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Generic Side-channel Distinguisher Based on Kolmogorov-Smirnov Test: Explicit Construction and Practical Evaluation

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Abstract: Construction and evaluation of efficient distinguishers with broad generality is one fundamental problem in the area of side-channel cryptanalysis. Due to their capabilities to deal with general correlations, MIA-like distinguishers have received wide attention from academia. In this paper, we conduct a comprehensive comparison investigation of existing MIA-like distinguishers, and then propose a new generic side-channel distinguisher based on partial Kolmogorov-Smirnov test, namely PKS distinguisher. Theoretical analysis and experimental attacks unanimously justify that PKS distinguisher works remarkably well with both linear and non-linear leakage models. Specifically, PKS distinguisher has obvious advantages over existing MIA-like distinguishers in terms of both success rate and guessing entropy. Additionally, lower computational complexity of PKS distinguisher further shows its better applicability than MIA-like distinguishers.

Category / Keywords: implementation / Side-Channel Cryptanalysis; Power Analysis Attack; Distinguisher; Distribution Similarity; Kolmogorov-Smirnov Test

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