TECHNOLOGY

All-Elastomer 3-Axis Tactile Sensing Skin

OVERVIEW

Background:
With recent advances in robotic manipulators, tactile sensing has had an increasing emphasis on compliant designs to accommodate curved surfaces such as robotic fingers. Remarkable progress has been made in the design and fabrication of flexible tactile sensors including multi-axis sensing, high sensor area density, and integration of elastomers with microfabrication. One of the remaining challenges related to flexible tactile sensing is maintaining high dynamic range (DR) force sensing in both the shear and normal directions, where DR is defined as force range divided by force resolution.

Innovation:
Researchers at the University of Maryland have developed an All-Elastomer 3-Axis Tactile Sensing Skin.This MEMS tactile skin utilizes electrode geometries of varying heights to sense both shear and normal forces without the need of an out-of-plane bump. The tactile skin was fabricated using a simple and rapid molding process while maintaining high sensor area density, with sensors spaced every 3 millimeter. A high dynamic shear and normal force range was achieved of 40:1 and 42:1, respectively, which is the highest reported of elastomeric 3-axis sensors thus far.

APPLICATIONS

Robotic fingertip tactile sensing
Sensory skin for prosthetic-human interface
Bionic glove human finger actuation sensing

ADVANTAGES

Simple Fabrication
High Dynamic Range
Multi-axis sensing

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Additional Information

INSTITUTION

University of Maryland, College Park

PATENT STATUS

Pending

LICENSE STATUS

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CATEGORIES

- Robotics
- Sensors/Monitors
- Robotics

EXTERNAL RESOURCES

- US Patent 9,868,217
- US Patent 10,293,490

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