Photonic Physically Unclonable Function for True Random Number Generation and Biometric ID for Hardware Security Applications

Tech ID: 33832 / UC Case 2024-583-0

ABSTRACT

Researchers at the University of California, Davis have developed a technology that introduces a novel approach to hardware security using photonic physically unclonable functions for true random number generation and biometric ID.

FULL DESCRIPTION

The technology utilizes the variability in optical performance to generate unclonable and unpredictable random bit arrays. These arrays pass rigorous randomness tests and can be converted into true random numbers or used as unique hardware IDs to prevent intellectual property (IP) cloning and enhance security.

APPLICATIONS

- Secure hardware identification for cloud-based storage systems.
- Protection of confidential databases against unauthorized access and cloning.
- System IP protection for fab-less telecommunication companies.
- Enhancement of cybersecurity measures in industries vulnerable to hardware IP breaches.
- Application in biometric identification systems for improved hardware security.

FEATURES/BENEFITS

- Enhanced security against advanced cybercrime and hardware IP breaches.
- Unbreachable hardware ID generation to protect against data leaks and IP cloning.
- Utilizes optical performance variability, offering a novel approach beyond conventional electrical performance-based true random number generation methods.
- Generates true random numbers and unique IDs that pass NIST statistical randomness tests.
- Provides a solution to the vulnerability of hardware security in the face of advanced computational capabilities, including quantum computing.
- Addresses the issue of hardware security breaches and IP cloning in global storage servers and cloud-based storage systems.
- Overcomes the limitations of previous electrical signal variability driven PUF generation methods that are susceptible to breaches with advanced scanning technologies.

PATENT STATUS

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OTHER INFORMATION

KEYWORDS

photonic PUF, 3D nanostructures, embedded optics, semiconductor, light based biometric security sensor

CATEGORIZED AS

- **Computer**
  - Hardware
  - Other
  - Security
  - Software
- **Optics and Photonics**
  - All Optics and Photonics
- **Engineering**

Patent Pending

- Engineering
- Other
- **Nanotechnology**
- Electronics
- Materials
- Other
- Tools and Devices
- **Security and Defense**
- Cyber security
- Other

RELATED CASES

2024-583-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Photonic Physically Unclonable Function for the Quantum Era

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