Reducing View Transition Artifacts in Automultiscopic Displays
Technology #16850

Applications

This technology improves visual quality in multi-view autostereoscopic (automultiscopic) displays. These displays provide an immersive, glasses-free 3D viewing experience and are widely regarded to be the future of television and cinema.

Problem Addressed

Automultiscopic displays enable glasses-free 3D viewing by providing both binocular and motion parallax effects. Within the display’s field of view, different images are observed depending on the viewing direction. When moving outside the field of view, the observed images may repeat, inducing visual artifacts in the form of discontinuities, depth reversals, and binocular disparities. These artifacts degrade visual quality and restrict the usage of automultiscopic screens in home applications and large scale visualizations. The Inventors have developed a method to improve automulticopic visual quality by modifying the presented image to be more continuous, reducing transition artifacts in the display.

Technology

The images observed on an automultiscopic screen correspond to a cut through the light field created by the screen. Unlike in real world, the light fields produced by automultiscopic screens have a repetitive structure. When the viewing position is not optimal this induces image quality-degrading visual artifacts. To avoid transitions artifacts, the light field produced by an automultiscopic display must be continuous. This method employs techniques in seamless image and video editing to cut and stitch together different copies of the light field images into one natural, continuous composition.

Local and global shearing techniques are applied to refine the light field by aligning the structure of its repetitive fragments. These fragments are then overlapped to find an optimal cut, upon which they are stitched together using Poisson reconstruction techniques. This method produces reconstructed, continuous light fields with reduced disparities and transition artifacts, therefore exhibiting improved visual quality. In contrast to previous hardware solutions, this optimization does not require knowledge about viewer’s position, which makes the technique suitable for an arbitrary number of observers.

Advantages

- Method does not require hardware modifications
- Technique can be applied without knowledge about viewer’s position
- Applicable for both static images and videos using parallax barriers and lenticular sheets
Intellectual Property

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Categories For This Invention:
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Imaging (Computer Sciences & Information Technology)
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Publications:
Improving Visual Quality of View Transitions in Automultiscopic Displays
ACM Transactions on Graphics
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Joint View Expansion and Filtering for Automultiscopic 3D Displays
ACM Transactions on Graphics
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External Links:
Computer Sciences and Artificial Intelligence Laboratory
http://people.csail.mit.edu/fredo/
Computational Fabrication Group
http://cfg.mit.edu/

Image Gallery: