Implementation and evaluation of an interactive volume visualization system on a lightfield display

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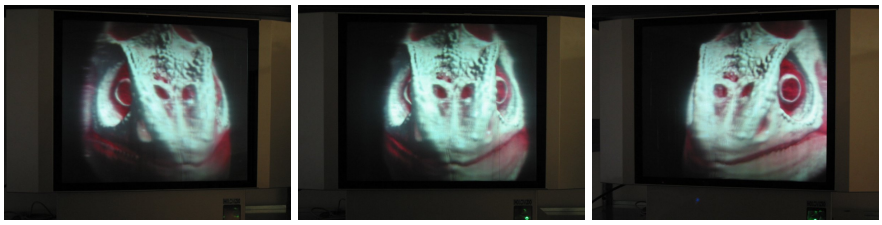

Fig. 1. Real-time interaction with the light field display. Real-time inspection of a large volumetric model containing a CT dataset of a biological specimen. Pictures are taken with an hand-held camera at different viewing angles, in order to highlight the horizontal parallax of the light field display.

Summary

Multiscopic visualization is an emerging display technology that aims to reproduce three dimensional scenes by generating observer independent light fields. Here, we will report on a volume visualization system that can drive a display of this class to fully support direct, interactive, 3D volume rendering of high resolution, 16 bits, very large medical datasets (1024^3 voxel and more). As a matter of example, figure 1 shows the inspection of a large volumetric model containing a CT dataset ($1024 \times 1024 \times 1080$ with 16 bits/sample) of a biological specimen [3]. Moreover, we report on the preliminary results of a series of evaluation tests aimed to investigate the depth discrimination capability of the system. The perceptual evaluation indicates that this class of volume visualization system provides correct stereo cues, layout discrimination and it is clearly superior to two dimensional displays for path tracing tasks such as the understanding of vascular structures.

[3] Source: Digital Morphology Project, the CTLab and the Texas Advanced Computing Center, University of Texas, Austin