	Method	Dataset					
		ASCADv1 (fixed)	ASCADv1 (random)	DPAv4 (Zaid version)†	AES-HD†	OTiAiT†	OTP†
	Random	0.00 ± 0.03	0.0 ± 0.2	0.01 ± 0.01	0.00 ± 0.03	-0.01 ± 0.03	0.02 ± 0.03
First-order parametric methods	SNR	0.0259	−0.120	1.000	1.000	1.000	1.000
	SOSD	−0.251	0.273	0.330	0.508	0.898	0.858
	CPA	0.521	−0.0647	0.377	0.334	0.631	1.000
Neural net attribution	GradVis	0.58 ± 0.01	0.36 ± 0.05	0.46 ± 0.01	0.05 ± 0.04	0.21 ± 0.05	0.58 ± 0.02
	Saliency	0.58 ± 0.01	0.36 ± 0.05	0.510 ± 0.005	0.05 ± 0.04	0.52 ± 0.03	0.57 ± 0.03
	Input $*$ Grad	0.58 ± 0.01	0.36 ± 0.05	0.516 ± 0.004	0.05 ± 0.04	0.61 ± 0.03	059 ± 0.03
	LRP	0.58 ± 0.01	0.36 ± 0.05	0.516 ± 0.004	0.05 ± 0.04	0.61 ± 0.03	0.58 ± 0.03
	1-Occlusion	0.58 ± 0.01	0.36 ± 0.05	0.465 ± 0.008	0.05 ± 0.04	0.62 ± 0.03	0.59 ± 0.03
	5-Occlusion	0.58 ± 0.01	0.50 ± 0.07	0.48 ± 0.01	0.15 ± 0.08	0.77 ± 0.01	0.74 ± 0.03
	17-Occlusion	0.35 ± 0.02	0.45 ± 0.07	0.445 ± 0.003	0.2 ± 0.1	0.76 ± 0.01	0.702 ± 0.007
	65-Occlusion	0.22 ± 0.01	0.22 ± 0.04	0.374 ± 0.005	0.2 ± 0.1	0.71 ± 0.02	0.629 ± 0.002
	257-Occlusion	0.20 ± 0.03	0.05 ± 0.03	0.193 ± 0.003	0.3 ± 0.2	0.70 ± 0.04	0.586 ± 0.004
	2^{nd}-order 1-Occlusion	0.62 ± 0.01	0.37 ± 0.05	0.470 ± 0.008	0.05 ± 0.05	0.71 ± 0.03	0.58 ± 0.03
	OccPOI	TODO	TODO	TODO	TODO	TODO	TODO
	GradVis (ZaidNet)	0.25 ± 0.04	n/a	0.23 ± 0.01	0.14 ± 0.02	n/a	n/a
	Saliency (ZaidNet)	0.25 ± 0.04	n/a	0.23 ± 0.01	0.14 ± 0.02	n/a	n/a
	Input $*$ Grad (ZaidNet)	0.25 ± 0.04	n/a	0.22 ± 0.01	0.14 ± 0.02	n/a	n/a
	1-Occlusion (ZaidNet)	0.24 ± 0.03	n/a	0.22 ± 0.01	0.14 ± 0.02	n/a	n/a
	5-Occlusion (ZaidNet)	0.26 ± 0.03	n/a	0.32 ± 0.01	0.20 ± 0.02	n/a	n/a
	17-Occlusion (ZaidNet)	0.17 ± 0.01	n/a	0.32 ± 0.01	0.22 ± 0.02	n/a	n/a
	65-Occlusion (ZaidNet)	0.19 ± 0.02	n/a	0.27 ± 0.02	0.24 ± 0.03	n/a	n/a
	257-Occlusion (ZaidNet)	0.0 ± 0.1	n/a	0.18 ± 0.01	0.33 ± 0.02	n/a	n/a
	2^{nd}-order 1-Occlusion (ZaidNet)	0.23 ± 0.02	n/a	0.23 ± 0.01	0.14 ± 0.02	n/a	n/a
	OccPOI (ZaidNet)	TODO	n/a	TODO	TODO	n/a	n/a
	GradVis (WoutersNet)	0.20 ± 0.03	n/a	0.25 ± 0.03	0.17 ± 0.03	n/a	n/a
	Saliency (WoutersNet)	0.19 ± 0.03	n/a	0.25 ± 0.03	0.17 ± 0.03	n/a	n/a
	Input $*$ Grad (WoutersNet)	0.19 ± 0.03	n/a	0.24 ± 0.03	0.17 ± 0.03	n/a	n/a
	1-Occlusion (WoutersNet)	0.19 ± 0.03	n/a	0.24 ± 0.03	0.17 ± 0.02	n/a	n/a
	5-Occlusion (WoutersNet)	0.22 ± 0.03	n/a	0.33 ± 0.03	0.22 ± 0.05	n/a	n/a
	17-Occlusion (WoutersNet)	0.21 ± 0.02	n/a	0.34 ± 0.02	0.21 ± 0.06	n/a	n/a
	65-Occlusion (WoutersNet)	0.23 ± 0.01	n/a	0.28 ± 0.02	0.23 ± 0.02	n/a	n/a
	257-Occlusion (WoutersNet)	0.20 ± 0.04	n/a	0.17 ± 0.01	0.32 ± 0.03	n/a	n/a
	2^{nd}-order 1-Occlusion (WoutersNet)	0.23 ± 0.02	n/a	0.24 ± 0.03	0.17 ± 0.03	n/a	n/a
	OccPOI (WoutersNet)	TODO	n/a	TODO	TODO	n/a	n/a
	ALL (ours)	0.779 ± 0.006	0.76 ± 0.06	0.517 ± 0.006	0.42 ± 0.03	0.817 ± 0.006	0.922 ± 0.003

Table 1: Performance of leakage localization algorithms according to the oSNR ('omniscient' signal to noise ratio) metric (larger is better). This metric is computed by first computing 'ground truth'-like per-timestep leakiness measurements using implementation knowledge and internal random variables which the baselines do not have access to, then computing the Spearman rank correlation coefficient between the 'ground truth' leakiness measurements and those estimated by the baseline. Best result is boxed and best deep learning result is underlined. Results are reported as mean ± std. dev. over 5 random seeds. Observe that *our method outperforms all baselines by a large margin* on the ASCADv1 datasets, which are dominated by second-order leakage. On the remaining datasets, which are dominated by first-order leakage, *our method outperforms or matches all deep learning baselines*. First-order parametric methods perform well in the first-order leakage setting (e.g. here the SNR is identical to the oSNR).