## Appendix ECIR Submission #0582

## None

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## 1 Appendix: Formal Similarity Analysis

In this Appendix, we report Table 1, the complete version of the similarity table in the paper submitted. The results show the complete formal privacy analysis of the privacy provided to the queries of the collection studied. In addition, the Table reported here demonstrates the need for a more comprehensive privacy analysis of the obfuscated texts, not limiting such analysis to a formal parameters study but also towards an actual one.

	Obfuscation	Mechanism Lexical Similarity (Jaccard Similarity)											Sentence Similarity (Cosine Similarity)											
Strategy												$\varepsilon$ - $\mathbf{Pr}$	ivacy E	$\mathbf{udget}$										
			1	5	10	12.5	15	17.5	20	25	30	50		1	5	10	12.5	15	17.5	20	25	30	50	
Deep Learning '19	Sampling	CusText SanText TEM WBB	0.093 0.000 0.000 0.000	0.390 0.926 0.997 0.000	0.809 0.927 1.000 0.000	0.881 0.927 1.000 0.000	0.910 0.927 1.000 0.000	0.922 0.927 1.000 0.000	0.926 0.927 1.000 0.000	0.927 0.927 1.000 0.000	0.927 0.927 1.000 0.000	0.927 0.927 1.000 0.000	- - -	0.331 0.021 0.024 0.463	0.587 0.890 0.999 0.466	0.836 0.890 1.000 0.464	0.870 0.889 1.000 0.462	0.883 0.889 1.000 0.465	0.888 0.890 1.000 0.464	0.889 0.889 1.000 0.465	0.888 0.892 1.000 0.466	0.888 0.893 1.000 0.462	0.889 0.896 1.000 0.467	- - -
	Embedding Perturbation	CMP Mhl VickreyCMP VickreyMhl	0.000 0.000 0.000 0.000	0.002 0.002 0.002 0.002	0.104 0.054 0.046 0.026	0.279 0.141 0.100 0.060	0.503 0.281 0.140 0.098	0.700 0.459 0.157 0.126	0.813 0.611 0.163 0.145	0.901 0.804 0.169 0.164	0.921 0.885 0.173 0.172	0.927 0.927 0.192 0.193	- - -	0.021 0.022 0.021 0.023	0.031 0.029 0.029 0.026	0.200 0.115 0.123 0.075	0.420 0.242 0.214 0.132	0.639 0.409 0.297 0.208	0.782 0.589 0.361 0.273	0.848 0.722 0.406 0.324	0.882 0.842 0.466 0.407	0.888 0.876 0.496 0.460	0.890 0.891 0.553 0.538	- - - -
	SotA	AEA FEA	-	-	-	-	-	-	-	-	-	-	$0.332 \\ 0.001$	-	-	-	-	-	-	-	-	-	-	0.479 $0.172$
Deep Learning '20	Sampling	CusText SanText TEM WBB	0.094 0.000 0.000 0.000	0.384 0.939 0.998 0.000	0.823 0.942 1.000 0.000	0.900 0.942 1.000 0.000	0.929 0.942 1.000 0.000	0.939 0.942 1.000 0.000	0.941 0.942 1.000 0.000	0.942 0.942 1.000 0.000	0.942 0.942 1.000 0.000	0.942 0.942 1.000 0.000	- - -	0.356 0.024 0.025 0.419	0.623 0.936 0.999 0.418	0.887 0.938 1.000 0.419	0.926 0.938 1.000 0.419	0.937 0.938 1.000 0.417	0.942 0.939 1.000 0.422	0.942 0.938 1.000 0.421	0.943 0.938 1.000 0.421	0.943 0.937 1.000 0.418	0.943 0.937 1.000 0.421	- - -
	Embedding Perturbation	CMP Mhl VickreyCMP VickreyMhl	0.000 0.000 0.000 0.000	0.003 0.003 0.001 0.002	0.098 0.053 0.047 0.027	0.271 0.140 0.102 0.061	0.490 0.271 0.137 0.099	0.686 0.436 0.158 0.127	0.809 0.591 0.164 0.147	0.911 0.802 0.167 0.166	0.935 0.889 0.167 0.168	0.942 0.941 0.185 0.188	- - -	0.023 0.023 0.022 0.022	0.037 0.034 0.030 0.031	0.210 0.124 0.138 0.087	0.438 0.256 0.247 0.159	0.664 0.433 0.329 0.240	0.816 0.609 0.403 0.307	0.890 0.746 0.45 0.363	0.931 0.886 0.502 0.446	0.937 0.921 0.532 0.492	0.938 0.939 0.584 0.569	- - -
	SotA	AEA FEA	-	-	-	-	-	-	-	-	-	-	0.319 0.001	-	-	-	-	-	-	-	-	-	-	0.450 0.148
Robust '04	Sampling	CusText SanText TEM WBB	0.103 0.000 0.000 0.000	0.407 0.908 1.000 0.000	0.810 0.909 1.000 0.000	0.873 0.909 1.000 0.000	0.896 0.909 1.000 0.000	0.904 0.909 1.000 0.000	0.906 0.909 1.000 0.000	0.908 0.909 1.000 0.000	0.909 0.909 1.000 0.000	0.909 0.909 1.000 0.000	- - -	0.486 0.076 0.074 0.509	0.691 0.924 1.000 0.511	0.888 0.925 1.000 0.510	0.912 0.926 1.000 0.509	0.921 0.926 1.000 0.510	0.923 0.926 1.000 0.509	0.924 0.927 1.000 0.509	0.926 0.927 1.000 0.509	0.926 0.928 1.000 0.509	0.924 0.928 1.000 0.509	- - - -
	Embedding Perturbation	CMP Mhl VickreyCMP VickreyMhl	0.000 0.000 0.000 0.000	0.006 0.004 0.004 0.003	0.202 0.095 0.085 0.044	0.465 0.242 0.144 0.092	0.707 0.448 0.176 0.139	0.839 0.651 0.183 0.167	0.887 0.789 0.185 0.180	0.906 0.889 0.189 0.190	0.908 0.904 0.195 0.196	0.909 0.909 0.220 0.222	- - -	0.072 0.075 0.072 0.074	0.095 0.090 0.092 0.088	0.362 0.228 0.255 0.175	0.617 0.399 0.377 0.266	0.806 0.596 0.475 0.364	0.891 0.759 0.537 0.445	0.917 0.855 0.581 0.504	0.925 0.917 0.635 0.585	0.925 0.924 0.664 0.632	0.925 0.926 0.706 0.700	- - -
	SotA	AEA FEA	-	-	-	-	-	-	-	-	-	-	0.104 0.000	-	-	-	-	-	-	-	-	-	-	0.453 0.239