1 ADDITIONAL EXPERIMENTS

1.1 EFFECT OF PRIVACY RADIUS ON MLDP-KDE

Table 1: MSEs of MLDP-KDE on each dataset when the privacy radius r is the maximum of the 10% percentile distance of a point to its neighbors, compared to the results in the original settings. We highlight results with increases of more than $10\times$ in the MSE in **bold**.

Dataset	r	MSE			r	MSE		
		$\varepsilon = 1$	$\varepsilon = 5$	$\varepsilon = 20$		$\varepsilon = 1$	$\varepsilon = 5$	$\varepsilon = 20$
CodRNA	0.8494	**0.0268** (12.7×)	0.00174 (2.9×)	0.0009 (3.0×)	0.01	0.0021	0.0006	0.0003
CovType	1.7803	**0.0520** (173×)	**0.00853** (42.7×)	**0.001155** (19.2×)	0.01	0.0003	0.0002	6e-05
RCV1	0.8565	**0.0131** (16.4×)	0.00131 (2.2×)	0.000759 (3.8×)	0.01	0.0008	0.0006	0.0002
Yelp	8.4035	**0.0295** (36.9×)	**0.0154** (45.3×)	**0.0101** (56.1×)	0.001	0.0008	0.00034	0.00018
SYN	11.2314	0.0082 (2.4×)	**0.00377** (14.0×)	**0.00242** (24.2×)	0.072	0.0034	0.00027	0.0001

Table 2: MSEs of MLDP-KDE on each dataset by varying the privacy radius r as the average distance from a point to its t-nearest neighbors for $t \in \{1, 10, 100, 1000, 10000\}$ (rounded up to the nearest decimals of up to three digits). For $t = \{10, 100, 1000, 10000\}$, we highlight results with over $5\times$ increases in the MSE compared to that for $t = 1$ in **bold**.

Datasets	t	r	MSE		
			$\varepsilon = 1$	$\varepsilon = 5$	$\varepsilon = 20$
CodRNA	1	0.01	0.0021	0.0006	0.0003
	10	0.055	0.0018	0.0007	0.0003
	100	0.1	0.0016	0.0009	0.0005
	1,000	0.15	0.0044	0.00095	0.0006
	10,000	0.2	0.0044	0.00142	0.0006
CovType	1	0.01	0.0003	0.0002	6e-05
	10	0.06	0.0003	0.0001	8e-05
	100	0.1	**0.0023** (7.7×)	0.0001	8e-05
	1,000	0.3	**0.0065** (21.7×)	0.0004	0.0001
	10,000	0.5	**0.0144** (48×)	0.0005	0.0001
RCV1	1	0.01	0.0008	0.0006	0.0002
	10	0.057	0.0013	0.0007	0.0002
	100	0.2	**0.0058** (7.3×)	0.0008	0.0006
	1,000	0.35	**0.006** (7.5×)	0.0008	0.0006
	10,000	0.5	**0.022** (27.5×)	0.0013	0.0007
Yelp	1	0.001	0.0008	0.00034	0.00018
	10	0.00175	0.0014	0.00038	7e-05
	100	0.0025	0.0016	0.00056	7e-05
	1,000	0.00375	0.0013	0.00041	8e-05
	10,000	0.005	0.0015	0.00073	0.0001
SYN	1	0.072	0.0034	0.00027	0.0001
	10	0.088	0.0036	0.00035	0.0001
	100	0.107	0.0037	0.0008	0.0001
	1,000	0.142	0.0036	0.0008	0.0001
	10,000	0.177	0.0037	0.0004	0.0001

1.2 EXPERIMENTS WITH REVISED PRIVACY PARAMETER AND RADIUS

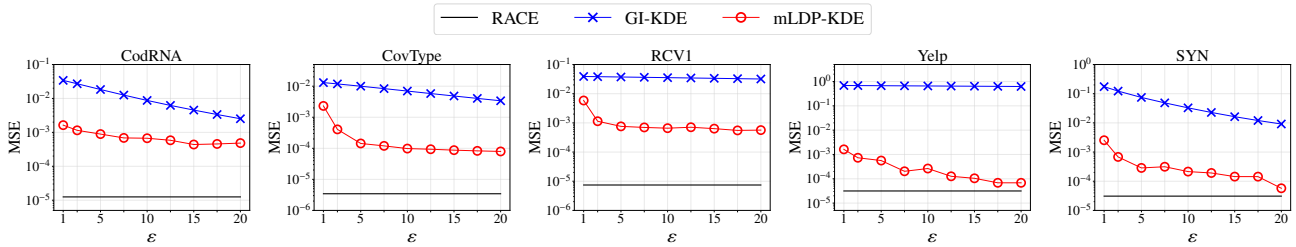

Figure 1: MSEs for KDE under mLDP with varying privacy budget $\varepsilon \in \{1, 2.5, 5, \ldots, 20\}$, where r is set to be the average distance from a point to its 100-nearest neighbors in each dataset.

1.3 ADDITIONAL VISUALIZED RESULTS

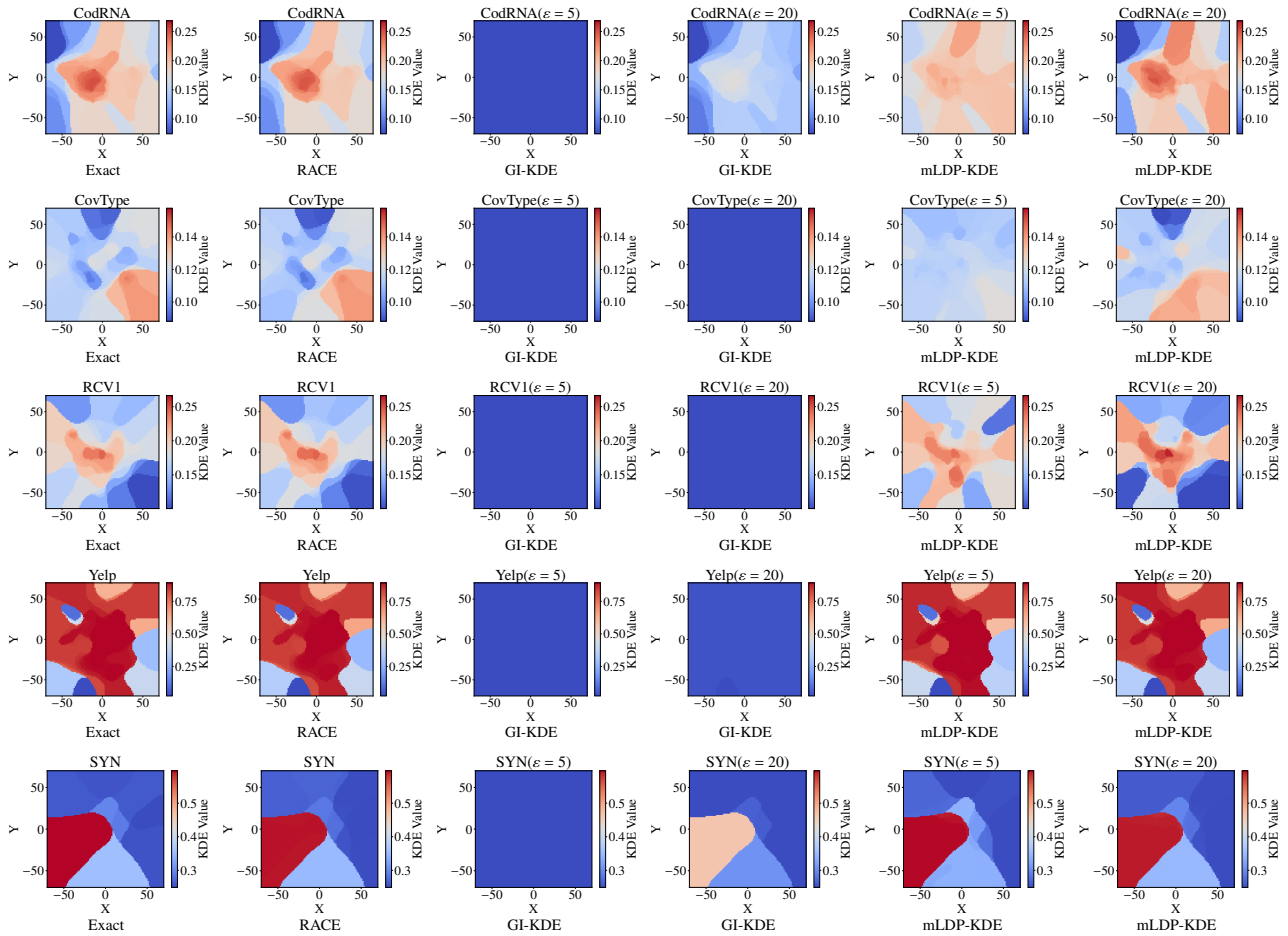

Figure 2: 2D heat maps for the KDE distributions provided by different methods on each dataset, where t-SNE is used for dimensionality reduction. For GI-KDE and MLDP-KDE, we present the results for $\varepsilon = 5$ and 20. We set r as the average distance from a point to its 100-nearest neighbors in each dataset. We observe that GI-KDE completely fails to preserve the exact KDE distributions in all cases, but MLDP-KDE generally preserves the exact KDE distributions in most cases when $\varepsilon = 5$ and always does when $\varepsilon = 20$.