CO-WIRING METHOD FOR PRIMITIVE SPATIAL MODULATION

Tech ID: 33057 / UC Case 2023-091-0

PATENT STATUS

Patent Pending

BRIEF DESCRIPTION

Dynamic patterning of light is used in a variety of applications in imaging and projection. This is often done by spatial light modulation, in which a coherent beam of input light is modified at the pixel level to create arbitrary output patterns via later interference. Traditional approaches to spatial light modulation suffer from a high operating burden, especially as the number of pixels increases, and incomplete coverage of the optical surface. This results in high device complexity, and cost, as well as enormous real-time computation requirements, reduced optical performance, and optical artifacts.

To address these problems, researchers at UC Berkeley have developed a method for wiring groups of pixels, such as annular rings, parallel strips, or radial strips. This takes advantage of the fact that most spatial light modulation tasks can be accomplished by combining a number of simple “primitive phase profiles”, in which not all pixels need be independent of each other. In this co-wiring method, individual optical elements remain at the pixel level, but are wired together in a way that they move in precisely the coordinated manner to produce one of these primitive phase profiles. This allows for high frame rates, high coverage of the optical plane, and a degree of sensitivity impossible to produce with large, geometric optical elements that exist in prior art.

SUGGESTED USES

This invention can be used for any system which requires spatial light modulation, or “optical sculpting” that relies only on combinations of primitive phase profiles. Potential applications include holography, augmented or virtual reality, adaptive optical systems in astronomy, biological microscopy, optical trapping of microscopic objects, ophthalmoscopy, and material processing.

ADVANTAGES

This co-wiring scheme allows SLM devices to have high frame rate and optical quality with near-complete coverage of the optical plane, comparatively low operating burden and real-time computation costs, and favorable drive and transduction behavior which improves optical performance while eliminating optical artifacts which plague most prior art.

RELATED MATERIALS

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- Computation Method For 3D Point-Cloud Holography

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OTHER INFORMATION

KEYWORDS

Optical sculpting, holography, Virtual reality, Adaptive optics, ophthalmoscopy, microscopy, augmented reality

CATEGORIZED AS

» **Optics and Photonics**
» All Optics and Photonics
» **Imaging**
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RELATED CASES

2023-091-0

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