

A Real-Time Tracking Method for MRI Procedures

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Technology description

This tracking method is based on a magnetic signature to obtain the position of the object being tracked in a conventional magnetic resonance imaging (MRI) system. A single projection is performed for each of the 3 axes to obtain a 3D location of the magnetic signature.

Description

The invention is a tracking method and device developed within the constraints imposed by the use of untethered microdevices in medical interventions which follow pre-planned paths inside blood vessels. In such a case, since a passive tracking is preferable for simplicity and miniaturization purposes, a new approach was developed to improve their spatial and temporal resolution. This approach leads to a more robust and effective system because the technology (called MR-Tracking) is time-multiplexed and operated in conjunction with the generation of propulsion gradients. The tracking method uses the linear gradient as a spatial variation of the magnetic field which is directly proportional to the position. The presence of an object whose magnetic properties differ from those of the human body generates disturbances in the homogeneous magnetic field and the gradients. Using the same MRI system for both tracking and propelling microdevices (cf. Magnetic Resonance Submarine for Minimally Invasive Medical Procedures) avoids additional communication and synchronization latencies between two separate systems. This facilitates the implementation of an overall application with tight real-time constraints.

Additional

The method is coupled with another technology called MR Sub (cf. Magnetic Resonance Submarine for Minimally Invasive Medical Procedures) developed by the team. This set of technologies uses a MRI for propelling, controlling and tracking the position of a microrobot in blood vessels in real-time. These technologies have been developed in collaboration with researchers from the Centre Hospitalier de l'Université de Montréal. For more information on research activities from this team, please visit Univalor's portfolio of technologies include other MRI related technology such as a Quantified MRI Method.

Application area

The technology proposed can be used as a stand alone procedure for real-time tracking of medical devices for instance. The applications range from endovascular operations based on miniature untethered devices to passive tracking method with other tools such as catheters or guidewires.

Institution

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