Compression Algorithms for PUFs

Physical Unclonable Functions (PUFs) exploit manufacturing process and physical environmental variations to generate unique signatures. These signatures can be used for key generation or in challenge-response protocols. In both cases it is important to have high entropy in the PUF-response. However, since response bits of a PUF might be correlated, computation of entropy is not trivial. Therefore, compression algorithms are used to approximate the entropy in a PUF-response.

The goal of the project is to compare different compression algorithms and to apply them to different real world data sets measured from PUFs.

The thesis will include the following steps (the tasks are scheduled for a Master thesis; for other kinds of theses subtasks will be selected):

- Get familiar with currently available compression algorithms.
- Implementation of selected compression algorithms and adaption to special requirements in the PUF-context (C++).
- Definition of a test setup and test of the implemented algorithms.
- Evaluation of different real-world PUFs using the implemented algorithms.

This work can be conducted in German or English. Please contact the thesis supervisor for further details. In case of a high quality of the work, results might be published.

References:

- Ignatenko, T.; Schrijen, G.-J.; Skoric, B.; Tuyls, P.; Willems, F.;"Estimating the Secrecy Rate of Physical Uncloneable Functions with the Context-Tree Weighting Method"; ISIT 2006

Prerequisites

- Good mathematical skills (especially in stochastics)
- Good programming skills in C/C++

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