

Workshop

“Enhancing communication and computer access via assistive technology in Complex Communications Needs”

Date: November, 17th, 2012

Place: Beatriz Hotel (Toledo, Spain)

Contact: rafael.raya@csic.es, marta.pajaro@car.upm-csic.es

This workshop will provide assistants with information about the newest advances and trends in assistive technology (AT) for Complex Communication Needs (CCN). Audience will be able to characterize and to describe what are CCN, to identify CCN and to define characteristics and common causes of CCN. Assistants will be able to determine potential users that may benefit from AT for communication. Participants will be able to understand how can CCN be treated with AT and to plan interventions. Attendants will be able to assess potential users including those presenting with progressive neurologic diseases (i.e. Sclerosis) and severe motor dysfunction (i.e. locked-in syndrome, traumatic brain injury, stroke and cerebral palsy).

This workshop will present a view of some already commercially available systems. We will provide a description of the usability and versatility of some emerging systems that play an important role in AAC and that will include eye-tracking systems, biosensor and multimodal interfaces. The interaction between human and AT is the core of the aid in CCN. The interface is the medium through which communication flows between user and device. Assistants will presence a real demonstration of a person with CCN using an eye tracking system to communicate in front of the audience. Participants will be also introduced to the ABC project that is focused on the development of Brain Neural Computer Interface (BNCI) communication systems, including EEG systems and its applicability in the field of CCN. Attendees will assist to an introduction of some systems like ENLAZA interface, a headset with a helmet and an inertial measurement unit. The ENLAZA interface translates head movements into voluntary commands to control the computer. ENLAZA can also assist to drive adapted vehicles in children with cerebral palsy. Assistants will also receive an insight into the TechFilter mouse system that is able to filter undesired hand shaking movements from PC mouse cursor and may help to access to computer system to patients presenting with tremor as essential tremor and Parkinson Disease.

List of speakers

- Luis Azevedo, PhD, Center for Analysis and Signal Processing, Technical Institute (Technical University of Lisbon), Lisbon, Portugal.
- Eduardo Rocon, PhD, Bioengineering Group of Spanish National Council for Science Research, Spain.
- Ana Londral, PhD candidate, PLUX Biosignals, Lisbon, Portugal.
- Juanma Belda, PhD, Instituto de Biomecánica de Valencia, Spain
- Rafael Raya, PhD, Bioengineering Group of Group of Spanish National Council for Science Research, Spain.

Practical demonstrations: User with Cerebral Palsy controlling different alternative interfaces

- **ASPACE Cantabria EYE TRACKING SYSTEM** (Santander, Spain, website: www.aspacecantabria.org/). A volunteer with cerebral palsy will show us how he uses an eye-tracking system to control the computer. This demonstration will be supported with a talk, which will explain the technical aspects of the interface and its relation with user's needs.
- **San Rafael Hospital INERTIAL INTERFACE** (Madrid, Spain, website: <http://www.hospitalsanrafael.es/>). A volunteer with cerebral palsy will show us how he uses an inertial head-mounted system to control the computer. This demonstration will be supported with a talk, which will explain the technical aspects of the interface and its relation with user's needs.
- **Multiple Sclerosis Foundation. TECHFILTER (Madrid, Spain)**. A volunteer with multiple sclerosis will show us how he uses a mouse that filters involuntary movements to control the computer. This demonstration will be supported with a talk, which will explain the technical aspects of the interface and its relation with user's needs.

Schedule

Saturday November 17th

Time	Speaker	Talk title
8:30-9:15	Luis Azevedo, MSc, PhD.	Assessment and Intervention through the use of "Eye Tracking Systems" in persons with Complex Communication Needs
9:15-9:45	Ana Londral, MSc, PhD Candidate	Multimodal Interfaces for AAC in Persons with Amyotrophic Lateral Sclerosis
9:45-10:15	Eduardo Rocon	Filtering Neurological Tremors Sensed by computer mouse: The Techfilter
10:15-10:30	Collaboration with Multiple Sclerosis Foundation	Demonstration of the Techfilter: user with Multiple Sclerosis
10:30-11:00	Juanma Belda, PhD	"ABC Project Overview: augmented BNCI communication" http://www.abc-project.eu/
11:00-11:30		Coffee Break
11:30-12:00	Collaboration with ASPACE Cantabria	Demonstration of Eye Tracking System: user with Cerebral Palsy
12:00-12:30	Rafael Raya, PhD	"An inertial human computer interface for cerebral palsy: The Enlaza device"
12:30-13:00	Collaboration with Hospital San Rafael (Madrid, Spain)	Demonstration of Enlaza interface: user with Cerebral Palsy

Organizers

Marta Pajaro, MD, Clinical Staff at Bioengineering Group of Spanish National Research Council (CSIC, Spain). She received the MD Degree in 2004 from the University of Seville, (Spain) in 2004. She completed the Medical Residency program in Physical Medicine and Rehabilitation at Virgen del Rocío University Hospital (Seville, Spain) in 2009. She received the

Advanced Studies Diploma in 2009 from the University of Seville. She completed a Research Fellowship in the Pediatric Rehabilitation Program at Spaulding Rehabilitation Hospital (Boston, MA) in 2011. She is currently conducting a Research Fellowship program in the Motion Analysis Laboratory at Spaulding Rehabilitation Hospital.

Rafael Raya, PhD, is with the Bioengineering group of CSIC (Spain). He received the PhD degree in 2011 and a M.S. degree in 2008 from the University of Alcalá (Spain). He received an Electronic and Automatic Engineering degree in 2006 from the University of Córdoba (Spain). He was a postdoc fellow at the Harvard Medical School in Boston (USA) and MOVE Institute (Vrije Amsterdam Universiteit). He is author/co-author of more than 40 publications including international journals and conferences and he is reviewer of several international journals. His research activity is focused on assistive devices for people with Cerebral Palsy.

Luis Azevedo, PhD, holds a Degree in Electrical Engineering (Instituto Superior Técnico - Technical University of Lisbon, 1976) and a Graduate Technical Audiology (Sweden, 1978), a Masters in Biomedical Engineering and Rehabilitation Engineering (University of Dundee, Scotland, UK, 1988) and a PhD in Computer Science (Faculty of Informatics, University of the Basque Country, Spain, 2006). Dr. Azevedo is a researcher at the Center for Analysis and Signal Processing, the Technical Institute, Technical University of Lisbon in the area of Assistive Technology. He is the Director of ANDITEC-Rehabilitation Technologies Ltd, a company specializing in marketing, training and development in assistive technologies. His teaching experience includes courses as a Visiting Professor of the Master of Clinical Engineering, Faculty of Engineering, Catholic University, of the Masters in Lusophone University Augmentative Communication, Lecturer's Degree in Occupational Therapy, School of Health Alcoitão, Guest Lecturer for Courses / Seminars on "Assistive Technology for Persons with Disabilities in foreign universities, including Spain, Brazil, Argentina, Chile, Colombia, Ecuador and Costa Rica. He is Scientific Coordinator of National and International Projects in Technologies for Rehabilitation. Invited Expert of the European Commission to evaluate projects in the area of Assistive Technology, Founding member and Board of Directors of the Association for the Advancement of Assistive Technology in Europe (1995 - 1998). He was a member of the Board of Directors of ISAAC - International Society of Augmentative and Alternative Communication (1995 - 2000). Member of the Rehabilitation Engineering Society of North America. Founding Member and Vice President of AITADIS - Ibero-American Association of Assistive Technology. Advisor specialized in the field of Assistive Technology in various Rehabilitation Centers and Hospitals. Author of more than 150 communications to national and international congresses.

Ramón Ceres, PhD, Professor of Research at the Bioengineering Group of the Spanish National Council for Science Research (CSIC).

He graduated in Physics (electronic) from Universidad Complutense de Madrid in 1971, receiving the PhD degree in 1978. After a first stay for one year in the LAAS-CNRS, in Toulouse (France), he has been working at Industrial Automation Institute of the CSIC, being in this Centre Head of Department and Deputy Director for twelve years. For the period 1990-1991 was R&D director and promoter of the start up AUTELEC, company working on the electronic field. From the 90's he has been developing different functions such as Spanish Delegate in the Regulatory Committee of the R&D BRITE/EURAM Programme of the E.U., General Coordinator of the Innovation Projects IBEROEKA, within the Latin-American Programme CYTED, promoter and president of the Latin-American Association for Assistive Technologies AITADIS and its congress IBERDISCAP, Coordinator of the Bioengineering Group, member of the Steering Committee of the Comité Español de Automática, belonging to the IFAC association.

He is author of more than 250 publications (papers and congress presentations), director of nine doctoral thesis, having several patents in industrial exploitation on automation works in the field of the sensors and robotics. In the two last decades he has been centred on the field of research of the Assistive Technologies, particularly in sensors, interfaces and signal processing, leading national and European projects and several networks (INCLUTEC-eVIA, RETADIM, GBIO-CEA).