Detection of Organ Deformation for Augmented Reality Application

The development of medical robots and manipulators is one of the research areas of the chair. A manipulator system for automated real-time imaging with ergonomic visualization of relevant information in an augmented reality environment is currently being developed.

In order to facilitate the surgeon's work, information from ultrasound images is to be projected onto the organ surface and displayed in a laparoscopic image in an augmented reality environment. For this purpose, the organ surface has to be recognized. Since the organ moves during the operation, the organ surface is tracked. Since human organs are not rigid bodies, the deformation of the organ during the operation also has to be taken into account.

In the context of this work, the deformation of the organ surface has to be considered based on preliminary work for the recognition and the tracking of the organ surface. The suitability of different analytical and numerical methods shall be evaluated. The implementation in C/C++ and Matlab is required. Finally, the results are to be integrated into the existing software and experiments are to be carried out to prove the functionality and suitability of the program.

Prerequisites for the work are:
- Good knowledge and passion for image processing
- Independent operation
- Very good knowledge of C/C++
- Good knowledge of MATLAB and Java

Start of work: From now on

Proposals for accompanying courses: Automatisierungstechnik in der Medizin (Automation Technology in Medicine), Messtechnik und medizinische Assistenzsysteme (Measurement Technology and Medical Assistance Systems)

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