Feed-forward XOR physical unclonable functions

Feed-forward XOR physical unclonable functions for device authentication software security

IP Status: US Patent Issued (Issued Patent No: '11,374,774')

Applications

- RFID
- Device Authentication

Technology Overview

Physical unclonable functions (PUF) are small circuits implemented in integrated circuit (IC) chips that are used for authenticating devices. PUFs can be used to generate unique signatures of IC chips. Although XOR arbiter PUFs (which typically contain multiple standard arbiter PUFs as their components) are more secure than standard arbiter PUFs, arbiter PUFs suffer from two main drawbacks: vulnerability to modeling attacks and degraded reliability. Researchers at the University of Minnesota have developed a technology that deals with a specific circuit referred to as feed-forward XOR PUFs where multiple feed-forward PUFs are used and the XOR of their outputs is computed and used as the response. It has been previously shown that XOR PUFs that compute XOR of standard linear PUFs can be easily attacked. In contrast, in the proposed PUF, the component PUFs are feed-forward and highly nonlinear. This makes them more resistant to an attack. It is also shown that applying soft-response thresholding can effectively increase the reliability of the method to more than 96%.

Phase of Development

TRL:8-9
The work has been completed.

Desired Partnerships

This technology is now available for:

- License
- Sponsored research
- Co-development

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Researchers

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References

Technology ID
2020-221

Category
Software & IT/Algorithms
Software & IT/Artificial Intelligence
Software & IT/Communications & Networking
Software & IT/Cyber Security

Learn more

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