Docket #: S19-032

Coupling Insensitive compact reader for fully-passive sensors

Stanford researchers have developed a compact, low-cost complete sensor solution (sensor plus reader) which can interpret fully-passive sensors through a simple handheld external reader. The readout mechanism can take measurements independent of the readout distance (i.e. coupling insensitive) without adding complexity to the reader or sensor, unlike conventional fully-passive sensing systems up to a few centimeters (mainly determined by the dimensions of the reader/sensor coils).

The reader can use simple measurement techniques which eliminates the need for bulky and expensive external equipment for analysis and passive sensor circuits which reduces complexity, cost, and power consumption. Additionally, this system operates in a manner that avoids the needs and limitations of optimizing frequency and distance/orientation for efficient power and/or data transfer. Its broad applications include healthcare monitoring, food safety, smart sensing technology and wearable electronics.
"Downloadable Presentation: Capacitive sensing measurement"

Related Technologies
Compatible with sensor systems disclosed in Stanford dockets S17-441 and S19-292
Stanford Docket S17-441"BodyNET: Sensor System for wearable electronics"
Stanford Docket S19-292 "Stretchable multi-sensor tag for wearable electronics"

Stage of Development

- Proof-of-concept

Applications

- **Bedside and point-of-care health monitoring and sensing. Examples include:**

    - Blood pressure and heartbeat (using capacitive sensors)
    - Sweat and temperature (using resistive sensors)
    - Embedded in mattresses to analyze body movements for sleep studies
- **Food safety** where sensors can be designed to contain information about how well the product is handled or stored in transportation
- **Smart sensing applications,** such as internet-of-things (IoT), device-to-device connectivity, smart home applications, and smart retail

Advantages

- **Insensitive to coupling** of resonance circuitry (i.e. the distance between the sensor the readout coil)
- **Complete sensor solution** (sensor plus reader)
- **Compact** - eliminates the need for bulky and expensive external equipment for analysis
- **Wireless and energy-efficient**
- Low cost and easy-to-use
- Sensors can be made of stretchable electronics enabling wearable technology
- Much simpler and economical replacement for short-range radar technology

Patents

- Published Application: 20200257946
- Issued: 11,048,990 (USA)

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