Highly Stretchable Electronic Tactile Sensors

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Technology description

A stretchable electronic tactile sensor that can be stretched over 50% in at least two axial directions. Researchers at the University of California, Santa Barbara, have created a stretchable electronic tactile sensor that can be stretched over 50% in at least two axial directions. This technology can be tailored to match application-specific requirements, and to achieve sensitivity, dynamic range, and other performance measures that are not possible with alternative methods. It can be used to image mechanical properties of touched objects such as, for example, tissue palpated during medical examination, in order to aid in diagnosis. In the case of tissue palpation, the sensing method is used to detect and image subcutaneous anomalies in tissue.

Background

Tangible sensors that have been developed thus far use inflexible substrates that cannot be transformed into alternate forms. Even devices that can be modified to bend or stretch, such as those that use flexible electronic substrates, can still damage tactile sensing. Researchers from numerous fields including robotics, biomedical engineering, and materials engineering, have tried several strategies for producing flexible sensing arrays. However, current designs still lack stretchability resulting in sensors that cannot accurately transduce distributed finite-strain information, such as the information produced during palpation. Additionally, these devices cannot transmit the distributed finite-strain information to the skin of a wearer, and cannot conform to the skin of a wearer without imposing undesirable deformation.

Application area

May be placed over an irregularly shaped object, such as a medical glove or a robotic device, for the purpose of capturing tactile signals such as pressure or shear force distributions
Clinical palpation including improved diagnoses

Advantages

Can be tailored to match application-specific requirements

Sufficiently elastic to conform to irregularly shaped objects

Institution

University of California, Santa Barbara

Inventors

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