

Tables with detectors AUCs on stationary data.

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May 22, 2015

problem	KNN	LODA	PCA	iForest	FRAC	LOF	OCSVM
breast-tissue	0.952	0.958	0.962	0.942	0.937	0.942	0.944
ecoli	0.825	0.812	0.771	0.817	0.687	0.722	0
ionosphere	0.993	0.978	0	0.952	0.990	0.983	0
average rank	1.833	2.667	4	4.167	4.333	4.667	6.333

Table 1: Medium scattered anomalies at rate 0 within the training data.

problem	FRAC	OCSVM	PCA	KNN	LOF	LODA	iForest
statlog-segment	0.857	0.832	0.788	0.841	0.836	0.772	0.754
yeast	0.782	0.797	0.800	0.768	0.740	0.781	0.747
average rank	2.250	2.750	3.250	3.750	4.750	4.750	6.500

Table 2: Medium scattered anomalies at rate 0.005 within the training data.

problem	OCSVM	KNN	iForest	PCA	LOF	LODA	FRAC
blood-transfusion	0.867	0.807	0.828	0.806	0.828	0.767	0.563
breast-cancer-wisconsin	0.941	0.946	0.958	0.927	0.935	0.956	0.912
statlog-segment	0.826	0.819	0.761	0.789	0.817	0.768	0.857
vertebral-column	0.773	0.844	0.886	0.823	0.773	0.904	0.769
yeast	0.845	0.838	0.812	0.861	0.836	0.813	0.836
average rank	3.100	3.600	3.900	4.100	4.100	4.200	5

Table 3: Medium scattered anomalies at rate 0.01 within the training data.

problem	KNN	iForest	LODA	LOF	FRAC	PCA	OCSVM
breast-cancer-wisconsin	0.918	0.933	0.935	0.899	0.871	0.888	0.916
breast-tissue	0.940	0.954	0.947	0.915	0.899	0.932	0.890
ecoli	0.829	0.817	0.810	0.754	0.748	0.806	0.383
ionosphere	0.994	0.963	0.977	0.983	0.990	0.922	0.922
average rank	2.250	2.500	2.500	4.750	5	5	6

Table 4: Medium scattered anomalies at rate 0.05 within the training data.

problem	FRAC	PCA	KNN	OCSVM	LOF	LODA	iForest
ionosphere	0.990	0.994	0.994	0.994	0.976	0.967	0.949
average rank	2.500	2.500	2.500	2.500	5	6	7

Table 5: Medium scattered anomalies at rate 0.1 within the training data.

problem	KNN	OCSVM	LOF	LODA	iForest	PCA	FRAC
abalone	0.548	0.503	0.545	0.548	0.525	0.526	0.528
blood-transfusion	0.494	0.507	0.473	0.547	0.549	0.470	0.491
breast-cancer-wisconsin	0.970	0.968	0.966	0.975	0.970	0.973	0.952
breast-tissue	0.960	0.957	0.939	0.968	0.943	0.969	0.945
ecoli	0.833	0	0.760	0.797	0.801	0.800	0.753
glass	0.694	0.762	0.727	0.641	0.561	0.780	0.790
haberman	0.799	0.674	0.808	0.797	0.817	0.727	0.796
ionosphere	0.973	0	0.940	0.946	0.874	0	0.952
isolet	0.722	0.766	0.749	0.559	0.565	0.616	0.590
letter-recognition	0.763	0.795	0.783	0.602	0.577	0.671	0.632
libras	0.626	0.745	0.551	0.584	0.587	0.493	0.498
madelon	0.532	0.531	0.531	0.514	0.516	0.521	0.516
multiple-features	0.965	0.983	0.956	0.764	0.805	0.870	0.524
pendigits	0.976	0.983	0.977	0.902	0.908	0.908	0.885
pima-indians	0.790	0.761	0.745	0.788	0.791	0.780	0.768
sonar	0.731	0.760	0.655	0.662	0.683	0.739	0.507
statlog-segment	0.744	0.736	0.737	0.677	0.643	0.697	0.800
statlog-vehicle	0.655	0.575	0.610	0.651	0.649	0.613	0.585
synthetic-control-chart	0.961	0.973	0.987	0.897	0.893	0.876	0.830
vertebral-column	0.633	0.557	0.567	0.688	0.671	0.598	0.549
wall-following-robot	0.590	0.577	0.593	0.709	0.599	0.557	0.569
waveform-2	0.722	0.718	0.664	0.849	0.838	0.691	0.593
wine	0.919	0.934	0.870	0.893	0.898	0.921	0.869
yeast	0.757	0.689	0.769	0.718	0.720	0.759	0.767
average rank	2.833	3.729	3.833	3.875	4.125	4.396	5.208

Table 6: Low scattered anomalies at rate 0 within the training data.

problem	KNN	LOF	OCSVM	LODA	PCA	iForest	FRAC
abalone	0.712	0.708	0.666	0.692	0.697	0.687	0.658
cardiotocography	0.663	0.684	0.714	0.690	0.632	0.697	0.553
gissette	0.822	0.827	0	0.781	0.838	0.527	0.576
isolet	0.742	0.760	0.770	0.597	0.625	0.591	0.594
letter-recognition	0.773	0.795	0.801	0.621	0.674	0.579	0.632
madelon	0.612	0.607	0.614	0.574	0.585	0.558	0.556
multiple-features	0.966	0.958	0.975	0.759	0.873	0.821	0.540
pendigits	0.939	0.951	0.913	0.785	0.825	0.807	0.810
statlog-segment	0.845	0.835	0.846	0.792	0.776	0.772	0.854
statlog-vehicle	0.593	0.556	0.530	0.647	0.543	0.647	0.491
wall-following-robot	0.627	0.580	0.629	0.744	0.598	0.658	0.603
waveform-1	0.694	0.643	0.688	0.833	0.678	0.833	0.589
waveform-2	0.707	0.650	0.700	0.835	0.694	0.834	0.596
yeast	0.714	0.713	0.654	0.690	0.696	0.681	0.707
average rank	2.821	3.321	3.393	3.964	4.321	4.500	5.679

Table 7: Low scattered anomalies at rate 0.005 within the training data.

problem	KNN	LODA	LOF	iForest	OCSVM	PCA	FRAC
abalone	0.726	0.689	0.716	0.679	0.664	0.705	0.672
blood-transfusion	0.814	0.826	0.798	0.838	0.788	0.764	0.663
breast-cancer-wisconsin	0.958	0.966	0.953	0.966	0.947	0.940	0.920
cardiotocography	0.622	0.669	0.664	0.678	0.687	0.588	0.517
isolet	0.728	0.578	0.752	0.572	0.762	0.630	0.605
letter-recognition	0.760	0.607	0.785	0.577	0.789	0.663	0.623
madelon	0.593	0.531	0.591	0.525	0.591	0.562	0.539
multiple-features	0.961	0.754	0.951	0.814	0.961	0.841	0.516
pendigits	0.942	0.799	0.952	0.823	0.901	0.838	0.818
pima-indians	0.785	0.791	0.741	0.791	0.755	0.781	0.770
statlog-segment	0.762	0.698	0.747	0.669	0.757	0.707	0.799
statlog-vehicle	0.597	0.634	0.575	0.630	0.526	0.545	0.502
synthetic-control-chart	0.969	0.906	0.990	0.906	0.976	0.879	0.826
vertebral-column	0.667	0.701	0.608	0.698	0.586	0.638	0.581
wall-following-robot	0.613	0.730	0.574	0.647	0.604	0.591	0.596
waveform-1	0.683	0.816	0.632	0.814	0.677	0.670	0.585
waveform-2	0.676	0.824	0.616	0.820	0.668	0.665	0.568
yeast	0.736	0.706	0.742	0.710	0.696	0.742	0.736
average rank	2.722	3.694	3.722	3.778	3.778	4.611	5.694

Table 8: Low scattered anomalies at rate 0.01 within the training data.

problem	KNN	LODA	iForest	LOF	OCSVM	PCA	FRAC
abalone	0.542	0.548	0.523	0.540	0.504	0.523	0.524
blood-transfusion	0.508	0.598	0.587	0.485	0.503	0.481	0.494
breast-cancer-wisconsin	0.930	0.950	0.958	0.921	0.926	0.917	0.887
breast-tissue	0.931	0.948	0.944	0.879	0.899	0.946	0.905
ecoli	0.810	0.789	0.795	0.754	—	0.800	0.746
glass	0.688	0.608	0.593	0.739	0.718	0.773	0.791
haberman	0.800	0.798	0.820	0.797	0.633	0.720	0.808
ionosphere	0.963	0.909	0.850	0.928	0.567	0.567	0.947
isolet	0.699	0.560	0.556	0.739	0.731	0.600	0.579
letter-recognition	0.747	0.595	0.574	0.775	0.765	0.647	0.608
libras	0.611	0.583	0.591	0.549	0.722	0.476	0.477
madelon	0.536	0.526	0.521	0.535	0.534	0.526	0.520
multiple-features	0.906	0.735	0.778	0.914	0.885	0.646	0.515
pendigits	0.946	0.863	0.894	0.959	0.822	0.874	0.832
pima-indians	0.766	0.776	0.778	0.711	0.727	0.766	0.753
sonar	0.715	0.643	0.666	0.649	0.741	0.717	0.515
statlog-segment	0.665	0.595	0.580	0.660	0.723	0.648	0.752
statlog-vehicle	0.637	0.644	0.640	0.600	0.565	0.588	0.565
synthetic-control-chart	0.949	0.872	0.888	0.982	0.962	0.870	0.795
vertebral-column	0.623	0.681	0.660	0.554	0.550	0.588	0.542
wall-following-robot	0.578	0.677	0.587	0.584	0.561	0.553	0.560
waveform-2	0.743	0.855	0.838	0.683	0.724	0.724	0.636
wine	0.923	0.884	0.900	0.868	0.931	0.897	0.835
yeast	0.668	0.666	0.679	0.650	0.651	0.718	0.707
average rank	2.792	3.625	3.646	4.104	4.333	4.354	5.146

Table 9: Low scattered anomalies at rate 0.05 within the training data.

problem	KNN	LOF	iForest	LODA	PCA	OCSVM	FRAC
abalone	0.546	0.537	0.517	0.540	0.528	0.499	0.532
breast-cancer-wisconsin	0.873	0.724	0.940	0.930	0.893	0.887	0.865
breast-tissue	0.941	0.861	0.972	0.963	0.945	0.928	0.929
ecoli	0.756	0.699	0.767	0.766	0.757	0.173	0.699
glass	0.670	0.723	0.613	0.581	0.750	0.685	0.761
ionosphere	0.951	0.916	0.836	0.900	0.797	0.788	0.937
isolet	0.668	0.718	0.544	0.543	0.572	0.692	0.553
letter-recognition	0.726	0.760	0.568	0.586	0.627	0.735	0.593
libras	0.595	0.567	0.592	0.584	0.448	0.686	0.443
madelon	0.528	0.528	0.517	0.510	0.521	0.528	0.517
multiple-features	0.822	0.817	0.744	0.707	0.652	0.809	0.583
pendigits	0.882	0.908	0.870	0.835	0.840	0.755	0.784
pima-indians	0.761	0.678	0.790	0.790	0.774	0.717	0.756
sonar	0.713	0.650	0.648	0.640	0.698	0.737	0.576
statlog-segment	0.883	0.811	0.835	0.868	0.763	0.790	0.810
statlog-vehicle	0.614	0.555	0.623	0.636	0.551	0.534	0.525
synthetic-control-chart	0.932	0.971	0.865	0.843	0.859	0.947	0.756
vertebral-column	0.612	0.543	0.644	0.664	0.582	0.544	0.540
wall-following-robot	0.574	0.592	0.582	0.656	0.544	0.568	0.551
wine	0.923	0.962	0.890	0.860	0.927	0.932	0.860
yeast	0.644	0.593	0.673	0.663	0.722	0.656	0.688
average rank	3.095	3.667	3.667	3.857	4.214	4.262	5.238

Table 10: Low scattered anomalies at rate 0.1 within the training data.

problem	KNN	OCSVM	LODA	iForest	LOF	PCA	FRAC
abalone	0.472	0.500	0.492	0.501	0.485	0.482	0.472
blood-transfusion	0.499	0.550	0.527	0.561	0.506	0.510	0.377
breast-cancer-wisconsin	0.968	0.966	0.973	0.968	0.964	0.972	0.949
breast-tissue	0.772	0.764	0.771	0.745	0.764	0.741	0.737
cardiotocography	0.468	0.555	0.595	0.616	0.602	0.417	0.369
ecoli	0.610	0	0.678	0.681	0.502	0.600	0.551
gisette	0.546	0	0.488	0.293	0.545	0.604	0.508
glass	0.683	0.738	0.632	0.535	0.714	0.768	0.798
haberman	0.680	0.557	0.671	0.706	0.707	0.583	0.677
ionosphere	0.934	0	0.935	0.851	0.862	0	0.813
iris	0.875	0.867	0.966	0.876	0.738	0.530	0.590
isolet	0.619	0.680	0.460	0.455	0.650	0.519	0.505
letter-recognition	0.677	0.721	0.534	0.493	0.690	0.582	0.548
libras	0.537	0.671	0.479	0.478	0.462	0.495	0.498
madelon	0.295	0.289	0.400	0.410	0.293	0.387	0.442
multiple-features	0.963	0.981	0.756	0.799	0.953	0.866	0.531
parkinsons	0.626	0.678	0.627	0.597	0.569	0.639	0.666
pendigits	0.974	0.972	0.880	0.904	0.983	0.903	0.894
pima-indians	0.566	0.512	0.572	0.573	0.538	0.565	0.581
sonar	0.614	0.654	0.582	0.587	0.564	0.618	0.510
spect-heart	0.243	0.259	0.304	0.313	0.239	0.265	0.299
statlog-satimage	0.938	0.957	0.889	0.907	0.944	0.438	0.412
statlog-segment	0.926	0.930	0.922	0.872	0.904	0.825	0.888
statlog-vehicle	0.640	0.549	0.643	0.631	0.573	0.625	0.611
synthetic-control-chart	0.943	0.963	0.859	0.855	0.984	0.838	0.783
vertebral-column	0.555	0.458	0.652	0.603	0.456	0.519	0.511
wall-following-robot	0.597	0.602	0.731	0.604	0.610	0.523	0.536
waveform-1	0.719	0.722	0.809	0.818	0.676	0.580	0.499
waveform-2	0.718	0.721	0.804	0.810	0.682	0.579	0.499
wine	0.968	0.982	0.933	0.860	0.973	0.961	0.906
yeast	0.443	0.427	0.421	0.423	0.456	0.445	0.434
average rank	3.339	3.532	3.677	3.839	3.984	4.548	5.081

Table 11: Low clustered anomalies at rate 0 within the training data.

problem	LOF	KNN	LODA	iForest	OCSVM	PCA	FRAC
abalone	0.621	0.642	0.588	0.592	0.584	0.636	0.621
cardiotocography	0.497	0.402	0.486	0.498	0.491	0.403	0.382
gisette	0.528	0.525	0.490	0.332	0	0.562	0.501
isolet	0.418	0.378	0.326	0.325	0.337	0.311	0.324
letter-recognition	0.456	0.416	0.379	0.349	0.346	0.332	0.334
madelon	0.303	0.294	0.414	0.411	0.295	0.372	0.427
multiple-features	0.949	0.941	0.805	0.840	0.695	0.703	0.510
pendigits	0.899	0.876	0.659	0.698	0.816	0.714	0.720
statlog-satimage	0.758	0.732	0.648	0.667	0.680	0.529	0.502
statlog-segment	0.742	0.745	0.635	0.593	0.680	0.637	0.782
statlog-vehicle	0.530	0.547	0.542	0.539	0.462	0.520	0.479
wall-following-robot	0.523	0.539	0.667	0.571	0.527	0.505	0.523
waveform-1	0.553	0.591	0.775	0.770	0.594	0.527	0.444
waveform-2	0.549	0.580	0.776	0.775	0.585	0.521	0.433
yeast	0.487	0.475	0.457	0.462	0.453	0.478	0.468
average rank	2.667	2.933	3.800	3.900	4.800	4.867	5.033

Table 12: Low clustered anomalies at rate 0.005 within the training data.

problem	LOF	KNN	iForest	LODA	OCSVM	PCA	FRAC
abalone	0.675	0.696	0.632	0.641	0.605	0.683	0.665
blood-transfusion	0.699	0.698	0.732	0.701	0.731	0.683	0.528
breast-cancer-wisconsin	0.634	0.697	0.781	0.775	0.701	0.805	0.771
cardiotocography	0.474	0.384	0.477	0.466	0.470	0.386	0.373
isolet	0.603	0.530	0.468	0.462	0.522	0.482	0.479
letter-recognition	0.646	0.584	0.494	0.529	0.534	0.508	0.489
madelon	0.274	0.273	0.407	0.392	0.270	0.358	0.419
multiple-features	0.931	0.882	0.820	0.771	0.574	0.630	0.490
pendigits	0.931	0.906	0.726	0.691	0.833	0.749	0.749
pima-indians	0.553	0.588	0.606	0.608	0.526	0.593	0.603
statlog-satimage	0.751	0.719	0.659	0.645	0.674	0.515	0.494
statlog-segment	0.732	0.717	0.560	0.598	0.650	0.617	0.767
statlog-vehicle	0.533	0.538	0.531	0.536	0.457	0.509	0.469
synthetic-control-chart	0.986	0.942	0.887	0.881	0.961	0.866	0.782
vertebral-column	0.511	0.584	0.624	0.647	0.505	0.575	0.550
wall-following-robot	0.509	0.503	0.529	0.631	0.487	0.464	0.479
waveform-1	0.572	0.608	0.779	0.775	0.613	0.548	0.469
waveform-2	0.561	0.596	0.784	0.784	0.603	0.544	0.458
yeast	0.501	0.489	0.470	0.473	0.460	0.491	0.484
average rank	3.211	3.237	3.500	3.658	4.579	4.658	5.158

Table 13: Low clustered anomalies at rate 0.01 within the training data.

problem	LODA	iForest	KNN	OCSVM	PCA	LOF	FRAC
abalone	0.489	0.492	0.460	0.495	0.471	0.470	0.469
blood-transfusion	0.504	0.530	0.465	0.543	0.481	0.469	0.340
breast-cancer-wisconsin	0.926	0.946	0.811	0.815	0.887	0.691	0.857
breast-tissue	0.756	0.752	0.762	0.733	0.725	0.721	0.730
cardiotocography	0.514	0.555	0.383	0.491	0.376	0.433	0.337
ecoli	0.660	0.661	0.575	0	0.579	0.500	0.535
glass	0.552	0.558	0.644	0.648	0.719	0.699	0.752
haberman	0.684	0.705	0.661	0.540	0.568	0.679	0.679
ionosphere	0.757	0.687	0.769	0.224	0.235	0.747	0.729
iris	0.889	0.866	0.864	0.716	0.530	0.751	0.586
isolet	0.412	0.416	0.480	0.501	0.450	0.535	0.457
letter-recognition	0.425	0.419	0.456	0.466	0.449	0.501	0.451
libras	0.453	0.449	0.491	0.590	0.475	0.428	0.477
madelon	0.401	0.408	0.292	0.287	0.377	0.290	0.435
multiple-features	0.642	0.660	0.696	0.657	0.550	0.572	0.509
parkinsons	0.595	0.566	0.590	0.598	0.572	0.559	0.581
pendigits	0.799	0.825	0.775	0.648	0.778	0.566	0.717
pima-indians	0.556	0.557	0.537	0.477	0.544	0.496	0.560
sonar	0.555	0.568	0.572	0.594	0.580	0.532	0.500
spect-heart	0.288	0.292	0.243	0.257	0.263	0.234	0.297
statlog-satimage	0.836	0.850	0.721	0.715	0.426	0.695	0.406
statlog-segment	0.881	0.852	0.897	0.820	0.773	0.852	0.841
statlog-vehicle	0.617	0.588	0.561	0.481	0.545	0.513	0.524
synthetic-control-chart	0.793	0.817	0.831	0.873	0.769	0.621	0.632
vertebral-column	0.637	0.588	0.538	0.448	0.502	0.431	0.495
wall-following-robot	0.642	0.557	0.524	0.516	0.483	0.552	0.484
waveform-1	0.771	0.770	0.614	0.624	0.551	0.564	0.489
waveform-2	0.765	0.762	0.612	0.622	0.552	0.566	0.491
wine	0.865	0.867	0.903	0.874	0.855	0.959	0.750
yeast	0.407	0.411	0.425	0.418	0.433	0.433	0.421
average rank	2.967	2.983	3.633	4.033	4.733	4.817	4.833

Table 14: Low clustered anomalies at rate 0.05 within the training data.

problem	LODA	iForest	KNN	OCSVM	PCA	LOF	FRAC
abalone	0.441	0.441	0.458	0.463	0.467	0.462	0.486
blood-transfusion	0.421	0.450	0.408	0.508	0.441	0.423	0.324
breast-cancer-wisconsin	0.900	0.916	0.750	0.761	0.854	0.394	0.823
breast-tissue	0.649	0.650	0.646	0.621	0.621	0.541	0.625
ecoli	0.736	0.745	0.708	0	0.719	0.645	0.663
glass	0.478	0.483	0.575	0.603	0.671	0.660	0.696
haberman	0.444	0.479	0.457	0.426	0.397	0.489	0.452
ionosphere	0.818	0.721	0.821	0.114	0.120	0.744	0.841
iris	0.805	0.779	0.807	0.677	0.485	0.711	0.571
isolet	0.382	0.387	0.470	0.489	0.441	0.543	0.451
letter-recognition	0.381	0.374	0.458	0.470	0.449	0.526	0.453
libras	0.462	0.461	0.492	0.580	0.478	0.428	0.477
madelon	0.413	0.416	0.306	0.301	0.385	0.304	0.440
multiple-features	0.587	0.588	0.635	0.627	0.533	0.565	0.521
parkinsons	0.719	0.682	0.659	0.585	0.555	0.707	0.572
pendigits	0.680	0.705	0.630	0.591	0.653	0.498	0.612
pima-indians	0.745	0.749	0.699	0.653	0.717	0.590	0.701
sonar	0.510	0.518	0.518	0.536	0.547	0.480	0.526
spect-heart	0.263	0.260	0.219	0.227	0.246	0.205	0.287
statlog-satimage	0.801	0.794	0.629	0.648	0.415	0.508	0.397
statlog-segment	0.832	0.784	0.843	0.750	0.728	0.778	0.795
statlog-vehicle	0.607	0.599	0.581	0.511	0.533	0.545	0.513
synthetic-control-chart	0.726	0.765	0.776	0.819	0.734	0.631	0.596
vertebral-column	0.592	0.551	0.533	0.451	0.500	0.454	0.487
wall-following-robot	0.621	0.551	0.505	0.518	0.465	0.539	0.457
waveform-1	0.660	0.658	0.514	0.539	0.452	0.470	0.419
waveform-2	0.654	0.649	0.520	0.546	0.458	0.476	0.427
wine	0.789	0.790	0.780	0.754	0.779	0.921	0.696
yeast	0.376	0.380	0.393	0.399	0.406	0.405	0.391
average rank	3.190	3.224	3.672	4.224	4.448	4.603	4.638

Table 15: Low clustered anomalies at rate 0.1 within the training data.

problem	OCSVM	KNN	LOF	LODA	iForest	FRAC	PCA
abalone	0.352	0.513	0.452	0.458	0.397	0.551	0.492
blood-transfusion	0.507	0.398	0.428	0.391	0.437	0.325	0.431
breast-tissue	0.436	0.403	0.402	0.394	0.383	0.369	0.340
cardiotocography	0.465	0.354	0.525	0.550	0.579	0.287	0.317
ecoli	0	0.844	0.776	0.789	0.805	0.775	0.811
glass	0.691	0.609	0.674	0.529	0.436	0.789	0.741
haberman	0.420	0.377	0.393	0.346	0.391	0.370	0.326
ionosphere	0	0.926	0.843	0.926	0.821	0.797	0
iris	0.867	0.880	0.780	0.970	0.871	0.575	0.528
libras	0.728	0.495	0.514	0.453	0.472	0.479	0.474
parkinsons	0.657	0.602	0.546	0.644	0.587	0.688	0.659
pendigits	0.985	0.975	0.974	0.895	0.914	0.892	0.911
sonar	0.504	0.447	0.389	0.512	0.505	0.496	0.408
spect-heart	0.150	0.135	0.133	0.205	0.203	0.223	0.169
statlog-satimage	0.951	0.921	0.934	0.862	0.896	0.394	0.404
statlog-segment	0.938	0.922	0.901	0.949	0.873	0.837	0.760
vertebral-column	0.341	0.321	0.358	0.350	0.340	0.373	0.347
wall-following-robot	0.749	0.635	0.493	0.834	0.746	0.477	0.513
wine	0.976	0.962	0.970	0.910	0.866	0.873	0.947
yeast	0.348	0.342	0.369	0.292	0.307	0.333	0.364
average rank	3.100	3.650	3.825	3.900	4.175	4.650	4.700

Table 16: Medium clustered anomalies at rate 0 within the training data.

problem	iForest	LODA	LOF	KNN	FRAC	PCA	OCSVM
abalone	0.723	0.796	0.807	0.868	0.833	0.840	0.628
cardiotocography	0.437	0.429	0.384	0.291	0.301	0.297	0.380
isolet	0.110	—	—	—	0.113	—	—
letter-recognition	0.107	—	—	—	0.105	—	—
multiple-features	0.909	0.883	0.973	0.924	0.507	0.495	0.145
pendigits	0.934	0.912	0.984	0.973	0.896	0.927	0.833
statlog-satimage	0.475	0.459	0.606	0.529	0.421	0.415	0.501
statlog-segment	0.375	0.417	0.736	0.661	0.726	0.533	0.485
statlog-vehicle	0.577	0.605	0.470	0.517	0.505	0.509	0.440
wall-following-robot	0.463	0.530	0.457	0.401	0.366	0.384	0.376
waveform-1	0.649	0.756	0.677	0.457	0.128	0.157	0.594
waveform-2	0.772	0.755	0.258	0.332	0.102	0.167	0.363
yeast	0.473	0.475	0.462	0.454	0.473	0.484	0.454
average rank	3.038	3.038	3.077	3.962	4.577	4.731	5.577

Table 17: Medium clustered anomalies at rate 0.005 within the training data.

problem	iForest	LODA	LOF	KNN	PCA	FRAC	OCSVM
abalone	0.761	0.795	0.621	0.723	0.677	0.691	0.436
blood-transfusion	0.821	0.800	0.772	0.780	0.767	0.682	0.717
breast-cancer-wisconsin	0.933	0.926	0.894	0.882	0.928	0.865	0.769
cardiotocography	0.448	0.443	0.359	0.269	0.277	0.281	0.369
multiple-features	0.909	0.873	0.955	0.777	0.437	0.486	—
pendigits	0.876	0.847	0.955	0.916	0.850	0.806	0.761
pima-indians	0.402	0.417	0.342	0.372	0.394	0.427	0.316
statlog-satimage	0.450	0.433	0.538	0.463	0.371	0.398	0.495
statlog-segment	0.396	0.429	0.656	0.585	0.528	0.705	0.497
statlog-vehicle	0.606	0.632	0.450	0.505	0.524	0.524	0.437
synthetic-control-chart	0.759	0.709	0.948	0.746	0.641	0.542	0.814
vertebral-column	0.559	0.613	0.398	0.479	0.478	0.499	0.400
wall-following-robot	0.544	0.597	0.518	0.400	0.430	0.381	0.431
yeast	0.370	0.365	0.358	0.342	0.399	0.371	0.375
average rank	2.714	2.821	3.714	4.393	4.429	4.714	5.214

Table 18: Medium clustered anomalies at rate 0.01 within the training data.

problem	iForest	LODA	FRAC	OCSVM	PCA	KNN	LOF
abalone	0.275	0.322	0.545	0.323	0.466	0.452	0.426
blood-transfusion	0.367	0.349	0.287	0.483	0.402	0.337	0.355
breast-tissue	0.380	0.378	0.350	0.410	0.330	0.391	0.365
cardiotocography	0.469	0.420	0.227	0.376	0.231	0.224	0.262
ecoli	0.735	0.719	0.644	0	0.713	0.627	0.597
glass	0.419	0.428	0.662	0.473	0.601	0.503	0.622
haberman	0.399	0.332	0.368	0.408	0.337	0.371	0.404
ionosphere	0.644	0.724	0.714	0	0	0.620	0.561
iris	0.829	0.865	0.549	0.664	0.496	0.814	0.745
libras	0.366	0.363	0.411	0.345	0.406	0.293	0.226
parkinsons	0.499	0.562	0.410	0.395	0.416	0.450	0.472
pendigits	0.673	0.664	0.502	0.627	0.619	0.489	0.342
sonar	0.403	0.421	0.474	0.211	0.330	0.269	0.324
spect-heart	0.193	0.191	0.225	0.144	0.170	0.133	0.119
statlog-satimage	0.776	0.769	0.377	0.636	0.375	0.555	0.355
statlog-segment	0.787	0.824	0.705	0.662	0.636	0.744	0.549
vertebral-column	0.305	0.310	0.364	0.320	0.332	0.314	0.330
wall-following-robot	0.434	0.429	0.176	0.426	0.243	0.250	0.352
wine	0.818	0.802	0.566	0.604	0.712	0.814	0.953
yeast	0.270	0.247	0.266	0.309	0.325	0.266	0.252
average rank	2.925	3.275	4	4.200	4.325	4.575	4.700

Table 19: Medium clustered anomalies at rate 0.05 within the training data.

problem	OCSVM	LODA	iForest	LOF	PCA	FRAC	KNN
abalone	0.411	0.273	0.248	0.435	0.412	0.477	0.390
blood-transfusion	0.529	0.348	0.407	0.402	0.446	0.241	0.342
breast-tissue	0.345	0.289	0.288	0.304	0.238	0.260	0.303
ecoli	0	0.667	0.657	0.356	0.669	0.604	0.564
glass	0.461	0.391	0.404	0.585	0.535	0.620	0.421
iris	0.607	0.780	0.744	0.697	0.468	0.535	0.729
libras	0.298	0.210	0.198	0.212	0.397	0.396	0.252
parkinsons	0.477	0.761	0.713	0.645	0.421	0.481	0.504
pendigits	0.538	0.480	0.496	0.401	0.433	0.390	0.399
sonar	0.207	0.321	0.310	0.257	0.341	0.428	0.204
spect-heart	0.152	0.193	0.202	0.129	0.177	0.230	0.142
statlog-satimage	0.565	0.680	0.658	0.421	0.364	0.387	0.448
statlog-segment	0.591	0.699	0.648	0.487	0.584	0.613	0.616
vertebral-column	0.399	0.295	0.330	0.419	0.332	0.342	0.330
wall-following-robot	0.448	0.337	0.339	0.515	0.201	0.168	0.231
wine	0.569	0.676	0.666	0.885	0.619	0.489	0.564
yeast	0.329	0.246	0.265	0.283	0.335	0.284	0.276
average rank	3.588	3.647	3.765	3.853	4.206	4.235	4.706

Table 20: Medium clustered anomalies at rate 0.1 within the training data.

problem	OCSVM	LODA	LOF	FRAC	KNN	iForest	PCA
abalone	0.537	0.381	0.385	0.355	0.305	0.406	0.346
blood-transfusion	0.593	0.334	0.511	0.251	0.450	0.481	0.497
breast-tissue	0.348	0.357	0.287	0.321	0.310	0.326	0.246
glass	0.722	0.601	0.687	0.824	0.640	0.349	0.762
iris	0.853	0.967	0.727	0.508	0.867	0.862	0.442
statlog-satimage	0.983	0.926	0.967	0.288	0.955	0.946	0.227
statlog-segment	0.893	0.886	0.870	0.925	0.890	0.832	0.856
average rank	2.143	3.714	3.857	4.286	4.286	4.286	5.429

Table 21: Highly clustered anomalies at rate 0 within the training data.

problem	iForest	LODA	OCSVM	LOF	PCA	FRAC	KNN
abalone	0.418	0.443	0.403	0.362	0.438	0.459	0.385
cardiotocography	0.521	0.510	0.360	0.287	0.149	0.143	0.123
pendigits	0.865	0.816	0.810	0.956	0.858	0.813	0.937
statlog-satimage	0.589	0.567	0.582	0.579	0.229	0.305	0.521
statlog-segment	0.581	0.585	0.652	0.642	0.623	0.736	0.597
statlog-vehicle	0.887	0.895	0.667	0.651	0.758	0.664	0.803
wall-following-robot	0.562	0.578	0.454	0.529	0.425	0.342	0.408
yeast	0.287	0.272	0.316	0.287	0.368	0.283	0.255
average rank	2.938	3.500	3.750	3.875	4	4.812	5.125

Table 22: Highly clustered anomalies at rate 0.005 within the training data.

problem	iForest	LODA	OCSVM	PCA	FRAC	LOF	KNN
abalone	0.366	0.398	0.397	0.413	0.444	0.313	0.353
blood-transfusion	0.421	0.405	0.527	0.445	0.303	0.358	0.358
cardiotocography	0.497	0.485	0.333	0.111	0.114	0.193	—
pendigits	0.836	0.792	0.780	0.850	0.775	0.925	0.871
statlog-satimage	0.701	0.682	0.625	0.234	0.302	0.689	0.634
statlog-segment	0.697	0.670	0.698	0.666	0.727	0.609	0.603
vertebral-column	0.297	0.321	0.276	0.285	0.326	0.240	0.264
wall-following-robot	0.538	0.474	0.437	0.331	0.221	0.401	0.229
yeast	0.193	0.195	0.249	0.274	0.204	0.188	0.186
average rank	2.944	3.278	3.389	3.778	4.333	4.722	5.556

Table 23: Highly clustered anomalies at rate 0.01 within the training data.

problem	OCSVM	iForest	LODA	LOF	FRAC	PCA	KNN
abalone	0.518	0.246	0.224	0.379	0.347	0.309	0.263
blood-transfusion	0.562	0.338	0.254	0.365	0.199	0.444	0.324
breast-tissue	0.376	0.313	0.326	0.289	0.299	0.241	0.315
glass	0.452	0.373	0.366	0.600	0.674	0.599	0.441
iris	0.618	0.745	0.818	0.659	0.475	0.376	0.742
statlog-satimage	0.694	0.785	0.765	0.291	0.287	0.212	0.278
statlog-segment	0.605	0.719	0.704	0.362	0.662	0.642	0.540
average rank	2.857	3.429	3.786	4.143	4.214	4.786	4.786

Table 24: Highly clustered anomalies at rate 0.05 within the training data.

problem	LODA	iForest	OCSVM	LOF	FRAC	PCA	KNN
glass	0.327	0.288	0.394	0.495	0.621	0.465	0.182
iris	0.668	0.568	0.567	0.515	0.461	0.316	0.544
statlog-satimage	0.722	0.739	0.689	0.359	0.245	0.181	0.206
average rank	2.667	3.167	3.167	3.667	4	5.667	5.667

Table 25: Highly clustered anomalies at rate 0.1 within the training data.