



Supplementary File

Table S 1. Evaluation of Growth Capping Values and Window Size for the FORTH_TRACE Dataset

Growth Capping	Distance Metric	Window Size	Machine Learning	accuracy	precision	recall	f1_score
1	Minkowski	60	XGBoost	92.77	92.45	92.77	92.46
			LightGBM	92.77	92.45	92.77	92.51
		90	XGBoost	94.57	94.30	94.57	94.36
			LightGBM	94.54	94.25	94.54	94.31
		120	XGBoost	95.86	95.71	95.86	95.73
			LightGBM	96.10	95.96	96.10	95.97
2	Minkowski	60	XGBoost	94.33	94.04	94.33	94.07
			LightGBM	94.34	93.97	94.34	94.06
		90	XGBoost	95.94	95.85	95.94	95.86
			LightGBM	96.12	96.00	96.12	96.02
		120	XGBoost	96.28	96.21	96.28	96.24
			LightGBM	96.61	96.54	96.61	96.56
3	Minkowski	60	XGBoost	94.33	94.04	94.33	94.07
			LightGBM	94.34	93.97	94.34	94.06
		90	XGBoost	95.94	95.85	95.94	95.86
			LightGBM	96.12	96.00	96.12	96.02
		120	XGBoost	96.28	96.21	96.28	96.24
			LightGBM	96.61	96.54	96.61	96.56
4	Minkowski	60	XGBoost	94.33	94.04	94.33	94.07
			LightGBM	94.34	93.97	94.34	94.06
		90	XGBoost	95.94	95.85	95.94	95.86
			LightGBM	96.12	96.00	96.12	96.02
		120	XGBoost	96.28	96.21	96.28	96.24
			LightGBM	96.61	96.54	96.61	96.56

Table S 2. Evaluation of Growth Capping Values and Window Size for the SBHARPT Dataset

Growth Capping	Distance Metric	Window Size	Machine Learning	accuracy	precision	recall	f1_score
1	Minkowski	60	XGBoost	95.51	95.35	95.51	95.42
			LightGBM	56.67	52.30	56.67	54.04
		90	XGBoost	97.20	97.11	97.20	97.14
			LightGBM	47.13	56.90	47.13	42.38
		120	XGBoost	97.33	97.19	97.33	97.26



			LightGBM	97.70	97.53	97.70	97.60
2	Minkowski	60	XGBoost	95.84	95.75	95.84	95.78
			LightGBM	96.01	96.03	96.01	95.99
		90	XGBoost	96.33	96.25	96.33	96.27
			LightGBM	46.75	42.57	46.75	41.54
		120	XGBoost	96.13	95.99	96.13	96.05
			LightGBM	97.23	97.29	97.23	97.23
3	Minkowski	60	XGBoost	95.84	95.75	95.84	95.78
			LightGBM	96.01	96.03	96.01	95.99
		90	XGBoost	96.33	96.25	96.33	96.27
			LightGBM	46.75	42.57	46.75	41.54
		120	XGBoost	96.13	95.99	96.13	96.05
			LightGBM	97.23	97.29	97.23	97.23
4	Minkowski	60	XGBoost	95.84	95.75	95.84	95.78
			LightGBM	96.01	96.03	96.01	95.99
		90	XGBoost	96.33	96.25	96.33	96.27
			LightGBM	46.75	42.57	46.75	41.54
		120	XGBoost	96.13	95.99	96.13	96.05
			LightGBM	97.23	97.29	97.23	97.23

Table S 3. Evaluation of Growth Capping Values and Window Size for the WISDM Dataset

Growth Capping	Distance Metric	Window Size	Machine Learning	accuracy	precision	recall	f1_score
1	Minkowski	60	XGBoost	97.45	97.44	97.45	97.44
			LightGBM	97.55	97.55	97.55	97.55
		90	XGBoost	98.27	98.26	98.27	98.26
			LightGBM	98.68	98.68	98.68	98.68
		120	XGBoost	98.23	98.24	98.23	98.22
			LightGBM	98.70	98.72	98.70	98.70
2	Minkowski	60	XGBoost	98.10	98.09	98.10	98.09
			LightGBM	98.38	98.38	98.38	98.38
		90	XGBoost	97.87	97.86	97.87	97.86
			LightGBM	98.04	98.03	98.04	98.04
		120	XGBoost	98.65	98.64	98.65	98.64
			LightGBM	98.92	98.92	98.92	98.92
3	Minkowski	60	XGBoost	98.10	98.09	98.10	98.09
			LightGBM	98.38	98.38	98.38	98.38
		90	XGBoost	97.87	97.86	97.87	97.86
			LightGBM	98.04	98.03	98.04	98.04
		120	XGBoost	98.65	98.64	98.65	98.64
			LightGBM	98.92	98.92	98.92	98.92



			LightGBM	98.92	98.92	98.92	98.92
4	Minkowski	60	XGBoost	98.10	98.09	98.10	98.09
			LightGBM	98.38	98.38	98.38	98.38
		90	XGBoost	97.87	97.86	97.87	97.86
			LightGBM	98.04	98.03	98.04	98.04
		120	XGBoost	98.65	98.64	98.65	98.64
			LightGBM	98.92	98.92	98.92	98.92

Table S 4. Evaluation of Growth Capping Values and Window Size for the PAMA2 Dataset

Growth Capping	Distace Metric	Window Size	Machine Learning	accuracy	precision	recall	f1_score
1	Minkowski	60	XGBoost	86.55	87.02	86.55	86.64
			LightGBM	86.80	87.33	86.80	86.91
		90	XGBoost	88.90	89.29	88.90	88.98
			LightGBM	88.93	89.34	88.93	89.03
		120	XGBoost	90.21	90.60	90.21	90.30
			LightGBM	90.41	90.84	90.41	90.52
2	Minkowski	60	XGBoost	88.92	89.28	88.92	89.00
			LightGBM	89.10	89.47	89.10	89.19
		90	XGBoost	90.96	91.26	90.96	91.01
			LightGBM	91.28	91.60	91.28	91.33
		120	XGBoost	91.78	92.04	91.78	91.82
			LightGBM	92.06	92.34	92.06	92.10
3	Minkowski	60	XGBoost	88.92	89.28	88.92	89.00
			LightGBM	89.10	89.47	89.10	89.19
		90	XGBoost	90.96	91.26	90.96	91.01
			LightGBM	91.28	91.60	91.28	91.33
		120	XGBoost	91.78	92.04	91.78	91.82
			LightGBM	92.06	92.34	92.06	92.10
4	Minkowski	60	XGBoost	88.92	89.28	88.92	89.00
			LightGBM	89.10	89.47	89.10	89.19
		90	XGBoost	90.96	91.26	90.96	91.01
			LightGBM	91.28	91.60	91.28	91.33
		120	XGBoost	91.78	92.04	91.78	91.82
			LightGBM	92.06	92.34	92.06	92.10



Table S 5 Proposed Model Performance with XGBoost on FORTH_TRACE Dataset

Thr. (τ)	Feat. Num.	Manhattan				Euclidean				Minkowski			
		acc.	prec.	rec.	f-1.	acc.	prec.	rec.	f-1.	acc.	prec.	rec.	f-1.
0.1	33	95.28	95.12	95.28	95.16	95.50	95.37	95.50	95.38	95.44	95.31	95.44	95.36
0.2	32	95.73	95.62	95.73	95.64	95.72	95.58	95.72	95.61	95.69	95.49	95.69	95.55
0.3	32	95.95	95.91	95.95	95.90	95.81	95.71	95.81	95.71	95.60	95.51	95.60	95.53
0.4	32	96.18	96.11	96.18	96.11	95.76	95.66	95.76	95.67	95.56	95.48	95.56	95.50
0.5	33	96.43	96.36	96.43	96.35	96.33	96.24	96.33	96.26	95.79	95.69	95.79	95.72
0.6	31	96.16	96.06	96.16	96.08	96.21	96.08	96.21	96.11	95.85	95.77	95.85	95.78
0.7	30	96.05	96.00	96.05	96.00	96.84	96.75	96.84	96.76	96.32	96.21	96.32	96.25
0.8	32	96.44	96.37	96.44	96.38	96.68	96.60	96.68	96.61	96.65	96.58	96.65	96.60
0.9	33	96.97	96.92	96.97	96.92	96.63	96.54	96.63	96.57	97.16	97.14	97.16	97.14
1	33	97.26	97.21	97.26	97.20	96.99	96.95	96.99	96.96	96.30	96.20	96.30	96.23

Table S 6 Proposed Model Performance with LightGBM on FORTH_TRACE Dataset

Thr. (τ)	Feat. Num.	Manhattan				Euclidean				Minkowski			
		acc.	prec.	rec.	f-1.	acc.	prec.	rec.	f-1.	acc.	prec.	rec.	f-1.
0.1	33	95.75	95.55	95.75	95.62	95.66	95.49	95.66	95.52	95.59	95.50	95.59	95.53
0.2	33	96.03	95.88	96.03	95.91	95.81	95.68	95.81	95.67	95.91	95.74	95.91	95.77
0.3	32	95.95	95.89	95.95	95.89	95.94	95.86	95.94	95.87	95.87	95.77	95.87	95.80
0.4	33	96.23	96.14	96.23	96.16	95.97	95.84	95.97	95.87	95.79	95.67	95.79	95.71
0.5	33	96.53	96.43	96.53	96.46	96.47	96.41	96.47	96.41	96.03	95.91	96.03	95.95
0.6	32	96.34	96.21	96.34	96.24	96.34	96.22	96.34	96.25	96.16	96.08	96.16	96.10
0.7	31	96.32	96.25	96.32	96.27	96.84	96.75	96.84	96.77	96.42	96.24	96.42	96.30
0.8	32	96.71	96.65	96.71	96.67	96.80	96.67	96.80	96.71	96.91	96.84	96.91	96.87
0.9	33	97.03	96.92	97.03	96.96	96.61	96.50	96.61	96.55	97.25	97.19	97.25	97.20
1	32	97.26	97.21	97.26	97.22	97.08	97.06	97.08	97.07	96.65	96.62	96.65	96.63

Table S 7 Proposed Model Performance with XGBoost on SBHARPT Dataset

Thr. (τ)	Feat. Num.	Manhattan				Euclidean				Minkowski			
		acc.	prec.	rec.	f-1.	acc.	prec.	rec.	f-1.	acc.	prec.	rec.	f-1.
0.1	31	97.34	97.32	97.34	97.30	97.45	97.37	97.45	97.40	97.73	97.70	97.73	97.70
0.2	31	97.48	97.35	97.48	97.40	97.72	97.49	97.72	97.61	97.26	97.18	97.26	97.20
0.3	27	97.70	97.50	97.70	97.60	97.15	97.06	97.15	97.08	98.09	98.01	98.09	98.00
0.4	25	96.64	96.52	96.64	96.56	97.18	97.01	97.18	97.07	96.48	96.35	96.48	96.38
0.5	30	96.68	96.64	96.68	96.61	97.17	96.99	97.17	97.08	97.33	97.15	97.33	97.23



0.6	32	97.19	97.06	97.19	97.12	97.08	96.99	97.08	97.00	96.88	96.81	96.88	96.81
0.7	30	96.87	96.80	96.87	96.81	96.44	96.28	96.44	96.33	96.43	96.48	96.43	96.39
0.8	33	96.11	96.02	96.11	96.04	96.55	96.36	96.55	96.43	96.55	96.38	96.55	96.45
0.9	29	97.12	97.04	97.12	97.05	96.86	96.72	96.86	96.77	96.77	96.54	96.77	96.63
1	30	97.78	97.55	97.78	97.64	97.78	97.64	97.78	97.70	97.05	96.89	97.05	96.96

Table S 8 Proposed Model Performance with LightGBM on SBHARPT Dataset

Thr. (τ)	Feat. Num.	Manhattan				Euclidean				Minkowski			
		acc.	prec.	rec.	f-1.	acc.	prec.	rec.	f-1.	acc.	prec.	rec.	f-1.
0.1	33	97.95	97.91	97.95	97.91	97.45	97.58	97.45	97.48	97.95	97.93	97.95	97.93
0.2	25	98.01	97.83	98.01	97.91	97.72	97.72	97.72	97.70	97.50	97.40	97.50	97.44
0.3	29	97.70	97.77	97.70	97.73	97.58	97.46	97.58	97.52	98.15	98.17	98.15	98.13
0.4	29	97.23	97.02	97.23	97.11	97.44	97.32	97.44	97.35	96.94	96.80	96.94	96.83
0.5	32	97.23	97.15	97.23	97.16	97.79	97.61	97.79	97.69	97.46	97.34	97.46	97.39
0.6	33	97.41	97.28	97.41	97.34	97.37	97.19	97.37	97.26	97.17	97.15	97.17	97.15
0.7	29	97.26	97.20	97.26	97.22	96.82	96.67	96.82	96.71	97.05	96.84	97.05	96.93
0.8	30	96.69	96.60	96.69	96.61	97.12	96.92	97.12	97.01	97.54	97.33	97.54	97.40
0.9	29	97.73	97.44	97.73	97.56	97.21	97.10	97.21	97.13	97.12	97.17	97.12	97.09
1	30	97.87	97.62	97.87	97.73	97.78	97.78	97.78	97.75	97.60	97.59	97.60	97.57

Table S 9 Proposed Model Performance with XGBoost on WISDM Dataset

Thr. (τ)	Feat. Num.	Manhattan				Euclidean				Minkowski			
		acc.	prec.	rec.	f-1.	acc.	prec.	rec.	f-1.	acc.	prec.	rec.	f-1.
0.1	32	98.38	98.37	98.38	98.38	98.44	98.44	98.44	98.44	98.22	98.21	98.22	98.21
0.2	33	98.35	98.35	98.35	98.35	98.63	98.64	98.63	98.63	98.60	98.60	98.60	98.60
0.3	32	98.41	98.40	98.41	98.40	98.24	98.23	98.24	98.24	97.98	97.97	97.98	97.97
0.4	33	98.37	98.38	98.37	98.37	98.55	98.54	98.55	98.54	97.85	97.85	97.85	97.84
0.5	33	98.59	98.59	98.59	98.59	98.04	98.02	98.04	98.03	98.59	98.59	98.59	98.59
0.6	32	98.31	98.31	98.31	98.31	98.58	98.58	98.58	98.58	98.62	98.62	98.62	98.62
0.7	32	98.35	98.35	98.35	98.35	98.48	98.50	98.48	98.49	98.70	98.70	98.70	98.69
0.8	30	98.45	98.44	98.45	98.44	98.75	98.74	98.75	98.74	98.55	98.54	98.55	98.55
0.9	32	98.34	98.34	98.34	98.34	98.61	98.61	98.61	98.61	98.97	98.98	98.97	98.97
1	33	98.54	98.53	98.54	98.53	98.64	98.64	98.64	98.64	98.74	98.74	98.74	98.74



Table S 10 Proposed Model Performance with LightGBM on WISDM Dataset

Thr. (τ)	Feat. Num.	Manhattan				Euclidean				Minkowski			
		acc.	prec.	rec.	f-1.	acc.	prec.	rec.	f-1.	acc.	prec.	rec.	f-1.
0.1	32	98.50	98.51	98.50	98.50	98.72	98.72	98.72	98.72	98.62	98.62	98.62	98.62
0.2	32	98.41	98.41	98.41	98.41	98.76	98.77	98.76	98.76	98.79	98.79	98.79	98.79
0.3	33	98.71	98.71	98.71	98.70	98.54	98.54	98.54	98.54	98.34	98.35	98.34	98.34
0.4	32	98.65	98.65	98.65	98.65	98.72	98.71	98.72	98.71	98.27	98.27	98.27	98.26
0.5	32	98.99	98.99	98.99	98.99	98.59	98.58	98.59	98.58	98.92	98.92	98.92	98.92
0.6	33	98.38	98.39	98.38	98.39	98.77	98.77	98.77	98.77	98.74	98.74	98.74	98.74
0.7	30	98.64	98.63	98.64	98.63	98.56	98.58	98.56	98.57	98.74	98.74	98.74	98.74
0.8	33	98.74	98.73	98.74	98.74	98.87	98.87	98.87	98.87	98.68	98.67	98.68	98.67
0.9	30	98.65	98.65	98.65	98.65	98.82	98.82	98.82	98.82	99.06	99.06	99.06	99.06
1	30	99.00	98.99	99.00	98.99	99.00	99.01	99.00	99.00	99.01	99.01	99.01	99.01

Table S 11 Proposed Model Performance with XGBoost on PAMA2 Dataset

Thr. (τ)	Feat. Num.	Manhattan				Euclidean				Minkowski			
		acc.	prec.	rec.	f-1.	acc.	prec.	rec.	f-1.	acc.	prec.	rec.	f-1.
0.1	33	90.99	91.37	90.99	91.07	90.73	91.11	90.73	90.82	90.33	90.69	90.33	90.43
0.2	30	90.32	90.60	90.32	90.39	90.86	91.20	90.86	90.92	90.98	91.26	90.98	91.02
0.3	31	90.93	91.26	90.93	91.00	91.22	91.52	91.22	91.28	90.80	91.10	90.80	90.86
0.4	31	90.32	90.76	90.32	90.42	90.44	90.79	90.44	90.52	90.87	91.24	90.87	90.94
0.5	31	91.51	91.86	91.51	91.57	90.95	91.27	90.95	91.00	91.22	91.47	91.22	91.25
0.6	33	91.38	91.66	91.38	91.42	91.32	91.73	91.32	91.41	91.04	91.33	91.04	91.10
0.7	30	91.41	91.68	91.41	91.45	90.95	91.29	90.95	91.04	91.35	91.65	91.35	91.42
0.8	30	91.48	91.79	91.48	91.53	91.30	91.46	91.30	91.32	91.68	91.96	91.68	91.74
0.9	31	91.36	91.61	91.36	91.41	91.78	91.99	91.78	91.82	92.21	92.52	92.21	92.28
1	31	91.67	92.00	91.67	91.72	91.50	91.81	91.50	91.55	91.94	92.21	91.94	91.99

Table S 12 Proposed Model Performance with LightGBM on PAMA2 Dataset

Thr. (τ)	Feat. Num.	Manhattan				Euclidean				Minkowski			
		acc.	prec.	rec.	f-1.	acc.	prec.	rec.	f-1.	acc.	prec.	rec.	f-1.
0.1	30	91.05	91.42	91.05	91.14	91.19	91.55	91.19	91.28	90.45	90.81	90.45	90.55
0.2	30	90.14	90.50	90.14	90.22	91.02	91.44	91.02	91.10	90.98	91.30	90.98	91.04
0.3	30	91.13	91.43	91.13	91.19	91.54	91.86	91.54	91.60	91.01	91.35	91.01	91.09
0.4	30	90.43	90.89	90.43	90.53	90.78	91.17	90.78	90.86	90.84	91.19	90.84	90.90
0.5	30	91.72	92.08	91.72	91.78	91.07	91.44	91.07	91.14	91.38	91.67	91.38	91.41



0.6	30	91.55	91.84	91.55	91.61	91.67	92.10	91.67	91.75	91.37	91.69	91.37	91.44
0.7	30	91.53	91.79	91.53	91.57	91.00	91.37	91.00	91.10	91.67	91.96	91.67	91.74
0.8	30	91.57	91.97	91.57	91.62	91.47	91.70	91.47	91.50	91.78	92.12	91.78	91.86
0.9	30	91.76	91.96	91.76	91.80	92.24	92.51	92.24	92.30	92.43	92.73	92.43	92.49
1	28	92.18	92.53	92.18	92.25	91.99	92.29	91.99	92.04	92.06	92.34	92.06	92.10

Table S 13. CPU Execution Time Comparison between Static Window and the Proposed Adaptive Sliding Window Approach

Dataset	M. Lear.	Static Sliding Window					Semi Adaptive (Proposed)					+/- (%)
		acc.	prec.	rec	F1	cpu time (s)	acc.	prec.	rec	F1	cpu time (s)	
FORTH_T	XGB	95.99	95.71	95.99	95.73	64.83	96.30	96.20	96.30	96.23	112.11	+72.93
RACE	LGBM	96.31	96.07	96.31	96.12	64.83	96.61	96.54	96.61	96.56	112.11	+72.93
SBHARPT	XGB	94.42	94.57	94.42	94.43	17.58	96.13	95.99	96.13	96.05	21.20	+20.59
	LGBM	95.63	95.62	95.63	95.58	17.58	97.23	97.29	97.23	97.23	21.20	+20.59
WISDM	XGB	98.33	98.35	98.33	98.34	24.55	98.74	98.74	98.74	98.74	44.70	+82.08
	LGBM	98.39	98.42	98.39	98.40	24.55	98.92	98.92	98.92	98.92	44.70	+82.08
PAMA2	XGB	91.18	91.56	91.18	91.26	53.09	91.78	92.04	91.78	91.82	81.78	+54.04
	LGBM	91.76	92.14	91.76	91.83	53.09	92.06	92.34	92.06	92.10	81.78	+54.04

XGB= XGBoost, LGBM= LightGBM, +/- = indicates the relative change compared to the static sliding window (%).

Table S 14. Performance Before and After Rotation (XGBoost, FORTH-TRACE, Manhattan)

Feature Number	Threshold (τ)	Rotation Angle	acc.	Δ acc.	prec.	Δ prec.	rec.	Δ rec.	f-1.	Δ f-1.
33	1	1	96.95	-0.31	96.95	-0.26	96.95	-0.31	96.88	-0.32
33	1	4	95.44	-1.82	95.48	-1.73	95.44	-1.82	95.37	-1.83
33	1	7	94.25	-3.01	94.29	-2.92	94.25	-3.01	94.15	-3.05
33	1	10	93.33	-3.93	93.28	-3.93	93.33	-3.93	93.24	-3.96
33	1	13	92.22	-5.04	92.15	-5.06	92.22	-5.04	92.11	-5.09
33	1	15	90.44	-6.82	90.48	-6.73	90.44	-6.82	90.37	-6.83

Table S 15. Performance Before and After Rotation (LightGBM, FORTH-TRACE, Manhattan)

Feature Number	Threshold (τ)	Rotation Angle	acc.	Δ acc.	prec.	Δ prec.	rec.	Δ rec.	f-1.	Δ f-1.
32	1	1	97.17	-0.09	97.10	-0.11	97.17	-0.09	97.11	-0.11
32	1	4	95.89	-1.37	95.91	-1.30	95.89	-1.37	95.85	-1.37
32	1	7	94.31	-2.95	94.34	-2.87	94.31	-2.95	94.25	-2.97
32	1	10	92.94	-4.32	92.91	-4.30	92.94	-4.32	92.86	-4.36
32	1	13	91.20	-6.06	91.15	-6.06	91.20	-6.06	91.12	-6.10
32	1	15	89.56	-7.70	89.51	-7.70	89.56	-7.70	89.48	-7.74



Table S 16. Performance Before and After Rotation (XGBoost, SBHARPT, Minkowski)

Feature Number	Threshold (τ)	Rotation Angle	acc.	Δ acc.	prec.	Δ prec.	rec.	Δ rec.	f-1.	Δ f-1.
27	0.3	1	96.61	-1.48	96.57	-1.44	96.61	-1.48	96.57	-1.43
27	0.3	4	93.09	-5.00	93.13	-4.88	93.09	-5.00	93.06	-4.94
27	0.3	7	88.65	-9.44	89.38	-8.63	88.65	-9.44	88.57	-9.43
27	0.3	10	87.17	-10.92	88.41	-9.60	87.17	-10.92	87.13	-10.87
27	0.3	13	85.26	-12.83	87.37	-10.64	85.26	-12.83	85.13	-12.87
27	0.3	15	83.65	-14.44	86.49	-11.52	83.65	-14.44	83.45	-14.55

Table S 17. Performance Before and After Rotation (LightGBM, SBHARPT, Minkowski)

Feature Number	Threshold (τ)	Rotation Angle	acc.	Δ acc.	prec.	Δ prec.	rec.	Δ rec.	f-1.	Δ f-1.
29	0.3	1	96.98	-1.17	97.03	-1.14	96.98	-1.17	96.96	-1.17
29	0.3	4	91.67	-6.48	91.95	-6.22	91.67	-6.48	91.64	-6.49
29	0.3	7	85.19	-12.96	87.19	-10.98	85.19	-12.96	84.96	-13.17
29	0.3	10	82.85	-15.30	86.11	-12.06	82.85	-15.30	82.47	-15.66
29	0.3	13	82.17	-15.98	86.39	-11.78	82.17	-15.98	81.70	-16.43
29	0.3	15	79.52	-18.63	85.17	-13.00	79.52	-18.63	78.78	-19.35

Table S 18. Performance Before and After Rotation (XGBoost, WISDM, Minkowski)

Feature Number	Threshold (τ)	Rotation Angle	acc.	Δ acc.	prec.	Δ prec.	rec.	Δ rec.	f-1.	Δ f-1.
32	0.9	1	98.76	-0.21	98.77	-0.21	98.76	-0.21	98.76	-0.21
32	0.9	4	98.24	-0.73	98.29	-0.69	98.24	-0.73	98.25	-0.72
32	0.9	7	98.15	-0.82	98.23	-0.75	98.15	-0.82	98.16	-0.81
32	0.9	10	97.98	-0.99	98.06	-0.92	97.98	-0.99	97.99	-0.98
32	0.9	13	97.85	-1.12	97.93	-1.05	97.85	-1.12	97.86	-1.11
32	0.9	15	97.51	-1.46	97.60	-1.38	97.51	-1.46	97.52	-1.45

Table S 19. Performance Before and After Rotation (LightGBM, WISDM, Minkowski)

Feature Number	Threshold (τ)	Rotation Angle	acc.	Δ acc.	prec.	Δ prec.	rec.	Δ rec.	f-1.	Δ f-1.
30	0.9	1	98.71	-0.35	98.72	-0.34	98.71	-0.35	98.72	-0.34
30	0.9	4	98.50	-0.56	98.53	-0.53	98.50	-0.56	98.50	-0.56
30	0.9	7	98.07	-0.99	98.14	-0.92	98.07	-0.99	98.08	-0.98
30	0.9	10	97.51	-1.55	97.65	-1.41	97.51	-1.55	97.52	-1.54
30	0.9	13	97.30	-1.76	97.43	-1.63	97.30	-1.76	97.30	-1.76
30	0.9	15	97.08	-1.98	97.25	-1.81	97.08	-1.98	97.09	-1.97



Table S 20. Performance Before and After Rotation (XGBoost, PAMA2, Minkowski)

Feature Number	Threshold (τ)	Rotation Angle	acc.	Δ acc.	prec.	Δ prec.	rec.	Δ rec.	f-1.	Δ f-1.
31	0.9	1	91.88	-0.33	92.19	-0.33	91.88	-0.33	91.94	-0.34
31	0.9	4	90.44	-1.77	90.77	-1.75	90.44	-1.77	90.51	-1.77
31	0.9	7	85.57	-6.64	87.78	-4.74	85.57	-6.64	85.05	-7.23
31	0.9	10	83.00	-9.21	86.83	-5.69	83.00	-9.21	81.55	-10.73
31	0.9	13	81.56	-10.65	85.74	-6.78	81.56	-10.65	80.07	-12.21
31	0.9	15	80.83	-11.38	85.11	-7.41	80.83	-11.38	79.36	-12.92

Table S 21. Performance Before and After Rotation (LightGBM, PAMA2, Minkowski)

Feature Number	Threshold (τ)	Rotation Angle	acc.	Δ acc.	prec.	Δ prec.	rec.	Δ rec.	f-1.	Δ f-1.
30	0.9	1	91.99	-0.44	92.31	-0.42	91.99	-0.44	92.05	-0.44
30	0.9	4	90.55	-1.88	90.90	-1.83	90.55	-1.88	90.61	-1.88
30	0.9	7	85.77	-6.66	87.65	-5.08	85.77	-6.66	85.43	-7.06
30	0.9	10	81.96	-10.47	85.98	-6.75	81.96	-10.47	80.87	-11.62
30	0.9	13	79.84	-12.59	85.21	-7.52	79.84	-12.59	78.64	-13.85
30	0.9	15	77.89	-14.54	83.99	-8.74	77.89	-14.54	76.55	-15.94