

Fiber Bragg Grating Three-Dimensional Force Sensor



Overview

The sensor incorporates a specially designed layered elastic structure, achieving miniaturization, structural self-decoupling, and high-sensitivity 3-D force measurement through a cleverly compact spatial design and a reasoned layout of 5 FBGs. To reduce the risk of soft tissue being damaged and to enhance the intelligent control strategy of the puncture robot, this paper designs a three-dimensional force sensor based on fiber Bragg gratings. 7 million patients globally (). A common treatment of AFib is through ablation and scarring of cardiac tissue with the aim of impeding occurrences of irregular contraction waves (). Introduction Puncture surgery has the advantages of minimal trauma, quick recovery and rapid surgical procedure. It has become the first choice for current clinical treatments and has an extremely wide range of applications [1,2].



Article Content

A Novel Fiber Bragg Grating Three-Dimensional Force Sensor for

Abstract: This article introduces a novel Fiber Bragg Grating (FBG) 3-D force sensor designed for the end-effectors of medical robots.

Design of 3D force perception system surgical robots based on Fiber ...

The customized design and integration of force perception functions on different robots have become one of the research hotspots of surgical robotics-worldwide recently. A force perception sensor for

A High-Precision Miniature 3-D Tactile Force Sensor Based on Fiber ...

Accurate measurement of contact forces between medical instrument tips and tissues is a critical challenge in minimally invasive surgery (MIS), where the lack of tactile feedback can compromise

Three-Dimensional Force Sensor Based on Fiber Bragg Grating for

Moreover, the force transfer to the base introduces various disturbing forces and the measurement accuracy is low. To reduce the risk of soft tissue being damaged and to enhance the

A Novel Fiber Bragg Grating Three-Dimensional Force Sensor for

A reliable and high-performance end-effector force-sensing solution for the field of medical robotics that excels in force detection during medical palpation and acupuncture procedures,

A Novel Fiber Bragg Grating Three-Dimensional Force Sensor for

A Novel Fiber Bragg Grating Three-Dimensional Force Sensor for Medical Robotics
Qiaokang Liang, Senior Member, IEEE, Songtao Ouyang, Jianyong Long, Member, IEEE, Li Zhou, and Dan Zhang,

Development of Force Sensor System Based on Tri

Fiber Bragg grating (FBG) sensors have an advantage over optical sensors in that they are lightweight, easy to terminate, and have a high flexibility

Design of a Modular 3-D Force Sensor With Fiber Bragg Gratings for ...

This paper presents a fiber Bragg grating (FBG)-based six-dimensional (6-D) force/torque (F/T) sensor that can be mounted on robot joints for the detection of comprehensive force/torque

A Novel 3-D Force Perception Structure Based on Fiber Bragg Grating

This article designed a novel 3D force perception system based on the Fiber Bragg Grating Sensor (FBG). It contains four fibers and one of them set at the center of sensor. The

A Three-Dimensional Fiber Bragg Grating Force Sensor for Robot

This paper presents a three-dimensional (3-D) force sensor based on fiber Bragg grating (FBG) for robot plantar force measuring. A classical Maltese-cross beam with multiplexed FBGs has

Research of three-dimensional force sensor based on multiplexed fiber ...

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Fiber Bragg Grating Force Sensors for Minimally Invasive Surgery:

Fiber Bragg grating (FBG) sensors are attractive for MIS instruments because they are compact, multiplexable, and intrinsically immune to electromagnetic interference, enabling distal force

Three-dimensional catheter tip force sensing using multi

Accurate and high resolution force sensing is therefore indispensable in such critical situations. Accordingly, this work presents the development of a

Three-dimensional displacement sensor based on fiber Bragg

Abstract The acquisition of three-dimensional (3D) movement information of cracks is essential for structural health monitoring. This paper proposes an FBG-based 3D displacement

Design of a Modular 3-D Force Sensor With Fiber Bragg Gratings for ...

An instrument usually is installed at the distal end of a continuum surgical robot to perform specific tasks. The driving wire of the instrument needs to pass through the central channel of the continuum robot.

(PDF) Three-Dimensional Force Sensor Based on Fiber

To reduce the risk of soft tissue being damaged and to enhance the intelligent control strategy of the puncture robot, this paper designs a three

High-Precision FBG 3-D Force Sensor Based on Spatial Hierarchical ...

A 3-D force sensor based on fiber Bragg grating (FBG) is proposed in this article. A spatially layered elastomer structure is designed, and a single-mode fiber inscribed with four FBGs is laid at each

A 3D-printed sensing element based on fiber Bragg grating technology ...

Abstract This study introduced a 3D-printed sensing element based on fiber Bragg grating (FBG) technology to measure grasping forces when integrated into surgical forceps during minimally

A Novel Fiber Bragg Grating Three-Dimensional Force Sensor for

AB - This article introduces a novel Fiber Bragg Grating (FBG) 3-D force sensor designed for the end-effectors of medical robots. The sensor incorporates a specially designed layered elastic structure,

Three-Dimensional Force Sensor Based on Fiber Bragg Grating for

To reduce the risk of soft tissue being damaged and to enhance the intelligent control strategy of the puncture robot, this paper designs a three-dimensional force sensor based on fiber Bragg ...

A three-axis force fingertip sensor based on fiber Bragg grating

Abstract Fiber Bragg grating (FBG) based force sensing technology receives much attention from various research communities in robotics. In this paper, we investigate a three-axis

Research of three-dimensional force sensor based on multiplexed fiber ...

Conventional fiber Bragg grating (FBG) sensors cannot fully meet the requirements of a modern safety monitoring system in practical application. Therefore, the research of a three

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