

Three-dimensional Autostereoscopic Display for Neurosurgery Application

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Abstract

Three-dimensional (3D) imaging technology has recently been successfully used in Neurosurgery. These new experiments with several types of brain surgeries performed in 3D show promising results in improving the training of clinicians in new techniques. In the surgical theater, the image data is captured by two separate imagers attached to the microscope, corresponding to a left view and a right view. These images are then displayed on a 3D television. Recent experiments performed in the operating theater use glasses in sync with the view of the left and right microscope image outputs to show apparent 3D to the clinicians. A well-known concern with 3D technology is eye-strain and fatigue of the viewer over hours of viewing. We report initial results of 3D research for the surgery application using an autostereoscopic (no-glasses) display, which reduces 3D fatigue. The left-right view of the surgical task was captured, processed, and is shown successfully on an autostereoscopic display. Initial subjective evaluation by the surgeon indicates that the images are substantially similar to viewing through the microscope directly. Our next steps will be to provide real-time autostereoscopic (no-glasses) viewing in the operating theater for evaluation and assessment. The 3D display with surgical highlights will be shown in the poster session.