E. Thomson, S. Mathews, D. Todd, P.J. McCullagh, M.P. Ware, M.D. Mulvenna, S. Martin.
BRAIN: Developing brain computer interfaces with rapid automated interfaces for non experts.
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Purpose As people age it is conceivable that illness or traumatic injury could create a scenario of dependence on others which could be further compounded by a loss of verbal communication skills; consider for example the final stages of motor neurone disease or multiple sclerosis. Traumatic injury or disease processes such as stroke can, in severe cases, lead to 'locked-in syndrome'[1] which is the combined effect of quadriplegia, anarthria and preservation of consciousness. As services strive to support independent living and ageing in place, it can be challenging to verify that the uniqueness of the individual, their desires and wants, have been grasped and understood by both informal and formal carers. The adoption of a Brain-computer interface (BCI) aimed to assist with and augment human cognitive and sensory processes by developing automated interfaces, which communicate directly with the brain, could assist with these challenges. The ultimate goal of BCI is to provide communication and control capacities to people with severe disabilities[2,3]. **Method** This paper presents the work undertaken as part of the BRAIN project[4]. This European consortium is funded within the 7th Framework research programme, bringing together experts from academia and industry with service users to develop a BCI system linked directly to assistive tools within the home environment to support inclusion for a range of disabled users. The user interface which supports human-computer interaction is a key component of a BCI system[5]. The research methods aim to support a strong user lead in terms of both design and evaluation of the prototype system whilst technically advancing a reliable, flexible and accessible system which is not only functional but brings added value to the user in their home environment. The lead user has been a critical innovation within the consortium, influencing design of methods and prototype. The vision within the project is to develop lightweight, inexpensive, non-invasive sensors and amplifiers for signal acquisition that do not require significant preparation or cleanup times, uncomfortable electrode gel, skin abrasion, exposed wires or cables, expert assistance, or laboratory conditions. Software will identify the best BCI parameters for each user and customize the operating protocol accordingly. Automated signal processing software will improve signal translation. An intuitive, universal interface will enable control of a range of existing applications, including home assistive technologies, a BCI training system to enhance performance, and a communications and entertainment package. **Results & Discussion** This paper presents the methods and results to date of the first year of the project. The reality of user engagement and maintaining a user centric focus within a project that is technically inspiring and innovative, will be considered. The challenges and benefits of the lead user aspect to the central component will be reflected upon in relation to added value to the innovation process. The proposed architecture of the early system will be described and the particular challenge of evaluation of immature, yet sophisticated, systems, developed by a geographically dispersed consortium, within a real life scenario, will be explored. Acknowledgement: The BRAIN consortium gratefully acknowledge the support of the European Commission's ICT for Inclusion Unit, under grant agreement No. 224156.

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Address: CEDAR Foundation, Belfast, Northern Ireland, UK;
E: thomson@cedar-foundation.org