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COGAIN

Communication by Gaze Interaction

Network of Excellence

Information Society Technologies

Periodic Activity Report
Year 4
Executive Summary

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Project coordinator organisation name: University of Tampere

Executive Summary

COGAIN is a Network of Excellence on Communication by Gaze Interaction, supported by the European Commission's IST 6th framework program. COGAIN integrates cutting-edge expertise on interface technologies for the benefit of users with disabilities. The network gathers Europe's leading expertise in eye gaze interaction with computers in a research project on assistive technologies for citizens with motor impairments.

Objectives and expected end results

Current eye tracking equipment allows users to generate text on a computer by using eye gaze. Users are able to select letters and numbers by looking at a keyboard on a screen with their eyes, and can construct words and sentences that can be spoken aloud by the system. Using these systems both empowers and enables people with disabilities as they can now communicate without the need for an assistant or helper, giving the users greater freedom in their lives. Eye tracking systems that allow text entry by eye gaze have been in existence for about two decades, but the technology is still only available to a small portion of the potential user population. Obstacles for more widespread use currently include: the high cost of eye tracking equipment, the limitation that gaze communication applications may only work with a particular dedicated eye tracking device, and finally that eye tracking devices may require experts to operate them.

The COGAIN consortium (members of which are listed in Table 1) is formed from cutting-edge research groups and companies who have joined forces for a common goal: empowering people with disabilities. There are over 100 researchers in the network. Through the integration of research activities, the network will develop new technologies and systems, improve existing gaze-based interaction techniques, and facilitate the implementation of systems for everyday communication.

The project aims to make research results and commercial solutions known and available, at an affordable cost, to the user community, to SMEs, and to local organisations and authorities. Usability and take-up of the results is ensured by having the user communities as an integral part of the network. COGAIN also aims at developing mainstream applications that would benefit all. COGAIN believes that assistive technologies are most successful when they provide applications that are both empowering and fun to use, and this is one of our main aims.

Figure 1. Photos from COGAIN 2007 (September 2007, Leicester, UK).
More photos of the event are available online at http://www.cogain.org/photos/cogain2007.

Organisation and contractors involved

The members of the COGAIN consortium are listed below in Table 1.

Participant name	Participant short name	Country
University of Tampere	UTA	Finland
IT University of Copenhagen	ITU	Denmark
Bispebjerg Hospital	BH	Denmark
Danish Centre for Assistive Technology	DC	Denmark
Danmarks Tekniske Universitet	DTU	Denmark
Technische Universitaet Dresden	TU DRESDEN	Germany
Universitaet Koblenz-Landau	UNI KO-LD	Germany
Universität zu Lübeck	UzL	Germany
Hewlett Packard Italiana SRL	HP	Italy
Politecnico di Torino	POLITO	Italy
Siauliu Universitetas	SU	Lithuania
Tobii Technology	Tobii	Sweden
ACE Centre Advisory Trust Ltd	ACE	United Kingdom
The Chancellor, Masters and Scholars of the University of Cambridge	UCAM	United Kingdom
De Montfort University	DMU	United Kingdom
Tokyo Institute of Technology	TIT	Japan
Universitaet Zuerich	UNIZH	Switzerland
Universidad Publica de Navarra	UPNA	Spain
Czech Technical University	CTU	Czech
Västra Götalands Läns Landsting	DART	Sweden
Loughborough University	LBORO	United Kingdom
Metrovision	Metrovision	France
LC Technologies	LC	USA
EyeTech Digital Systems	EYETECH	USA

Table 1. List of COGAIN partners during the fourth project year.

In addition to the core members, COGAIN involves two external boards to consult in the future planning and decision-making activities: the Board of User Communities (BUC) and the Board of Industrial Advisors (BIA). Both boards function as advisory entities whose input will be sought regarding the practical usefulness, dissemination and possible commercialisation of the research findings (see http://www.cogain.org/boards). BUC and BIA members also participate in the decisions of the COGAIN Supervisory Body on Standardization, providing their input and feedback over the various standards developed within COGAIN.

The work in COGAIN has been done within 8 workpackages: (WP1) Durable community building, (WP2) Standardisation, (WP3) User involvement, (WP4) Tool development, (WP5) Eye tracker development, (WP7) Community outreach, (WP8) Academic impact, and (WP9) Management. (WP6 "Analysis and evaluation" was merged into WP3 for practical reasons as the evaluation is closely linked with user trials.)

Promoting integration and fostering durable community building

COGAIN has put extensive effort into integration and durable community building. As a result, The COGAIN Association was established in the beginning of the fifth project year. The founding meeting of the Association was held in connection with the COGAIN 2008 conference in Prague, 3 September 2008. For more information about The COGAIN Association, see http://www.cogain.org/association.

To further boost the integration, special integration sessions were organized in the yearly camps both in 2007 in Leicester and in 2008 in Prague in order to spread information about topics for potential collaboration and to boost joint work between partners. The role of the Association and its future tasks was discussed in working groups as part of the half-day integration session in the 2008 event.

As part of its durable training activities, COGAIN organized a summer school on Gaze, Communication, and Interaction Technology (GaCIT) together with the UCIT graduate school, see http://www.cs.uta.fi/ucit/gacit/. Another part of the durable training activities has been initiated in the form of a COGAIN Book (a forthcoming deliverable D8.5) which will be available through The COGAIN Association once printed. Finally, the video material recorded in connection of the camps and PhD schools, and made available through the web portal, contains a rich source of information suitable for educational use.

Work performed and results achieved during the fourth year of the project

Activities for making the information on eye control solutions available and preparing self-training materials were continued. A lot of effort was put on new eye tracking solutions and especially on the safety issues and novel areas such as mobility control by gaze. The following deliverables were delivered:

- *D1.6 Information and training material on eye tracking published online* collects self-study materials and resources available on web (both on COGAIN portal and on other web pages) under appropriate sections, see http://www.cogain.org/training.

- *D2.6 A survey of existing 'de-facto' standards and systems of gaze based mobility control* reviews previous work and standards, and discusses issues involved in gaze-based mobility.

- *D3.5 Exemplar eye control activities for users with complex needs* is an online resource with instructions and downloadable examples to help in initial eye control assessment, see http://www.cogain.org/user_involvement/exemplars/.

- *D4.7 Software for text editing by gaze* is a prototype that demonstrates how a context aware tool can assist in navigating and editing text by gaze.

- *D4.8 Integration of SAW5-Dasher* demonstrates how Dasher can be used within a framework software such as SAW5 and discusses problems involved and potential solutions.

- *D5.4 Exploration of safety issues in eye tracking* is an extensive review of existing standards and guidelines for IR illumination and other safety issues in eye tracking.

- *D5.5 Silicon Chip and other novel approaches for eye tracking* reports novel hardware and software solutions for eye tracking.

- *D5.6 Report on New Approaches to Eye Tracking* summarizes novel work and research findings.

- *D7.7 BIA co-operation with permanent members initiated*

- *D8.4 COGAIN related special issue in a scientific journal accepted for publication*

COGAIN reports are available online at http://www.cogain.org/results/reports.

Multimedia files and example applications are available at http://www.cogain.org/downloads/.

Dissemination activities

The *COGAIN 2007 Camp* in Leicester, UK, started the fourth project year. The event had two parts: the two-day COGAIN 2007 conference that was open to the public and two days for internal project meetings. The theme of the conference was "Gaze-based Creativity, Interacting with Games and On-line Communities". The theme was well reflected in the academic talks as well as in the exhibition. The end-

user and industry day was started by an end-user session, where users, their relatives and professionals working with the end-users gave talks on their experience on eye control and gaze communication. The top leisure applications from the COGAIN student competition were demonstrated at the exhibition. The COGAIN 2007 proceedings are available at http://www.cogain.org/cogain2007/#proceedings.

COGAIN has put special effort on dissemination activities, including decision makers, the scientific community, assistive technology professionals, and the general public. For example, COGAIN was invited to exhibit in the e-Inclusion Ministerial Event in Lisbon, Portugal, December 2007. In addition, COGAIN gave public demonstrations in over 20 events, including international and national conferences, workshops and seminars. For example, COGAIN demonstrated eye control in the exhibitions at Closing the Gap 2007 (Minneapolis, MN, USA), ETRA 2008 (Savannah, GA, USA), CHI 2008 (Florence, Italy) and ISAAC 2008 (Montreal, Canada). COGAIN has also attracted the interest the public press. A list of media appearances and dissemination material is available at http://www.cogain.org/media.

COGAIN has also been active in scientific conferences; for example, COGAIN was involved in organizing ETRA 2008. Over forty COGAIN related scientific papers were published in journals and conference proceedings during the fourth project year. A bibliography of COGAIN publications is available online at http://www.cogain.org/bibliography/.

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