MODEM – Monitoring Of Dementia using Eye Movements

https://neurodegenerationresearch.eu/survey/modem-monitoring-of-dementia-using-eye-movements/

Principal Investigators

Sawyer, Professor P

Institution

Lancaster University

Contact information of lead PI
Country

United Kingdom

Title of project or programme

MODEM - Monitoring Of Dementia using Eye Movements

Source of funding information

EPSRC

Total sum awarded (Euro)

€ 1,288,557

Start date of award

31/03/2015

Total duration of award in years

3.5

The project/programme is most relevant to:

Alzheimer's disease & other dementias

Keywords

Neurodegenerative disease in general

Research Abstract
There is mounting evidence that deficits in saccadic and smooth pursuit eye movements are characteristic of dementia. These deficits can be detected in a lab or clinical setting using specialised eye-tracking equipment but this is inconvenient for the patient, costly for the NHS

and introduces the risk of sampling bias because clinic visits are inevitably intermittent. The aim of the Monitoring Of Dementia using Eye Movements (MODEM) project is to enable the longitudinal collection of data at low cost and with minimal inconvenience, to provide a novel platform for prognosis and diagnosis of dementia.

We propose to tackle monitoring of disease progression with in-home eye tracking and computational analysis of eye movement embedded with patients' everyday activity. This is an entirely novel approach, and hence high risk. However, it has the potential to lead to major breakthroughs, for three reasons: (i) Eye movement and cognitive health are closely linked, including initial evidence of markers for dementia diagnosis. (ii) Eye trackers are on the verge of a step change from lab instrument to widely deployed sensor, and their adoption for contact-less health monitoring is becoming a realistic proposition. (iii) People/patients use their eyes in daily routines that are visually engaging, and that present rich contexts for collection of information about how their eye movement changes over time, as a function of disease progression.

Our vision is that rather than patients having to attend a clinic or laboratory, eye movement data can be collected in settings where the technology is ambient and peoples' behaviour is relaxed and natural. The target settings are peoples' own homes and care homes. Eye trackers can be placed strategically to observe eye movement in the context of everyday tasks. For example they can be used to track hand-eye coordination in routine tasks such as tea-making for possible signs of change; these might signal cognitive decline long before routines become more obviously affected. Eye trackers can also be deployed interactively. People spend significant amounts of their daily lives as consumers of visual media, especially through TV, which affords interactive stimulation of eye movement. For example, content (e.g. TV programmes) can be designed to elicit behaviours of interest for diagnosis. People can also be provided with active gaze controls for interaction, for instance as alternative to remote control functions of a TV. Use of gaze for control stimulates specific eye movements which can be used for testing. Though beyond the scope project, this could also lead to therapeutic application of the technology. Moreover, as eye trackers are based on cameras and computer vision, this opens up avenues for integration with other vision-based approaches such as analysis of facial expressions, for multimodal cognitive health analysis.

Lay Summary
Further information available at:

Types:
Investments > €500k

Member States:
United Kingdom

Diseases:
Alzheimer's disease & other dementias

Years:
2016

Database Categories:
N/A

Database Tags:
N/A