

Video-based 3D wire-frame scanning and stereoscopic re-rendering

Adam Gleitman, Andrew Shum, Tim Balbekov

3D object scanning using video cameras has many possible industrial and human-computer interaction applications. The technology is central to the functionality of three-dimensional television, virtual reality, and video conferencing systems. For our project, we focus on photographing wire-frame models and generating 3D imagery from the pictures taken. We use two cameras positioned a few inches apart to mimic a pair of human eyes, and the pictures are combined and filtered to generate an anaglyph image that is viewable with red and cyan 3D glasses. The second stage of the project converts simple polyhedra to wire-frame models on the FPGA by finding color-coded vertices and edges. The 3D data is rendered on the screen using 3D rendering hardware implemented on the FPGA.