

EYEGLASSES-FREE DISPLAY TOWARDS CORRECTING VISUAL ABERRATIONS WITH COMPUTATIONAL LIGHT FIELD DISPLAYS

Tech ID: 24350 / UC Case 2015-027-0

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	10,529,059	01/07/2020	2015-027

BRIEF DESCRIPTION

Almost 170 million people in the United States (~55% of the total U.S. population) wear vision correction. Of this population, more than 63 million people (53%) up to age 64 have presbyopic vision. Eyeglasses have been the primary tool to correct such aberrations since the 13th century. In more modern times, contact lenses and refractive surgery have become viable alternatives to wearing eyeglasses. Unfortunately, these approaches require the observer to either use eyewear or undergo surgery, which is often uncomfortable and costly, and can lead to complications, in the case of surgery. To address these challenges, researchers at the University of California, Berkeley, and MIT have developed vision correcting screen technology which involves digitally modifying the content of a display so that the display can be seen in sharp focus by the user without requiring the use of eyeglasses or contact lenses. By leveraging specialized optics in concert with proprietary prefiltering algorithms, the display architecture achieves significantly higher resolution and contrast than prior approaches to vision-correcting image display. The teams have successfully demonstrated light field displays at low cost backed by efficient 4D prefiltering algorithms, producing desirable vision-corrected imagery even for higher-order aberrations that are difficult to be corrected with conventional approaches like eyeglasses.

SUGGESTED USES

- » Tablets, desktops, laptops
- » Televisions
- » Smartphones
- » E-readers
- » Other consumer displays

ADVANTAGES

- » Higher resolution and contrast than prior approaches
- » Leverages off-the-shelf and low-cost parts
- » Accounts for range of viewing distances
- » Implementations with parallax barriers are brighter
- » Implementations with lenslet-based devices have thinner form factors

RELATED MATERIALS

- » [Eyeglasses-free Display: Towards Correcting Visual Aberrations with Computational Light Field Displays](#)

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OTHER INFORMATION

KEYWORDS

eyeglasses, software, algorithms, vision-correcting, aberrations, computational prefiltering, glasses, contact lenses, liquid-crystal display, glasses-free, image simulation, optics, screen, light field display, computer graphics, picture generation, image generation, display algorithms, display, light fields, computational ophthalmology

CATEGORIZED AS

- » **Optics and Photonics**
 - » All Optics and Photonics
- » **Computer**
 - » Software
- » **Imaging**
 - » Medical
 - » Software
- » **Medical**
 - » Devices
 - » Disease: Ophthalmology and Optometry



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