Eye Detection and Tracking-Based Communication System for Tetraplegia Patients

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Tetraplegia patients have a problem using computers and communicating with others. Currently used eye tracking systems for tetraplegia patients are complicated to handle, heavy in weight and expensive; to solve these problems, new eye detection and tracking-based communication system for tetraplegia patients was developed. The software was built by C#, using Emgu and AForge image processing libraries. Firstly, a light wireless eyewear was designed with a CMOS imaging sensor and infrared light to detect eyes in real-time in high resolution. Eye detection and tracking software was developed to detect and track the position of the eye pupil from the real-time image. This software uses a calibration sequence to map the tracked eye pupil coordinates to certain positions onto a computer screen. By using this software, once the user controls the pointer, the software can select the item that the user is looking at This system offers a new portable, wireless, rechargeable and low-cost communication system that will be available for all tetraplegia patients. Moreover, the eye movement is translated to words using a virtual keyboard which will be converted to voice using Text-To-Speech software.

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