

“ARION” project German Cancer Research Center Heidelberg

TASK

The BMBF - "ARION" project investigates possibilities of computer-aided navigation in liver surgery. Especially in surgery of the soft organs, at present there exist no such navigation systems that take into account the flexible state of these organs. The aim of navigation systems is to provide intraoperative support based upon pre-operative surgical operation planning.

The medical necessity for liver surgery arises from the very low 5-year survival rate of patients suffering from a liver tumor, with liver surgery being the only option to improve the situation essentially.

Project focus:

- Improved precision and orientation for the surgeon during resections
- Reduced rate of complications and recurrence
- Wider range of indications for curative liver resections
- Implementation of results from virtual operation planning

SOLUTION

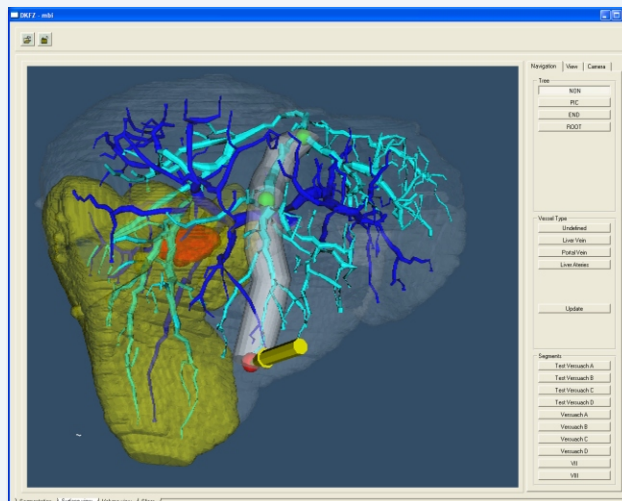
One vital component of the visually-aided surgery navigation system is the interface to the surgeon. By using visualisation techniques from the field of virtual reality, an improved understanding of the total scenario can be reached.

To this end, the surgical instrument is shown in three-dimensional relation to the anatomy of the patient. Stereoscopic visualisation is especially suitable for this as it can provide the surgeon with an adequate impression of depth. Stereoscopy is achieved by means of a quasiholographic visualisation technique on an autostereoscopic display.

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“ARION” project:

Computer-aided navigation in liver surgery makes it possible for the surgeon to see his instrument in spatial relationship to tumor and blood vessels on the screen. This helps him to remove the tumor safely damaging as less blood vessels as possible.

RESULT

By using the autostereoscopic display from SeeReal Technologies, the “ARION” project provides the surgeon with an extremely real and three-dimensionally adequate image without needing any extra equipment that would only hinder the surgeon, a clear advantage of this particular system.

The stereoscopic realtime visualisation of the display offers increased safety and precision during operation by delivering true spatial relations without any delay.

The 3D display controlled by an infrared-based tracking system ensures high mobility for the surgeon, even under strongly varying lighting conditions in the operating room.