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SARA

Surgical Augmented Reality Assistance

SMART HEALTH

Computer-assisted surgery (CAS) is becoming an essential tool for surgical planning and guidance as well as training for procedures. The SARA project will investigate the use of augmented reality to overlay a 3D rendering of medical images and planning information onto the patient's anatomy during neurosurgery and orthopedic surgery to enhance the CAS experience.

Reducing cognitive pressure on surgeons

CAS solutions provide anatomical references to surgeons as well as planning information such as cutting lines and resection boundaries and may automatically update based on the positions of tools or pointers. However, surgeons must look away from the patient to a nearby display and mentally align the visualized 2D structures with what they see on the table. Augmented reality overcomes this issue by projecting information directly onto the surgeon's field of vision.

Based on available technologies

The SARA consortium is composed of members with expertise in medical imaging and 3D modeling, augmented reality, surgical technology and training models and integrated operating rooms. They will use the Microsoft Hololens to explore the use of AR in surgical training, planning and execution.

Prioritizing the needs of the surgical team

SARA will develop the following tools and components:

1. A pipeline that enables the accurate separation of anatomical structures in neurosurgery and orthopedic surgery;
2. Voice or gesture-controllable high-quality rendering apps for wall-mounted displays and head-mounted devices for training, planning, visualization and surgical navigation;
3. A protocol for the evaluation of the AR experience and user needs of the surgical team.

Clinically-validated demonstrators

The SARA project will result in several demonstrators for the use of AR apps in multiple surgical contexts. Detailed requirements lists, control recommendations and accuracy and reliability analyses will be produced as well. In addition, the feasibility of AR in surgery will be evaluated in view of future applications, as will surgeons' views and attitudes on the use of AR in the operating room.

> *"The SARA project will investigate the use of augmented reality to overlay a 3D rendering of medical images and planning information onto the patient's anatomy during surgery. The aim is to enhance the computer-assisted surgery experience and reduce the cognitive pressure on surgeons."*

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Project information

Industry

- Cronos Groep
- eSaturnus
- Materialise
- Orsi Academy

Research

- imec - ETRO - MIT - VUB
- imec - SMIT - VUB
- VUB - BEFY - ORTHO
- VUB - C4N - Neur

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