	0.7	0.73	0.69	0.68	0.75	0.85
Yeastgalactose	0.9	0.91	0.91	0.77	0.86	0.92	0.7	0.73	0.87	0.87	0.82	**0.93**	0.91	**0.93**
Zoo	0.73	0.9	0.88	**0.97**	0.69	0.89	0.48	0.79	0.88	**0.97**	0.8	0.88	0.63	0.6
Synthetic	0.73 ± 0.09	0.88 ± 0.08	**0.93 ± 0.03**	0.92 ± 0.09	0.89 ± 0.08	0.89 ± 0.09	0.78 ± 0.09	0.86 ± 0.08	0.80 ± 0.16	0.91 ± 0.08	0.86 ± 0.13	0.84 ± 0.09	0.81 ± 0.07	0.75 ± 0.05
	0.73	0.74	0.77	**0.81**	0.76	0.79	0.66	0.75	0.76	0.79	0.72	0.74	0.77	0.74

Table 20: Detailed results of the methods with the parameters selected using Cross-validation over all datasets of the Type II experiments (multiple source-class inliers) with respect to AdjustedPrec@n. We visualize the distribution of these values in Figure 5(b).

AdjustedPrec@n	ABOD	Auto Enc.	GLOSH	GMM	iForest	KNN G.	SVDD	KNN L.	LOCI	LOF	LP	Parzen	SOD	DSVDD
Abalone	0.22	0.21	0.19	0.26	0.19	0.24	**0.35**	0.18	0.26	0.2	0.33	0.33	0.14	0.24
Artificial-characters	0.05	0.18	0.15	**0.25**	0.09	0.17	0.2	0.14	0.12	0.22	0.18	0.14	0.18	0.19
Balancescale	0.42	0.4	0.53	0.47	0.48	**0.55**	0.52	0.53	0.47	**0.55**	0.52	0.47	0.23	0.33
Car-evaluation	0.23	0.44	0.46	**0.69**	0.51	0.49	**0.69**	0.4	0.62	0.65	0.66	0.32	0.46	0.34
Cardiotocography	0.08	0.76	0.16	**0.89**	0.62	0.17	0.21	0.16	0.11	0.16	0.26	0.18	0.3	0.88
Cellcycle	0.33	0.36	0.39	0.2	0.27	0.42	0.25	0.33	0.2	0.34	0.23	**0.47**	0.35	0.27
Cnae	0.01	0.06	0.1	0.19	0	0.1	0.09	0.21	0.08	0.25	0.05	0.01	**0.28**	0.14
Dermatology	0.14	0.65	0.5	**0.7**	0.31	0.44	0.46	0.42	0.39	0.49	0.47	0.44	0.58	0.69
Flare	0.02	0.32	0.05	0.05	0.09	0.17	0.24	0.18	0.27	0.22	0.29	0.05	**0.33**	0.14
Glass	0.26	0.37	0.41	0.19	0.25	0.29	0.33	0.32	0.3	0.34	**0.44**	0.33	0.33	0.32
Hayes-roth	0.43	0.42	0.56	0.43	0.18	**0.71**	**0.71**	0.28	**0.71**	0.56	0.58	0.56	0.43	0.3
Iris	0.79	0.84	**0.9**	0.84	0.59	**0.9**	0.84	0.8	0.79	**0.9**	0.84	0.84	0.79	0.81
Led	0.83	0.78	0.78	0.78	**0.85**	**0.85**	0.78	0.78	0.83	0.83	0.78	0.83	0.74	0.79
Lung-cancer	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	0.48
Multiple-features	0.13	0.36	0.51	0.6	0.32	0.53	**0.62**	0.49	0.32	**0.62**	0.36	0.05	0.44	0.52
Optdigits	0.19	0.48	**0.84**	0.46	0.27	**0.84**	**0.84**	0.6	0.24	0.76	0.76	0.71	0.6	0.46
Sat	0.23	0.38	0.46	0.36	0.32	0.45	0.49	0.4	0.31	0.43	0.44	0.46	**0.51**	0.43
Seeds	0.64	0.64	0.75	0.79	0.64	0.75	**0.82**	0.64	0.64	0.79	**0.82**	0.79	0.71	0.77
Semeion	0.13	0.25	0.43	0.21	0.25	0.42	0.36	0.28	0.18	0.42	**0.44**	0.25	0.43	0.3
Soybean-small	0.59	0.84	0.88	**1**	**1**	0.59	0.75	0.71	0.71	**1**	0.88	0.62	**1**	0.85
Systhetic-control	0.27	0.72	0.78	0.44	0.29	0.81	0.77	0.87	0.67	**0.91**	0.83	0.44	0.55	0.59
Texture	0.14	0.54	0.68	0.77	0.28	0.62	0.71	0.72	0.35	**0.83**	0.54	0.37	0.66	0.59
User-knowledge	0.16	0.3	0.33	**0.37**	0.14	**0.37**	0.36	0.23	0.29	0.3	0.29	0.36	0.29	0.26
Vehicle	0.12	0.33	0.32	**0.46**	0.25	0.29	0.28	0.13	0.2	0.2	0.26	0.24	0.38	0.29
Vertebra-column	0.21	0.38	0.23	0.34	0.2	0.21	**0.5**	0.28	0.36	0.35	0.2	0.34	0.34	0.45
Vowels	0.13	0.45	0.57	0.64	0.05	0.6	**0.75**	0.44	0.46	0.58	0.71	0.73	0.59	0.38
Waveform	0.32	0.24	0.45	0.39	0.42	0.44	0.41	0.29	0.45	0.37	0.42	**0.52**	0.23	0.4
Wine	0.4	0.8	0.32	**0.88**	0.7	0.32	0.41	0.37	0.35	0.41	0.46	0.32	0.19	0.72
Yeastgalactose	0.68	0.83	0.86	0.51	0.77	0.77	0.79	0.46	**0.88**	0.74	0.86	0.77	0.83	0.78
Zoo	0.78	0.86	0.92	0.92	0.65	**1**	0.92	0.54	0.92	0.92	0.92	0.92	0.82	0.73
Synthetic	0.23 ± 0.15	0.33 ± 0.11	0.42 ± 0.12	**0.65 ± 0.14**	0.29 ± 0.12	0.38 ± 0.11	0.43 ± 0.11	0.27 ± 0.11	0.28 ± 0.11	0.46 ± 0.12	0.39 ± 0.1	0.34 ± 0.14	0.13 ± 0.09	0.11 ± 0.05
	0.32	0.49	0.5	0.52	0.39	0.5	**0.54**	0.43	0.44	0.53	0.51	0.45	0.48	0.48

Table 21: Detailed results of the methods with the parameters selected using Self-Adaptive Data Shifting (SDS) over all datasets of the Type II experiments (multiple source-class inliers) with respect to AdjustedPrec@n. We visualize the distribution of these values in Figure 13(a).

AdjustedPrec@n	ABOD	Auto Enc.	GLOSH	GMM	iForest	KNN G.	SVDD	KNN L.	LOCI	LOF	LP	Parzen	SOD	DSVDD
Abalone	0.28	0.31	0.16	0.27	**0.33**	0.18	0.28	0.19	**0.33**	0.2	0.31	0.13	0.19	0.21
Artificial-characters	0.07	0.12	0.18	**0.26**	0.11	0.2	0.2	0.19	0.11	0.23	0.2	0.15	0.2	0.17
Balancescale	0.66	0.66	0.53	0.69	0.72	0.58	**0.81**	0.56	0.68	0.5	0.74	0.72	0.43	0.41
Car-evaluation	0.23	0.31	0.19	0.6	0.24	0.5	0.69	0.5	0.42	**0.79**	0.66	0.34	0.45	0.33
Cardiotocography	0.1	0.8	0.11	**0.9**	0.62	0.17	0.17	0.13	0.08	0.16	0.25	0	0.19	0.86
Cellcycle	**0.39**	0.23	0.17	0.14	0.16	0.22	0.25	-0.02	0.22	0.34	0.3	0.36	0.22	0.24
Cnae	0.01	0.05	0.03	**0.18**	-0.1	0.02	0.07	0.05	0.1	0.08	0.02	0.01	-0.03	0.05
Dermatology	0.23	0.67	0.5	**0.71**	0.4	0.54	0.62	0.26	0.46	0.35	0.62	0.55	0.46	**0.71**
Flare	0.03	0.1	0.05	0.02	0.11	0.12	0.24	0.11	**0.26**	0.09	0.21	0.05	0.02	0.14
Glass	0.26	**0.39**	**0.39**	0.28	0.23	0.21	0.31	0.35	0.16	0.35	0.33	0.31	0.33	0.19
Hayes-roth	0.43	0.43	0.15	0.58	0.16	0.56	**0.71**	**0.71**	0.56	**0.71**	0.58	0.43	0.42	0.21
Iris	0.79	0.79	0.84	0.79	0.79	0.84	**0.89**	0.84	0.79	0.84	0.84	0.79	0.79	0.7
Led	**0.83**	0.78	0.74	0.78	0.78	0.74	**0.83**	0.74	0.74	0.78	**0.83**	**0.83**	0.78	0.79
Lung-cancer	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	0.55
Multiple-features	0.14	0.27	0.51	0.45	0.31	**0.53**	0.51	0.39	0.28	0.52	0.35	0.05	0.38	0.43
Optdigits	0.19	0.35	0.83	0.46	0.27	0.84	0.7	0.59	0.22	0.76	**0.85**	0.72	0.57	0.32
Sat	0.29	0.37	0.5	0.42	0.48	0.5	**0.57**	0.47	0.38	0.5	0.54	0.52	0.56	0.41
Seeds	0.64	0.57	0.71	0.75	0.71	0.75	**0.82**	0.5	0.57	0.57	0.68	0.79	0.61	0.66
Semeion	0.13	0.18	0.43	0.22	0.12	**0.44**	0.3	0.22	0.15	0.39	0.35	0.21	0.39	0.17
Soybean-small	0.59	0.71	**1**	**1**	0.84	0.75	0.88	0.59	0.59	0.88	0.88	0.75	0.84	0.64
Systhetic-control	0.27	0.39	0.79	0.41	0.29	0.82	0.74	0.88	0.59	**0.92**	0.77	0.26	0.6	0.34
Texture	0.14	0.47	0.61	0.75	0.25	0.62	0.67	0.73	0.13	**0.82**	0.44	0.38	0.65	0.39
User-knowledge	0.16	0.31	0.22	**0.39**	0.16	0.31	0.3	0.19	0.23	0.26	0.27	0.27	0.28	0.21
Vehicle	0.13	0.31	0.24	**0.45**	0.26	0.29	0.24	0.2	0.14	0.17	0.28	0.13	0.33	0.27
Vertebra-column	0.37	0.47	0.37	0.29	**0.52**	0.37	0.35	0.29	0.43	0.44	0.3	0.37	0.29	0.38
Vowels	0.14	0.34	0.58	**0.68**	0.08	0.61	0.58	0.45	0.3	0.38	0.52	**0.68**	0.58	0.32
Waveform	0.32	0.04	0.4	0.34	0.41	0.4	0.42	0.28	0.36	0.34	0.42	**0.49**	0.24	0.32
Wine	0.4	0.55	0.4	**0.91**	0.87	0.4	0.32	0.31	0.35	0.36	0.36	0.45	0.19	0.47
Yeastgalactose	0.68	0.69	**0.86**	0.23	0.6	0.77	**0.86**	0.54	0.69	0.73	**0.86**	0.74	0.78	0.65
Zoo	0.78	0.59	0.92	0.82	0.78	**1**	0.92	0.82	0.92	**1**	0.92	0.92	0.54	0.47
Synthetic	0.21 ± 0.14	0.34 ± 0.12	0.38 ± 0.11	**0.45 ± 0.15**	0.29 ± 0.12	0.34 ± 0.1	0.44 ± 0.1	0.24 ± 0.12	0.21 ± 0.14	0.35 ± 0.12	0.33 ± 0.15	0.33 ± 0.14	0.13 ± 0.09	0.12 ± 0.04
	0.34	0.43	0.47	0.51	0.4	0.5	**0.53**	0.42	0.4	0.5	0.51	0.43	0.43	0.4

Table 22: Detailed results of the methods with the parameters selected using Uniform Objects over all datasets of the Type II experiments (multiple source-class inliers) with respect to AdjustedPrec@n. We visualize the distribution of these values in Figure 13(b).

AdjustedPrec@n	ABOD	Auto Enc.	GLOSH	GMM	iForest	KNN G.	SVDD	KNN L.	LOCI	LOF	LP	Parzen	SOD	DSVDD
Abalone	0.28	0.23	0.09	0.25	0.31	0.18	0.23	0.2	**0.39**	0.21	0.22	0.32	0.12	0.2
Artificial-characters	0.07	0.16	0.16	**0.28**	0.11	0.18	0.03	0.17	0.11	0.15	0.16	0.12	0.18	0.17
Balancescale	0.66	0.46	0.72	0.68	0.74	**0.79**	0.76	0.68	0.72	0.72	0.74	0.72	0.43	0.52
Car-evaluation	0.23	0.21	0.46	0.68	0.5	0.65	0.35	0.62	0.42	**0.75**	0.25	0.34	0.45	0.32
Cardiotocography	0.1	0.44	0.13	**0.83**	0.53	0.13	-0.04	0.17	0.07	0.15	0.25	-0.02	0.29	0.6
Cellcycle	**0.39**	0.23	0.18	0.2	0.25	0.33	0.33	0.08	0.1	0.22	0.23	0.3	0.31	0.23
Cnae	0.01	0.07	0.1	0.18	0	0.11	-0.01	0.08	0.04	0.14	0	0.01	**0.25**	0.03
Dermatology	0.23	0.57	0.6	**0.78**	0.35	0.53	0.14	0.36	0.4	0.46	0.4	0.14	0.67	0.61
Flare	0.03	0.12	0.07	0	0.07	0.08	0.2	0.15	0.26	0.05	0.16	0.05	**0.27**	0.12
Glass	0.26	0.24	0.35	0.3	0.25	0.26	0.26	0.34	0.31	0.26	**0.36**	0.25	0.34	0.08
Hayes-roth	0.43	0.42	0.56	0.71	0.18	0.56	**0.85**	0.71	0.71	0.56	0.72	0.56	0.3	0.19
Iris	0.79	0.79	0.74	0.84	0.69	0.84	0.69	0.74	**0.85**	0.79	0.84	0.79	0.52	0.65
Led	**0.83**	**0.83**	0.74	0.78	**0.83**	0.78	0.78	0.78	0.74	0.78	0.78	**0.83**	0.78	0.81
Lung-cancer	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**	**0.62**
Multiple-features	0.14	0.31	0.5	**0.52**	0.35	**0.52**	0.01	0.43	0.29	0.43	0.05	0.05	0.39	0.37
Optdigits	0.19	0.37	0.84	0.31	0.24	0.81	0.11	0.5	0.23	0.71	**0.85**	0.42	0.58	0.3
Sat	0.29	0.34	0.5	0.35	0.47	0.48	0.26	0.47	0.31	0.5	0.54	0.26	**0.56**	0.39
Seeds	0.64	0.46	0.75	**0.79**	0.68	0.75	0.5	0.54	0.64	0.57	0.57	**0.79**	0.64	0.59
Semeion	0.13	0.18	**0.43**	0.19	0.22	0.4	0.11	0.14	0.15	0.32	0.33	0.19	0.41	0.15
Soybean-small	0.59	0.71	0.75	**1**	0.75	0.3	0.59	0.75	0.59	0.88	0.59	0.43	**1**	0.56
Systhetic-control	0.27	0.07	0.43	0.2	0.27	0.43	0.1	0.86	0.37	**0.93**	-0.02	0.31	0.54	0.36
Texture	0.14	0.17	0.64	0.45	0.21	0.55	0.07	0.71	0.1	**0.78**	0.13	0.07	0.65	0.3
User-knowledge	0.16	0.25	0.21	**0.35**	0.15	0.28	0.23	0.25	0.22	0.31	0.21	0.23	0.25	0.22
Vehicle	0.13	0.12	0.22	**0.36**	0.16	0.31	0.04	0.12	0.02	0.15	0.24	0.08	0.3	0.24
Vertebra-column	0.37	0.47	0.37	0.42	0.44	0.37	**0.56**	0.17	0.46	0.47	0.35	0.37	0.24	0.38
Vowels	0.14	0.23	0.15	0.34	0.07	**0.49**	0.05	0.04	0.15	0.22	0.06	0.32	0.47	0.3
Waveform	0.32	0.04	0.42	0.21	0.36	0.42	0.06	0.28	0.38	0.37	0.34	**0.5**	0.23	0.33
Wine	0.4	0.59	0.24	**0.96**	0.7	0.4	0.4	0.28	0.35	0.14	0.4	0.4	0.24	0.26
Yeastgalactose	0.68	0.74	**0.83**	0.26	0.65	0.77	0.38	0.41	0.71	0.78	0.63	0.65	0.81	0.44
Zoo	0.78	0.63	0.86	0.82	0.86	**0.93**	0.51	0.85	0.76	0.9	0.85	0.82	0.64	0.37
Synthetic	0.21 ± 0.14	0.28 ± 0.17	0.36 ± 0.14	**0.40 ± 0.16**	0.28 ± 0.14	0.34 ± 0.1	0.09 ± 0.07	0.22 ± 0.12	0.21 ± 0.15	0.35 ± 0.11	0.28 ± 0.12	0.27 ± 0.15	0.16 ± 0.11	0.1 ± 0.05
	0.34	0.37	0.46	**0.49**	0.4	0.48	0.31	0.42	0.38	0.48	0.4	0.36	0.45	0.36

Table 23: Detailed results of the methods with the parameters selected using Perturbation over all datasets of the Type II experiments (multiple source-class inliers) with respect to AdjustedPrec@n. We visualize the distribution of these values in Figure 13(c).

AdjustedPrec@n	ABOD	Auto Enc.	GLOSH	GMM	iForest	KNN G.	SVDD	KNN L.	LOCI	LOF	LP	Parzen	SOD	DSVDD
Abalone	0.28	0.2	0.14	0.25	0.31	0.16	0.2	0.2	**0.38**	0.21	0.16	0.32	0.12	0.25
Artificial-characters	0.07	0.12	0.18	**0.28**	0.11	0.2	0.08	0.17	0.11	0.22	0.16	0.15	0.21	0.18
Balancescale	0.66	0.46	0.72	0.64	**0.77**	0.69	**0.77**	0.55	0.74	0.63	0.74	0.72	0.4	0.49
Car-evaluation	0.23	0.22	0.48	0.68	0.5	0.65	0.37	0.6	0.62	**0.79**	0.25	0.34	0.53	0.32
Cardiotocography	0.1	0.58	0.14	0.83	0.55	0.17	0.1	0.07	0.1	0.15	0.25	0	0.28	**0.88**
Cellcycle	0.39	0.27	0.15	0.24	0.18	0.04	0.33	0.02	0.12	0.11	0.38	0.25	**0.4**	0.14
Cnae	0.01	0.04	0.04	0.18	0.01	0.07	-0.01	0.06	0.04	0.11	0	0.01	**0.26**	0.04
Dermatology	0.23	0.57	0.55	**0.78**	0.29	0.5	0.23	0.33	0.46	0.29	0.46	0.35	0.65	0.73
Flare	0.03	0.29	0.01	-0.02	0.07	0.08	**0.35**	0.23	0.15	0.07	0.23	0.05	0.29	0.14
Glass	0.26	0.33	0.36	0.31	0.22	0.29	**0.37**	0.33	0.35	0.21	0.35	0.24	0.36	0.25
Hayes-roth	0.43	0.42	0.56	**0.71**	0.18	0.56	**0.71**	0.58	**0.71**	0.56	0.58	0.56	0.3	0.16
Iris	0.79	0.79	0.74	0.84	0.69	0.84	0.84	0.74	**0.85**	0.79	0.84	0.79	0.52	0.68
Led	**0.83**	**0.83**	0.74	0.78	**0.83**	0.78	0.78	0.78	0.74	0.78	0.78	**0.83**	0.78	0.78
Lung-cancer	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	0.62	**0.7**
Multiple-features	0.14	0.31	0.5	**0.52**	0.32	**0.52**	0.02	0.41	0.29	0.43	0.05	0.05	0.34	0.45
Optdigits	0.19	0.39	0.83	0.41	0.17	0.84	0.29	0.59	0.21	0.76	**0.85**	0.69	0.54	0.31
Sat	0.29	0.33	0.5	0.35	0.47	0.48	0.24	0.47	0.32	0.5	**0.54**	0.42	**0.54**	0.41
Seeds	0.64	0.46	0.68	**0.79**	0.68	0.75	0.64	0.54	0.57	0.57	0.68	**0.79**	0.64	0.53
Semeion	0.13	0.16	0.25	0.19	0.24	0.26	0.12	0.14	0.2	0.31	**0.33**	0.14	0.08	0.05
Soybean-small	0.59	0.71	0.88	**1**	0.75	0.59	0.59	0.75	0.59	0.75	0.59	0.59	**1**	0.59
Systhetic-control	0.27	0.07	0.54	0.2	0.26	0.52	0.11	0.86	0.44	**0.93**	-0.02	0.31	0.55	0.38
Texture	0.14	0.38	0.68	0.45	0.19	0.58	0.07	0.72	0.1	**0.76**	0.13	0.12	0.65	0.27
User-knowledge	0.16	0.24	0.25	**0.39**	0.16	0.31	0.15	0.23	0.23	0.32	0.21	0.22	0.21	0.21
Vehicle	0.13	0.19	0.2	**0.36**	0.17	0.29	-0.02	0.12	0.12	0.16	0.24	0.13	0.3	0.24
Vertebra-column	0.37	0.47	0.37	0.47	**0.54**	0.37	0.51	0.28	0.3	0.44	0.35	0.37	0.24	0.36
Vowels	0.14	0.29	0.19	0.41	0.08	0.49	0.09	0.17	0.13	0.29	0.15	0.32	**0.5**	0.29
Waveform	0.32	0.04	0.43	0.39	0.37	0.43	0.1	0.28	0.38	0.37	0.34	**0.51**	0.23	0.33
Wine	0.4	0.4	0.28	**0.96**	0.7	0.4	0.32	0.23	0.35	0.36	0.4	0.45	0.19	0.5
Yeastgalactose	0.68	0.61	**0.86**	0.26	0.55	0.77	0.53	0.15	0.81	0.73	0.63	0.77	0.72	0.68
Zoo	0.78	0.63	0.86	0.82	0.76	**0.92**	0.51	0.85	0.82	0.82	0.85	**0.92**	0.86	0.45
Synthetic	0.21 ± 0.14	0.31 ± 0.14	0.37 ± 0.14	**0.40 ± 0.16**	0.29 ± 0.13	0.34 ± 0.1	0.22 ± 0.11	0.24 ± 0.11	0.21 ± 0.15	0.35 ± 0.11	0.28 ± 0.12	0.29 ± 0.13	0.15 ± 0.09	0.13 ± 0.04
	0.34	0.38	0.46	**0.5**	0.39	0.47	0.33	0.4	0.4	0.47	0.4	0.4	0.44	0.39

Table 24: Detailed results of the methods with the parameters selected using Cross-validation over all datasets of the Type II experiments (multiple source-class inliers) with respect to MCC. We visualize the distribution of these values in Figure 5(c).

MCC	ABOD	Auto Enc.	GLOSH	GMM	iForest	KNN G.	SVDD	KNN L.	LOCI	LOF	LP	Parzen	SOD	DSVDD
Abalone	0.18	0.12	0.2	0.23	0.21	0.23	0.2	0.21	**0.26**	0.24	0.2	0.17	0.15	0.23
Artificial-characters	0.09	0.22	0.17	**0.29**	0.13	0.21	0.13	0.15	0.17	0.23	0.13	0.17	0.2	0.2
Balancescale	0.43	0.43	0.47	0.46	0.5	0.5	0.29	**0.55**	0.46	0.49	0.35	0.48	0.26	0.35
Car-evaluation	0.23	0.38	0.44	**0.66**	0.54	0.64	0.13	0.51	0.64	0.58	0.31	0.33	0.42	0.35
Cardiotocography	0.11	0.73	0.14	0.76	0.51	0.11	0.11	0.18	0.11	0.14	0.13	0.01	0.24	**0.87**
Cellcycle	0.28	0.31	0.28	0.32	0.21	0.26	0.26	0.28	0.24	0.31	0.3	**0.52**	0.26	0.3
Cnae	0.02	0.08	0.15	0.29	0	0.13	0.02	0.23	0.1	0.25	0.06	0	**0.36**	0.15
Dermatology	0.19	0.59	0.54	0.61	0.36	0.41	0.06	0.41	0.38	0.48	0.07	0.15	0.6	**0.63**
Flare	0.01	**0.38**	0.01	0.07	0.15	0.1	0.32	0.18	0.22	0.19	0.35	0.23	0.34	0.15
Glass	0.27	0.29	0.24	**0.51**	0.25	0.28	0.22	0.19	0.26	0.19	0.29	0	0.42	0.31
Hayes-roth	0.44	0.23	0.5	0.43	0.17	0.5	0.64	0.25	0.5	0.44	**0.65**	0.44	0.44	0.21
Iris	0.8	0.78	0.81	0.67	0.63	0.85	0.77	0.79	0.82	**0.87**	0.75	0.66	0.82	0.82
Led	0.06	-0.02	0.04	0.11	0.09	0	0.03	0	0.11	0.02	0.09	**0.14**	0.07	0.13
Lung-cancer	0.32	0	0.19	0	0.32	0.32	-0.2	0	0	0.32	0	**0.33**	0.12	0.16
Multiple-features	0.22	0.37	0.6	0.22	0.38	0.56	0.28	0.49	0.47	**0.61**	0	0	0.52	0.48
Optdigits	0.24	0.52	0.75	0.51	0.32	**0.76**	0.07	0.58	0.46	0.73	0.04	0.69	0.6	0.45
Sat	0.23	0.38	0.51	0.38	0.32	0.44	0.21	0.39	0.32	0.41	0.22	0.41	**0.52**	0.43
Seeds	0.59	0.46	0.76	**0.77**	0.58	0.75	0.49	0.65	0.64	0.73	0.61	0.65	0.71	0.75
Semeion	0.17	0.27	**0.47**	0.04	0.31	0.45	0.01	0.32	0.23	0.46	0	0.2	0.46	0.28
Soybean-small	0.59	0.62	0.79	0.35	**0.94**	0.73	0.46	0.81	0.79	0.89	0.21	0.63	**0.94**	0.24
Systhetic-control	0.31	0.63	0.8	0.29	0.34	0.79	0.32	0.82	0.69	**0.84**	0	0.31	0.59	0.59
Texture	0.26	0.59	0.67	**0.76**	0.34	0.63	0.44	0.68	0.46	**0.76**	0.52	0.42	0.64	0.54
User-knowledge	0.2	0.34	0.25	**0.44**	0.24	0.32	0.2	0.21	0.25	0.34	0.29	0.08	0.21	0.26
Vehicle	0.14	**0.34**	0.33	**0.34**	0.21	0.22	0.05	0.12	0.17	0.28	0.16	0.08	0.33	0.29
Vertebra-column	0.21	0.4	0.24	0.31	0.21	0.26	0.34	0.29	0.33	0.37	0.18	0.21	0.34	**0.44**
Vowels	0.2	0.52	0.57	0.51	0.12	**0.61**	0.16	0.45	0.6	0.55	0.27	0.16	0.56	0.39
Waveform	0.32	0.21	0.45	0.39	0.39	0.45	0.32	0.31	0.43	0.39	0.27	**0.52**	0.21	0.43
Wine	0.48	0.19	0.41	0.56	0.6	0.41	0.46	0.46	0.36	0.41	0.24	0.46	0.29	**0.61**
Yeastgalactose	0.7	0.55	**0.76**	0.26	0.69	0.72	0.62	0.56	0.71	0.68	0.71	0.69	0.72	0.64
Zoo	0.35	0.17	0.45	0.11	0.21	0.47	0.17	0.47	0.52	0.53	0.33	0.55	**0.63**	0.24
Synthetic	0.18 ± 0.13	0.34 ± 0.08	0.40 ± 0.08	**0.60 ± 0.18**	0.29 ± 0.11	0.33 ± 0.09	0.23 ± 0.06	0.27 ± 0.09	0.28 ± 0.06	0.42 ± 0.08	0.28 ± 0.09	0.29 ± 0.09	0.17 ± 0.07	0.12 ± 0.04
	0.29	0.37	0.43	0.39	0.34	0.44	0.25	0.38	0.39	**0.46**	0.26	0.32	0.43	0.4

Table 25: Detailed results of the methods with the parameters selected using Self-Adaptive Data Shifting (SDS) over all datasets of the Type II experiments (multiple source-class inliers) with respect to MCC. We visualize the distribution of these values in Figure 14(a).

MCC	ABOD	Auto Enc.	GLOSH	GMM	iForest	KNN G.	SVDD	KNN L.	LOCI	LOF	LP	Parzen	SOD	DSVDD
Abalone	0.25	0.3	0.17	0.3	0.34	0.22	0.29	0.21	**0.36**	0.23	0.31	0.07	0.24	0.2
Artificial-characters	0.1	0.14	0.19	**0.26**	0.12	0.2	0.18	0.18	0.17	0.23	0.17	0.16	0.2	0.16
Balancescale	0.69	0.64	**0.71**	0.7	0.6	**0.71**	0.63	**0.71**	0.66	0.48	0.65	**0.71**	0.52	0.41
Car-evaluation	0.24	0.31	0.38	0.59	0.13	**0.71**	0.18	**0.71**	0.24	0.7	0.31	0.31	0.4	0.31
Cardiotocography	0.1	0.74	0.07	0.77	0.53	0.13	0.16	0.15	0.08	0.11	0.14	0.03	0.04	**0.78**
Cellcycle	0.24	0.33	0.13	0.22	0.17	0.16	0.32	0.09	0.26	0.3	**0.37**	0.31	0.21	0.26
Cnae	0.03	0.03	0.05	**0.26**	-0.09	0.05	0.1	0.08	0.14	0.11	0	0	0.15	0.06
Dermatology	0.15	**0.64**	0.46	0.51	0.35	0.52	0.3	0.26	0.41	0.3	0.33	0.21	0.39	0.48
Flare	0.05	0.07	-0.05	0.05	0.07	0.06	0.28	0.08	**0.29**	0.19	**0.29**	0.1	0.13	0.15
Glass	0.28	0.25	0.3	0.33	0.28	0.26	**0.34**	0.26	0.1	0.24	0.31	0.29	0.33	0.21
Hayes-roth	0.44	0.44	0.37	0.45	-0.02	**0.5**	0.04	0.41	**0.5**	0.35	0.31	0.44	0.41	0.13
Iris	0.7	0.5	0.69	0.45	0.73	0.74	0.51	**0.78**	0.72	0.69	0.64	0.68	0.74	0.45
Led	0.07	0.09	-0.01	0.02	0.02	-0.01	0.03	0.04	0	0.04	0.05	0.08	**0.17**	-0.01
Lung-cancer	0	0	0.12	0	-0.08	0.12	-0.32	**0.32**	0	**0.32**	0	-0.08	0.12	-0.17
Multiple-features	0.18	0.27	**0.51**	0.24	0.31	0.47	0.4	0.4	0.38	0.5	0	0	0.43	0.34
Optdigits	0.23	0.34	**0.76**	0.45	0.32	**0.76**	0.37	0.5	0.36	0.73	0.09	0.63	0.48	0.31
Sat	0.15	0.32	0.47	0.39	0.43	0.46	0.45	0.4	0.33	0.43	0.38	0.46	**0.48**	0.35
Seeds	0.62	0.52	**0.67**	0.62	0.64	0.63	0.54	0.54	0.5	0.6	0.54	0.58	0.56	0.61
Semeion	0	0	0.13	0	0.13	**0.45**	0.01	0.21	0	0.33	0	0.1	0.4	0.15
Soybean-small	0.45	0.6	**0.95**	0.35	0.74	0.75	0	0.44	0.67	0.85	0	0.64	0.84	0.31
Systhetic-control	0.26	0.36	0.58	0.22	0.3	0.58	0.22	0.76	0.53	**0.85**	0	0.27	0.53	0.29
Texture	0.21	0.44	0.59	**0.67**	0.25	0.55	0.41	0.52	0.22	0.62	0.4	0.35	0.53	0.33
User-knowledge	0.14	0.2	0.22	**0.39**	0.25	0.31	0.24	0.28	0.24	0.3	0.29	0.24	0.16	0.19
Vehicle	0.11	0.25	0.25	**0.42**	0.27	0.24	0.24	0.18	0.14	0.17	0.26	0.06	0.32	0.27
Vertebra-column	0.35	0.43	0.35	0.3	**0.49**	0.33	0.28	0.31	0.42	0.4	0.27	0.34	0.26	0.26
Vowels	0.16	0.25	0.49	0.47	0.07	**0.6**	0.24	0.48	0.45	0.35	0.3	0.4	0.5	0.3
Waveform	0.3	0.01	0.41	0.29	0.37	0.41	0.29	0.29	0.19	0.33	0.34	**0.44**	0.23	0.34
Wine	0.44	0.48	0.4	0.69	**0.76**	0.43	0.27	0.31	0.4	0.31	0.12	0.47	0.18	0.47
Yeastgalactose	0.58	0.44	0.59	0.38	0.51	**0.6**	0.38	0.43	0.46	0.51	0.44	0.42	**0.6**	0.33
Zoo	0.28	0.58	0.5	0.42	0.21	0.53	0.19	0.5	0.34	**0.67**	0.3	0.36	0.21	0.17
Synthetic	0.14 ± 0.11	0.30 ± 0.1	**0.36 ± 0.1**	0.32 ± 0.14	0.27 ± 0.08	0.31 ± 0.09	0.21 ± 0.04	0.24 ± 0.07	0.23 ± 0.13	0.32 ± 0.09	0.22 ± 0.11	0.27 ± 0.08	0.16 ± 0.07	0.14 ± 0.04
	0.26	0.33	0.38	0.37	0.31	**0.42**	0.25	0.36	0.32	0.41	0.25	0.3	0.36	0.28

Table 26: Detailed results of the methods with the parameters selected using Uniform Objects over all datasets of the Type II experiments (multiple source-class inliers) with respect to MCC. We visualize the distribution of these values in Figure 14(b).

MCC	ABOD	Auto Enc.	GLOSH	GMM	iForest	KNN G.	SVDD	KNN L.	LOCI	LOF	LP	Parzen	SOD	DSVDD
Abalone	0.25	0.03	0.12	0.05	0.23	0.02	0.2	0.24	**0.35**	0.23	0.22	0.08	0.13	0.05
Artificial-characters	0.04	0.05	0.08	**0.25**	0.1	0.11	0.1	0.18	0.05	0.11	0.17	0.09	0.17	0.11
Balancescale	0.73	0.42	0.76	0.65	0.74	**0.8**	0.75	0.69	0.69	0.69	0.77	0.72	0.47	0.51
Car-evaluation	0.24	0.21	0.61	0.72	0.48	**0.75**	0.38	0.7	0.43	0.64	0.29	0.32	0.43	0.31
Cardiotocography	0.01	**0.43**	0	0.32	0.08	0.01	-0.01	0.01	0.06	-0.02	0.14	0.01	0.01	0.35
Cellcycle	0.24	0.1	0.19	0.01	0.15	0.25	0.29	0	0.23	0.19	**0.35**	0.33	0.15	0.31
Cnae	0	0.01	0.02	**0.18**	0	0.02	-0.01	0.03	0.02	0.02	0	0	0.03	0.04
Dermatology	-0.01	0.53	-0.01	**0.71**	0.26	-0.01	-0.04	0.12	0.16	0.16	0.38	-0.01	0.34	0.52
Flare	-0.02	-0.01	0	0.1	0.02	-0.02	0.16	0.16	**0.18**	-0.03	**0.18**	0.01	0.15	0.07
Glass	0.2	0.24	0.25	0.11	0.25	0.14	0.24	0.19	0.21	**0.3**	0.19	0.09	0.25	0.04
Hayes-roth	0.51	0.47	0.45	0.38	0.12	0.52	0.54	**0.62**	0.58	0.35	0.59	0.4	0.41	0.09
Iris	0.67	**0.87**	0.66	0.76	0.64	0.77	0.54	0.76	0.69	0.66	0.79	0.82	0.59	0.57
Led	0.09	**0.17**	0.02	0.15	0.15	0.05	0.16	0.03	0.02	0.07	0.05	0.08	-0.07	0.05
Lung-cancer	0	0	0	0	**0.32**	0	-0.2	0	0.19	0	0	0	0	0.15
Multiple-features	0	0.31	0.01	**0.4**	0	0.03	0.06	0.07	0.24	0.08	0	0	0.07	0.24
Optdigits	0.03	0.01	0.29	0.02	0.01	0.18	0.08	**0.49**	0.08	0.19	0.09	0.07	0.26	0.15
Sat	0.18	0.18	0.21	0.2	0.25	0.2	0.32	0.23	0.15	0.24	**0.38**	0.18	0.23	0.2
Seeds	0.47	0.36	0.59	**0.71**	0.54	0.55	0.46	0.4	0.61	0.41	0.62	0.65	0.42	0.41
Semeion	0.1	0.03	0.04	0.15	0.03	0.01	0.12	0.12	0.08	0.08	0.12	0.09	0.13	**0.16**
Soybean-small	0.45	0.6	0.75	0.35	0.59	0.55	0.43	0.83	0.31	0.88	0.37	0.45	**0.94**	0.32
Systhetic-control	0.18	0.16	0.23	0.22	0.21	0.25	0.18	0.62	0.29	**0.71**	0	0.24	0.28	0.29
Texture	0.01	0.04	0.13	0.17	0.22	0.11	0.09	0.28	0.09	**0.3**	0.14	0.01	0.05	0.11
User-knowledge	0.14	0.16	0.21	**0.3**	0.27	0.27	0.2	0.22	0.2	**0.3**	0.18	0.22	0.28	0.2
Vehicle	0.03	0	0.03	0.02	-0.02	0.03	0.1	0.05	-0.04	0.03	**0.25**	0.03	0.08	0.11
Vertebra-column	0.32	0.36	0.37	0.38	0.33	0.44	**0.48**	0.25	**0.48**	0.44	0.3	0.31	0.28	0.4
Vowels	0.13	0.14	0.13	0.12	0.06	**0.5**	0.08	0.05	0.07	0.15	0.09	0.16	0.17	0.27
Waveform	0.01	-0.01	0.18	0.06	0.15	0.19	0.01	0.15	0.14	0.16	0.22	0.08	0.16	**0.37**
Wine	0.3	0.56	0.24	**0.8**	0.07	0.3	0.42	0.28	0.38	0.12	0.29	0.3	0.07	0.23
Yeastgalactose	0.43	0.51	0.31	0.41	0.35	0.24	0.43	0.19	0.37	0.56	**0.59**	0.25	0.19	0.36
Zoo	0.13	0.58	0.29	0.54	0.43	0.13	0.04	**0.64**	0.46	0.25	0.27	0.22	0.25	0.01
Synthetic	0.12 ± 0.15	0.09 ± 0.14	0.13 ± 0.16	0.25 ± 0.16	0.08 ± 0.14	0.16 ± 0.18	0.07 ± 0.09	0.06 ± 0.1	0.23 ± 0.13	0.1 ± 0.13	**0.31 ± 0.14**	0.14 ± 0.16	0.01 ± 0.05	0.03 ± 0.04
	0.2	0.25	0.24	**0.31**	0.23	0.25	0.22	0.29	0.26	0.28	0.27	0.21	0.23	0.23

Table 27: Detailed results of the methods with the parameters selected using Perturbation over all datasets of the Type II experiments (multiple source-class inliers) with respect to MCC. We visualize the distribution of these values in Figure 14(c).

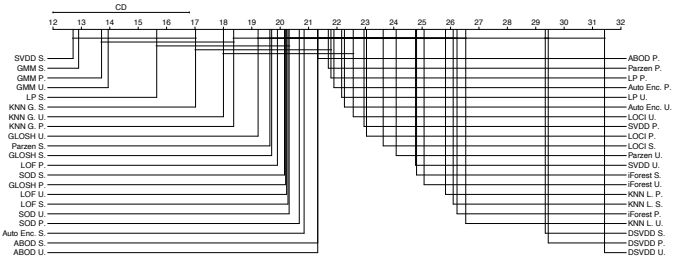
	ABOD	Auto Enc.	GLOSH	GMM	iForest	KNN G.	SVDD	KNN L.	LOCI	LOF	LP	Parzen	SOD	DSVDD
Abalone	0.25	0.08	0.15	0.09	0.23	0.17	0.28	0.24	**0.35**	0.23	0.27	0.08	0.13	0.09
Artificial-characters	0.04	0.09	0.16	**0.26**	0.1	0.19	0.13	0.18	0.05	0.23	0.17	0.12	0.2	0.18
Balancescale	0.7	0.45	0.76	0.63	0.74	0.76	0.75	0.66	0.69	0.65	**0.77**	0.64	0.54	0.48
Car-evaluation	0.24	0.22	0.6	0.72	0.48	**0.75**	0.43	0.72	0.65	0.73	0.29	0.35	0.54	0.33
Cardiotocography	0.07	0.67	0.08	0.32	0.09	0.09	0.12	0.08	0.06	0.14	0.14	-0.01	0.01	**0.76**
Cellcycle	0	0.1	0	0.12	0.17	0	0.29	0.13	0	0.08	**0.32**	0.23	0.1	0.2
Cnae	0	0.03	0.02	0.18	0	0.02	-0.01	0.03	0.02	0.08	0	0	**0.2**	0.05
Dermatology	0.18	0.53	0.49	**0.71**	0.21	0.38	0.17	0.25	0.18	0.27	0.37	0.19	0.4	0.65
Flare	0.08	0.26	0.02	0.04	0.06	-0.02	**0.33**	0.2	0.1	0.01	0.24	0	0.24	0.14
Glass	0.27	0.27	0.17	0.25	0.23	0.2	0.22	0.15	0.2	0.18	0.26	0.19	**0.3**	0.23
Hayes-roth	0.35	0.47	0.5	0.34	0.12	0.5	0.54	0.48	0.5	0.39	**0.64**	0.44	0.48	0.18
Iris	0.67	**0.87**	0.69	0.74	0.64	0.8	0.76	0.76	0.69	0.69	0.76	0.74	0.61	0.62
Led	0.07	**0.17**	-0.04	0.06	0.15	0.05	0.16	0.01	0	-0.02	0.05	-0.03	0.01	-0.03
Lung-cancer	**0.32**	0	0.19	0	**0.32**	0.19	-0.2	0	**0.32**	0	0	0	0.12	0.23
Multiple-features	0.05	0.31	0.01	0.4	0	0.03	0.04	0.09	0.24	0.08	0	0	0.15	**0.43**
Optdigits	0.23	0.29	**0.75**	0.06	0.06	**0.75**	0.29	0.57	0.17	0.72	0.08	0.63	0.53	0.32
Sat	0.12	0.17	0.21	0.2	0.31	0.2	0.3	0.23	0.24	0.24	**0.38**	0.17	0.28	0.21
Seeds	0.65	0.36	0.59	0.71	0.52	**0.77**	0.59	0.4	0.58	0.55	0.65	0.65	0.47	0.47
Semeion	0.14	0.18	0.27	0.18	0.25	0.28	0.12	0.17	0.23	**0.3**	0.12	0.14	0.12	0.03
Soybean-small	0.45	0.58	0.68	0.35	0.69	0.55	0.4	0.77	0.79	0.59	0.35	0.51	**0.88**	0.28
Systhetic-control	0.18	0.16	0.37	0.22	0.19	0.37	0.17	0.62	0.5	**0.71**	0	0.24	0.35	0.32
Texture	0.12	0.05	0.13	0.17	0.21	0.11	0.09	0.3	0.09	**0.31**	0.14	0.01	0.05	0.09
User-knowledge	0.19	0.16	0.27	**0.38**	0.2	0.28	0.16	0.24	0.17	0.27	0.11	0.19	0.19	0.17
Vehicle	-0.01	0.08	0.1	0.02	0.01	0.03	0.06	0.12	0.01	0.06	**0.25**	0.04	0.08	0.11
Vertebra-column	0.32	0.36	0.36	0.38	**0.51**	0.44	0.48	0.23	0.29	0.42	0.3	0.38	0.24	0.34
Vowels	0.13	0.18	0.18	0.25	0.06	**0.5**	0.09	0.13	0.07	0.28	0.14	0.15	0.23	0.27
Waveform	0.13	-0.01	0.19	0.26	0.23	0.2	0.05	0.15	0.14	0.17	0.22	0.2	0.14	**0.37**
Wine	0.49	0.48	0.4	**0.8**	0.46	0.44	0.38	0.26	0.41	0.39	0.28	0.25	0.32	0.46
Yeastgalactose	0.59	0.48	**0.72**	0.41	0.53	0.66	0.46	0.16	0.39	0.48	0.54	0.67	0.6	0.54
Zoo	0.18	0.56	0.49	0.54	0.22	0.48	0.16	0.62	0.52	**0.63**	0.27	0.4	0.43	0.14
Synthetic	0.12 ± 0.15	0.11 ± 0.17	0.14 ± 0.16	0.24 ± 0.16	0.09 ± 0.14	0.16 ± 0.18	0.20 ± 0.12	0.10 ± 0.11	0.21 ± 0.14	0.10 ± 0.13	**0.31 ± 0.14**	0.15 ± 0.16	0.06 ± 0.1	0.06 ± 0.05
	0.24	0.29	0.32	0.33	0.27	**0.34**	0.26	0.3	0.29	0.33	0.27	0.25	0.3	0.29

Table 28: Detailed results of the ensemble experiments with members selected using different approaches (ROC AUC).

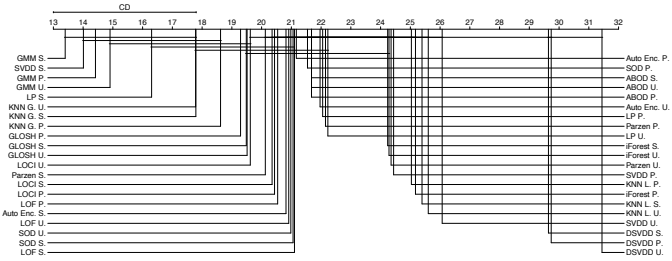
ROC AUC	Naive	Cross-validation	SDS	Perturbation	Uniform Objects
Abalone	0.75	**0.76**	0.71	0.72	0.72
Arrhythmia	**0.74**	**0.74**	**0.74**	**0.74**	**0.74**
Artificial-characters	0.89	**0.9**	0.89	0.89	0.89
Balancescale	0.87	**0.93**	0.86	0.86	0.87
Ball-bearing	0.98	**1**	0.98	0.98	0.98
Biomed	0.76	**0.79**	0.64	0.64	0.66
Breast	**0.99**	**0.99**	0.96	0.93	0.96
Cancer	**0.72**	**0.72**	0.67	0.65	0.67
Car-evaluation	0.99	**1**	0.99	0.98	0.98
Cardiotocography	0.78	**0.96**	0.76	0.78	0.75
Cellcycle	0.76	**0.79**	0.7	0.72	0.77
Cnae	0.79	**0.82**	0.74	0.75	0.76
Colon	0.78	0.77	0.73	0.78	**0.81**
Delft	0.96	**0.97**	0.95	0.95	0.91
Dermatology	0.98	**0.99**	0.98	0.98	0.98
Diabetes	0.71	**0.73**	0.7	0.7	0.71
Ecoli	**0.9**	**0.9**	0.89	0.88	0.88
Flare	0.8	**0.81**	0.77	0.79	0.77
Glass	0.73	**0.82**	0.76	0.8	0.77
Hayes-roth	0.68	**0.73**	0.67	0.59	0.62
Heart	0.63	**0.9**	0.62	0.63	0.62
Hepatitis	0.51	**0.76**	0.55	0.53	0.49
Housing	0.76	**0.83**	0.76	0.75	0.74
Imports	**0.88**	0.87	0.66	0.69	0.66
Ionosphere	**0.98**	**0.98**	**0.98**	0.96	0.95
Iris	**1**	**1**	**1**	0.99	0.99
Led	**0.93**	0.9	**0.93**	0.92	**0.93**
Lung-cancer	0.75	**0.78**	0.75	0.73	0.75
Multiple-features	**0.99**	**0.99**	**0.99**	**0.99**	0.98
Optdigits	**1**	**1**	**1**	**1**	**1**
Pageblocks	0.91	**0.95**	0.82	0.89	0.9
Sat	**0.96**	**0.96**	0.95	0.95	0.95
Seeds	0.98	**0.99**	**0.99**	**0.99**	**0.99**
Semeion	**0.97**	**0.97**	**0.97**	0.96	0.96
Sonar	**0.75**	**0.75**	0.68	0.67	0.6
Soybean-small	**1**	**1**	**1**	**1**	**1**
Spectf	0.84	0.84	0.84	**0.85**	0.84
Survival	0.76	**0.77**	0.7	0.7	0.68
Systhetic-control	**0.99**	**0.99**	**0.99**	0.98	0.98
Texture	**1**	**1**	**1**	0.99	0.99
User-knowledge	0.94	**0.95**	0.94	0.93	0.94
Vehicle	0.81	**0.86**	0.81	0.8	0.8
Vertebra-column	**0.9**	**0.9**	**0.9**	**0.9**	0.89
Vowels	**1**	**1**	**1**	0.99	0.99
Waveform	0.89	**0.9**	0.88	0.89	0.89
Wine	0.85	**0.91**	0.86	0.87	0.86
Yeastgalactose	**1**	**1**	**1**	**1**	**1**
Zoo	**1**	**1**	**1**	**1**	**1**
	0.87	**0.89**	0.85	0.85	0.85

Table 29: Detailed results of the ensemble experiments with members selected using different approaches (AdjustedPrec@n).

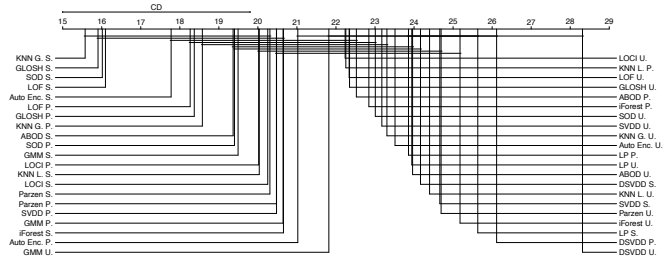
AdjustedPrec@n	Naive	Cross-validation	SDS	Perturbation	Uniform Objects
Abalone	0.34	**0.35**	0.3	0.32	0.31
Arrhythmia	0.36	0.36	**0.41**	**0.41**	**0.41**
Artificial-characters	0.36	**0.4**	0.36	0.36	0.37
Balancescale	0.47	**0.68**	0.48	0.45	0.46
Ball-bearing	0.91	**0.97**	0.89	0.9	0.89
Biomed	0.53	**0.59**	0.24	0.24	0.24
Breast	**0.91**	**0.91**	0.85	0.74	0.83
Cancer	0.28	**0.35**	0.28	0.28	0.21
Car-evaluation	0.87	**0.88**	0.82	0.8	0.8
Cardiotocography	0.34	**0.76**	0.32	0.36	0.31
Cellcycle	**0.43**	0.36	0.38	0.36	**0.43**
Cnae	0.46	**0.5**	0.32	0.34	0.39
Colon	**0.25**	**0.25**	**0.25**	**0.25**	**0.25**
Delft	0.72	**0.79**	0.74	0.7	0.61
Dermatology	0.84	**0.89**	0.84	0.82	0.8
Diabetes	0.28	0.28	**0.31**	**0.31**	**0.31**
Ecoli	**0.76**	**0.76**	**0.76**	0.65	**0.76**
Flare	**0.44**	0.4	0.43	0.41	0.43
Glass	0.33	**0.38**	0.33	0.33	0.31
Hayes-roth	0.15	**0.25**	0.15	0.06	0.16
Heart	0.18	**0.62**	0.18	0.18	0.18
Hepatitis	-0.25	**0.17**	-0.25	-0.25	-0.25
Housing	0.21	**0.33**	0.21	0.21	0.21
Imports	**0.61**	**0.61**	0.22	0.22	0.22
Ionosphere	**0.81**	**0.81**	**0.81**	**0.81**	0.75
Iris	**0.95**	**0.95**	**0.95**	**0.95**	**0.95**
Led	**0.58**	0.48	0.48	0.48	**0.58**
Lung-cancer	**0.47**	**0.47**	**0.47**	**0.47**	**0.47**
Multiple-features	0.88	**0.89**	0.88	0.88	0.87
Optdigits	0.94	**0.95**	0.94	0.94	0.93
Pageblocks	0.46	**0.6**	0.29	0.45	0.4
Sat	0.77	**0.78**	0.74	0.74	0.73
Seeds	0.86	**0.93**	0.89	0.89	0.89
Semeion	0.8	**0.81**	0.8	0.77	**0.81**
Sonar	**0.36**	**0.36**	0.22	0.17	0.07
Soybean-small	**1**	**1**	**1**	**1**	**1**
Spectf	**0.43**	**0.43**	**0.43**	**0.43**	**0.43**
Survival	0.36	**0.41**	0.27	0.23	0.27
Systhetic-control	0.88	**0.94**	0.88	0.85	0.86
Texture	0.95	**0.96**	0.93	0.92	0.91
User-knowledge	**0.63**	**0.63**	0.61	0.57	0.54
Vehicle	0.47	**0.48**	0.47	0.45	0.43
Vertebra-column	**0.58**	0.55	0.56	**0.58**	0.56
Vowels	**0.96**	**0.96**	0.93	0.91	0.85
Waveform	0.58	**0.6**	0.56	0.55	0.56
Wine	0.43	**0.71**	0.47	0.57	0.61
Yeastgalactose	0.88	**0.97**	0.88	**0.97**	**0.97**
Zoo	**1**	**1**	**1**	**1**	**1**
	0.58	**0.64**	0.55	0.54	0.54



(a) ROC AUC

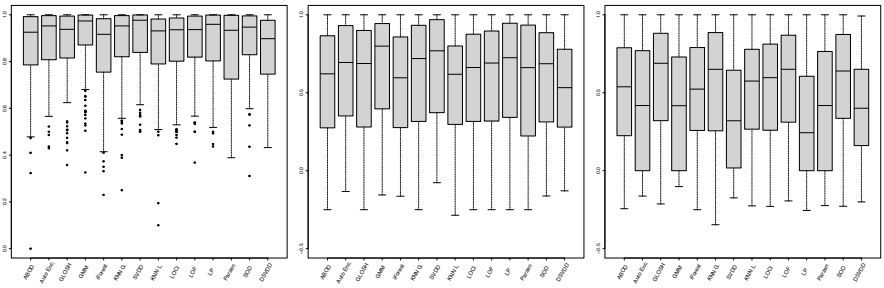


(b) AdjustedPrec@n



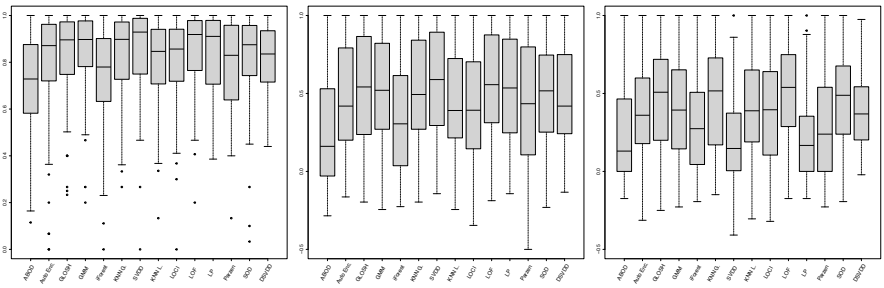
(c) MCC

Fig. 3: Complete critical difference diagrams with average ranks of the methods equipped with their best parameter value according to the respective model selection method. Methods ending in S., P. and U. had their parameters selected by SDS, Perturbation, and Uniform Objects, respectively



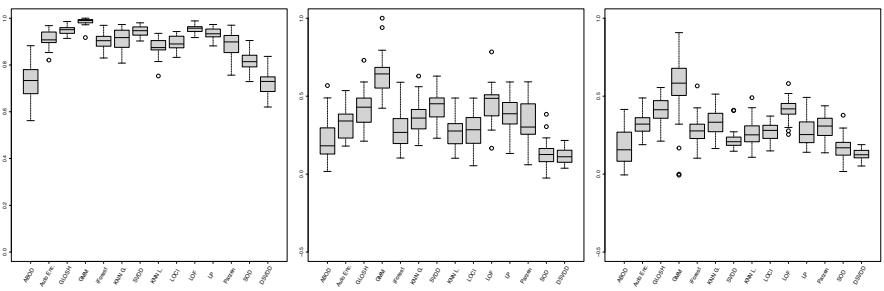
(a) ROC AUC (b) AdjustedPrec@n (c) MCC

Fig. 4: Boxplot of the results of the methods with the parameters selected using Cross-validation over all datasets of the Type I experiments (Single Source-Class Inliers)



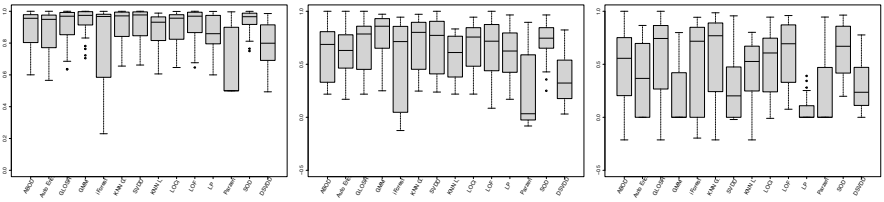
(a) ROC AUC (b) AdjustedPrec@n (c) MCC

Fig. 5: Boxplot of the results of the methods with the parameters selected using Cross-validation over all datasets of the Type II experiments (Multiple Source-Class Inliers)



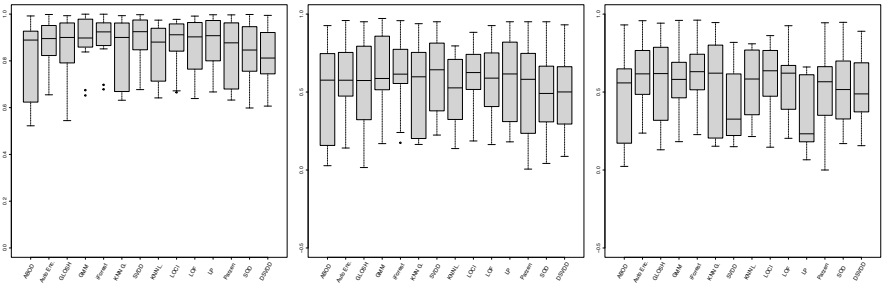
(a) ROC AUC (b) AdjustedPrec@n (c) MCC

Fig. 6: Boxplot of the results of the methods with the parameters selected using Cross-validation over all datasets of the Type III experiments (Local Outliers)



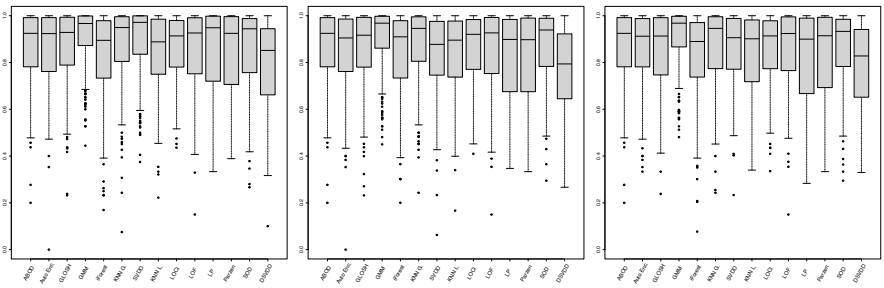
(a) ROC AUC (b) AdjustedPrec@n (c) MCC

Fig. 7: Boxplot of the results of the methods with the parameters selected using Cross-validation over all datasets of the Type IV experiments (High-Dimensional Datasets)



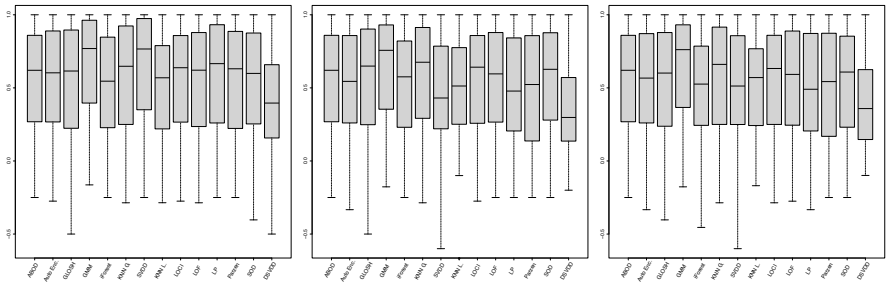
(a) ROC AUC (b) AdjustedPrec@n (c) MCC

Fig. 8: Boxplot of the results of the methods with the parameters selected using Cross-validation over all datasets of the Type V experiments (Larger Sample Size)



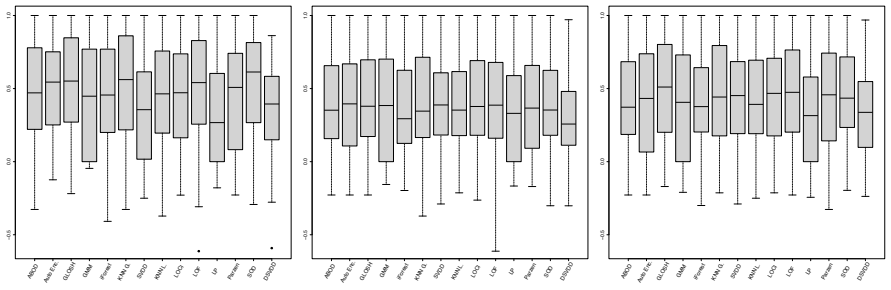
(a) SDS (b) Uniform Objects (c) Perturbation

Fig. 9: Boxplot of the ROC AUC results of the methods with the parameters selected using different practical model selection methods over all datasets of the Type I experiments (Single Source-Class Inliers)



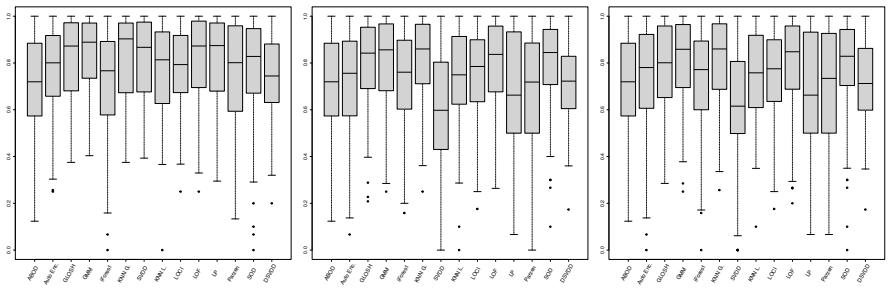
(a) SDS (b) Uniform Objects (c) Perturbation

Fig. 10: Boxplot of the AdjustedPrec@n results of the methods with the parameters selected using different practical model selection methods over all datasets of the Type I experiments (Single Source-Class Inliers)



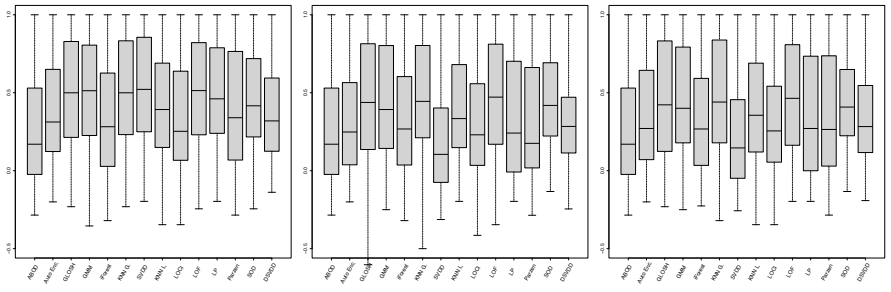
(a) SDS (b) Uniform Objects (c) Perturbation

Fig. 11: Boxplot of the MCC results of the methods with the parameters selected using different practical model selection methods over all datasets of the Type I experiments (Single Source-Class Inliers)



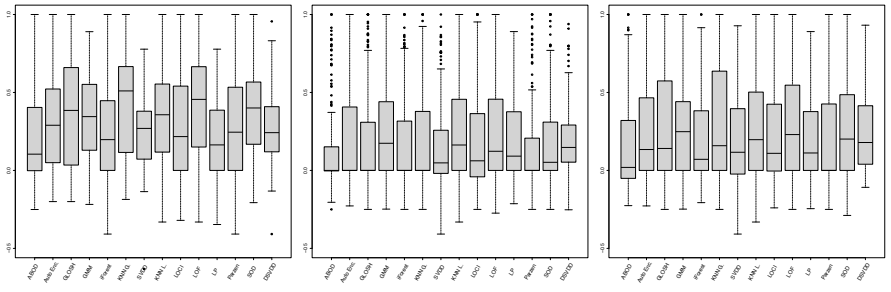
(a) SDS (b) Uniform Objects (c) Perturbation

Fig. 12: Boxplot of the ROC AUC results of the methods with the parameters selected using different practical model selection methods over all datasets of the Type II experiments (Multiple Source-Class Inliers)



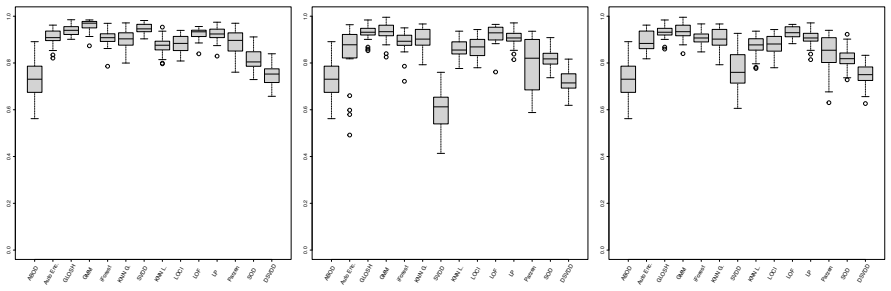
(a) SDS (b) Uniform Objects (c) Perturbation

Fig. 13: Boxplot of the AdjustedPrec@n results of the methods with the parameters selected using different practical model selection methods over all datasets of the Type II experiments (Multiple Source-Class Inliers)



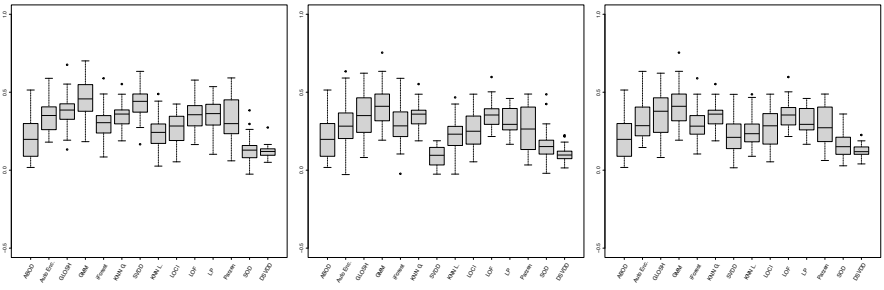
(a) SDS (b) Uniform Objects (c) Perturbation

Fig. 14: Boxplot of the MCC results of the methods with the parameters selected using different practical model selection methods over all datasets of the Type II experiments (Multiple Source-Class Inliers)



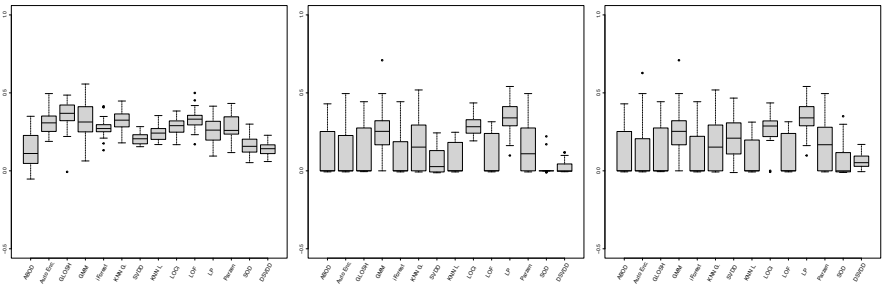
(a) SDS (b) Uniform Objects (c) Perturbation

Fig. 15: Boxplot of the ROC AUC results of the methods with the parameters selected using different practical model selection methods over all datasets of the Type III experiments (Local Outliers)



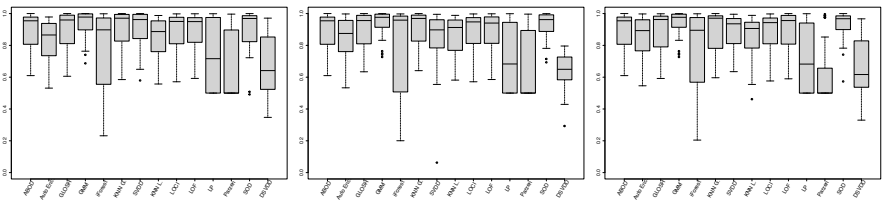
(a) SDS (b) Uniform Objects (c) Perturbation

Fig. 16: Boxplot of the AdjustedPrec@n results of the methods with the parameters selected using different practical model selection methods over all datasets of the Type III experiments (Local Outliers)



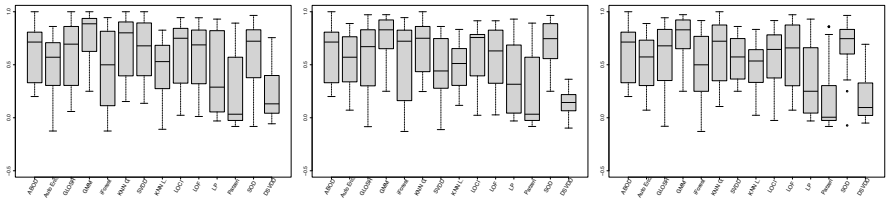
(a) SDS (b) Uniform Objects (c) Perturbation

Fig. 17: Boxplot of the MCC results of the methods with the parameters selected using different practical model selection methods over all datasets of the Type III experiments (Local Outliers)



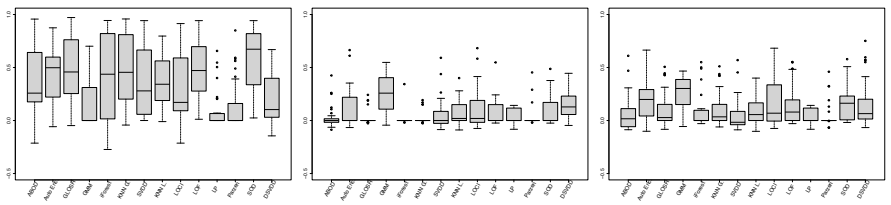
(a) SDS (b) Uniform Objects (c) Perturbation

Fig. 18: Boxplot of the ROC AUC results of the methods with the parameters selected using different practical model selection methods over all datasets of the Type IV experiments (High-Dimensional Datasets)



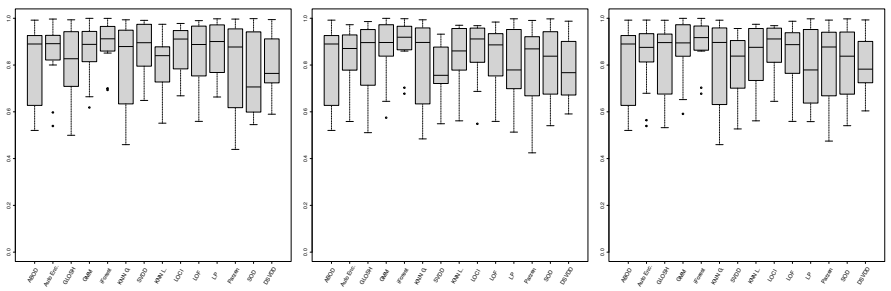
(a) SDS (b) Uniform Objects (c) Perturbation

Fig. 19: Boxplot of the AdjustedPrec@n results of the methods with the parameters selected using different practical model selection methods over all datasets of the Type IV experiments (High-Dimensional Datasets)



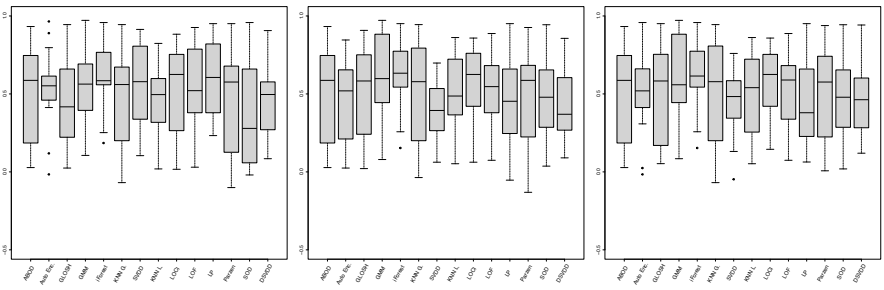
(a) SDS (b) Uniform Objects (c) Perturbation

Fig. 20: Boxplot of the MCC results of the methods with the parameters selected using different practical model selection methods over all datasets of the Type IV experiments (High-Dimensional Datasets)



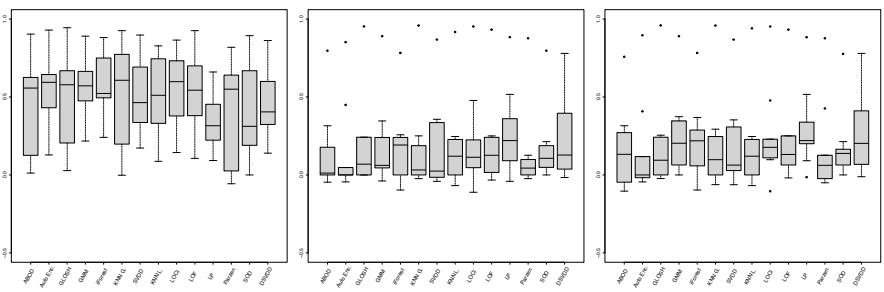
(a) SDS (b) Uniform Objects (c) Perturbation

Fig. 21: Boxplot of the ROC AUC results of the methods with the parameters selected using different practical model selection methods over all datasets of the Type V experiments (Larger Sample Size)



(a) SDS (b) Uniform Objects (c) Perturbation

Fig. 22: Boxplot of the AdjustedPrec@n results of the methods with the parameters selected using different practical model selection methods over all datasets of the Type V experiments (Larger Sample Size)



(a) SDS (b) Uniform Objects (c) Perturbation

Fig. 23: Boxplot of the MCC results of the methods with the parameters selected using different practical model selection methods over all datasets of the Type V experiments (Larger Sample Size)