

# ESLRR Symposium on Technology

Chairs: Maria Coco (Spain) & Blaithín Gallagher (Ireland), ESLRR board members

## 1. A critical review of recent technological developments to support older and visually impaired people

Helen Petrie, Blaithín Gallagher and Jennifer S. Darzentas

*Human Computer Interaction Research Group, Department of Computer Science, University of York, United Kingdom*

We are undertaking a critical review of the last decade (2005 – 2015) of research on the technological developments for disabled and older people, as well as their needs and wishes for technological support and attitudes to technology. This includes both improving access to mainstream technologies as well as the development of new assistive technologies that help people overcome the problems they face in their lives. We are reviewing publications in nine mainstream conference proceedings and journals and seven conference proceedings and journals which specialise in technology for disabled and older people. We have identified 834 relevant papers about technology for disabled and older people, of which 296 (35.5%) are about technology for older people and 190 (22.8%) are about technology for people with visual impairments.

In this presentation we review research on technology for older, visually impaired people. We have categorized the research in two ways: the problem being addressed and the type of research study. The problems being addressed group into the following areas: mobility and wayfinding; communication and social interaction; being able to use technology; computer security; home control and monitoring; rehabilitation; health and wellbeing; exercise; loneliness and isolation; access to and use of information; education memory problems; time management; games; activities of daily living; support for carers; diagnosis; and educating professionals and the public. The types of research study group into those seeking to understand the needs and characteristics of the target users; those proposing a new adaptation or system; those proposing guidelines and standards for developing technology for the target users; and those exploring methods for working with the target users in the development of technology.

In our presentation, we will explore this corpus of research in more depth, highlighting the major achievements, potential gaps in the research and the challenges of research in this area.

**EYE TRACKER FOR HUMAN COMPUTER INTERACTION**

Maria B Coco, PhD

*Department of Health Sciences, European University Miguel de Cervantes, Valladolid, Spain*

Jaime Finat, Eng

*CIDIF, Fundación ASPAYM Castilla y León, Valladolid, Spain*

This paper discusses a new technical device which has been developed as part of a project whose aim is to craft a single device, incorporating a HMD (Head Mounted Display) which is used to display Virtual Reality (VR) will be modified to allow it conduct an early diagnosis of vision impairment linked to acquired brain injury. The device will also be used as an aid in the rehabilitation of this target group i.e. people who have had a stroke, cerebral trauma or other cerebral injury which can alter the visual interpretation.

The device attaches two infrared (IR) micro-cameras and infrared lightning inside the helmet. The new piece includes a new part in Oculus Rift HMD which has been printed with a 3D printer to add to its standard hardware infrared lights and the eye tracker camera. The electronics needed to feed the cameras and the IR LEDs and return de video input, have been developed as part of the project and added subsequently.

The software is based on three distinct parts: Eye-tracking module, clinic trial and rehab-videogames.

The Eye Tracking module is intended to process images from the cameras and deduce exactly what region inside the VR the user is looking at. That information will be given to the clinic trials or our videogames as other inputs such mouse or keyboard.

The trial is focused on replicating visual tests performed by other machines used in the diagnosis of field loss. In this project, we will compare our methodology and results with the gold standard one performed by the Humprey campimeter.

The videogame has been designed to improve the patient´s visual function, in actions such as visual navigation and eye tracking training for saccades, mainly for peripheral vision loss defects.

Summing up, the HMD piece, the electronics and the three main software modules, comprise the a new portable low-cost system which can be taken to every hospital or primary care center at lower cost than the current technology using the latest immersive technology.

*This symposium includes 4 open abstracts*