Research theme   3D visualisation
Research title   Prototyping of a Lightfield Display
Researcher   Frank van Steeden
Research period   From March 2011 to July 2012
Company   University of Twente
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Background

The computer plays a very important role in the field of design engineering. Although most Computer-Aided design (CAD) software works with 3D models, they are still depicted in 2D. Creating a display that allows engineers to see their design in true 3D while working on it would be a major step forward. It will give the engineers a better understanding of their design and simulations can help identifying problem areas sooner in the process.

Assignment

The goal of this project is the design of a 3D display. This display should give the viewer depth perception without the need of special glasses. The viewer should be allowed to move freely in a predetermined area, resulting in motion parallax. The display must be provided with 3D content. Therefore, a connection between SolidWorks and the screen is desired. A proof of principle is the goal for this project.

Results

A prototype was build by placing two Liquid Crystal Displays (LCDs) in front of each other. This prototype is capable of direction selective light emission. Two different approaches are used to create the 3D content. Parallax based methods resulted in good depth perception with a small area where motion parallax is experienced by the viewer. Content adaptive methods achieved good theoretical results but the same quality was not achieved on the prototype.
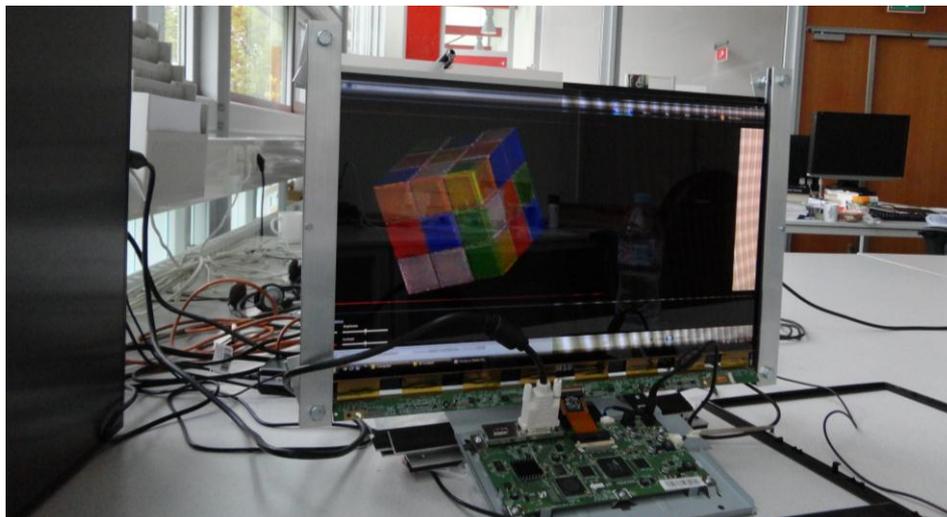
Personal experience

This master thesis contained a good combination of creating theory and building a prototype. Literature research also proved to be very interesting, especially because 3D televisions are a hot item on the market nowadays. It was very nice to built a prototype to test the theoretical results which also helps you understanding that building a prototype is never without problems.