

A Multimodal Distributed Sensing Device

Tech ID: 34252 / UC Case 2025-457-0

ABSTRACT

Researchers at the University of California, Davis have developed tactile feedback systems that enhance spatial and sensory resolution in sensor arrays through unique signal modulation techniques.

FULL DESCRIPTION

The technology introduces systems, methods, and media for implementing sensor arrays that mimic the high spatial and sensory resolution of human skin. By utilizing unique modulations for each sensor signal, it allows for dense arrays on a single communication medium, overcoming the scalability and complexity challenges of conventional sensor networks.

APPLICATIONS

- ▶ Robotic systems, particularly for tactile sensing in robotic limbs and end-effectors.
- ▶ Healthcare devices, including therapeutic devices and patient monitoring systems for pressure distribution and ulcer prevention.
- ▶ Industrial automation, for monitoring contact forces and surface interactions.
- ▶ Wearable technology, for sensing physical parameters such as pressure and temperature.
- ▶ Prosthetic devices, enhancing functionality through high-resolution tactile feedback.

FEATURES/BENEFITS

- ▶ Achieves high spatial resolution with dense sensor arrays, accommodating up to 100 sensors per square centimeter.
- ▶ Reduces system complexity and cost by eliminating the need for individual wiring and data acquisition channels for each sensor.
- ▶ Implements flexibility on various mediums, including fabrics and both flexible and rigid PCBs.
- ▶ Integrates multiple types of sensors, such as pressure, temperature, and vibration sensors, within the same array.
- ▶ Enables real-time responsiveness through efficient modulation techniques, allowing simultaneous transmission of multiple sensor signals.
- ▶ Addresses scalability issues of traditional sensor networks with high-density sensor requirements.
- ▶ Overcomes limitations in achieving high spatial resolution over large areas with existing sensor technologies.
- ▶ Solves challenges in integrating diverse sensor types within a single array efficiently.

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OTHER INFORMATION

KEYWORDS

data transmission,
flexible materials,
healthcare, high-
resolution, industrial
automation, prosthetics,
robotics, sensor arrays,
tactile feedback,
wearable technology

CATEGORIZED AS

- ▶ **Sensors & Instrumentation**
 - ▶ Biosensors
 - ▶ Environmental Sensors
 - ▶ Medical
 - ▶ Other

PATENT STATUS

Patent Pending

- Physical Measurement
- **Engineering**
- Robotics and Automation

RELATED CASES

2025-457-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- [A High Degree of Freedom, Lightweight, Multi-Finger Robotic End-Effector](#)

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