AR/VR Headset with a novel lens and display combination

Background

Technical field

Embodiments of the invention relate to AR/VR Headsets

Description of the related art.

AR/VR Headsets in prior art consist of bulky and cumbersome wearables which impede normal vision when worn.

Summary of embodiments of the invention

A unique AR/VR Headset with a combination of variable focus and variable intensity pinhole lenses, variable focus liquid lenses, and reflectors.

One embodiment of the invention relates to methods and systems of making ultra-thin, ultra-lightweight, and non obstructive headsets for AR/VR applications.

Various arrangements may be envisaged to achieve an immersive experience using the novel headset which consists of variable focus and variable intensity pinhole lenses, variable focus liquid lenses and reflectors.

The pinhole lens is a lens which has round holes in an opaque sheet of material. The variable focus and variable intensity pinhole lens is operated by making selected areas transparent while the rest of the area is made to be black or opaque. By changing the diameter of the transparent areas and the pitch between them the variable focus and the variable intensity functions are achieved. The variable pinhole lens is made by using a screen or a filter having areas of pixels which can be discreetly turned on and off to create transparent or translucent areas and opaque areas by controlling the power applied to each pixel thereby creating a pinhole array lens depending on the pattern in which power is applied to different areas in the screen or filter. The screen or the filter having areas of pixels which can be discreetly turned on or off can be a LCD, TFT, LED based or similar hardware but not limited to these.

A fresnel lens is a lens which has a collection of concentric rings. The variable focus fresnel lens has transparent and opaque rings which can be operated selectively. The variable focus

and variable intensity fresnel lens is operated by making selected areas transparent while the rest of the area is made to be black or opaque. By changing the diameter of the transparent areas and the pitch between them the variable focus and the variable intensity functions are achieved. The variable fresnel lens is made by using a screen or a filter having areas of pixels which can be discreetly turned on and off to create transparent or translucent areas and opaque areas by controlling the power applied to each pixel thereby creating a fresnel lens depending on the pattern in which power is applied to different areas in the screen. The screen or the filter having areas of pixels which can be discreetly turned on or off can be a LCD, TFT, LED based or similar hardware but not limited to these.

The pinhole lens is made fully transparent when AR/VR is not in use. Thereby not interfering with the normal vision through the headset.

The variable focus liquid lens is deactivated to have zero degree when AR/VR is not in use. Thereby not interfering with the normal vision through the headset.

An LCD which is transparent when not powered is used as a display on the headset where two of these displays are used per headset, where one of these displays is used on the headset for each eye. When the LCD is activated the image is shown on the LCD display where the lens system incorporated with the headset focuses the image onto the user's eye.

In another embodiment, a transparent sheet of glass or plastic is placed at an angle to the display which is placed in such a way that the image displayed on the LCD image display screen is reflected back to the eye by the transparent glass or plastic sheet through the lens system.

Display is not limited to LCD but can be used with any display technology.

Brief description of the drawings.

Fig (1) illustrates the pinhole lens consisting of switchable transparent and opaque areas.

Fig (2) illustrates the fresnel lens consisting of transparent and opaque rings.

Fig (3) illustrates the arrangement of the AR/VR headset.

Fig (4) illustrates the arrangement of another embodiment of the AR/VR headset, using a transparent sheet of glass or plastic placed at an angle to the image display screen.

Fig (5) illustrates the cross sectional view of the AR/VR headset.

Detailed description of illustrative embodiments

In the following description, numerous specific details are set forth in order to provide a thorough understanding of various illustrative embodiments of the invention. It will be understood, however, to one skilled in the art, that embodiments of the present invention may be practised without some or all of these specific details. In other instances, well known process operations have not been described in detail in order not to unnecessarily obscure pertinent aspects of embodiments being described.

In one embodiment, a variable focus and variable intensity pinhole lens is realised by integrating transparent areas (101) and opaque areas (102) as illustrated in Fig 1. The variable focus and variable intensity pinhole lens is in the form of a sheet (502) as illustrated in Fig. 5. This variable focus and variable intensity lens (302) is of similar size to the variable focus liquid lens (301).

The transparent areas in the variable focus and variable intensity pinhole lens (101) are able to be adjusted in diameter alongside varying the pitch between them represented by the opaque areas (102) as illustrated in Fig. 1. The diameter can be contracted electrically, mechanically, electrochemically, opto-chemically, thermal chemically or other suitable methods.

In one embodiment, a fresnel lens is realised by integrating rings of transparent areas (202) and opaque areas (203) as illustrated in Fig. 2.

In one embodiment, the variable focus liquid lens (301), variable focus and variable intensity pinhole lens (302) and the transparent image display screen where an AR/VR image is formed (303) are arranged chronologically one before the other as illustrated in Fig. 3.

In one embodiment a transparent sheet (403) is integrated on the LCD image display screen (404) at an angle so as to reflect the image displayed on the LCD image display screen (404) back to the eye by the transparent glass or plastic sheet through the lens system (403) as illustrated in Fig. 4.

Claims

1. One embodiment of the invention relates to methods and systems of making ultra-thin, ultra-lightweight and non obstructive headsets for AR/VR applications.

2. Various arrangements may be envisaged to achieve an immersive experience using the novel headset which consists of variable focus and variable intensity pinhole lenses, variable focus liquid lenses and reflectors.

3. The pinhole lens is a lens which has round holes in an opaque sheet of material. The variable focus and variable intensity pinhole lens is operated by making selected areas transparent while the rest of the area is made to be black or opaque. By changing the diameter of the transparent areas and the pitch between them the variable focus and the variable intensity functions are achieved. The variable pinhole lens is made by using a screen or a filter having areas of pixels which can be discreetly turned on and off to create transparent or translucent areas and opaque areas by controlling the power applied to each pixel thereby creating a pinhole array lens depending on the pattern in which power is applied to different areas in the screen or filter. The screen or the filter having areas of pixels which can be discreetly turned on or off can be a LCD, TFT, LED based or similar hardware but not limited to these.

4. A fresnel lens is a lens which has a collection of concentric rings. The variable focus fresnel lens has transparent and opaque rings which can be operated selectively. The variable focus and variable intensity fresnel lens is operated by making selected areas transparent while the rest of the area is made to be black or opaque. By changing the diameter of the transparent areas and the pitch between them the variable focus and the variable intensity functions are achieved. The variable fresnel lens is made by using a screen or a filter having areas of pixels which can be discreetly turned on and off to create transparent or translucent areas and opaque areas by controlling the power applied to each pixel thereby creating a fresnel lens depending on the pattern in which power is applied to different areas in the screen. The screen or the filter having areas of pixels which can be discreetly turned on or off can be a LCD, TFT, LED based or similar hardware but not limited to these.

5. The pinhole lens is made fully transparent when AR/VR is not in use. Thereby not interfering with the normal vision through the headset.

6. The variable focus liquid lens is deactivated to have zero degree when AR/VR is not in use. Thereby not interfering with the normal vision through the headset.

7. An LCD which is transparent when not powered is used as a display on the headset where two of these displays are used per headset, where one of these displays is used on the headset for each eye. When the LCD is activated the image is shown on the LCD display where the lens system incorporated with the headset focuses the image onto the user's eye.

8. In another embodiment, a transparent sheet of glass or plastic is placed at an angle to the display which is placed in such a way that the image displayed on the LCD is reflected back to the eye by the transparent glass or plastic sheet through the lens system.

9. Display is not limited to LCD but can be used with any display technology.