

Tactile Sensors and Fiber Optic Sensors



Overview

This review provides an in-depth analysis of the principles, classifications, fabrication techniques, and data processing methodologies associated with fiber optic tactile sensors. Materials science & engineering English Tactile sensors with high softness and multiplexing are highly desirable for applications in humanoid robotics and smart prosthetics. Current tactile sensors face bottlenecks in multi-channel dynamic sensing based on miniaturized and economical signal demodulation devices especially for manipulator. Fabry-Perot interferometer; Fiber Bragg grating; Fiber optic sensors; Machine learning; Tactile sensing; Fabry-Perot; Fiber Bragg; Fiber-optics; Fibre-optic sensor; In-fiber; Machine-learning; Mechanical stimulus; Tactile sensation; Tactile sensors; Electronic, Optical and Magnetic Materials;.

Abstract—Human skin can accurately sense the self-decoupled normal and shear forces when in contact with objects of different sizes. Although there exist many soft and conformable tactile sensors on robotic applications able to decouple the normal force and shear forces, the impact of the size of. Multi-channel optical sensor enables distributed pressure sensing, which could enable smarter interfaces and devices
Caption: Researchers have developed a thin optical touch sensor that can simultaneously detect the strength and location of pressure with high sensitivity and stability.

Article Content

Advancements in fiber optic tactile sensors: A comprehensive review

The field of tactile sensation, which involves the perception of mechanical stimuli through pressure on the skin, has advanced notably with the integration of fiber optic tactile sensors. These sensors

A low-cost, human-like, high-resolution, tactile sensor

This article proposes a novel and patented optic-based tactile sensor design, in which fiber optic cables are used to increase the number of sensory

Polymer-Based Self-Calibrated Optical Fiber Tactile Sensor

In this paper, we have demonstrated a novel polymer-based optical fiber tactile sensor that can measure the contact object size and the decouple normal and shear forces calibrated by the object size, with

Recent progress of optical tactile sensors: A review

In this section, we discussed the recent progress in hydrogel fiber-based tactile sensors and the application of autonomous self-healing optical fibers. For hydrogel fiber-based tactile

Fibertouch: A novel fiber-optic tactile sensor with deep learning ...

Although various tactile sensing systems have been proposed for robotic applications, existing solutions of electromagnetic-based, vision-based, and traditional fiber Bragg gratings (FBG)

Theoretical Research of Tactile Shape Sensor for Complex Surfaces

Tactile shape sensor is a crucial research focus in the field of soft robotics, and many researchers have developed intelligent tactile shape sensors. However, current research on tactile shape sensors

Advancements in fiber optic tactile sensors: A ...

The fabrication of optical fiber-based tactile sensors often involves embedding the fiber in a flexible material. This process requires careful selection of the flexible material, considering factors

Development of Hetero-Core Fiber Optic Tip Tactile Sensors for an ...

This report describes a compact tactile sensor based on hetero-core fiber optics for imparting tactile perception to an artificial fingertip. The proposed tactile sensor is as small as an

Advancements in fiber optic tactile sensors: A comprehensive review

Semantic Scholar extracted view of "Advancements in fiber optic tactile sensors: A comprehensive review on principles, fabrication, and applications" by Xiangxi Zhu et al.

A tactile gripper on an optical fiber for perception and actuation

Here, the authors present a tactile gripper integrated with an optical fiber system that enables simultaneous perception and actuation.

Sensing principle of the fiber-optic tactile sensor

In the literature no tactile sensor element can be found which has proven its functionality in deep-sea before. In we show that using a fiber-optic tactile

Integration of Fiber-Optic Sensor Arrays into a Multi-Modal Tactile ...

The use of a multi-modal tactile sensory system is motivated, which combines static and dynamic force sensor arrays together with an absolute force measurement system. This publication

ORBi UMONS: Advancements in fiber optic tactile sensors: A ...

This review provides an in-depth analysis of the principles, classifications, fabrication techniques, and data processing methodologies associated with fiber optic tactile sensors.

Review Advancements in fiber optic tactile sensors: A comprehensive ...

Highlights • Fiber optic tactile sensors enhance mechanical stimuli perception through skin pressure. • Advantages include EMI immunity, high-temperature robustness, and compact form. •

Fiber Optic Sensors in Tactile Sensing: A Review

Fiber optic tactile sensors are considered a possible solution to the problem. Related research has attracted increasing attention in recent years.

Frontiers | Integrable elastic fiber-optic tactile sensors for ...

In this work, we designed an integrable elastic fiber-optic tactile (IEFT) sensor using the principle of the photoelastic effect of the polarization maintaining fiber (PMF) capable of detecting the

Tactile sensors: A review

Compared to optical fiber sensors, capacitive, resistive, and piezoresistive tactile sensors are more accessible to make nowadays and are still flexible enough to accommodate large areas

Flexible optical smart skin with high-density tactile sensing nodes ...

We introduce a novel optical smart skin that features a dense array of tactile sensing nodes (up to 100 per cm²) using a single strand of single mode optical fiber sandwiched between a

ORBi UMONS: Advancements in fiber optic tactile sensors: A ...

Recent technological advancements have significantly expanded their applications in areas such as robotics, medical diagnostics, and human-machine interfaces. This review provides an in-depth

Review Advancements in fiber optic tactile sensors: A comprehensive ...

Recent advancements in fiber-optic sensing technology have significantly propelled the development of optical tactile sensors, injecting new vitality into the field of tactile sensing.

Development of a tactile sensor based on optical fiber specklegram ...

The development of a tactile sensor based on optical fiber specklegram analysis is reported. The device is comprised of 9 microbending transducers con

A Self-Powered Optical Fiber Tactile Sensor with Crosstalk-Free

This work presents a skin-like optical fiber tactile sensor integrating self-powered mechanoluminescent materials. It achieves crosstalk-free, high-fidelity spatial encoding via a dense

Flexible optical touch sensor simultaneously pinpoints

Although other research groups have demonstrated thin, flexible tactile sensors by embedding commercial glass optical fibers into polymer

Flexible Optical Fiber Sensing: Materials,

Flexible optical fiber sensors offer superior advantages over conventional flexible electronic sensors, including high sensitivity, rapid response time, high

Fiber Optic Sensors in Tactile Sensing: A Review

This article reviews the progress of research on fiber optic tactile sensing technology in recent years, including those based on fiber Bragg gratings, micro-/nanofibers (MNFs), fiber specklegram patterns,

Fiber Optic Sensors in Tactile Sensing: A Review

Tactile is an important source of information for people to explore the external environment. In the past few decades, researchers have paid special attention to tactile sensors and have made good

Tactile recognition technology based on Multi-channel fiber optical ...

In order to achieve efficient and high-accuracy tactile sensing recognition of objects in complex industrial environments, this paper builds a multi-channel fiber optic tactile sensing system

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