Table 1: Cover and F1 scores using various distance metrics in the L_1 family

L_1												
	Energy (A)		Energy (C)		Energy (R)		NSL-KDD (A)		NSL-KDD (C)		NSL-KDD (R)	
Metric	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1
Kulczynski d	0.988	1	0.988	1	0.988	1	0.626	0.857	0.746	0.895	0.765	0.895
Bray-Curtis	0.988	1	0.988	1	0.988	1	0.601	0.824	0.746	0.895	0.75	0.872
Lorentzian	0.988	1	0.988	1	0.988	1	0.638	0.765	0.738	0.872	0.763	0.895
Gower	0.988	1	0.988	1	0.988	1	0.63	0.743	0.746	0.895	0.749	0.889
Sorgel	0.948	0.952	0.988	1	0.988	1	0.601	0.824	0.721	0.865	0.736	0.865
Canberra	0.984	1	0.933	0.909	0.962	0.909	0.46	0.621	0.360	0.462	0.544	0.688
	UNSW (A)		UNSW (C)		UNSW (R)		Wind (A)		Wind (C)		Wind (R)	
Metric	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1
Kulczynski d	0.98	1	0.98	1	0.98	1	0.996	1	0.996	1	0.996	1
Bray-Curtis	0.98	1	0.98	1	0.98	1	0.996	1	0.996	1	0.996	1
Lorentzian	0.98	1	0.98	1	0.98	1	0.996	1	0.996	1	0.996	1
Gower	0.98	1	0.98	1	0.98	1	0.996	1	0.996	1	0.996	1
Sorgel	0.98	1	0.98	1	0.98	1	0.996	1	0.996	1	0.996	1
Canberra	0.883	0.947	0.883	0.947	0.883	0.947	0.996	1	0.996	1	0.996	1

Table 2: Cover and F1 scores using various distance metrics in the Intersection family

Intersection												
	Energy (A)		Energy (C)		Energy (R)		NSL-KDD (A)		NSL-KDD (C)		NSL-KDD (R)	
Metric	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1
Czekanowski	0.988	1	0.984	1	0.988	1	0.683	0.737	0.746	0.895	0.677	0.791
Tanimoto	0.988	1	0.984	1	0.988	1	0.551	0.765	0.721	0.865	0.736	0.865
Wave Hedges	0.984	1	0.984	1	0.988	1	0.845	0.919	0.531	0.71	0.758	0.833
Motyka	0.988	1	0.593	0.75	0.593	0.75	0.551	0.765	0.727	0.85	0.656	0.773
Nonintersection	0.299	0.429	0.299	0.429	0.299	0.429	0.591	0.727	0.61	0.727	0.592	0.667
	UNSW (A)		UNSW (C)		UNSW (R)		Wind (A)		Wind (C)		Wind (R)	
Metric	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1
Czekanowski	0.980	1	0.98	1	0.98	1	0.996	1	0.996	1	0.996	1
Tanimoto	0.980	1	0.972	1	0.98	1	0.996	1	0.996	1	0.996	1
Wave Hedges	0.883	0.947	0.883	0.947	0.891	0.947	0.996	1	0.996	1	0.996	1
Motyka	0.985	1	0.985	1	0.98	1	0.996	1	0.996	1	0.996	1
Nonintersection	0.855	0.9	0.855	0.9	0.855	0.9	0.995	0.909	0.995	0.909	0.995	0.909

Table 3: Cover and F1 scores using various distance metrics in the L_p family

L_p												
	Energy (A)		Energy (C)		Energy (R)		NSL-KDD (A)		NSL-KDD (C)		NSL-KDD (R)	
Metric	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1
Manhattan	0.988	1	0.988	1	0.988	1	0.63	0.743	0.746	0.895	0.749	0.889
Minkowski ($p=2$)	0.984	1	0.984	1	0.969	0.952	0.711	0.735	0.641	0.773	0.823	0.818
Euclidean	0.984	1	0.984	1	0.969	0.952	0.49	0.688	0.462	0.647	0.601	0.824
Chebyshev (Max)	0.558	0.348	0.617	0.432	0.55	0.235	0.542	0.277	0.41	0.202	0.501	0.164
Chebyshev (Min)	0.373	0.211	0.372	0.12	0.374	0.151	0.068	0.095	0.068	0.095	0.068	0.095
	UNSW (A)		UNSW (C)		UNSW (R)		Wind (A)		Wind (C)		Wind (R)	
Metric	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1
Manhattan	0.980	1	0.98	1	0.98	1	0.996	1	0.996	1	0.996	1
Minkowski (p=2)	0.98	1	0.98	1	0.98	1	0.996	1	0.996	1	0.996	1
Euclidean	0.980	1	0.972	1	0.98	1	0.996	1	0.996	1	0.996	1
Chebyshev (Max)	0.566	0.625	0.563	0.538	0.67	0.636	0.82	0.526	0.849	0.533	0.847	0.667
Chebyshev (Min)	0.223	0.333	0.223	0.333	0.223	0.333	0.579	0.25	0.463	0.17	0.518	0.6

Table 4: Cover and F1 scores using various distance metrics in the Fidelity family

Fidelity	Energy (A)		Energy (C)		Energy (R)		NSL-KDD (A)		NSL-KDD (C)		NSL-KDD (R)	
Metric	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1
Squared-chord	0.903	0.909	0.871	0.69	0.923	0.833	0.579	0.75	0.626	0.857	0.626	0.857
Hellinger	0.882	0.833	0.593	0.75	0.923	0.833	0.601	0.824	0.626	0.857	0.626	0.857
Matusita	0.903	0.909	0.846	0.625	0.923	0.833	0.529	0.75	0.626	0.857	0.626	0.857
Bhattacharyya	0.1	0.182	0.299	0.429	0.1	0.182	0.129	0.115	0.253	0.205	0.129	0.115
	UNSW (A)		UNSW (C)		UNSW (R)		Wind (A)		Wind (C)		Wind (R)	
Metric	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1
Squared-chord	0.972	1	0.972	1	0.96	0.952	0.996	1	0.996	1	0.996	1
Hellinger	0.972	1	0.972	1	0.972	1	0.996	1	0.996	1	0.996	1
Matusita	0.951	0.952	0.972	1	0.96	0.952	0.996	1	0.996	1	0.996	1
Bhattacharyya	0.519	0.533	0.482	0.438	0.314	0.23	0.203	0.333	0.203	0.333	0.995	0.909

Table 5: Cover and F1 scores using various distance metrics in the Squared L_2 family

Squared L_2	Energy (A)		Energy (C)		Energy (R)		NSL-KDD (A)		NSL-KDD (C)		NSL-KDD (R)	
Metric	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1
Squared Chi-square	0.984	1	0.973	0.952	0.971	0.952	0.49	0.688	0.626	0.857	0.626	0.857
Divergence	0.902	0.833	0.675	0.476	0.83	0.667	0.686	0.667	0.531	0.71	0.544	0.688
Clark	0.836	0.714	0.397	0.571	0.909	0.769	0.532	0.71	0.495	0.556	0.306	0.333
Add. Sym. Chi-square	0.918	0.818	0.974	0.952	0.958	0.909	0.5	0.383	0.531	0.579	0.491	0.369
Pearson Chi-square	0.869	0.9	0.885	0.947	0.965	0.952	0.068	0.095	0.068	0.095	0.068	0.095
Max Sym. Chi-square	0.911	0.783	0.974	0.952	0.944	0.87	0.428	0.6	0.302	0.444	0.339	0.324
Neyman Chi-square	0.92	0.783	0.969	0.909	0.903	0.833	0.428	0.6	0.302	0.444	0.344	0.333
	UNSW (A)		UNSW (C)		UNSW (R)		Wind (A)		Wind (C)		Wind (R)	
Metric	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1
Squared Chi-squared	0.98	1	0.98	1	0.98	1	0.996	1	0.996	1	0.996	1
Divergence	0.883	0.947	0.883	0.947	0.883	0.947	0.996	1	0.996	1	0.996	1
Clark	0.883	0.947	0.883	0.947	0.883	0.947	0.996	1	0.996	1	0.996	1
Add. Sym. Chi-square	0.649	0.521	0.698	0.526	0.635	0.632	0.673	0.667	0.954	0.8	0.866	0.833
Pearson Chi-square	0.256	0.462	0.256	0.462	0.256	0.462	0.996	1	0.996	1	0.996	1
Max Sym. Chi-square	0.457	0.308	0.357	0.2	0.336	0.353	0.411	0.571	0.411	0.571	0.411	0.571
Neyman Chi-square	0.457	0.308	0.357	0.195	0.336	0.353	0.411	0.571	0.411	0.571	0.411	0.571

Table 6: Cover and F1 scores using various distance metrics in the Combinations family

Combinations												
	Energy (A)		Energy (C)		Energy (R)		NSL-KDD (A)		NSL-KDD (C)		NSL-KDD (R)	
Metric	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1
ACC	0.988	1	0.988	1	0.988	1	0.63	0.743	0.746	0.895	0.749	0.889
Taneja	0.369	0.5	0.435	0.471	0.383	0.5	0.068	0.095	0.068	0.095	0.068	0.095
	UNSW (A)		UNSW (C)		UNSW (R)		Wind (A)		Wind (C)		Wind (R)	
Metric	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1
ACC	0.98	1	0.98	1	0.98	1	0.98	1	0.98	1	0.98	1
Taneja	0.256	0.462	0.256	0.462	0.256	0.462	0.996	1	0.996	1	0.996	1

Table 7: Cover and F1 scores using various distance metrics in the Shannon's Entropy family

Shannon's Entropy												
	Energy (A)		Energy (C)		Energy (R)		NSL-KDD (A)		NSL-KDD (C)		NSL-KDD (R)	
Metric	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1
Topsøe	0.988	1	0.952	0.952	0.967	0.952	0.068	0.095	0.068	0.095	0.068	0.095
Jensen-Shannon	0.988	1	0.952	0.952	0.967	0.952	0.068	0.095	0.068	0.095	0.068	0.095
Jensen	0.988	1	0.952	0.952	0.967	0.952	0.068	0.095	0.068	0.095	0.068	0.095
K Divergence	0.691	0.824	0.66	0.636	0.691	0.824	0.605	0.585	0.562	0.75	0.466	0.688
Jeffreys	0.394	0.533	0.435	0.471	0.394	0.571	0.068	0.095	0.068	0.095	0.068	0.095
KL Divergence	0.691	0.824	0.69	0.737	0.691	0.824	0.068	0.095	0.068	0.095	0.068	0.095
	UNSW (A)		UNSW (C)		UNSW (R)		Wind (A)		Wind (C)		Wind (R)	
Metric	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1
Topsøe	0.256	0.462	0.256	0.462	0.256	0.462	0.996	1	0.996	1	0.996	1
Jensen-Shannon	0.256	0.462	0.256	0.462	0.256	0.462	0.996	1	0.996	1	0.996	1
Jensen	0.256	0.462	0.256	0.462	0.256	0.462	0.996	1	0.996	1	0.996	1
K Divergence	0.75	0.889	0.75	0.889	0.75	0.889	0.575	0.75	0.703	0.667	0.575	0.75
Jeffreys	0.256	0.462	0.256	0.462	0.256	0.462	0.996	1	0.996	1	0.996	1
KL Divergence	0.256	0.462	0.256	0.462	0.256	0.462	0.575	0.75	0.575	0.75	0.575	0.75

Table 8: Cover and F1 scores using various distance metrics in the Vicissitude family

Vicissitude												
	Energy (A)		Energy (C)		Energy (R)		NSL-KDD (A)		NSL-KDD (C)		NSL-KDD (R)	
Metric	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1
Vicis-Wave Hedges	0.921	0.727	0.892	0.947	0.931	0.87	0.583	0.541	0.579	0.462	0.561	0.615
Vicis Sym. Chi-square	0.73	0.389	0.614	0.56	0.585	0.316	0.573	0.455	0.551	0.316	0.508	0.449
	UNSW (A)		UNSW (C)		UNSW (R)		Wind (A)		Wind (C)		Wind (R)	
Metric	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1
Vicis-Wave Hedges	0.521	0.533	0.3	0.19	0.411	0.333	0.411	0.571	0.411	0.571	0.411	0.571
Vicis Sym. Chi-square	0.412	0.353	0.43	0.3	0.48	0.353	0.475	0.444	0.441	0.444	0.42	0.5

Table 9: Cover and F1 scores using various distance metrics not categorized by family

Uncategorized	Energy (A)		Energy (C)		Energy (R)		NSL-KDD (A)		NSL-KDD (C)		NSL-KDD (R)	
Metric	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1
Penrose Shape	0.988	1	0.988	1	0.988	1	0.49	0.688	0.59	0.8	0.601	0.824
Google	0.496	0.667	0.496	0.667	0.496	0.667	0.749	0.889	0.799	0.919	0.749	0.889
Pearson Distance	0.346	0.096	0.377	0.051	0.337	0.148	0.462	0.15	0.557	0.197	0.419	0.182
	UNSW (A)		UNSW (C)		UNSW (R)		Wind (A)		Wind (C)		Wind (R)	
Metric	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1
Penrose Shape	0.98	1	0.972	1	0.972	1	0.996	1	0.996	1	0.996	1
Google	0.98	1	0.98	1	0.98	1	0.996	1	0.996	1	0.996	1
Pearson Distance	0.303	0.286	0.202	0.125	0.355	0.267	0.398	0.182	0.494	0.286	0.513	0.222

Table 10: Cover and F1 scores using the Wasserstein Distance

	Energy (A)		Energy (C)		Energy (R)		NSL-KDD (A)		NSL-KDD (C)		NSL-KDD (R)	
Metric	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1
Wasserstein	0.526	0.308	0.633	0.353	0.583	0.317	0.503	0.458	0.612	0.512	0.758	0.467
	UNSW (A)		UNSW (C)		UNSW (R)		Wind (A)		Wind (C)		Wind (R)	
Metric	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1	Cover	F1
Wasserstein	0.516	0.37	0.586	0.36	0.507	0.37	0.253	0.092	0.339	0.102	0.267	0.129