Looking for information?

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 Up to now, mechanics carrying out complex repairs relied mostly on information from handbooks to guide them. But leafing through books tended to break concentration and repairs took longer. This situation is by no means improved by using PCs or laptops to call up the information; mechanics still need to click their way through page after page to find what they need. Another disadvantage is that tools have to be put to one side in order to deal with the book or computer. Researchers at the Fraunhofer Center for Organics, Materials and Electronic Devices Dresden COMEDD have been working for several years designing interactive HMDs – Head Mounted Displays – based on OLED technology for just such applications. These displays offer access to what is known as "augmented reality", enhancing the real world with additional visual information. Navi-gating through this augmented reality used to require data gloves or a joystick. Now COMEDD scientists, working together with their colleagues from the Fraunhofer Institute for Optronics, System Technologies and Image Exploitation IOSB in Karlsruhe and near-the-eye technologies specialist TRIVISIO, have succeeded in developing data glasses fitted with displays that can be controlled by the movements of the human eye. Mechanics wearing such glasses are able to assess the damage while also using their eyes to turn the pages of the virtual instruction manual. The system will be on display at the joint Fraunhofer booth in Hall A5, Booth 121, at the electronica trade fair in Munich, from November 13.

Photodiode detects eye movements

"We've fitted our glasses with a novel CMOS chip with an integrated camera and OLED microdisplay, for which we also hold the patent," explains project manager Dr.

Rigo Herold. This is the first time that researchers have integrated OLEDs together with photodetectors onto the surface of the CMOS chip. "The chip is equipped with microscaled transmitter and receiver units that configure the pieces of information sequentially; we call this an array structure. This gives us a bidirectional microdisplay, making it possible both to record and to reproduce images," says Herold. The chip measures 11 by 13 millimeters and contains four OLED pixels as well as a photodiode in the center that detects the wearer's eye movements. The pixels are responsible for rendering the images that appear on the microdisplay. The display itself is made up of an interleaved matrix of OLED pixels, embedded into which are photodetectors that function as a kind of camera, and has a light field measuring 10.24 by 7.68 millimeters. Looking through the glasses as if at the horizon, viewers see anything from an assembly drawing to a map projected apparently at a size of up to one meter some distance before them.

"Here we have a completely new generation of personal information management systems," says Herold. "The data glasses allow us to see the real world in the normal way, while at the same time registering our eye movements with the camera. One glance at the arrow key turns the page. Despite the fact that Google's data glasses, for instance, might be a little more stylish in appearance, navigating through the menu still requires using joysticks, whereas our glasses do not." Be they technicians or doctors, all users have their hands free and can concentrate fully on the task in hand.

Researchers will present the system in the form of an Evaluation Kit at the electronica trade fair. The kit contains the glasses as well as the corresponding hardware and software. These last were developed by colleagues at Fraunhofer IOSB, while the eyewear itself was produced by TRIVISIO. The system can run on both LINUX and Windows. Buyers have the option of ordering a computer with the system or buying the software by itself and installing it on their own computer.

As the Society for Information Display celebrated its 50th anniversary, Fraunhofer researchers celebrated winning the Best in Show Award at the world's most important display conference, the SID Display Week, held in Boston, MA in June this year. Those first in line from manufacturing, industry, medical and security sectors are currently exploring possible applications of this new technology.

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