Sensorized Surgery

Optically guided precision surgery through real-time AI-interpreted multimodal imaging with continuous sensory feedback

Acronym: **Sens**Ξ

Project Sponsor: Carl-Zeiss-Stiftung

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Project Partners:

Project Description:

In minimally invasive surgery, surgeons decide on tumor boundaries and tumor resection based on white light image-based examination of the tumor and their experience. In up to 30 % of cases, this approach leads to an incomplete tumor resection and thus a decreased chance of survival for patients. Through interdisciplinary cooperation, a complex sensorized surgery is to be developed that uses multimodal marker-free imaging and intraoperative measurement of mechanical properties, combined with real-time analysis based on artificial intelligence (AI). This approach aims at continuous recording of the current tumor boundaries and to present those to the surgeon in such a way that it may be used directly for decision-making. The combination of technologies could mean a breakthrough in more precise personalized surgery with better chances of survival and maximum protection of healthy tissue.

The focus of the Biomechatronics Group is both the intraoperative measurement of mechanical properties of the tumor and its environment and their upscaled haptic (tactile) representation in "soft" real time. Immersion with information from biophotonic analysis is a joint field of work with the partners.