

X10 - are you looking at me?

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Abstract

Various disabilities restrict the ease with which individuals can operate electronic and ICT (Information and Communication Technologies) devices. X10 is a system for home automation control and consequently lends itself for use by disabled individuals, who particularly have mobility restrictions, to control a wide range of devices although the resultant user interface can be cumbersome. The development of an adequate user-centred interface/control which will allow such an individual easily to operate multiple ICT devices is then a considerable challenge. The development of a technique that utilises a user's point of gaze to select a particular ICT device for subsequent operation, thereby simplifying the user interface, is described. All ICT devices in the environment are first digitally imaged from different angles to identify them to a computer imaging system. Subsequently each device can be automatically recognised. The user's eye movements are recorded and their direction of gaze related in real time to the known 3D location of the possible ICT devices so enabling device selection prior to operation. The development of the technique and current ongoing research status are described.

Background

Individuals with several types of disability can have very limited mobility with greatly restricted hand/arm movements coupled with little physical strength, e.g. ALS (Amyotrophic Lateral Sclerosis), spinal cord injury, Cerebral Palsy, Multiple Sclerosis, or brain injury. Various dedicated interaction control systems can enable such individuals the freedom to move about in the environment, using a powered wheelchair, and also to operate multiple devices by means of simple controls. Some individuals have locked-in syndrome, which is a condition in which a person is aware but unable to communicate or move due to complete paralysis of the body. This condition typically results from some interruption of motor pathways in the brain usually by a stroke, trauma or a tumour. However they are able to understand sensory stimuli and so interaction, whether it be communication or direct control of electronic devices, is possible by recording and utilising their eye movements. It is further argued here that eye gaze can provide an appropriate method of interaction and device control for a whole range of disabled people. The Attentive Responsive Technology (ART) project is developing a system enabling a user's eye gaze to select a device and offer it for subsequent direct control.

In D. de Waard, K.A. Brookhuis, and A. Toffetti (Eds.) (2006), *Developments in Human Factors in Transportation, Design, and Evaluation* (pp. 285 - 294). Maastricht, the Netherlands: Shaker Publishing.