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Call for papers, posters, demonstrators, and videos

Brain-Computer Interfaces as intelligent sensors for enhancing human-computer interaction

A grand challenge *at the 14th ACM International Conference on Multimodal Interaction (ICMI)*

Abstract. The 14th ACM International Conference on Multimodal Interaction (ICMI) has launched its grand challenges. One of them is baptized "Brain-Computer Interfaces as intelligent sensors for enhancing human-computer interaction". This challenge calls for papers, posters, demonstrators, and videos. It aims to explore the integration of traditional multimodal interaction with physiological computing (i.e., systems that use data from the human nervous system as control input to a technological system); in particular, Brain-Computer Interfaces (BCI). We propose to change the conceptual use of "BCI as an actor" (input control) into "BCI as an intelligent sensor" (monitor). This shift of emphasis promotes the capacity of BCI to represent spontaneous changes in the state of the user in order to induce intelligent adaptation at the interface. BCIs can be increasingly used as intelligent sensors which "read" passive signals from the nervous system and infer user states to adapt Ambient Intelligent (AmI) environments and facilitate personalized and ubiquitous computing.

Keywords: Multimodal, brain-computer interfacing (BCI), ambient intelligence (AmI), intelligent sensors, physiological computing

Brain-Computer Interfaces (BCI) are traditionally conceived as a way to control apparatus, an interface that allows you to "act on" external devices as a form of input control. As such BCIs do not mix very well with the Ambient Intelligence (AmI) paradigm However, most BCI do not provide a reliable and efficient means of input control and are difficult to learn and use, when compared with other interfaces. We propose to change the conceptual use of "BCI as an actor" (input control) into "BCI as an intelligent sensor" (monitor), which can catalize its user's interaction with AmI. This shift of emphasis promotes the capacity of BCI to represent spontaneous changes in the state of the user in order to induce intelligent behavior of systems. This conceptual change gives rise to three grand challenges:

1. *Inclusion challenge:* How can we make an interface profit from user-information from differ-

Table 1
Links to web pages

ICMI 2012 conference	http://www.acm.org/icmi/2012/
ICMI 2012 – BCI Grand challenge	http://hmi.ewi.utwente.nl/BCIGrandChallenge2012/
ACM Digital Library	http://dl.acm.org/

ent sensors? How can we include BCI as one of the interaction paradigms in the Multimodal Interaction Framework? and How to transfer from "Brains Only" to "Brains Also"?
2. *Interpretation challenge:* How can we fuse, but also disentangle and interpret information from the user, the task. and the environment?
3. *Representation challenge:* How can we best *feed back* information to the user?

Go for a detailed description and more sub-challenges to the challenge's website (see Table 1).

1. What can you send in?

We invite work on systems that (could) use BCI's as intelligent sensors. Authors are encouraged to express their own challenges without any constraints. The following types of contributions are welcome:

- Papers on developed systems: please follow the template styles for a long paper described by ICMI.
- Posters or papers proposing an idea: please follow the template styles for a short paper described by ICMI.
- Videos or demos: please follow the template styles for a short paper described by ICMI and describe your demo.

Please consult the webpages (see Table 1) and Table 2 for the accompanying deadlines.

2. Publications

Accepted papers will be included in the ICMI conference proceedings. These will be published by ACM as part of their series of International Conference Proceedings.

Table 2
Important dates

Deadline for submissions	June 30, 2012
Notification of acceptance	July 14, 2012
Final paper	August 15, 2102
ICMI conference	October 22–26, 2012

The ICMI proceedings will have an ISBN number assigned to it and all papers will have a unique DOI and URL assigned to them. Moreover, all accepted papers will be included in the ACM digital library (see Table 1).

3. Organizers

- Femke Nijboer, Mannes Poel, Anton Nijholt, *University of Twente, the Netherlands*
- Egon L. van den Broek, *TNO Technical Sciences, the Netherlands*
- Stephen Fairclough, *Liverpool John Moore University, United Kingdom*

4. Program committee *(to be completed)*

- Robert Jacobs, *Tufts University, USA*
- Jeremy Hill, *Wadsworth Center, USA*
- Michael Tangerman, *Berlin Institute of Technology, Germany*
- Fabien Lotte, *INRIA, France*
- Thorsten Zander, *Max Planck Institute for Intelligent Systems, Germany*
- Kiel Gilleade, *Liverpool John Moore University, United Kingdom*