TUHH
Hamburg University of Technology

MTEC
Medical Technology | Intelligent Systems

HiWi

Title: Augmented Reality Assistance for Anatomy Visualization during Needle Insertions

Background: A common intervention in anesthesia is the insertion of needles to deliver the narcotic directly to the nerve and avoid general anesthesia. For image guidance physicians often use an ultrasound (US) transducer in one hand while placing the needle with the other hand. However, this practice requires a large amount of experience from the medical expert because targets often lie close to arteries or other structures which should not be damaged and correctly positioning the transducer is challenging.

Tasks: The goal of this project is to assist the physician by placing the anatomy of the target and critical structures as virtual objects in the field of view by using a Hololens 2. For that purpose the game engine Unity should be used to display virtual 3D objects at the correct position.

Specific tasks may include:

- Basic implementation of visualization of 3D objects with the Hololens 2
- Estimation of the Hololens pose relative to the probe
- Evaluation of the Hololens' position tracking accuracy
- Correct visualization of 3D objects at their respective position relative to the US transducer
- Visualization of feasible needle insertion paths
- Contribution in research papers

Requirements: Good programming skills (in C#, Java, or C++), ability to work independently, ideally experience in Unity

References: TBD

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