New method of detecting endoscope position

A method of accurately determining the exact position of the end of the fibre of an endoscope during a procedure, by optically imaging through the body. This gives precise knowledge of the location of observed tissue abnormalities, and the ability to effectively sample multiple regions of an organ.

Features

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<th>Benefits</th>
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<td>Fast and accurate determination of position</td>
<td>Real time, reliable monitoring during procedures</td>
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<td>Uses light from the end of the fibre to determine position</td>
<td>Precise position of tip known, even when beyond the fibre guide, or where a guide is not in use</td>
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<td>Imaging of the fibre tip or also along the length is possible through thick/complex tissue structures</td>
<td>Suitable for use in most endoscopic applications</td>
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The Challenge

Detection of operational position during endoscopy is not currently a standard feature; however, it has been shown to provide advantages during endoscope insertion. A current method uses electromagnetic coils on the endoscope guide, but this cannot give the position of the fibre itself, which often extends beyond the guide. In some cases, a guide is not used, and therefore positioning is done ‘by feel’ or by looking at the camera image.

Technology

Our novel solution allows the fibre tip or cladding to be directly imaged through, and deep within the body. By adopting a time-resolved imaging method, the arrival of photons emitted from the fibre and travelling directly to the detector are distinguished from those experiencing significant scattering by surrounding tissue. Isolation of the direct photons is accomplished using a pulsed laser source and an array of sensitive single photon detectors. The image of the tip or cladding is then used to accurately determine precise location.

The technology can be fitted to any endoscopy system in any medical application where a suitable light source is incorporated into the endoscope and the bespoke imaging system positioned externally. The imaging system is projected to be low cost and compact in comparison with existing technologies.

Exemplification Data

Proof of concept experiments have been conducted in controlled model environments including sheep lungs, and the data demonstrates the utility of the method.

Applications

- Medical Devices - fibre optic based endoscopes, microendoscopy.

IP Status

A priority patent application (Ref: 1611819.2) was filed in July 2016

Development Status

Animal model data

Commercial Offering

Research collaboration

Licensing Contact

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