Array Directed Light-field (ADL) Display for Autostereoscopic Viewing
Technology #14370

Applications

This invention relates to 3D displays and more particularly to a display for autostereoscopic viewing. This is used to direct light to produce multithreaded, autostereoscopic, true 3D images and can also be used to capture 3D video or images. The display technology can produce true 3D images that show horizontal and vertical perspective without the need for special glasses and that are unique to each viewing location.

Problem Addressed

Stereoscopic displays utilize glasses that must be worn to generate the stereoscopic image and the image viewpoint is unalterable. Autostereoscopic displays produce 3D images without specialized glasses but they are not without limitations. Parallax based autostereoscopic display technologies require the viewer to be seated at a particular location in order to produce the stereoscopic effect which limits the number and orientation of viewers. Lenticular lens based autostereoscopic displays suffer from reduced resolution. Present autostereoscopic display technologies are able only to produce horizontal parallax for multiple viewers, not vertical parallax. Vertical parallax can be accomplished only for a single viewer using eye tracking. The image is altered to produce the vertical parallax for the single viewer based on a known eye location. The result is a distorted image for all other viewers.

Technology

The array directed light-field (ADL) display technology includes an array of elements from which light emanates, the elements being rotatable about two orthogonal axes by microcontrollers. An eye tracker is provided for determining the location in three dimensions of at least one eye viewing the array. The microcontrollers, using information from the eye tracker, rotate the elements to mimic a concave surface to deliver light to the eye. It is preferred that the elements are mirrors and the display further includes a projector for projecting an image on the array for reflecting to the eye. The elements themselves may include means for generating light rather than reflecting light.

Advantages

- Produces true 3D images without the need for special glasses
- Produces less
- Has a higher bandwidth
- Reduces visual motion blur due to smaller absolute motion
- The use of specular (reflective) mirrors simplifies the fabrication of the display
- Only a single projector : reduces cost and complexity of the electrical/optical components in the system
- sound during operation
Reduce hazards associated with operation
Requires only a thin planar operating volume rather than a large cylindrical volume

Categories For This Invention:
- Photonics
- Displays

Intellectual Property:
Array directed light-field display for autostereoscopic viewing
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