Weareable viewer for augmented reality

INVENTORS: Ferrari Vincenzo
Calabro' Emanuele Maria

PATENT STATUS: GRANTED

PRIORITY NUMBER: 102016000055855

GRANT DATE: 31/01/2019

Invention

This invention concerns the field of augmented reality. In particular, the invention concerns **a wearable headset to create augmented reality using the "see-through" technique**.

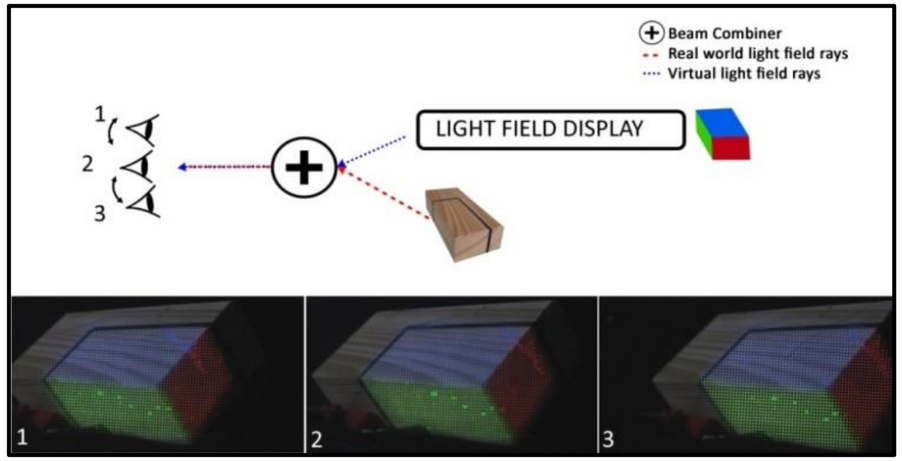
This technique requires the user to see the scenario he faces, directly with his eyes, at most through transparent or semi-transparent means. The "see-through" technique currently available allows you to show the virtual information added to the real scene by viewing it in the form of a two-dimensional image on transparent or semi-transparent media placed in front of the eye (as in the case of google glass) or possibly projected directly into the retina. The purpose of this invention is to provide an augmented reality system that allows the superposition of a virtual field of light of a 3d content to the field of real light of a surrounding environment. However, it is very complex to superimpose on reality a virtual three-dimensional image that is consistent with the position of the user's eye with respect to the surrounding environment and with the focus of the user's eyes.

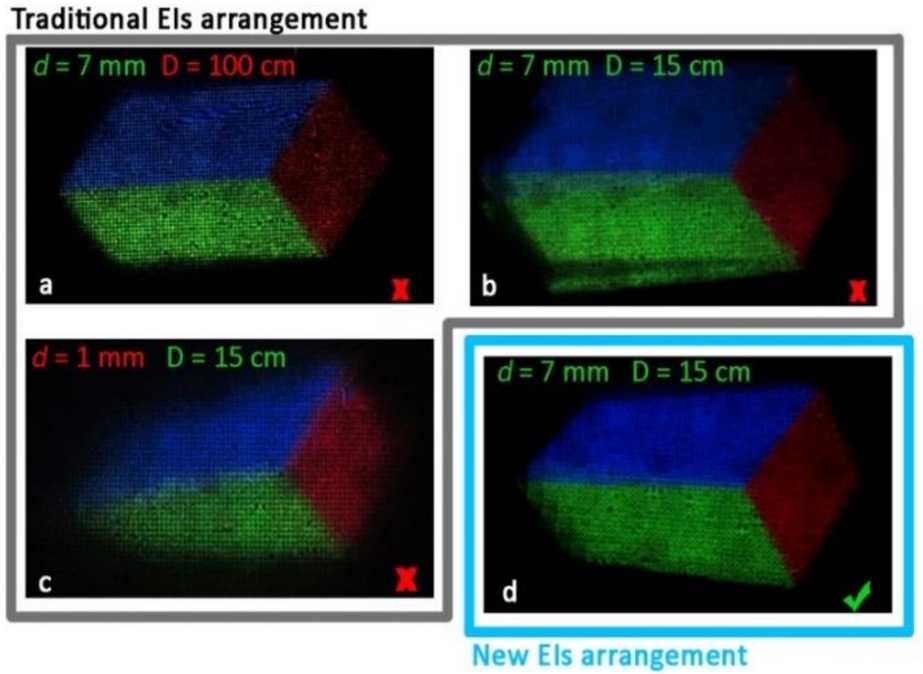
The common Optical See-Through displays paradigm entails intrinsic perceptual conflicts owing to mismatched accommodation between real 3D world and virtual 2D images projected over semi-transparent surfaces. Such paradigm is suitable for augmenting the reality with simple virtual elements (models, icons or text), but various shortcomings remain in case of complex virtual contents which must be spatially linked with reality accurately. The major shortcoming is due to the calibration methods (eye/display) required to achieve geometric consistency between virtual and real information.

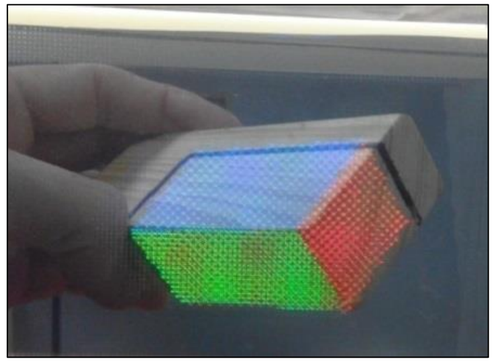
The solution designed allows you to inherently have a **perfect real/virtual alignment without the need for any calibration**. The solution also optimizes the **quality of the image projected on the display**, especially in the case of wearable systems.

The invention avoids the error of parallax eye/display with Optical See-through display and high-definition rendering for light field display.

Drawings & pictures







Industrial applications

The invention concerns the field of **augmented reality** and describes a new paradigm for the realization of displays OST (Optical See-Through displays) with the generation, through integral imaging techniques, of virtual contents as fields of light (light field display) in order to overcome the typical limitations of the traditional approach. This patent describes the hardware components and an innovative rendering strategy for «elemental images».

The visor can be used in the **surgical field** to guide the surgeon with extreme accuracy for example in the field oF **NEUROSURGERY, MAXILLOFACIAL SURGERY, OTORHINOLARYNGOLOGY**.

The use of technology extends to various industrial sectors, for example it can also be used by workers in the **manufacturing sector**. Augmented reality can drastically reduce the learning curve of operators in the execution of complex assembly sequences and in improving the overall activity of the process. However, at the moment there are no technical solutions that allow the use of viewers to drive manual tasks with high precision.

Possible developments

The objective of the research in which the present and other patents were originated was to develop a new surgical navigator that uses a newly developed visor that can provide the surgeon with the vision of the operating theatre, specific information concerning the patient and more general information concerning the organs involved in the intervention.

This data synthesis will be permanently available in the surgeon’s field of view, while today some information is present in the operating room and therefore require a double level of attention.

The invention is in a **cluster of patents** about **Augmented Reality viewers** and their subsequent implementations, new testing to increase the TRL of technology are currently underway.

For more information:

Tech Transfer Office of University of Pisa

Headquarters: Lungarno Pacinotti 43/44, Pisa (PI) 56126

Web site: www.unipi.it/index.php/trasferimento

E-mail: valorizzazionericerca@unipi.it

For more information:

Ufficio Regionale di Trasferimento Tecnologico

Headquarters: Via Luigi Carlo Farini, 8 50121 Firenze (FI)

E-mail: urtt@regione.toscana.it

UNIVERSITÀ DI PISA

REGIONE TOSCANA

urtt Ufficio Regionale di Trasferimento Tecnologico