Needle Tip Fiber Optic Sensor

Overview

A fibre-optic, Fabry-Pérot interferometer hydrophone is integrated into an intraoperative needle and used to localise the needle tip within a handheld ultrasound field. Ultrasound is an essential tool for guidance of many minimally-invasive surgical and interventional procedures, where accurate placement of the interventional device is critical to avoid adverse events. Needle insertion procedures for anaesthesia, fetal medicine and tumour biopsy are commonly. Needle insertion procedures for anaesthesia, fetal medicine and tumour biopsy are commonly ultrasound-guided, and misplacement of the needle may lead to complications such as nerve damage, organ injury or pregnancy loss. Clear visibility of the needle tip is therefore critical, but visibility is. We built a three-channel single core needle and a seven-channel multicore fiber (MCF) needle and discuss the pros and cons of both constructions for shape sensing experiments into constant curvature jigs. The overall needle tip error is 1.

Article Content

Phantom study of a fiber optic force sensor design for biopsy needles ...

In this work, an FPI based fiber optic force sensor design and its integration to an 18-gauge MRI compatible biopsy needle are presented. The custom designed FPI sensor provides a force

Intraoperative Needle Tip Tracking with an Integrated Fibre-Optic ...

The article intraoperative needle tip tracking with an integrated fiber-optic ultrasound sensor deals with advancing a marker system to highlight the needle tip during surgery. This work

Intraoperative Needle Tip Tracking with an Integrated

A fibre-optic, Fabry-Pérot interferometer hydrophone is integrated into an intraoperative needle and used to localise the needle tip within a handheld

A force sensor based on FPI for flexible needle force sensing

In order to measure the force at the tip of a puncture needle and to identify different levels of soft tissue in the puncture path, an FPI force sensor was made from a single-mode optical fibre

Ultrasonic Needle Tracking with a Fibre-Optic Ultrasound Transmitter ...

The results demonstrate that ultrasonic needle tracking with a fibre-optic transmitter is feasible in a clinically realistic fetal surgery environment, and that it could be useful to guide minimally invasive

Real-Time Ultrasonic Tracking of an Intraoperative

Abstract We have developed a real-time ultrasound needle tracking system based on a fibre-optic hydrophone integrated into an intraoperative needle.

Medical needle tip tracking based on Optical Imaging and AI

Specifically, our approach revolves around the creation of scattering imaging using an optical fiber-equipped needle, and uses Convolutional Neural Network (CNN) based algorithms to

Medical needle tip tracking based on Optical Imaging and AI

2. Sensor-Based Approaches: Integration of Optical and ElectroMagnetic Sensors Apart from methods relying on images, sensor-driven strategies have gained traction and exhibited strong

Design and analysis of a fiber-optic sensing system for shape ...

The system is based on four optical fibers glued along the needle at 90 degrees from each other to measure distributed strain along the needle from four different sides.

Optical Fiber-Based Needle Shape Sensing in Real Tissue: Single

In this paper, we directly compare single-core fiber-based and multicore fiber-based needle shape-sensing through identically constructed, four-active area sensorized bevel-tip needles inserted into

Phantom study of a fiber optic force sensor design for biopsy needles ...

Fiber optic force sensors can be used under MRI without causing any danger or any disruption on the MR image. Applied axial force measurement during needle guidance can be performed by Fabry

The Design of Optical Sensing Needles for Tactile Sensing ...

Optical sensors are a promising choice as they are immune to MR influence. This paper proposes optical sensing solutions for needle-tip applications of needle-tip tactile sensing and bio

Three-Dimensional Ultrasonic Needle Tip Tracking with

Here, a method to track the needle tip during ultrasound image-guided procedures is presented. This method involves the use of a fiber-optic ultrasound receiver that

Three-Dimensional Ultrasonic Needle Tip Tracking with

This method involves the use of a fiber-optic ultrasound receiver that is affixed within the cannula of a medical needle to communicate ultrasonically

Medical needle tip tracking based on Optical Imaging and AI

Machine learning algorithms have been widely explored for detecting the needle tip from fluoroscopic or ultra-sound images. Sensor-Based Approaches: Integration of Optical and ElectroMagnetic Sensors

Real-Time Ultrasonic Tracking of an Intraoperative Needle Tip with ...

We have developed a real-time ultrasound needle tracking system based on a fibre-optic hydrophone integrated into an intraoperative needle. The system is intended to track the location of a needle tip

Ultrasonic Needle Tracking with Dynamic Electronic Focusing

In this system, needle tip tracking was enabled with a fibre-optic ultrasound sensor that was integrated into a needle stylet, and the A-lines recorded by the sensor were processed to

Optical Fiber –Based Needle Shape Sensing: Three-channel Single

In this work, we compare two different types of FBG sensors under identical conditions and application, namely, acting as the sensor for needle insertion shape reconstruction.

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Hier sollte eine Beschreibung angezeigt werden, diese Seite lässt dies jedoch nicht zu.

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