In-Sensor Hardware-Software Co-Design Methodology of the Hall Effect Sensors to Prevent and Contain the EMI Spoofing Attacks

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BRIEF DESCRIPTION

Researchers at UCI have developed a novel co-design methodology of hardware-software architecture used for protecting Hall sensors found in autonomous vehicles, smart grids, industrial plants, etc…, against spoofing attacks.There are currently no comprehensive measures in place to protecting Hall sensors.

SUGGESTED USES

·Detecting the presence of external electromagnetic interference (EMI) spoofing reliably

·Separating the external spoofing EMI from the original signal safely

FEATURES/BENEFITS

·This technology can render the Hall sensor more robust, and prevent a systemic failure, known as Denial of Service (DoS)

·It can be applied to all types of hall sensors including active and passive sensors

·Compared to state-of-the-art technology, it is cheaper and low-power and does not interfere with real-time system constraints

TECHNOLOGY DESCRIPTION

Analog-RF electronics are utilized in a number of industries, including solar grids, autonomous vehicles, industrial plants, robotics, smart grids, etc... The signals emitted from these analog-RF electronic devices are susceptible to Electromagnetic Interference (EMI) and spoofing attack that could penetrate and hold hostage the electronics.

Researchers at UCI developed a way to detect EMI spoofing attacks against hall sensors and isolate the attack inside the sensors.This approach prevents any spoofing attack from spreading to the rest of the analog-RF system.The UCI technology uses a hardware-software co-design to prevent and contain EMI attacks.

STATE OF DEVELOPMENT

Preliminary studies and simulations have been conducted to determine the optimal number of Hall elements in place for reliable and effective detection of EMI spoofing attacks.

PATENT STATUS

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INVENTORS

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OTHER INFORMATION

CATEGORIZED AS

» **Computer**
  » Hardware
  » Security
  » Software
» **Security and Defense**
  » Cyber security

RELATED CASES

2020-650-0

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,614,502	03/28/2023	2020-650

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Polarization mode dispersion-based physical layer key generation for optical fiber link security
- Tracking Diet And Nutrition with a Wearable Bio-Iot

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