MOBILE ON-PATIENT VISUALIZATION DEVICE OF MEDICAL IMAGES

HINTERGRUND

Visualization of patients’ anatomical data is mainly done on a monitor of a radiological workstation after subsequently manipulation of static 3D images acquired with computed tomography (CT) or magnetic resonance imaging (MRI) scanners. Although image-guided surgery profits from today’s powerful image acquisition and processing techniques, visualization and interaction with preoperatively acquired images is still challenging and rather non-intuitive. This is because the provided displays require the physician to mentally transfer the 3D virtual image to the patient. This not only requires considerable skill and experience, but is also prone to failures, which might have very serious consequences for the patient under therapy.

LÖSUNG

We developed a new concept for on-patient visualization of anatomical data acquired with an arbitrary modality (typically CT or MRI). The method is based on a mobile device consisting of a flat display and a Time-of-Flight (ToF) camera (Fig. 1) which can be moved along the patient to provide a view on internal anatomical structures via augmented reality. For this purpose, the pose of the mobile device, which represents the viewing direction of the user, is continuously estimated by registering (i.e., aligning) the ToF data acquired during the visualization process with the patient surface extracted from the 3D medical data set. During camera pose estimation, a custom-designed algorithm accounts for the camera specific localization errors. In the current implementation, four different visualization modes are available as shown in Figure 2.