Program

8th International Conference
on Methods and Techniques
in Behavioral Research

Measuring Behavior 2012

Program of the 8th International Conference on Methods and Techniques in Behavioral Research. (Utrecht, The Netherlands, August 28 - 31 August 2012).

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Table of Contents

Welcome to *Measuring Behavior 2012*

We are delighted to welcome you all to the 8th *Measuring Behavior* conference. Building on the format that has emerged from previous meetings, this year we have also endeavored to bring together an international audience engaged in the development and validation of methods for recording and understanding behaviour and actions in their broadest sense. We thank all of you for bringing your best and most exciting science.

This year sees the return of *Measuring Behavior* to its birth place, Utrecht. It was here, that two visionaries, Berry Spruijt and Lucas Noldus, realized their ambition to bring together the scientific community interested in the objective recording and interpretation of behavior. Both remain actively involved in the further development of this field and play significant roles in this meeting, and the scientists present here today owe them a great deal of foresight and vision. Utrecht University with its international reputation in behavior and veterinary science was the ideal breeding ground for the conference. The measuring of behavior has always been an important topic in its research, and is currently reinforced in the University's strategic themes Life Sciences and Youth & Identity.

Scientifically, this year's programme encapsulates the recent conceptual progress in the development of translational tools highly relevant for medical research, combined with technical advances in terms of hard- and software for improved recording and as a response to the ever increasing challenges of data analyses. Encompassed are Special Sessions dedicated to selected topics, Workshops, User Meetings, Tutorials, Demonstrations, General sessions and Poster presentations representing the global endeavours to record, quantify, and understand behavior. Highly recommendable are also the Keynote lectures delivered by three outstanding and highly respected speakers. Finally, we trust you will enjoy the scientific tours in the Utrecht region and the social events, into which a lot of hard work has gone by the Local Organizing Committee.

We hope this program caters for many of your interests and we look forward to seeing and hearing your contributions and trust it will become a productive, exciting and memorable conference.

Andrew Spink (Noldus Information Technology, The Netherlands)

Gernot Riedel (University of Aberdeen, United Kingdom)

Remco Veltkamp (Utrecht University, The Netherlands)

Berry Spruijt (Utrecht University, The Netherlands)

Conference Chairs

The *Measuring Behavior* Conferences

Measuring Behavior is a unique conference about methods and techniques in behavioral research. While most conferences focus on a specific domain, *Measuring Behavior* creates bridges between disciplines by bringing together people who may otherwise be unlikely to meet each other. At a *Measuring Behavior* meeting, you find yourself among ethologists, behavioral ecologists, neuroscientists, experimental psychologists, human factors researchers, movement scientists, robotics engineers, software designers, electronic engineers, human-computer interaction specialists... to name but a few. Experience tells us that the focus on methodological and technical themes can lead to a very productive cross-fertilization between research fields. Crossing the boundaries between disciplines and species (from astronauts to zebras) can be extremely inspiring.

Measuring Behavior started in 1996 as a workshop in the framework of a European research project "Automatic Recording and Analysis of Behavior", aimed at sharing the results of our project with colleagues from abroad. Organized by Noldus Information Technology and hosted by Utrecht University, *Measuring Behavior* '96 attracted over 150 participants. From that modest beginning, the conference has grown to a significant international event with several hundred delegates from thirty plus countries. We have also grown in terms of the scientific quality of the conference, with selection of papers now being determined by a process of independent peer-review by many hundreds of reviewers. The scientific program committee is very grateful for all that work that many of you reading this have contributed towards. In 2012, we return to our 'birthplace' and, appropriately, our first conference chair, Professor Berry Spruijt, is honorary chair this year.

Noldus Information Technology serves as conference organizer and main sponsor. For a small company like ours, the conference is a major investment. We gladly do this, because we believe that the focused attention on behavior research methods and techniques will eventually lead to a higher demand for our solutions. To prevent commercial bias, however, the scientific program is put together under auspices of an independent Scientific Program Committee, consisting of international experts from a broad variety of disciplines (see the Scientific Program Committee on page 146) and many different research groups and companies have contributed and participated in this series of conferences.

Over the years, the conference has been hosted by a variety of universities:

Year	City	Conference chair
1996	Utrecht	Berry Spruijt
1998	Groningen	Jaap Koolhaas
2000	Nijmegen	Alexander Cools
2002	Amsterdam	Gerrit van der Veer
2005	Wageningen	Louise Vet
2008	Maastricht	Harry Steinbusch
2010	Eindhoven	Boris de Ruyter
2012	Utrecht	Remco Veltkamp & Gernot Riedel

In the scientific program, which is well balanced between human and animal research, you can find a variety of formats for presentation, interaction and exchange of information. In the past years we have seen that the special sessions (with speakers invited by session chairs) have become more prominent, and also the Demonstration Showcase has become more popular.

Measuring Behavior is a scientific conference, so special attention is paid to publication of the work presented at the meeting. The format of papers in the Proceedings is always a matter of debate, due to the different conventions of the many disciplines represented at the conference. After trying a variety of formats over the years, we have settled on extended abstracts (1-2 pages for posters and 2-4 pages for oral presentations), and that seems to be the best compromise between a text with enough content for both lasting value and being possible to review and short enough so that the effort for the writers is not excessive. An important feature of the Conference Proceedings is that they are all available as open access from measuringbehavior.org. As usual, we will be having post-conference publications as special editions of selected journals, and we hope to be able to announce which journals are selected during the conference itself.

Now you find yourself at the 8th *Measuring Behavior* conference. The organizers have done their best to prepare an optimal mix of scientific, technical, and social ingredients. We hope that you will find *Measuring Behavior 2012* a rewarding and stimulating experience and wish you a pleasant stay in Utrecht.

Lucas P.J.J. Noldus
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Andrew Spink
Chair of Scientific Program Committee, Measuring Behavior 2012
Andrew@measuringbehavior.org

Measuring Behavior 2012: Highlights of the Scientific Program

The eighth edition of *Measuring Behavior* covers an even wider diversity of scientific topics than its predecessors. Within that diversity, some clear trends are visible. Tracking technologies are becoming more important. A few years ago, video tracking dominated the field, and although advances are being made in automatic behavior detection from video images, the tracking itself now uses a variety of different techniques as (for instance) GPS signals become more accurate and use lighter sensors. The rule remains that there is not much point collecting behavioral data if you cannot analyse and interpret it, and there are papers on analysing both spatial data and other sorts of behavioral data. Indeed, technology and science constantly influence each other.

Another trend over the past few years is for physiological and other sensors to be used more and more in combination with traditional behavioral measures. New technologies enable less intrusive and more accurate measurements, and as those measurements have become more common, so the interpretation of them has become more reliable. As in many areas in the field, this is one domain where insights in controlled conditions studying animal behavior have spilled over into both studies of human behavior, and studies in less confined contexts. As well as physiological data, signals in terms of auditory (and other) communication, the measurement of engagement, interactions with touch screens and capturing human behavior interacting with computers and other machines has really moved into the mainstream. Human factor research has become such an important domain that a number of different sessions are dedicated to it, including control of cars and planes, interaction of (and engagement with) games, and measurement and analysis of errors in peoples' interaction with software.

The above list of domains indicate that the proportion of behavioral measurement carried out in purely artificial environments is increasingly small. Most of the psychological advances presented at *Measuring Behavior* are experiments carried out in realistic environments, and especially in the context of animal research, the developments of home cages has allowed for the assessment of a much richer and natural range of behaviors (ethogram) than was present a few years ago. The importance of the possibility of a subject displaying a natural behavioral repertoire has become increasingly clear to researchers, and with it the necessity for good welfare conditions (in addition to the ethical imperative). *Measuring Behavior* has increased the welfare requirements for submitted papers this year and there is also a special session devoted to this subject.

Animal research is sometimes carried out because the animals' behavior is interesting in itself, and at other times because it may act as a model for human behavior or disease. In a few cases that can best be achieved by developing new animal models (see the example

of zebra fish as they have a better developed visual than olfactory cortex, and are in this respect a better model for human cognition than the traditional rodent models) and in some other cases by further development of existing models to critically examine their translational value.

Technical and methodological development critically relies on 'hands-on' experience, that is, the knowledge of what each subject is capable of and how training procedures can be implemented so that data are gathered unambiguously reporting on the research questions to be answered. This know-how comes to a great extent from MSc or PhD students. This year, we sought an even stronger incorporation of this group of researchers, and so we have reduced the student registration fees, increased the number of student travel grants and introduced a prize for the best student presentations.

Measuring Behavior 2012 uses the same presentation formats that have been built up over the past seven conferences. In 2012, most presentations will take place in special sessions (previously called symposia and special interest groups), in which the session chair has invited speakers. By contract, the general sessions (full papers) and posters are submitted as individual abstracts and clustered together by the conference organization. Tutorials are longer presentations teaching existing techniques, and demonstrations showcase new prototypes of software and hardware relevant to our research. The conference program is completed by four types of events outside the scientific program; user meetings, scientific tours, a commercial exhibition, and social events.

In 2012, *Measuring Behavior* returns to the city and university where the conference started 16 years ago. Utrecht University is the oldest university in the country (founded 1636) and in the Shanghai ranking comes out as the best in the country. It has an outstanding record in behavioral research and is a very fitting location for us to return to.

Andrew Spink
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Acknowledgement

Sponsor

The organizers of *Measuring Behavior 2012* gratefully acknowledge the support from its main sponsor:
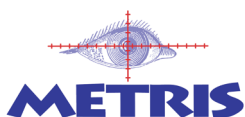
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Exhibitors

Measuring Behavior 2012 - Utrecht, The Netherlands

Conference Program at a Glance

Location

The following pages give an overview of the conference program. For the location of the different rooms, please take a look at the map of De Uithof on page 141.

Lunch, coffee, and tea are served in the *Foyer* and in *Urban 2* of the Conference Center (see the map on page 142). During *Measuring Behavior 2012*, there is also a EARLI SIG conference taking place at the Conference Center. Please make sure that you take lunch, coffee and tea from the correct locations.

Posters and demonstrations are displayed in the area adjacent to the restaurant (see the map on page 72). Authors will present their work on Thursday. There will be an award for the best demonstration and for the best student presentation.

Detailed program schedule

A detailed description of each session including time schedule and speakers is given later throughout the program book. Please notice that sessions do not always end at the beginning of a lunch, coffee or tea break, but sometimes continue into the first part of the break.

Welcome and Farewell reception

Join our Welcome reception on Tuesday from 17:30 hours and meet other conference delegates for a drink at the Botanical Gardens! On the last day of *Measuring Behavior 2012* Farewell drinks will take place in the Conference Center, at 16:30 hours.

Registration

Registration takes place during the entire conference and also during the welcome reception.

Websites

Please have a look at www.measuringbehavior.org for the latest info, or for mobile phones and tablets on m.measuringbehavior.org (QR code on the right). Announcements about, for example, changes to the program are posted on those websites and also on Twitter: https://twitter.com/#!/mbconference. The hash tag for Twitter is #MB2012. You find information on how to login to the wireless network of the Conference Center on page 143.

Satellite event

On Monday August 27 there is a one day course in The Observer XT. For details, see http://www.noldus.com/training/the-observer-xt-product-training.

TUESDAY, AUGUST 28

Time	Megaron	Blauw	Rood	42	A	40
10:30-11:00			Coffee			
11:00-12:30	**Special session** Measuring Driver and Pilot Behaviour (p. 33) (11:00-17:00)	**User meeting** The Observer XT (p. 117)	**Tutorial** Integrated CNS and CV monitoring via telemetry in behavior studies (p. 101)	**Tutorial** Psychophysiology applications using a wireless and wired BIOPAC MP system (p. 102)	**Tutorial** Gesture coding with the NEUROGES - ELAN system (p. 103) (11:00-15:30)	**Tutorial** Keystroke logging in a Windows environment via Inputlog (p. 105)
12:30-14:00			Lunch break			
14:00-15:30	**Special session** continued Measuring Driver and Pilot Behaviour (p. 33) (11:00-17:00)	**Tutorial** Signal-specific automated data analysis and batch processing using scripts (p. 107)	**User meeting** FaceReader (p. 118)	**User meeting** Theme (p. 119)	**Tutorial** continued Gesture coding with the NEUROGES - ELAN system (p. 103) (11:00-15:30)	**User meeting** EthoVision XT (p. 120)
15:30-16:00			Tea break			

TUESDAY, AUGUST 28

Time	Megaron	Blauw	Rood	42	A	40
16:00-17:00	**Special session** continued Measuring Driver and Pilot Behaviour (p. 33) (11:00-17:00)	**Tutorial** The Observer XT: external data integration, selection and analysis (p. 108)	**Tutorial** Analyzing individual and inter-individual behavior with Theme: detection and analysis of hidden temporal patterns and experimental effects (p. 109)	**Tutorial** How to use Ubisense Real Time Location System (RTLS) in research (p. 111)	**Tutorial** The 'CamTouch' standard in rodent touchscreen behavioural testing (p. 112)	**Tutorial** The Sequence Analysis Toolkit for the advanced analysis of EthoVision XT data (p. 113)
17:30-19:00	*Welcome reception at the Botanical Gardens (p. 137)*					

WEDNESDAY, AUGUST 29

Time	Megaron	Blauw	Rood	42	A	40
09:00-09:55	**Keynote speaker** Professor Yadin Dudai (p. 25)					
10:00-10:40	**Special session** From classic to automated HomeCage phenotyping (p. 35) (10:00-12:10)	**Workshop** Tracking movement using GPS: showcases (p. 123) (10:00-12:30)	**General session** Measurement of human behavior and interaction in natural contexts (p. 63) (10:00-15:00)	**Special session** Measuring engagement: affective and social cues in interactive art and media (p. 37) (10:00-12:50)		**Demonstration** Three-dimensional behavioral phenotyping with Track3D (p. 83)
10:40-11:10	*Coffee break*					
11:10-12:10	**Special session** continued From classic to automated HomeCage phenotyping (p. 35) (10:00-12:10)	**Workshop** continued Tracking movement using GPS: showcases (p. 123) (10:00-12:30)	**General session** continued Measurement of human behavior and interaction in natural contexts (p. 63) (10:00-15:00)	**Special session** continued Measuring engagement: affective and social cues in interactive art and media (p. 37) (10:00-12:50)		**General session** Measurement of animal behavior in natural and semi-natural contexts (p. 65)
12:10-12:30	**General session** Advanced statistical and other analysis of behavioral data (p. 61)					

WEDNESDAY, AUGUST 29

Time	Megaron	Blauw	Rood	42	A	40
12:30-14:00			Lunch break			
14:00-15:40	**Special session** Tests for mild cognitive impairment (p. 39) (14:00-17:10)	**Workshop** GPS animal tracking: From movement tracks to behaviour analysis (p. 124) (14:00-17:10)	**General session** continued Measurement of human behavior and interaction in natural contexts (p. 63) (10:00-15:00)	**Special session** The role of behavior measurement in persuasive settings (p. 41)		**Special session** Social behavior and communication - from mice to primates (p. 43) (14:00-17:10)
15:40-16:10			Tea break			
16:10-17:10	**Special session** continued Tests for mild cognitive impairment (p. 39) (14:00-17:10)	**Workshop** continued GPS animal tracking: From movement tracks to behaviour analysis (p. 124) (14:00-17:10)	**General session** Automation and analysis of rodent tests in mazes (p. 66) (16:10-16:50)	**General session** Use of sensors and other techniques to automate the measurement of behaviors (p. 67)	**Demonstration** Decisim: A digital version of Information Display Board (IDB) experimental technique (p. 85)	**Special session** continued Social behavior and communication - from mice to primates (p. 43) (14:00-17:10)
18:00-21:00			Conference dinner (p. 138)			

THURSDAY, AUGUST 30

Time	Megaron	Blauw	Rood	42	A	40
09:00-09:55	**Keynote speaker** Professor Berry Spruijt (p. 27)					
10:00-10:40	**Special session** Electro-physiological correlates of behaviour (p. 46) (10:00-12:30)	**Special session** The development of a diverse battery of behavioral tasks using touchscreen equipped operant boxes for the study of cognition in the rodent (p. 49) (10:00-12:50)	**Special session** Technical support for analysis of human error in task performance (p. 51) (10:00-12:30)	**Workshop** Measuring behaviour in open spaces (p. 126) (10:00-13:20)	E-Track stakeholder meeting	**General session** Use of sensors and other techniques to automate the measurement of behaviors (p. 67) (10:00-12:30)
10:40-11:10			*Coffee break*			
11:10-12:30	**Special session** continued Electro-physiological correlates of behaviour (p. 46) (10:00-12:30)	**Special session** continued The development of a diverse battery of behavioral tasks using touchscreen equipped operant boxes for the study of cognition in the rodent (p. 49) (10:00-12:50)	**Special session** continued Technical support for analysis of human error in task performance (p. 51) (10:00-12:30)	**Workshop** continued Measuring behaviour in open spaces (p. 126) (10:00-13:20)	E-Track stakeholder meeting	**General session** continued Use of sensors and other techniques to automate the measurement of behaviors (p. 67) (10:00-12:30)

THURSDAY, AUGUST 30

Time	
12:30-14:00	*Lunch break*
13:00-14:30	*Posters (p. 71)*
14:30-17:00	*Scientific Tours (p. 129)*
18:00-22:00	*City tour and dinner at the wharf (p. 139)*

FRIDAY, AUGUST 31

Time	Megaron	Blauw	Rood	42	A	40
09:00-09:55	**Keynote speaker** Professor Maja Pantic (p. 29)					
10:00-10:40	**Special session** Measuring behavior in a game context (p. 53) (10:00-12:30)	**Special session** Progress in assessing animal welfare in relation to new legislation: opportunities for behavioural researchers (p. 55) (10:00-12:30)	**General session** Advanced statistical and other analysis of behavioral data (p. 61) (10:00-12:10)	**Special session** Fish in behaviour research: unique tools with a great promise! (p. 57) (10:00-12:30)	**Demonstration** Introducing SESAMO: system for experience sampling on mobiles (p. 86)	**Demonstration** Mindware Ambulatory 2.0 acquisitions and Mindware/Noldus systems integration enhancements (p. 89)
10:40-11:10	*Coffee break*					
11:10-12:50	**Special session** continued Measuring behavior in a game context (p. 53) (10:00-12:30)	**Special session** continued Progress in assessing animal welfare in relation to new legislation: opportunities for behavioural researchers (p. 55) (10:00-12:30)	**General session** continued Advanced statistical and other analysis of behavioral data (p. 61) (10:00-12:10)	**Special session** continued Fish in behaviour research: unique tools with a great promise! (p. 57) (10:00-12:30)		

FRIDAY, AUGUST 31

Time	Megaron	Blauw	Rood	42	A	40
12:50-14:00			*Lunch break*			
14:00-15:20	**General session** Measuring human-computer interaction (p. 69) (14:00-15:00)	**Demonstration** Indoor marker-less people tracking for real-time spatial behaviour detection (p. 90)		**Tutorial** The MBRose HM-2 enhancing animal welfare in high throughput systems (p. 114)		**Demonstration** Multimodal sensing system to enhance the safety of infants in the home environment (p. 92)
15:20-15:40			*Tea Break*			
15:40-16:30	Closing and Awards					
16:30-17:30			*Farewell Drinks (p. 139)*			

Keynote Speakers

Keynote Speakers

We are very pleased that the following renowned scientists will present a keynote lecture during the conference:

On Wednesday:

Professor Yadin Dudai

The Neurobehaviorist Paradox: When Knowing More is Less

Professor Yadin Dudai is the Sela Professor in Neurobiology at the Weizmann Institute of Science, Rehovot, Israel, the Albert and Balanche Willner Family Global Distinguished Professor of Neuroscience, New York University.

On Thursday:

Professor Berry Spruijt

Back to the Future II

Validation of Paradigms of the Past and Technology of the Future

Professor Berry Spruijt holds a Chair in Ethology and Welfare, which involves research into the sensitivity of reward systems and positive emotions. This research is aimed at the assessment of welfare from the perspective of the animal.

On Friday:

Professor Maja Pantic

Machine Analysis of Facial Behaviour

Professor Maja Pantic is Professor of Affective & Behavioural Computing and the leader of the Intelligent Behaviour Understanding Group (iBUG) at Imperial College London. She also holds an appointment as the Professor of Affective & Behavioural Computing at the University of Twente, Computer Science Department, The Netherlands.

Professor Yadin Dudai

The Neurobehaviorist Paradox: When Knowing More is Less

Date: Wednesday, August 29
Time: 09:00-09:55
Location: Megaron

About the speaker

Yadin Dudai is the Sela Professor in Neurobiology at the Weizmann Institute of Science, Rehovot, Israel, the Albert and Balanche Willner Family Global Distinguished Professor of Neuroscience, New York University. He studied biochemistry and genetics, with supplements in modern history, at the Hebrew University in Jerusalem, received his Ph.D. in Biophysics from the Weizmann Institute of Science, and conducted his postdoctoral training at the California Institute of Technology, Pasadena, where he had been on the team that pioneered neurogenetic analysis of memory. Over the years he has been a visiting Professor at many academic and research institutions in the US and Europe. With research interests that include brain and behavioral mechanisms of learning and memory, as well as their interaction with culture, Prof. Dudai has over 190 professional publications in the field of brain and memory, including key books in the discipline. He has been awarded numerous honors, is a member of professional bodies in the fields of science, education, and science-society interactions, and serves on the boards of scientific journals in the neural- and cognitive sciences.

Prof. Dudai also has professional experience in administration and R&D planning. He has held multiple posts in public and academic life, including Advisor on Science Policy in the Prime Minister's office in Jerusalem, member of the Granting and Planning Committee of the Israeli Council for Higher Education, member of the Israeli and International Pugawsh group, chair of the life-sciences teaching program and of the postdoctoral programs at the Feinberg Graduate School of the Weizmann Institute of Science, Dean of the Faculty of Biology and Chair of the Department of Neurobiology and of the Brain Research Centers at the Weizmann Institute. Prof. Dudai also serves as the scientific director of the Israeli Center for Research Excellence (I-CORE) in the cognitive sciences.

Keynote Lecture

The stunning developments in molecular and cellular methodologies bring behavioral analyses of so called "model organisms", ranging from worms to rodents, into the toolbox of every self-respecting biology laboratory. Yet in most cases, a dissonance is apparent between the depth of analyses of the molecular mechanisms on the one hand and that

of the behavior on the other. To this date it is not rare to encounter reliance on a single behavioral measure as if it is a litmus test, evading the complexity underlying the behavior in real-life. Paradoxically, however, some major findings linking molecules to behavior found their way into the cannon of the scientific literature because the lack of detailed knowledge about the behavioral complexity allowed the investigators to reach their conclusions. Had the behavior of model organisms been known at the same resolution as that of the experimenter, the authors would have been much more reluctant to link identified molecular mechanisms to distinct attributes of normal and pathological behavior. I will discuss the tension between knowing too little and knowing too much about behavior, and illustrate how in the neuroscience, one might wish to adhere to that level of resolution of behavior that is just useful enough to allow productivity without sacrificing realism on the one hand but boldness on the other.

Professor Berry Spruijt

Back to the Future II

Validation of Paradigms of the Past and Technology of the Future

Date: Thursday, August 30
Time: 09:00-09:55
Location: Megaron

About the speaker
Professor B.M. Spruijt holds a Chair in Ethology and Welfare, which involves research into the sensitivity of reward systems and positive emotions. This research is aimed at the assessment of welfare from the perspective of the animal. An important premis is that for the early detection or prevention of welfare problems one should measure the animal's appraisal of its environment rather than wait until post hoc pathological symptoms of chronic stress have been developed.

The need for welfare measurement in, for instance, livestock husbandry practices at a large scale, and the need for objective measurements inspired an already long existing interest in automation and valorisation of ethological procedures. Furthermore, also in behavioural neuroscience, behavioural pharmacology and toxicology an urgent need for less laborious and more reliable and reproducible methodology exists, being more animal friendly at the same time. For rodents, a system (PhenoTyper®) has been developed that prevents the influence of confounding factors such as the presence of human observers, transport before the test, etc. (Spruijt and de Visser, 2006; de Visser et al., 2007, 2006). It also allows the distinct assessment of reactions to novelty, anxiety and cognitive performance as the system is equipped with various programmable (aversive and rewarding) stimuli to activate various behavioural systems in the home cage.

The collaboration with Noldus Information Technology (Wageningen, The Netherlands) resulted in the founding of a company Delta Phenomics, offering contract research services for pharma, food companies and other research institutes.

Keynote Lecture
The first open field study was conducted in 1934; the issue of what is exactly measured in such an open field test has been addressed in the first review written in 1973 [1]. In a recent review Haller & Alicki [2] mention that the open field is still a frequently used test nowadays, despite innovative alternatives. The open field is used for exploratory behaviour, habituation, anxiety depression, schizophrenia, but also for more pharmacological

questions. The ethogram used has always been a topic of debate. Technological innovation in molecular biology, biochemistry electrophysiology and histochemistry have enormously facilitated the level of resolution of independent variables, the acceleration of production of results and yielding new read out parameters and new insights. Now, the question emerges: Are there comparable benefits from technological innovations for behavioural science in terms of new parameters, results and insights as well? What has changed in the course of 80 years?

The topic of this paper highlights the necessity to validate novel technologies in behavioural sciences, an attempt that is hampered by the fact that the classical behavioural tests are poorly validated.

References

1.   Kulkarni SK, Dandiya PC. Effects of antidepressant agents on open field behaviour in rats. Psychopharmacologia 33, 333-338 (1973).

2.   Haller J, Alicki M. Current animal models of anxiety, anxiety disorders, and anxiolytic drugs. Curr. Opin. Psychiatry. 25, 59-64 (2012).

The full abstract of the keynote lecture of professor Berry Spruijt is present in the Proceedings book.

Professor Maja Pantic

Machine Analysis of Facial Behaviour

Date: Friday, August 31
Time: 09:00-09:55
Location: Megaron

About the speaker

Maja Pantic received the M.S. and PhD degrees in computer science from Delft University of Technology, The Netherlands, in 1997 and 2001.

From 2001 to 2005, she was an Assistant and then an Associate professor at Delft University of Technology, Computer Science Department. In April 2006, she joined the Imperial College London, Department of Computing, UK, and continued working on machine analysis of human non-verbal behaviour and its applications to Human-Computer Interaction (HCI). In October 2010, she became Professor of Affective & Behavioural Computing and the leader of the Intelligent Behaviour Understanding Group (iBUG) at Imperial College London. From November 2006, she also holds an appointment as the Professor of Affective & Behavioural Computing at the University of Twente, Computer Science Department, The Netherlands.

In 2002, for her research on Facial Information for Advanced Interface (FIFAI), she received Innovational Research Award of Dutch Research Council as one of the 7 best young scientists in exact sciences in The Netherlands.

In 2007, for her research on Machine Analysis of Human Naturalistic Behavior (MAHNOB), she received a European Research Council Starting Grant (ERC StG) as one of 2% best junior scientists in any research field in Europe. She is also the Scientific Director of the large European project on Social Signal Processing.

In 2011, Prof. Pantic received the BCS Roger Needham Award, awarded annually to a UK based researcher for a distinguished research contribution in computer science within ten years of their PhD.

She is the Editor in Chief of the Image and Vision Computing Journal (IVCJ/ IMAVIS), Associate Editor of the IEEE Transactions on Systems, Man, and Cybernetics - Part B: Cybernetics (IEEE TSMC-B), Associate Editor of the IEEE Transactions on Pattern Analysis and Machine Intelligence (IEEE TPAMI), and a member of the Steering Committee of the IEEE Transactions on Affective Computing. She is a Fellow of the IEEE.

Prof. Pantic is one of the world's leading experts in the research on machine understanding of human behavior including vision-based detection, tracking, and analysis of human behavioral cues like facial expressions and body gestures, and multimodal analysis of human behaviors like laughter, social signals, and affective states. She is also one of the pioneers in design and development of fully automatic, affect-sensitive human-centered anticipatory interfaces, built for humans based on human models. She has published more than 150 technical papers in the areas of machine analysis of facial expressions and emotions, machine analysis of human body gestures, and human-computer interaction. Her work is widely cited and has more than 25 popular press coverage (including New Scientist, BBC Radio, and NL TV 1 and 3).

See also: http://ibug.doc.ic.ac.uk/~maja/

Keynote Lecture

Facial behaviour is our preeminent means to communicating affective and social signals. There is evidence now that patterns of facial behaviour can also be used to identify people. This talk discusses a number of components of human facial behavior, how they can be automatically sensed and analysed by computer, what is the past research in the field conducted by the iBUG group at Imperial College London, and how far we are from enabling computers to understand human facial behaviour.

Special Sessions

Special Sessions

Several Special Sessions will highlight the methodological and technical state of the art in important domains. These sessions are of interest to a broad range of conference delegates.

The conference contains the following special sessions:

- Measuring Driver and Pilot Behaviour (page 33)

- From Classic to Automated HomeCage Phenotyping (page 35)

- Measuring Engagement: Affective and Social Cues in Interactive Art and Media (page 37)

- Tests for Mild Cognitive Impairment (page 39)

- The Role of Behavior Measurement in Persuasive Settings (page 41)

- Social Behavior and Communication – From Mice to Primates (page 43)

- Electrophysiological Correlates of Behaviour (page 46)

- The Development of a Diverse Battery of Behavioral Tasks Using Touchscreen Equipped Operant Boxes for the Study of Cognition in the Rodent (page 49)

- Technical Support for Analysis of Human Error in Task Performance (page 51)

- Measuring Behavior in a Game Context (page 53)

- Progress in Assessing Animal Welfare in Relation to New Legislation: Opportunities for Behavioural Researchers (page 55)

- Fish in Behaviour Research: Unique Tools with a Great Promise! (page 57)

Measuring Driver and Pilot Behaviour

Date: Tuesday August 28
Time: 11:00-17:00
Location: Megaron
Chairs: Tobias Heffelaar (Noldus IT, Wageningen, The Netherlands), and
            Riender Happee (Delft University of Technology, Delft, The Netherlands)

Abstract

Human in the loop testing is an essential step in the development of road and airborne transport systems. Driving and flight simulators enable flexible, efficient, and safe testing of human machine interfaces and vehicle control systems. Results are commonly analysed using objective performance data combined with subjective evaluation. Such traditional analyses often do not clarify how drivers and pilots use and adapt to new systems and innovative methods are needed to retrieve more insight into human behaviour from simulator testing. This session will present such innovative methods including:

- Operator model identification, deriving models of the visuomotor, vestibulomotor, and neuromuscular control loops.

- Visual scanning in multitask conditions.

- Workload assessment and management.

- Behaviour observation and physiological measurements regarding driver visual focus (head and eye-tracking) driver actions (e.g., hand motion) and driver state (ECG, EMG, facial expression, etc).

Program

11:00   Driver and Pilot Identification and Model Parameter Estimation; Modelling the Visual, Vestibular, and Neuromuscular Control Loops Describing Driver and Pilot Behaviour
         R. Happee, H.J. Damveld, D.A. Abbink, M.M. van Paassen, and M. Mulder
         Delft University of Technology, Delft, The Netherlands.

11:20   Identifying Driver Behaviour in Steering: Effects of Preview Distance
         H.J. Damveld, and R. Happee
         Delft University of Technology, Delft, The Netherlands.

11:40   Can we Discriminate Safe and Unsafe Visual Scanning in Multitask Driving Conditions?
         P.M. van Leeuwen, J.C.F. de Winter, and R. Happee
         Delft University of Technology, The Netherlands.

12:00   Can We Trust Driver Behaviour Assessment? Examples from Research in
        Simulators and in the Field
        Katja Kircher, and Christer Ahlström
        The Swedish National Road and Transport Research Institute (VTI), Linköping,
        Sweden.

12:20   *Lunch break*

14:00   Advantages and Disadvantages of Driving Simulators: A Discussion
        J.C.F. de Winter, P.M. van Leeuwen, and R. Happee
        Delft University of Technology, The Netherlands.

14:20   Managing Driver Workload Using Continuous Driver Workload Assessment
        Michel Alders[1], Jasper Michiel van Hemert[1], Jasper Pauwelussen[2],
        Tobias Heffelaar[3,] Riender Happee[4], and Joop Pauwelussen[5]
        [1]Tom Tom, The Netherlands.
        [2]TNO, The Netherlands.
        [3]Noldus Information Technology, Wageningen, The Netherlands.
        [4]Delft University of Technology, Delft, The Netherlands.
        [5]HAN University of Applied Technology, The Netherlands.

14:40   Selection of a Measurement Battery for Human Behaviour Assessment in Serious
        Games in the Aviation Domain
        G.D.R. Zon
        National Aerospace Laboratory – NLR, Amsterdam, The Netherlands.

15:00   On Road Observational Survey of Seat Belt Use Among Young Drivers in Qatar
        Khaled Shaaban
        Qatar University, Doha, Qatar.

15:20   *Tea break*

15:40   Studying Driver's Lane Changing Behavior Under Heavy Traffic Volumes
        Khaled Shaaban
        Qatar University, Doha, Qatar.

16:00   Driver Model Identification Demo
        The special session ends with a live demonstration of driver behavior analysis.
        Participants will get to drive a scenario during which multiple measurements
        will be collected. At the end of the scenario drivers will be assessed on their
        driving performance and their driving style.

17:00   *End of session*

From Classic to Automated HomeCage Phenotyping

Date: Wednesday August 29
Time: 10:00-12:10
Location: Megaron
Chair: Holger Russig (TSE Systems GmbH, Bad Homburg, Germany)

During the past decade several automated systems have been designed and developed for an integrated high-throughput phenotyping of genetically modified mice. Several projects (including European Projects) have produced extensive archives of mouse mutant lines, that are held worldwide as ES cells, frozen sperms or embryos, and will be available for use by the wider scientific community as tools for genome annotation and as models of a variety of human diseases. However, the next and necessary step, which will add immense value to these collections, will be the accurate determination of behavioral, physiological and metabolic phenotypes using these automated systems which can result in potential new animal models. Thus, comprehensive phenotyping of thousands of mutant or transgenic mouse lines will be an immense effort, requiring input from many laboratories and mouse clinics across the world. For the process of phenotyping to be comparable across strains and between centers it would be absolutely necessary to develop and validate Standard Operating Procedures (SOPs) combined with attempts to improve inter-laboratory comparability. In parallel, efficiency of such standardized screens needs to increase dramatically. The goal of this symposium is to summarize results of high-throughput phenotyping by using standardized protocols in novel high-throughput automated home cage environments allowing single or group-housing of animals. Speakers will present results and conclusions on different aspects automated phenotyping of motoric and cognitive function.

Program

10:00   Combining Classical and Automated Neurophenotyping in Mice and Rats
          S. von Hörsten, A.-C. Plank, Y. Urbach, and F. Canneva
          Friedrich-Alexander-University Erlangen-Nürnberg, Erlangen, Germany.

10:20   A SWOT Analysis on Automating "Measuring Behaviour"
          B.M. Spruijt, and R.C. de Heer
          Delta Phenomics, Utrecht, The Netherlands.
          Utrecht University, Utrecht, The Netherlands.

10:40   *Coffee break*

11:10   Comparison of Home-Cage Activity Systems Using Transgenic Mouse Lines and
         Pharmacological Interventions
         L. Robinson, and G. Riedel
         University of Aberdeen, Aberdeen, Scotland, United Kingdom.

11:30   Home-cage Automated Cognitive Phenotyping in Mice
         Valter Tucci
         Istituto Italiano di Tecnologia, Genova, Italy.

11:50   Mouse Phenotyping in the IntelliCage: From Spontaneous Behavior to Cognitive
         Function
         D.P. Wolfer[1,2], V Voikar[3], E. Vannoni[1], G. Colacicco[1], and H.P. Lipp[1]
         [1]University of Zurich, Zurich, Switserland.
         [2]ETH Zurich, Zurich, Switserland.
         [3]University of Helsinki, Helsinki, Finland.

12:10   *End of session*

Measuring Engagement: Affective and Social Cues in Interactive Art and Media

Date: Wednesday, August 29
Time: 10:00-12:50
Location: 42
Chair: Anton Nijholt (University of Twente, Enschede, The Netherlands), and
             Alessandro Vinciarelli (University of Glasgow, Glasgow, United Kingdom)

In game or entertainment environments the 'user' may take part in events that require bodily interaction with sensor-equipped environments. Embedded motion-capture and gyroscopic devices capture movements. Thanks to Nintendo's remote WII, motion-controlled games are now wide spread. Cameras, microphones, pressure sensors, proximity sensors have been added. Thanks to Microsoft's Xbox Kinect whole body interaction games have become popular. Apart from entertainment, such sensor equipped and game oriented environments can be designed to improve health conditions, sports performance, or (therapeutic) physical rehabilitation.

More and cheap sensors are becoming available, allowing a game to obtain more information about a player, in particular his or her bodily and emotional conditions. In addition, these sensors allow more input modalities for interaction with an environment. There are many examples of advanced games where posture, gestures, body movements, facial expressions and brain activity are among the input modalities that are used to control a game. Control can be direct, but it can also be mediated (for example through a balance board, a tangible or a wearable). Hence, observations of the face and body can be used in different forms, depending on whether the user has the initiative to control the interaction or whether the application takes the initiative to adapt itself to the user.

In this special session 'engagement' is the keyword. We will focus on measuring engagement in order to allow adaptation of a game or entertainment environment. That may include the appearance of the physical and virtual game and game environment, availability and quality of interaction modalities, feedback by actuators, game narrative, and game strategy. Cameras, microphones, position and proximity sensors, and (neuro-) physiological sensors allow us to collect behavioral information from one or more people performing in the environment. Obviously, we can also collect information before and after their performance, using interviews and questionnaires. In the presentations in this special session the various ways engagement information can be collected and used are surveyed.

Sponsors
This session is sponsored by the European FP7 Network of Excellence (NoE) SSPNet on Social Signal Processing.

Program

10:00   On Making Engagement Tangible
         Egon L. van den Broek
         TNO, Delft, University of Twente, Enschede, Radboud University Medical Center
         (UMC) Nijmegen, The Netherlands.

10:20   Measuring Fun and Enjoyment of Children in a Museum:Evaluating the
         Smileyometer
         F. van der Sluis, E.M.A.G. van Dijk, and L.M. Perloy
         University of Twente, Enschede, The Netherlands.

10:40   *Coffee break*

11:10   Making Ambient Spaces into Playgrounds
         Dennis Reidsma, Daniel Tetteroo, and Anton Nijholt
         University of Twente, Enschede, The Netherlands.

11:30   Building Corpora of Bodily Expressions of Affect
         Marco Pasch, and Monica Landoni
         University of Lugano, Lugano, Switzerland.

11:50   Video-Based Multi-person Human Motion Capturing
         Nico van der Aa[1], Lucas Noldus[1], and Remco Veltkamp[2]
         [1]Noldus Information Technology, Wageningen, The Netherlands.
         [2]Utrecht University, Utrecht, The Netherlands.

12:10   What can Body Movement tell us about Players' Engagement?
         N. Bianchi-Berthouze
         University College London, London, United Kingdom.

12:50   *End of session*

Tests for Mild Cognitive Impairment

Date: Wednesday August 29
Time: 14:00-17:10
Location: Megaron
Chairs: Paolo Fabene, and Giuseppe Bertini (University of Verona, Verona, Italy)

Abstract

Mild Cognitive Impairment (MCI) is a transitional state between normal aging and early dementia, and is commonly considered as a prodromal stage of Alzheimer's disease (AD), although not all cases of MCI develop into AD. The analysis of the current literature reveals an incidence of MCI of 20 to 70 per 1000 person-years, and the importance of MCI assessment as a diagnostic tool is steadily increasing. Although MCI is associated with a variety of symptoms, memory deficits are a dominant feature of the syndrome, and several different aspects of the memory function are routinely tested in order to contribute to the diagnosis.

The use of animal models is essential to understand the brain mechanisms of cognition and its deficits. To successfully translate findings from animal models to humans, tests should tap into comparable cognitive domains, independent of the apparent similarity of animal versus human tasks. In this symposium we bring together the experience gained in the context of Pharmacog, a European research program funded under the Innovative Medicines Initiative, aimed at addressing the lack of impact that translational medicine has thus far made in AD drug discovery. We will discuss the use of commonly adopted animal models and cognitive tasks in both preclinical and clinical models of MCI. Pitfalls and benefits of the different approaches will be discussed, and particular emphasis will be placed on the translatability of each of the described methods.

Program

14:00   The Radial Arm Maze (RAM) for the Evaluation of Working and Reference
            Memory Deficits in the Diurnal Rodent *Octodon degus*
            E. Tarragon[1], L. Lopez[1], F. Ros-Bernal[2], J.E. Yuste[1], V. Ortiz-Cullera[1], E. Martin[3], E.
            Schenker[4], F. Aujard[5], R. Bordet[6], J.C. Richardson[7], and M.T. Herrero[1]
            [1]School of Medicine, University of Murcia, Murcia, Spain.
            [2]University Jaume I of Castellon, Castelló de la Plana, Spain.
            [3]University of Albacete, Albacete, Spain.
            [4]Institut de Recherche Servier, France.
            [5]Centre National de la Recherche Scientifique, UMR, France.
            [6]University Lille Nord de France, Lille, France.
            [7]GlaxoSmithKline R&D China, U.K. Group, United Kingdom.

14:20   Evaluating MCI in AD Patients and the Effect of Symptomatic Drug Treatment
         J. Deguil, and R. Bordet
         University of Lille 2, Lille, France.

14:40   The Circular Platform Task for Evaluation of Mci in the Grey Mouse Lemur
         (*Microcebus murinus*), a Non-human Primate Model
         A. Rhaman[1], F. Pifferi[1], S. Languille[1], J.L. Picq[2], and F. Aujard[1]
         [1]CNRS UMR 7179, MNHN, Brunoy, France.
         [2]Université Paris 8, St-Denis, France.

15:00   The Use of Touchscreens as a New Tool in Mouse MCI Profiling
         S.L Dix[1], S. Billa[1], D. Delotterie[2], C. Dorner-Ciossek[2], J. Gartlon[3], T. Jacobs[4],
         C. A. Jones[4], L. Lerdrup[5], A. Marti[2], and J. C. Talpos[4]
         [1]Eli Lilly, Lilly Research Centre, Windlesham, United Kingdom.
         [2]Boehringer Ingelheim Pharma, Biberach, Germany.
         [3]Eisai Ltd., European Knowledge Centre, Hatfield, UK.
         [4]Janssen Research and Development, Beerse, Belgium.
         [5]Synaptic transmission, H. Lundbeck, Valby, Denmark.

15:20   New Insight for the Study of Mild Cognitive Impairment: the Novel Object
         Recognition Task and the Single Day Morris water Maze in Total Sleep Deprived
         Rats
         M. Pellitteri, V. Colavito, E. Moscardo, F. Schio, B. Salvetti, M. Bentivoglio,
         P.F. Fabene, and G. Bertini
         University of Verona, Italy.

15:40   *Tea break*

16:00   Whole Body Vibration and Spatial Learning: c-Fos and ChAT as Neuronal
         Correlates of Cognitive Improvements
         E.A. Van der Zee[1] , G. Riedel[2], F. Postema[1], B.J. Venema[1], and J.N. Keijser[1]
         [1]University of Groningen, The Netherlands.
         [2]University of Aberdeen, United Kingdom.

16:20   Discussion

17:10   *End of session*

The Role of Behavior Measurement in Persuasive Settings

Date: Wednesday, August 29
Time: 14:00-15:40
Location: 42
Chair: Robbert-Jan Beun (Utrecht University, Utrecht, The Netherlands)

Currently, an interest emerges in developing automated systems that provide behavior changing support to patients and consumers without human interference. In these systems, methods from so-called persuasive technology are applied to implement effective communication strategies that support self-care, adherence to prescribed exercises and sustainable behavior change. These systems provide for anonymous and frequent monitoring, feedback and counseling that would otherwise be impossible.

The goal of this special session is to investigate the role of automated sensor and behavior measurement in persuasive systems, in particular systems that are aimed at sustainable behavior change of humans, such as virtual coaching and training systems. Automated measuring of behavior by sensor information may have important advantages over symbolic messages. First, data can be collected in a more objective and reliable way than when intentionally entered by human individuals; second, the individuals need not to focus on the measurement process and can, therefore, avoid the tedium of tracking their own performance and do not have to worry about the timing of the measurement; third, it enables individuals to become aware of otherwise unobservable behavior; fourth, frequent feedback of a device often provides motivation to perform the desired activity. As a result, the process may give the persuaded individual, the system and third parties relevant information for diagnosis, understanding and exercise performance and so substantially improve the quality of the interaction.

This special session is intended to bring together a group of researchers in the field of automated coaching and other behavior changing applications. Questions concentrate on, but will not be restricted to, sensor types and behavioral measurements in well-known persuasive settings, the reliability of behavioral measurement, the influence of the behavioral information on the interaction (in particular the timing, modality and content of messages), and the integration of symbolic input and sensor data. In this session, various persuasive applications will be discussed, ranging from automated sleep therapy to activity coaching.

Program

14:00   Inter-usability and the Presentation of Multi-modal Feedback for Physical
         Activity and Diabetic Type II Patients
         Randy Klaassen, and Rieks op den Akker
         University of Twente, Enschede, The Netherlands.

14:20   A Context-Aware Adaptive Feedback Agent for Activity Monitoring and Coaching
         H. op den Akker[1,2], V.M. Jones[2], L.S. Moualed[1,3], and H.J. Hermens[1,2]
         [1]Roessingh Research and Development, Enschede, The Netherlands.
         [2]University of Twente, Enschede, The Netherlands.
         [3]University of Twente, Enschede, The Netherlands.

14:40   It's LiFe!: A Monitoring- and Feedback Tool to Stimulate Physical Activity,
         embedded in Primary Care
         S. van der Weegen, R. Verwey, M.D. Spreeuwenberg, H.J. Tange, T. van der
         Weijden, and L.P. de Witte
         Maastricht University, Maastricht, The Netherlands.

15:00   Unobtrusive Sleep Monitoring
         Reinder Haakma, and Robbert-Jan Beun
         Philips Research, Eindhoven, The Netherlands.
         Utrecht University, Utrecht, The Netherlands.

15:20   Unobtrusively Measuring Stress and Workload of Knowledge Workers
         S.J. Koldijk[1,2], M.A. Neerincx[2], and W. Kraaij[1,2]
         [1]ICIS, Radboud University, Nijmegen, The Netherlands.
         [2]TNO, The Netherlands.

15:40   *End of session*

Social Behavior and Communication – From Mice to Primates

Date: Wednesday, August 29

Time: 14:00-17:10

Location: 40

Chairs: Markus Wöhr (Philipps-University of Marburg, Marburg, Germany), and
Marcel van Gaalen (Abbott GmbH & Co. KG , Ludwigshafen, Germany)

Abstract

Social interactions and communication are among the most complex forms of behaviors. Analyzing these behaviors remains a time consuming challenge which requires practice, skills and patience. However, new techniques became available to speed up analysis and standardize methods. This is particularly relevant as social behaviors are a very prominent part of the behavioral repertoire in many species. In humans, a variety of social behaviors are disturbed in neurological and psychiatric disorders such as schizophrenia, Alzheimer's disease and autism. The seven speakers of this symposium will present methods that allow reliable assessment of social behavior and communication – from mice to primates. They will demonstrate improved techniques for analysis, but also give examples of behaviors that can so far only be analyzed by human observations.

Marcel van Gaalen will give examples of measurement of dominant submissive behavior and various forms of aggression in mice and rats. He will show that an increased understanding of the pharmacology of these behaviors is relevant for drug discovery for CNS disorders. In addition, he will give examples of experimental compounds that may have potential for treating social interaction and communication disruptions in CNS disorders.

Louk Vanderschuren will show that social play is the most characteristic component of the social repertoire of young mammals, which is of great importance for the development of physical, cognitive and social capacities. Social play is highly rewarding and an incentive for maze learning, lever pressing and place conditioning in rats and primates. It is modulated through neurotransmitters implicated in the motivational and hedonic properties of food and drug rewards, such as endogenous opioids, dopamine and endocannabinoids.

Michael Lukas will describe how behavioral assays like the social recognition/ discrimination and the social preference paradigms can be used to study elementary social abilities that are essential for functioning social communication such as social preference and individual social memory. Such social behaviors are regulated by highly conserved neuropeptides, like vasopressin, oxytocin, and the newly described neuropeptide S. Michael Lukas will present examples showing how social recognition/discrimination and the social preference can be combined with central pharmacological manipulations and in vivo

microdialysis to investigate the involvement of relevant neuropeptides.

Markus Wöhr will show how measuring ultrasonic vocalizations and scent marks can be applied to study communication deficits in mouse models of autism. Autism is a severe neurodevelopmental disorder characterized by three core symptoms: 1) abnormal reciprocal social interactions, 2) deficits in social communication, and 3) repetitive behaviors. While reliable behavioral assays for abnormal reciprocal social interactions and repetitive behaviors are available since several years, relevant behavioral assays in the field of communication became available only very recently. Ultrasonic vocalizations and scent marks are particularly interesting as they may help to detect acoustic and olfactory communication deficits, respectively. Markus Wöhr will describe under which conditions ultrasonic vocalizations and scent marks can be recorded and what equipment is needed.

Dominik Seffer will give examples how playback experiments can be used to study social behavior and ultrasonic communication in rats. Different types of rat ultrasonic vocalizations serve distinct communicative functions, eliciting opposite behavioral and neural responses. Dominik Seffer will present a recently developed behavioral paradigm to study social approach behavior elicited by appetitive high-frequency ultrasonic vocalizations and will provide experimental data showing that the paradigm is sensitive for detecting differences in social experience during early life.

Hans Slabbekoorn will address how standardized behavioral tests on temporary captive animals can provide an index of personality. He will argue that such a quantification of personality traits can help in the interpretation of avian playback results in natural territories.

Finally, Kurt Hammerschmidt will present a description of the vocal repertoire of nonhuman primates, which consists of a limited number of call types that vary substantially within these categories. One can find all variation from highly graded to more or less distinct vocal repertoires, and it may be unavoidable that call variants at category boundaries are difficult to categorize. This must not be a problem for animals which grew up in the same community, because the efficiency of categorical perception allows the receiver to respond correctly even in graded signaling systems. However, to understand the evolution of acoustic communication and to compare studies in bioacoustics it is necessary to have comparable units, or to know how different categorization levels influence the outcome of an acoustic analysis. Kurt Hammerschmidt will discuss different ways to establish a reliable categorization.

Program

14:00   Studying the Neurobehavioral Mechanisms of Social Behavior in Adolescent Rats
L.J.M.J. Vanderschuren[1,2], E.J.M. Achterberg[1], P.J.J. Baarendse[2], R. Damsteegt[2], L.W.M. Van Kerkhof[2], and V. Trezza[3]
[1]Utrecht University, Utrecht, The Netherlands.
[2]University Medical Center Utrecht, Utrecht, The Netherlands.
[3]University "Roma Tre", Rome, Italy.

14:20   Ultrasonic Communication in Mouse Models of Autism
Markus Wöhr
Philipps-University of Marburg, Marburg, Germany.

14:40   Ultrasonic Communication in Rats: Insights from Playback Studies
Dominik Seffer, Rainer K.W. Schwarting, and Markus Wöhr
Philipps-University of Marburg, Marburg, Germany.

15:00   Categorizing Vocal Repertoires of Nonhuman Primates
Kurt Hammerschmidt, and Philip Wadewitz
German Primate Center Göttingen, Germany.

15:20   Central Neuropeptides Social Recognition, Social Preference and Social Fear in Rodents
M. Lukas, I. Toth, and I.D. Neumann
University of Regensburg, Regensburg, Germany.

15:40   *Coffee break*

16:10   Measuring Behavioural Changes to Assess Anthropogenic Noise Impact on Singing Birds
H. Slabbekoorn
Leiden University, The Netherlands.

16:30   Measuring Social Behavior in Drug Discovery
Marcel van Gaalen, Thomas Appl, and Anton Bespalov
Neuroscience Research, GPRD, Abbott, Ludwigshafen, Germany.

16:50   Individual Differences in Fo Imitation: Causes and Effects
M. Postma, and E. Postma
Tilburg University, Tilburg, The Netherlands.

17:10   *End of session*.

Electrophysiological Correlates of Behaviour

Date: Thursday, August 30
Time: 10:00-12:30
Location: Megaron
Chairs: Bettina Platt (University of Aberdeen, Aberdeen, United Kingdom), and
            Karsten Wicke (Abbott GmbH & Co KG, Ludwigshafen, Germany)

Abstract

This symposium explores novel ways to monitor and analyse physiological brain activity in awake rodents and humans, for basic research purposes that addresses key aspects in cognitive and sleep research, as well as medically oriented applications with respect to the pharmacology and translational value of electrophysiological activity, and the use of biosignals for improved human-machine interfaces and a web-based platform for diagnosis of CNS conditions in humans.

Specifically, the first presentation by Nadine Becker and Matt Jones (University of Bristol, UK) explores how spatial information acquired in a T-maze task is encoded in firing patterns of cortical and hippocampal areas, monitored in rats via chronically implanted electrode arrays, and discusses how area- and task-component-specific firing patterns can be monitored and deciphered, and what this implies for our understanding of cognitive processes in specific brain areas.

The second presentation by Valter Tucci (Instituto Italiano di Tecnologia, Genoa, Italy) investigates how genetic variables determine biological clocks and how information is time-stamped in the mouse brain. He will discuss the interplay between different time-keeping mechanisms on the basis of mouse models with mutations of clock genes, and how these affect the ability to time intervals at different timescales, related to sleep, circadian rhythms and an experimental timing task. Behavioural analysis was combined with long-term electrophysiological measures in the home-cage and uncovered close relations between timing behaviors and sleep physiology.

The third presentation by Lianne Robinson and Gernot Riedel (University of Aberdeen, UK), embarks on pharmacological aspects of electrophysiological and behavioural profiles recorded in chronically implanted rodents. The talk will explore how sleep-wake cycles, and vigilance stage-specific EEG parameters, are affected by cannabinoids in mice and rats, and how this can be exploited for cognitive and therapeutic research.

Continuing with this line of research, Karsten Wicke (Abbott GmbH & Co KG, Ludwigshafen, Germany) will present results from rat sleep EEG recordings that represent a back-translation from clinical human data to preclinical experiments and are used as a predictive

translational model for the clinical potential of new pharmacological mechanisms. The antidepressants potential of drugs affecting the glutamatergic system will be discussed.

The remaining two presentations venture further into human and clinically oriented applications. Felix Putze and Tanja Schultz (Karlsruhe Institute of Technology, Germany) will present developments in the area of 'cognitive technical systems', which utilises a range of biosignals emitted from the human body such as EEG and muscle activity. These signals are measured and interpreted by machines and offer an inside perspective on human mental activities, intentions, or needs and thus complements the traditional way of observing humans from the outside. Current and future applications for this technology will be discussed.

Finally, Björn Crüts (BrainMarker, The Netherlands) will introduce an internet-based platform for qEEG-based diagnosis of neurological and neurodegenerative disorders. He will focus particularly on examples regarding EEG markers for depression and respective treatments, to explain how their database and algorithms aid diagnosis and therapeutic applications in hospitals.

Together, these presentations span a wide range of technical and methodical approaches and their applications, and thus provide an exciting overview of a currently booming are of research and development.

Program

10:00   Neural Correlates of a Spatial Learning Task in Parietal Cortex, Prefrontal Cortex and Hippocampus
N. Becker, and M.W. Jones
University of Bristol, Bristol, United Kingdom.

10:20   Sleep, Circadian Rhythms and Interval Timing
Valter Tucci
Istituto Italiano di Tecnologia, Genova, Italy.

10:40   *Coffee Break*

11:10   Modulation of Sleep-Wake Cycles in Mice and Rats with Cannabinoids
L. Robinson, A. Plano, A. Goonawardena, B. Platt, and G. Riedel
University of Aberdeen, Aberdeen, Scotland, United Kingdom.

11:30   NMDA Receptor Antagonists Induce Antidepressant-like Sleep Changes: A Translational Model from Rats to Humans?
K.M. Wicke, and G. Gross
Neuroscience Research, GPRD, Abbott GmbH & Co KG, Ludwigshafen, Germany.

11:50   Cognitive Technical Systems
         Felix Putze, and Tanja Schultz
         Karlsruhe Institute of Technology, Karlsruhe, Germany.

12:10   Quantitative EEG for the diagnosis of disease states
         Björn Crüts[1], and Pascal Römkens[2]
         [1]Brainmarker BV, Gulpen, The Netherlands.
         [2]Atrium Medical Centre, The Netherlands.

12:30   *End of session*

The Development of a Diverse Battery of Behavioral Tasks Using Touchscreen Equipped Operant Boxes for the Study of Cognition in the Rodent

Date: Thursday August 30
Time: 10:00-12:50
Location: Blauw
Chairs: John Talpos (Janssen Research and Development, Beerse, Belgium)

Abstract

The use of touchscreen equipped operant boxes for the study of cognition in rodents has grown in popularity since the mid-1990s, when the first publications using the method appeared. The combination of numerous stimuli types and the large number of response rules that may be implemented when using a touchscreen equipped operant box affords the user much of the flexibility of a maze-based hand testing approach, with the consistency and throughput associated with operant testing. Accordingly, touchscreen technology is currently being used by a growing number of academic and industrial research groups. These groups are reinventing existing approaches, and creating the next generation of behavioral tasks to study cognition in the rodent.

This session will provide a general overview of the touchscreen approach, and demonstrate how it is making a unique contribution to the study of basic cognitive function and central nervous system disorders. Four areas will be discussed in additional detail. First is use of the touchscreen approach to study spatial "cognition" and neurogenesis using the trial unique non-match to location (TUNL) task and related paradigms, as well as a test of spatial reversal learning. Moreover this session will bridge the species boundary by also discussing how spatial cognition is studied in non-human primates using the touchscreen-based self ordered spatial search paradigm. Secondly, because one of the most frequently used tasks within the touchscreen apparatus is the "visual discrimination", the utility of visual discriminations in studying animal models of schizophrenia will be discussed, as will the cross-site validation of pharmacological manipulations that is occurring within the NEWMEDS academic-industrial collaboration as part of the IMI (www.newmeds-europe. com). Next (3), the use of the touchscreen approach in studying cognitive flexibility will be considered with a focus on reversal learning and other novel developments. Finally (4), an overview of a touchscreen based paired associates learning (PAL) paradigm will be presented with a focus on its utility in the study of schizophrenia. This presentation will discuss the influence of specific brain regions on behavior in PAL, pharmacological sensitivity, as well steps that have been taken towards developing an acute model of schizophrenia for drug discovery.

Through this diverse combination of topics and speakers, we hope to provide a firsthand practical account of how this technology is being applied in academic and industrial settings to enhance research methods for the study of cognition and novel treatments for disease. The session will close with a dedicated question and answer period where attendees will have the chance to ask speakers questions of a practical and theoretical nature regarding their research using the touchscreen approach, and to allow a more thorough discussion of ongoing touchscreen activities with various IMI consortia (www.imi.europa.eu).

Program

10:00   The Touchscreen Cognitive Testing Method for Mice And Rats
         Tim Bussey
         University of Cambridge, Cambridge, United Kingdom.

10:40   Coffee break

11:10   Perspectives on the Non-Human Primate Touchscreen Self Ordered Spatial
         Search Paradigm
         Jane Sutcliffe, and Daniel Hutcheson
         Maccine Pte Ltd, United Kingdom.

11:30   Assessment of Behavioural Flexibility and Executive Function Using Novel
         Touch Screen Paradigms
         A.C. Mar[1], J. Alsiö[1], A. Haddenhorst[1], C.U. Wallis[1], A. Trecker[2], L.M. Saksida[1],
         T.J. Bussey[1], and T.W. Robbins[1]
         [1]University of Cambridge, Cambridge, United Kingdom.
         [2]Heinrich-Heine Universitaet Duesseldorf, Germany.

11:50   How Can a Touchscreen Based Visual Discrimination Help to Better
         Characterize Rodent Models of Schizophrenia?
         L. Fellini
         Janssen Research and Development, Beerse, Belgium.

12:10   Pharmacological Manipulation of a Rodent Paired Associates Learning (Pal)
         Paradigm, and other Tasks for Use in Disease Research
         J. C. Talpos
         Janssen Research and Development, Beerse, Belgium.

12:30   Pannel discussion with the presenters of the papers in this session and Sophie
         Dix (Eli Lilly, United Kingdom).

12:50   *End of session*

Technical Support for Analysis of Human Error in Task Performance

Date: Thursday, August 30
Time: 10:00-12:30
Location: Rood
Chairs: Ronald Poppe (University of Twente, Enschede, The Netherlands),
             Tobias Heffelaar (Noldus Information Technology, Wageningen, The
             Netherlands), and Jordi Bieger (Vicar Vision, Amsterdam, The Netherlands)

Abstract

Safety, efficiency and worker well-being often depend on correct task performance. Yet, the structured or even repetitive nature of these tasks can lead to a worker's loss of attention, fatigue, stress or other mental states that negatively affect the performance of the work. Such states are more likely to cause the introduction of human errors, with associated risk.

By bringing sensor technology into the work place, human behavior can be analyzed and interpreted automatically. Cameras can observe human posture, head movement and gestures. From these, the task at hand can be analyzed. Eye trackers can determine the worker's focus of attention. Microphones can pick up subtleties in the worker's voice. From these measurements, deviations from normal task flow or worker's alertness can be identified at an early stage, and might trigger alarms or start check or safety procedures.

As the sensing and interpretation technologies are currently at the point of maturing, there is a growing interest to apply these techniques at the workplace. This requires the development of integrated solutions of automatic human error assessment and prevention that combine sensor technology and robust interpretation with knowledge of the task and the user. These solutions are starting to find their place in automation industry, call centers and assembly lines. Also, desktop-related working environments can benefit from such solutions. In addition, there is a growing demand for these techniques to be applied in training and simulation (e.g. driving simulators), and in consumer products (e.g. ATMs).

In this special session, we aim at bringing together an audience from both academia and industry. We highlight recent advances from a technical point of view, and requirements from an industry perspective. In our discussion, we focus on current challenges and collaborations and ways to address these.

Program

10:00   Watching People Making Errors: Vision Architectures for Monitoring Task
           Performance
           Marten den Uyl
           Vicar Vision, Amsterdam, The Netherlands.

10:20   Measuring Electrodermal Activity of Both Individuals With Severe Mental
           Disabilities and Their Caretakers During Episodes of Challenging Behavior
           Matthijs Noordzij
           University of Twente, Enschede, The Netherlands.

10:40   *Coffee Break*

11:10   The Neural Origins and Applications of Human Error Processing
           Tsvetomira Tsoneva
           Philips Research, Eindhoven, The Netherlands.

11:30   Dealing with False Alarms in Camera Surveillance
           Frank Kooi
           TNO Behavioural & Social Sciences, Soesterberg, The Netherlands.

11:50   Eliciting Control Errors and Measuring Error Correlates
           Michael Lindenthal
           Münster University of Applied Sciences, Münster, Germany.

12:10   Generic Tool for Online Classification of Physical and Mental Workload
           Christoph Hintermüller, Günther Edlinger, and Christoph Guger
           Guger Technologies OG, Graz, Austria.

12:30   *End of session*

Measuring Behavior in a Game Context

Date: Friday August 31
Time: 10:00-12:30
Location: Megaron
Chairs: Christof van Nimwegen, and Herre van Oostendorp (Utrecht University,
             Utrecht, The Netherlands)

Entertainment games and serious games are becoming more and more popular. As a consequence there is an increasing need to get a more precise understanding of the effects of games, during playing the game (on-line) but also after the game (off-line). Investors and funding organizations are demanding clear evidence that serious games actually work. Fortunately there is evidence available, though sound empirical evidence is still scarce. In this session we will present and discuss different ways of measuring behavior in the context of games, on-line and off-line. This behavior can involve cognitive, attitudinal and emotional aspects (such as player experience), but also transfer to behavior in real life, particularly the last one is important because that is often the ultimate goal of serious games.

The first presentation will involve assessing personality traits in the context of games. Due to their involving nature games seem to be able to elicit natural reactions of players and to suppress social desirable behavior. Van Nimwegen will present results of a study where the personality trait Compliance of players was assessed in game context.

Games enable in principle to continuously assess players on-line. However it is not immediately clear which on-line measures should be used. In the second presentation Van der Spek will conclude that in-game measures (e.g. game scores) do not automatically tell the complete picture. This (in-game scoring) measure will be compared with several other cognitive and affective self-report measures and related to different types of game design interventions.

Often serious games, have as aim to improve the acquisition of knowledge, not only declarative knowledge but also deeper knowledge, often indicated by the term mental models. In the third presentation Wouters will discuss a method which unravels the underlying knowledge structure of a player. This method enables an in-depth understanding of the concepts and their relationships that are regarded as important in the domain of the game.

Important of course is also to have methods available to improve game design in such a way that gaming experience is optimized. The fourth paper by Zaman will discuss research on a tool to measure gamers' motivation, preference and experience and connecting this to

specific design elements.

Program

10:00   Assessing the Personality Trait Compliance in a Game Context
         Christof van Nimwegen[1], Herre van Oostendorp[1], Alec Serlie[2], and
         Joost Modderman[2]
         [1]Utrecht University, Utrecht, The Netherlands.
         [2] GITP Research, Rotterdam, The Netherlands.

10:20   Effects of Playing a Serious Game: a Comparison of Different Cognitive and
         Affective Measures
         Erik D. van der Spek
         Eindhoven University of Technology, Eindhoven, The Netherlands.

10:40   *Coffee break*

11:10   Structural Knowledge Assessment: Change in Cognitive Structure due to
         Playing a Serious Game
         P. Wouters
         Utrecht University, Utrecht, The Netherlands.

11:50   Player-Centric Game Design: Adding UX Laddering to the Method Toolbox for
         Player Experience Measurement
         Bieke Zaman[1], and Vero Vanden Abeele[2]
         [1]IBBT-CUO, KU Leuven, Belgium.
         [2]GROUP T-Leuven Engineering College, Leuven, Belgium.

12:30   *End of session*

Progress in Assessing Animal Welfare in Relation to New Legislation: Opportunities for Behavioural Researchers

Date: Friday August 31
Time: 10:00-12:30
Location: Blauw
Chair: Penny Hawkins (Research Animals Department, RSPCA, Southwater, United Kingdom)

Abstract

The need for effective assessment and retrospective review of laboratory animal welfare, including recognition of pain, suffering or distress, is recognized in many laws and guidelines that regulate animal use. For example, the US Institute for Laboratory Animal Research (ILAR) Guide emphasizes the importance of post-approval monitoring that includes regular review of adverse effects, and the new European Union (EU) Directive that regulates laboratory animal care and use requires retrospective assessment and reporting of the level of suffering experienced by animals.

Accurately recognizing, recording, analyzing and reporting animal behaviors are all important in order to conduct a proper retrospective assessment of the level and nature of suffering, and behavioral researchers are clearly in an especially good position regarding the ability to achieve this. They have also contributed greatly to our knowledge of behaviors associated with negative states, such as discomfort, pain, anxiety and distress – and positive wellbeing – in a wide range of species, as well as to the development of accessible techniques for observing and monitoring animals. Increased dialogue between behavioral researchers and those working in other fields would therefore be helpful in improving the standard of assessments of laboratory animal behavior. The outcome would be not only better animal welfare, but also better science, as it is now very widely recognised that avoidable suffering can lead to experimental confounds, for example due to physiological responses to stress.

This symposium will explore how researchers using and developing behavioral recognition and monitoring techniques are contributing towards improving the understanding and interpretation of animal behavior, particularly relating to the assessment of animal welfare and suffering.

Program

10:00   Progress in Assessing Animal Welfare in Relation to New Legislation: Opportunities for Behavioral Researchers
Penny Hawkins
Research Animals Department, RSPCA, Southwater, United Kingdom.

10:20   Automated Assessment of Animal Health and Wellbeing
         J.E. van der Harst, and B.M. Spruijt
         Delta Phenomics BV, Utrecht, The Netherlands.
         Utrecht University, Utrecht, The Netherland.

10:40   *Coffee break*

11:10   The Assessment of Pain using Facial Expressions in Laboratory Rodents
         Matt Leach
         University of Newcastle, Newcastle, United Kingdom.

11:30   Monitoring Burrowing and Nest Building Behavior as Species-specific Indicators
         of Animal Wellbeing
         Paulin Jirkof
         University of Zürich, Zürich, Switzerland.

11:50   Measuring Behavioral Changes to Assess Anthropogenic Noise Impact in Adult
         Zebrafish (*Danio rerio*)
         Hans Slabbekoorn
         University of Leiden, Leiden, The Netherlands.

12:10   Recognising and Assessing Positive Welfare: Developing Positive Indicators for
         Use in Welfare Assessment
         Wanda McCormick
         Moulton College, Moulton, Northampton, United Kingdom.
         This presentation is sponsored by Noldus Information Technology. However, the
         content of the presentation is independent of Noldus IT.

12:30   *End of session*

Fish in Behaviour Research: Unique Tools with a Great Promise!

Date: Friday August 31
Time: 10:00-12:30
Location: 42
Chair: Robert Gerlai (University of Toronto Mississauga, Mississauga, Canada)

Abstract

Zebrafish are becoming increasingly popular in behavioural brain research as this species offers good translational relevance and has several genetic and biological techniques developed for it. Other species of fish may also have utility in behavioural research as their analysis can not only shed light on interesting species-specific characteristics but also allow the investigator to examine complex behavioural phenomena in a simpler, evolutionarily older "design", and thus make conclusions about how our own behaviour may have evolved. The current symposium will have five speakers. Dr. Gerlach will talk about olfactory imprinting in coral reef fish and zebrafish and will discuss both the ecological and neurobiological aspect of her research. Dr. Agrillo will review findings on numerical abilities in fish presenting data obtained with the use of behavioural paradigms developed for fish species. These paradigms include spontaneous choice tasks as well as operant conditioning methods. Ms. Buske will describe how social behavior develops in zebrafish and how dynamic changes in shoaling may be quantified using video-tracking systems. Dr. Cretton will present his novel hardware and software solutions as to how to quantify larval zebrafish behavior including anxiety-like responses. Dr. Merlin will present his research on modeling and analyzing attention deficit hyperactivity disorders using zebrafish. Last, Dr. Gerlai will examine social affiliation, and how one can induce group cohesion using computer animated stimuli. He will also present data on the neurobiological mechanisms of group cohesion in zebrafish.

Program

10:00   Social Affiliation in Zebrafish: From Synthetic Images to Biological Mechanisms
            Robert Gerlai
            University of Toronto Mississauga, Mississauga, Canada.

10:20   Diving Deeper into Zebrafish Development of Social Behavior: Analyzing High
            Resolution Data
            Christine Buske, and Robert Gerlai
            University of Toronto, Toronto, Canada.

10:40   *Coffee break*

11:10   Zebrafish Assays to Measure ADHD Endophenotypes
         M. Lange[1], W.H.J. Norton[1], M. Chaminade[1], P. Vernier[2], K.P. Lesch[3], and
         L. Bally-Cuif[1]
         [1]Zebrafish Neurogenetics, Neurobiology & Development, INAF, CNRS UPR3294,
         France.
         [2]"Development and Evolution of Neurotransmission", Neurobiology and
         Development, CNRS UPR 3294, France.
         [3]University of Würzburg, Würzburg, Germany.

11:30   Automated Analyses of Behavior in Zebrafish Larvae
         Sean D. Pelkowski, Holly A. Richendrfer, Ruth M. Colwill, and Robbert Creton
         Brown University, Providence, Rhode Island, USA.

11:50   Fish as a Model to Study Non-verbal Numerical Abilities
         Christian Agrillo, Maria Elena Miletto Petrazzini, Laura Piffer, Marco Dadda, and
         Angelo Bisazza
         University of Padova, Padova, Italy.

12:10   Olfactory Signals Involved in Kin Recognition in Zebrafish.
         Gabriele Gerlach[1], and Cornelia Hinz[2]
         Carl von Ossietzky University, Oldenburg, Germany.

12:30   *End of session*

General Sessions

General Sessions

General Sessions are oral presentations grouped by topic.

The conference contains the following General sessions:

- Advanced Statistical and Other Analysis of Behavioral Data (page 61)

- Measurement of Human Behavior and Interaction in Natural Contexts (page 63)

- Measurement of Animal Behavior in Natural and Semi-Natural Contexts (page 65)

- Automation and Analysis of Rodent Tests in Mazes (page 66)

- Use of Sensors and Other Techniques to Automate the Measurement of Behaviors (page 67)

- Measuring Human-Computer Interaction (page 69)

Advanced Statistical and Other Analysis of Behavioral Data

Date: Wednesday, August 29
Time: 12:10-12:30
Location: Megaron

Program

12:10   A Markov Transition Score for Characterizing Interactive Behavior of Two
           Animals and its Application to Genetic Background Analysis of Social Behavior
           of Mouse
           Toshiya Arakawa[1], Aki Takahashi[2], Akira Tanave[3], Satoshi Kakihara[4],
           Shingo Kimura[5], Hiroki Sugimoto[6], Toshihiko Shiroishi[7], Kazuya Tomihara[8],
           Tsuyoshi Koide[9], and Takashi Tsuchiya[10]
           [1]The Graduate University for Advanced Studies (SOKENDAI), Tokyo, Japan.
           [2,3,9]National Institute of Genetics (NIG), Shizuoka, Japan.
           [2,3,9]Department of Genetics, SOKENDAI, Shizuoka, Japan.
           [4,10]National Graduate Institute for Policy Studies, Tokyo, Japan.
           [5]NEC Software Kyushu, Ltd., Fukuoka, Japan.
           [6]Jichi Medical University, Tochigi, Japan.
           [7]Mammalian Genetics Laboratory, NIG, Shizuoka, Japan.
           [8]Kagoshima University, Kagoshima, Japan.
           [10]The Institute of Statistical Mathematics, Tokyo, Japan.

12:30   *End of session*

Date: Friday August 31
Time: 10:00-12:10
Location: Rood

Program

10:00   Assigning and Combining Probabilities in Single-Case Studies
           R. Manolov, and A. Solanas
           University of Barcelona, Barcelona, Spain.

10:20   Data Fusion by Kernel Combination for Behavioral Data
           D. Fekas[1], P. Zimmerman[2], and C. J. F. ter Braak[1]
           [1]Wageningen University, Wageningen, The Netherlands.
           [2]Noldus Information Technology, Wageningen, The Netherlands.

10:40   *Coffee break*

11:10	Speech Inversion with Acoustic Classification
	C. Neufeld
	University of Toronto, Toronto, Canada.

11:10 Speech Inversion with Acoustic Classification
C. Neufeld
University of Toronto, Toronto, Canada.

11:30 Validating the Cross-Validation: A 3-Dimensional Model for Multiple Informant Data (3D-MMID)
J.A. Malik [1,2], and H.M. Koot[2]
[1]Quaid-i-Azam University, Islamabad, Pakistan.
[2]VU University, Amsterdam, The Netherlands.

11:50 How to Describe the Process of the Establishment of a Social System Within a Wolf Pup Model Group Using Traditional Ethological Indexes and the Detection of Hidden Patterns
A.A. Yachmennikova, and A.D. Poyarkov
Russian Academy of Sciences, Moscow, Russian Federation.

12:10 *End of session*

Measurement of Human Behavior and Interaction in Natural Contexts

Date: Wednesday, August 29
Time: 10:00-15:00
Location: Rood

Program

10:00 Sustainability Goes Change Talk: Can Motivational Interviewing Be Used to Increase Pro-Environmental behavior?
F. E. Klonek, and S. Kauffeld
Technical University Braunschweig, Braunschweig, Germany.

10:20 Functional Analysis of Challenging Behaviours in People with Severe Intellectual Disabilities Using The Observer XT 10.0 Software
C. Delgado[1], R. García[1,2], J. I. Navarro[1], and E. Hinojo[2]
[1]University of Cadiz, Cadiz, Spain.
[2]AFANAS-JEREZ, Centro Vistahermosa, Spain.

10:40 *Coffee break*

11:10 Crowd and Pedestrian Dynamics: Empirical Investigation and Simulation
S. Bandini, A. Gorrini, L. Manenti, and G. Vizzari
University of Milan-Bicocca, Milan, Italy.

11:30 Measuring Situation Awareness of the Microneurosurgeons
Shahram Eivazi
School of Computing, University of Eastern Finland.

11.50 Behavioral Dynamics (in Staff Meetings): What Patterns Lead To Success?
A.M.G.M. Hoogeboom, and C.P.M. Wilderom
University of Twente, Enschede, The Netherlands.

12:10 Autism and Somantics: Capturing Behaviour In The Wild
D.J. Walker, W. Keay-Bright, and D. Cobner
Cardiff Metropolitan University, Cardiff, United Kingdom.

12:30 *Lunch break*

14:00 Observing Flow in Child/Music Machine Interaction
A.R. Addessi, and L. Ferrari
University of Bologna, Bologna, Italy.

14:20   Measuring User Behavior in a Complex USAR Team Evaluation
         N.J.J.M. Smets[1], M.A. Neerincx[1,2], and R. Looije[1]
         [1]TNO, Soesterberg, Soesterberg, The Netherlands.
         [2]Delft University of Technology, Delft, The Netherlands.

14:40   Unobtrusive Emotion Sensing in Everyday Life
         Joyce Westerink[1], Anton van Boxtel[2], Geraldine Fitzpatrick[5],
         Wijnand Ijsselsteijn[3], Joris Janssen[1], Martin Ouwerkerk[1], Thérèse Overbeek[4],
         Petr Slovak[5], Gert-Jan de Vries[1], and Marjolein van der Zwaag[1]
         [1]Philips Research, Eindhoven, The Netherlands.
         [2]Tilburg University, Tilburg, The Netherlands.
         [3]Eindhoven University of Technology, Eindhoven, The Netherlands.
         [4]Pluryn, Hoenderloo, The Netherlands.
         [5]Vienna University of Technology, Vienna, Austria.

15:00   *End of session*

Measurement of Animal Behavior in Natural and Semi-Natural Contexts

Date: Wednesday, August 29
Time: 11:10-12:30
Location: 40

Program

11:10   Pine Weevil (*Hylobius abietis*) Feeding Pattern on Conifer Seedlings
         Frauke Fedderwitz, Niklas Björklund, Velemir Ninkovic, and Göran Nordlander
         Swedish University of Agricultural Sciences, Uppsala, Sweden.

11:30   High-Throughput Phenotyping of Plant Resistance to Insects
         Karen J. Kloth, Manus P.M. Thoen, Harro J. Bouwmeester,
         Maarten A. Jongsma, and Marcel Dicke
         Wageningen University, Wageningen, The Netherlands.

11:50   The Cause of Stereotypic Behaviour in a Male Polar Bear (*Ursus Maritimus*)
         P.W.F.H. Cremers, and S.L. Geutjes
         University of Applied Sciences Van Hall Larenstein, Leeuwarden,
         The Netherlands.

12:10   Analysis of Sequences in Aggressive Interactions of Pigs for the Development
         of an Automatic Aggression Monitoring and Control System
         M. Oczak[1,2], A.M. Costa[3], G. Ismailova[3], L. T. Sonoda[4], M. Fels[4], J. Hartung[4],
         M. Guarino[3], S. Viazzi[1], D. Berckmans[1], and E. Vranken[1,2]
         [1]Katholieke Universiteit Leuven, Leuven, Belgium.
         [2]Fancom Research, Fancom, Panningen, The Netherlands.
         [3]Department of Veterinary Science and Technologies for Food Safety, Faculty of
         Veterinary Science, Milan, Italy.
         [4]University of Veterinary Medicine Hannover, Foundation, Hannover, Germany.

12:30   *End of session*

Automation and Analysis of Rodent Tests in Mazes

Date: Wednesday, August 29
Time: 16:10-16:50
Location: Rood

Program

16:10   Temporal Patterns of Rodent Behavior in the Elevated Plus Maze Test
         M. Casarrubea[1], M.S. Magnusson[2], V. Roy[3], A. Arabo[3], F. Sorbera[1], A. Santangelo[1], and G. Crescimanno[1]
         [1]University of Palermo, Palermo, Italy.
         [2]University of Iceland, Reykjavik, Iceland.
         [3]Université de Rouen, Mont-Saint-Aignan, France.

16:30   A Computer-Based Application for Rapid Unbiased Classification of Swim Paths in the Morris Water Maze
         Kurt R. Stover, Timothy P. O'Leary, and Richard E. Brown
         Dalhousie University, Halifax, Canada.

16.50   *End of session*

Use of Sensors and Other Techniques to Automate the Measurement of Behaviors

Date: Wednesday, August 29
Time: 16:10-17:10
Location: 42

Program

16:10   Evaluation of Alterations in Behaviour, Cognition, and Neuronal Excitability
         Induced by Administration of QTracker® 800 Quantum Dots
         B. Salvetti[1], S. Becchi[2], F. Schio[1], E. Moscardo[1], G. Bertini[1], P.F. Fabene[1],
         and F. Osculati[1]
         [1]University of Verona, Verona, Italy.
         [2]University of Sydney, Sydney, Australia.

16:30   The Coordination between the Direction of Progression and Body Orientation
         in Normal, Alcohol- and Cocaine Treated Fruit Flies
         Ilan Golani[1], Anna Gakamsky[1], Efrat Oron[1], Dan Valente[2], Partha P Mitra[2],
         Daniel Segal[1], and Yoav Benjamini[1]
         [1]Tel Aviv University, Tel Aviv, Israel.
         [2]Cold Spring Harbor Laboratory, Cold Spring Harbor, USA.

16:50   Video-Based Analysis of Fear Conditioning: a Validation Test
         P.F. Fabene, G. Bertini, M. Pellitteri, E. Moscardo, B. Salvetti, F. Schio, A. Chakir, and
         C. Tognoli
         University of Verona, Verona, Italy.
         Section of Anatomy and Histology Laboratory of Functional Neuroanatomy,
         Verona, Italy.

17:10   *End of session*

Date: Thursday, August 30
Time: 10:00-12:30
Location: 40

Program

10:00   Pressure-Sensor System for Sleeping-Posture Classification
         Sabri Boughorbel, Fons Bruekers, and Koen de Groot
         Philips Research Laboratories, Eindhoven, The Netherlands.

10:20   Monitoring Facial Expressions During the Mars-500 Isolation Experiment
         R.D. Gorbunov, E.I. Barakova, R.M.C. Ahn, and G.W.M. Rauterberg
         Eindhoven University of Technology, Eindhoven, The Netherlands.

10:40   *Coffee break*

11:10   Automatic Clustering of Conversational Patterns from Speech and Motion
         Data
         S. Feese[1], B. Arnrich[1], G. Tröster[1], B. Meyer[2], and K. Jonas[2]
         [1]ETH Zurich, Zurich, Switzerland.
         [2]University of Zurich, Zurich, Switzerland.

11:30   Towards Sensing Behavior Using the Kinect
         Wouter van Teijlingen[1,2], Egon L. van den Broek[1,3], Reinier Könemann[4], and
         John G.M. Schavemaker[1]
         [1]TNO, Delft, The Netherlands.
         [2]Utrecht University of Applied Sciences, Utrecht, The Netherlands.
         [3]University of Twente, Enschede, The Netherlands.
         [4]TNO, Hoofddorp, The Netherlands.

11:50   Sonification of Experimental Parameters as a New Method for Efficient
         Coding of Behavior
         Andrea Ravignani, and W. Tecumseh Fitch
         University of Vienna, Vienna, Austria.

12:10   Automated Measurement of Spontaneous Surprise
         Bart Joosten[1], Eric Postma[1], Emiel Krahmer[1], Marc Swerts[1], and Jeesun Kim[2]
         [1]Tilburg University, Tilburg, The Netherlands.
         [2]University of Western Sydney, Sydney, Australia.

12:30   *End of session*

Measuring Human-Computer Interaction

Date: Friday August 31
Time: 14:00-15:00
Location: Megaron

Program

14:00   Controlled Game-Based Stress Manipulation
           Benny van der Vijgh, Robbert Jan Beun, and Peter Werkhoven
           Utrecht University, Utrecht, The Netherlands.

14:20   A Comparison of Two Methods to Assess Mobile Hand-Held Communication
           Device Use
           S. Berolo[1], I. Steenstra[2], B.C. Amick III[1,2,3], and R.P. Wells[1,2]
           [1]University of Waterloo, Waterloo, Canada.
           [2]Institute for Work and Health, Toronto, Canada.
           [3]University of Texas Health Science Center at Houston, Houston, USA.

14:40   Assessment of Level of Professional Competence of Programmers
           P.A. Orlov, and V.M. Ivanov
           St. Petersburg State Polytechnical University, St Petersburg, Russia.

15:00   *End of session*

Posters

Posters

Date:	Thursday, August 30
Time:	13:00-14:30
Location:	Ground floor, in the area adjacent to the restaurant
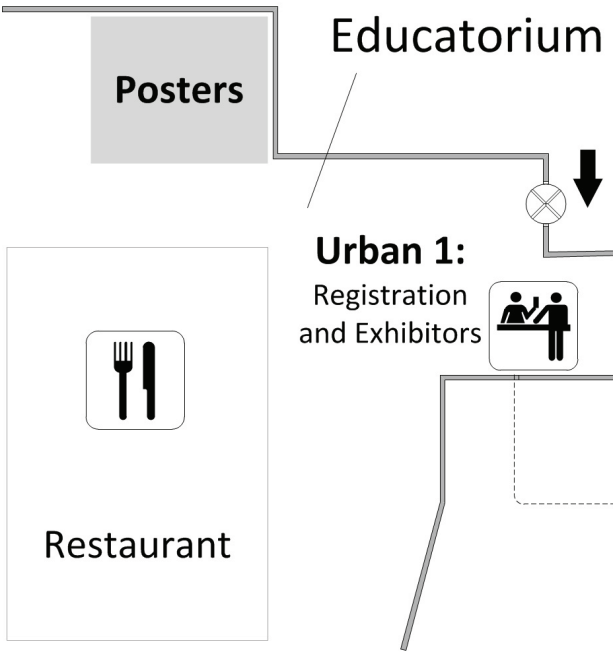
Location of the poster area at the Ground floor of the Educatorium.

P O S T E R S

Demonstration Showcase

Demonstration Showcase

In the Demonstration Showcase a prototype of a measuring device or technique, beta version of new software or recently launched product can be shown. The demonstrations take place in one of the seminar rooms. See the next pages for the time and location of the demonstrations.

The following Demonstrations are held during the conference:

- Three-Dimensional Behavioral Phenotyping with Track3D (page 83)

- Decisim: A Digital Version of Information Display Board (IDB) Experimental Technique (page 85)

- Introducing SESAMO: System for Experience Sampling on Mobiles (page 86)

- Mindware Ambulatory 2.0 Acquisitions and Mindware/ Noldus Systems Integration Enhancements (page 89)

- Indoor Marker-less People Tracking for Real-time Spatial Behaviour Detection (page 90)

- Multimodal Sensing System to Enhance the Safety of Infants in the Home Environment (page 92)

There will be an award for the best demonstration.

Three-Dimensional Behavioral Phenotyping with Track3D

Date: Wednesday August 29
Time: 10:00 – 10:40
Location: 40
Presenter: Fabrizio Grieco (Noldus IT, Wageningen, The Netherlands)

Abstract

What is Track3D?

Track3D is an extension of EthoVision XT which enables analysis and visualization of animal movement in three dimensions. It imports track files from EthoVision XT and calculates the 3D position of the animal's center point based on parameters obtained in a calibration procedure. Track3D provides a wealth of movement parameters, including speed, heading (also corrected for wind speed and direction), and angular velocity. It allows analysis of data in 3D zones defined by the user. Accuracy of 3D positioning is about ±0.5% of the size of the tracking arena.

In this demonstration, with the aid of videos and animations, we will showcase the basic principles of Track3D, and illustrate its potential to address research questions. As a use case, we show a recent application on zebrafish (*Danio rerio*) in drug abuse research.
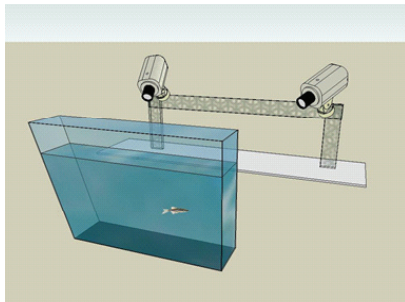
Figure 1. Track3D uses two cameras for an accurate 3D positioning of a tracked animal. The picture shows a possible solution for a zebrafish novel tank test. Other camera positions are possible.

Why does 3D analysis of animal movement matter?
Movement and orientation behavior of animals is often studied in two dimensions, for example by filming insects in flight on a horizontal or vertical plane. However, an appropriate 3D representation of animal movement is essential when: (a) movement track is very convoluted in all three planes and (b) when one needs to find whether a behavior, like a sudden turn, is associated with a three-dimensional object like an odor plume [1].

Use case: A delicious zebrafish served in 3D

Zebrafish represent a promising translational animal model with significant physiological homology to humans. Zebrafish are ideal for high-throughput screening due to their low cost, ease of maintenance and genetic manipulations, and robust behavioral responses to various drugs of abuse. In the Kalueff lab (Tulane University, USA) Track3D generates three-dimensional reconstructions of zebrafish behavioral profiles evoked by a number of anxiogenic/anxiolytic and hallucinogenic manipulations (e.g. nicotine, LSD, phencyclidine). These 3D tracks reveal striking differences between high- and low-anxiety behaviors in zebrafish, thereby enabling rapid visualization and objective interpretation of the observed phenotypes. The ongoing research [2,3] presented here successfully models the effects of numerous drugs of abuse in zebrafish behavioral paradigms, revealing their high sensitivity to various psychotropic compounds.
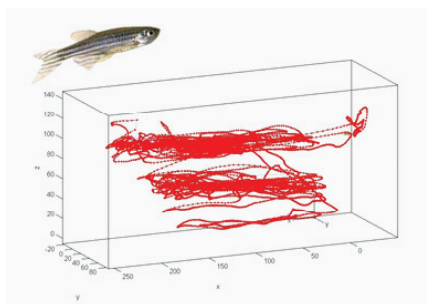
Figure 2. A three-dimensional representation of the swim track of a zebrafish.

Ethical statement.

All experimental procedures at Tulane University were in compliance with US National and Institutional guidelines on animal experimentation and care. For methods, see [2].

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Decisim: A Digital Version of Information Display Board (IDB) Experimental Technique

Date: Wednesday, August 29
Time: 16:10-17:10
Location: A
Presenter: Christine Petr (Political Insitute of Rennes, Rennes, France)

Abstract

Decisim is a free application available on the web. This application allows researchers conceiving, distributing, and receiving results of web survey with the originality to offer an on-line rejuvenation of the experimental method of IDB (Information Display Board). This method was created to track information search processes of individuals who are requested to make choices among simulated alternatives presented in a matrix. Concretely, it implies to gather the type and order of each data collected by participants from the beginning of information search up to the final decision.

This digital version has five main qualities. It is possible 1) to greatly expand the sample size (with possibility to target the future respondents, even on a dynamic located scale) although the costs collection decrease; 2) to measure precisely the temporal characteristics of the information requests what is a way to identify the deliberation moments during the decision-making task (when and how much); 3) to use theses deliberation cues for understanding on what contents respondents spend time for interpretation, rationalization and estimation; 4) to observe how deliberations and changes from previous appraisals of the situation alter the solving-decision task process (what rules and heuristics used after ?, continuity, shift or revision from the preceding ones ?); 5) to be less intrusive for respondents who can participate whenever they want (24/24hours accessibility of the "digital lab") and wherever they want (in their normal at home or at work Internet using place, and thank to smart phone, during their daily outings and waiting times).

Introducing SESAMO: System for Experience Sampling on Mobiles

Date: Friday August 31
Time: 10:00 – 10:40
Location: A
Presenter: Anna van Spanje (Rey Juan Carlos University, Madrid, Spain)

Experience sampling methods

Experience Sampling Methods (ESM) are widely used within behavioral sciences [1]. This type of methods consist of self-reports of any kind made by the study's participants [2]. Most commonly known as diary studies [3], ESM result in detailed and exhaustive data. Many people can participate at the same time in ESM-based studies. Moreover, most ESM procedures are easy to use and therefore applicable to a wide variety of (human) subjects. Also, ESM can be configured in many ways so that many different topics can be addressed at many different time points, producing rich data [4, 5].

Influence of modern technology

As with many aspects of research, Experience Sampling Methods have been influenced by modern technology. Diary studies have recently evolved from pen-and-paper methodology via telephone interviews to fully electronic data collection (with PDAs, smartphones, tablet computers, etc.) [3, 4]. Although modern technology comes with new problems (technical problems with the device or the software, losing or damaging the device, device costs, etc.), previous problems with old-fashioned ESM are solved by modern technology and make ESM much more feasible [3, 5].

For example, electronic data collection requires less time from the participant, does not suffer from retrospective bias, and results in easier accessible datasets [3-5]. Moreover, many side effects of the use of modern technology are easy to avoid (e.g., testing the software extensively to avoid technical problems) or are likely to not be a problem anymore in the future (e.g., the costs of electronic devices like smartphones and tablets are decreasing).

Introducing SESAMO

Given all advances that have been made with modern technology, our team at the Technical University of Madrid has been developing a survey application for smartphone and tablet use. This system, called SESAMO (System for Experience Sampling on Mobiles), is currently being applied by our team at the Rey Juan Carlos University using smartphones in a diary study on emotion regulation, mood, social support, and healthy behaviors among unemployed individuals. We recently finished a pilot study using SESAMO on smartphones from which we can conclude that the current version of SESAMO is stable and easy to manage.

How does SESAMO work?

SESAMO consists of two parts: online software, and an application (app) for smartphones and tablet computers. The online software is used to create, edit, and program surveys. Surveys can be prompted to devices that have the application installed, but web-based surveys (to be filled out using an internet browser) can also be created. The results of both the app surveys and the web-based surveys can be easily downloaded in Excel-format from the SESAMO software server. The online software can be accessed once a personal login profile is created by SESAMO's administrators.

In its current version, the SESAMO software can create surveys with the following types of questions:

- Open-ended questions.

- Multiple choice questions with one response.

- Multiple choice questions with multiple responses.

- Likert-type questions: the response has to be chosen from a numbered scale, ranging from 0 or 1 to N.

- Bipolar questions: two opposites are placed on a scale from 1 to 5 from which one option has to be chosen.

- Ranking questions: the user needs to put a certain amount of words or phrases in a desired order.

Further, SESAMO has the possibility to include paths in the surveys, so that several actions can be executed when a certain response is given to a certain question (including open-ended questions). These actions are: 1) skipping one or more questions, 2) ending the survey, 3) sending an e-mail to the user with his/her responses, 4) prompting a survey to another user, and 5) opening a URL in the web browser to display multimedia content (e.g., images and sounds) and subsequently continuing the survey.

Another option within the creation of surveys is to set the number of delays for both questions and surveys, i.e. indicate how many times a particular question or an entire survey may be postponed. Also, the software includes an advanced scheduling option through which surveys can be prompted at any given time, following any given schedule.

The SESAMO application makes it possible to receive and respond to surveys created with the SESAMO software, as well as sending the responses to the software server. Therefore, the device containing the app needs to be constantly connected to the internet. Once the app is downloaded, a unique ID number will be automatically assigned to the device, which will automatically appear in the SESAMO software. Questions are easily answered by selecting the response(s) or typing the response using the device's touch screen. After

every question, a "continue" button has to be selected in order to receive the next question. SESAMO notifies the user when the survey has finished. Survey responses are sent to the software server immediately and automatically through the internet. Response times are also automatically stored.

The application is easy to download on any type of electronic device. Although the app needs to be running on the device as well as connected to the internet constantly, battery use and data traffic are limited, as well as the use of the device's memory. The application is currently available for Android-operated smartphones and tablets. A version of the app based on the Symbian operation system has also been developed but has not been tested yet.

Application and advantages of SESAMO
The use of SESAMO has advantages for both researchers and study participants. SESAMO is fast, easy to use, requires little memory of the device on which it is installed, and the software is accessible from any device with an internet browser. Furthermore, SESAMO has all the advantages of modern technology ESM: real-time data collection, easily accessible databases, little interference with daily life for the users, etc.

Future directions
Our idea is to further develop SESAMO in such a way that both the software and the application will be more advanced (i.e., will contain more possibilities) so that SESAMO will answer to the needs and wishes of many different clients. One of these developments will be the addition of geolocation features. The software is already available in Spanish and English; the application's original Spanish version will be translated to English soon as well. Moreover, the SESAMO app will be developed for other operating systems, apart from Android and Symbian.

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Mindware Ambulatory 2.0 Acquisitions and Mindware/ Noldus Systems Integration Enhancements

Date: Friday August 31
Time: 10:00 – 10:40
Location: 40
Presenter: Gene Barbanera (Mindware, Gahanna, USA)

Abstract

Mindware Technologies, Ltd. will demonstrate the new, updated Ambulatory 2.0 Wireless Acquisition Unit in a live demonstration, highlighting the most updated enhancements to the Mindware / Noldus Systems Integration functionality.

The live demonstration will showcase the updated Biolab Acquisition Software, Bionex Hardware, Ambulatory 2.0 Wireless Acquisition Unit and updated Mindware Analysis Applications.

Systems will be demonstrated with live subjects, doing live acquisitions, and using Real Time Data exported for use into Noldus Observer XT for Behavioral Analysis.

Indoor Marker-less People Tracking for Real-time Spatial Behaviour Detection

Date: Friday August 31
Time: 14:00 – 15:20
Location: Blauw
Presenter: Ben Loke (Noldus IT, Wageningen, The Netherlands)

Abstract

We present and demonstrate a real-time people tracking and movement analysis system that generates spatial events in indoor environments. The system consists of the 'EagleGrid' system, a network of 'EagleEye's' (3D camera units), that reliable detects and tracks people, and 'AnyTrack', which is a generic software tool for movement analysis. It visualizes the people positions and trajectories on a digital map based on the coordinates of the EagleGrid system. AnyTrack also performs real-time spatial event detection based on user defined areas of interest. The spatial events are converted into safety events and are sent to a smart phone to alert or inform a person of the unsafe situation at that moment. We did investigate techniques to visualize a large amount of sample points and trajectories in real-time on a map, especially how to enable indoor and outdoor tracking with the same tool, i.e. the usage of different map servers for digital map rendering of the background.
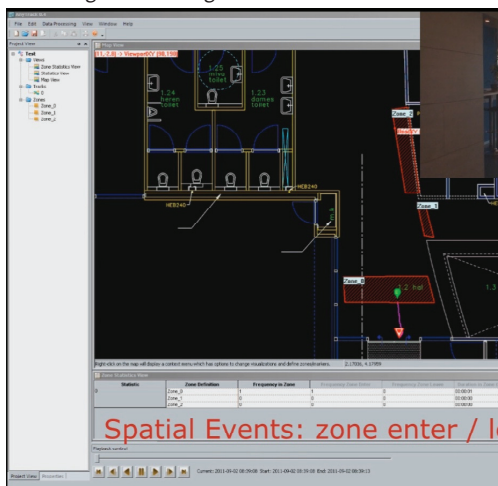
This session will present such innovative methods including:

- Markerless people tracking with 3D cameras.

- 3D image reconstruction.

- Real-time event messaging techniques.

- Generic tool for movement analysis by using plug-in architecture for map servers.

- Visual and statistical analytics of movement behavior.

- Track data processing techniques.

The demonstrator is developed within de ITEA2 GUARANTEE project where the system generates spatial events which in combinations with other non-spatial events (like sound events) are used to indicate the personal safety in the residential environment.

Multimodal Sensing System to Enhance the Safety of Infants in the Home Environment

Date: Friday August 31
Time: 14:00 – 15:20
Location: 40
Presenter: Koen de Groot (Philips Research, Eindhoven, The Netherlands)

Abstract

We propose a system which consists of a multimodal sensing-, reasoning- and actuation-stage to monitor the infant's behavior and sleeping environment, particularly to improve the infant's safety. Moreover, the system advices parents on the child's development. The multi-parametric monitoring system can detect physiological and behavior parameters derived from the infant. Furthermore, people visiting the infant's sleeping environment are identified upon entrance and tracked during their stay in the room. The sensors systems include video, pressure and audio based technologies. High level sensor events are extracted from the raw sensor data, fused and fed into a reasoning system. Depending on the decision outcome, relevant in-home services are automatically actuated to provide feedback to the parents or other caregivers on the behavior of the infant.

Introduction

Many young parents are concerned about the wellbeing of their sleeping child. The presented architecture addresses parent's desire for support in supervision when the infant is unattended in the bedroom. SIDS (Sudden Infant Death Syndrome) is a well-documented fear of many parents and it is the leading cause of death among infants below the age of 12 months [1][2]. Also the comfort of the sleeping child is of course important.

The presented architecture is an ambient intelligent system in the home environment, with the main goal to provide peace of mind to the parents when there is no direct parental supervision. In case of an unsafe situation in the infant's sleeping environment or infant's distress, the system signals the parents. Depending on the significance of the alarm, parents in turn could respond by giving the infant some attention. Moreover, the system includes methods to give the parents insight on the child's development.

The system is developed within the ITEA2 GUARANTEE (Guardian Angel for the Extended Home Environment) project. The project provides technical solutions for personal safety in the home environment. GUARANTEE introduces local and network-supported decision making for safety applications on the basis of sensor input and with immediate response and feedback to the people concerned.

Method

As starting point of the system design, use case scenarios have been made which define the scope and application context and underline the benefits of the system from a safety enhancing point of view. The use case scenarios were mapped on a high level system architecture that consists of three main stages, i.e. sensing, decision making and actuation. The system takes into account design aspects proposed for Ambient Intelligence (AmI) environments [3]. Each use case scenario contains a set of distinct situations that cause a condition change which may influence a sub-process due to user interaction or situation change in the observed area. For each stage, requirements have been specified which evolved into the architecture illustrated in Figure 1.
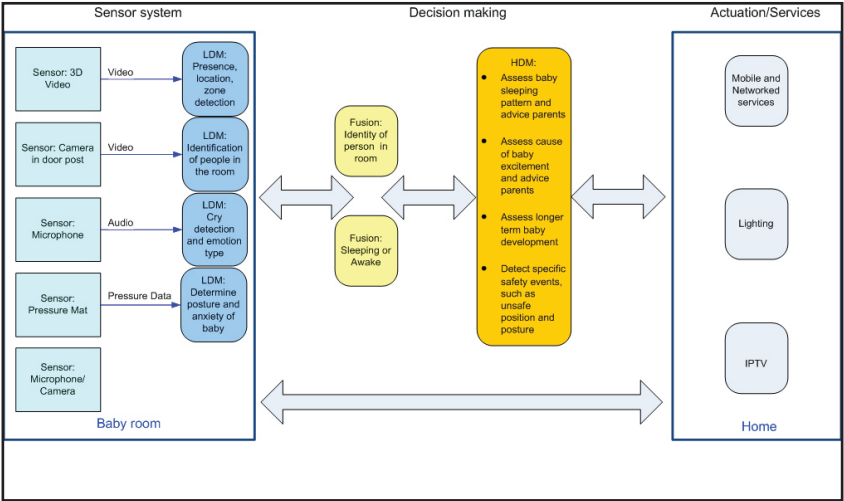
Figure 1. High level infant monitoring architecture consisting of three stages: sensing, reasoning and actuation.

The system transfers different types of information, i.e. events which could be either safety events (raised by a critical or dangerous situation) or standard events (raised by subsystems or nodes for further processing). A second form of information is data flows which could be either raw measured values or audio/video streams.

Sensing

The sensing stage extracts high level events from the raw data acquired by the sensor platform installed in the infant's bedroom. The various sensors comprise vision, audio and pressure based modalities: (i) Side-view face recognition: Cameras mounted in the doorpost of the infant's sleeping environment identify individuals visiting the room. Besides identification of an individual, the walking direction is detected to determine if a person enters or leaves the room. Based on the authentication result, the parent may decide if an individual is allowed to be with the infant. The analysis algorithm comprises

several processing steps to acquire images suitable for feature extraction. The system uses binary local patterns extracted from gray level images as features for authentication [4]. (ii) Zone detection: A stereo vision system installed in the ceiling of the baby room tracks the position of individuals during their stay. In order to compute the tracking coordinates, the stereo cameras first need to be cross-calibrated. Once the cameras are aligned, pixels that are part of the same object are matched across multiple views to build a disparity map [5]. From this information, coordinates of the visible objects are computed which are subsequently fed to a system which performs real-time zone detection, i.e. it detects if this person enters or leaves a predefined zone. In these cases the system generates a zone enter or zone leave event, respectively. The zone events are used in the reasoning stage. The system could for instance detect whether a second child enters the infant's sleeping environment without adult supervision which may provoke an insecure situation or may bother the infant while sleeping. (iii) Infant's emotion analysis: This module aims to extract the infant's emotion from an auditory scene. The sound analysis system consists of three main stages. Firstly, audio is captured from a microphone. Next a time frequency analysis is performed which incorporates information from a physical model of the human inner ear (cochlea). Several algorithms extract cues from the cochleogram. These cues are further analyzed to distinguish baby sounds (e.g. crying) from the audio stream. The signaled audio events are interpreted by the decision making process. (iv) Posture and restlessness detection: The activity of infants and more specifically the posture of infants is an important aspect in their safety and development. Several independent risk factors for SIDS have been identified, and a combination of preexisting conditions and initiating events may lead to SIDS. In view of safety, the supine sleeping position is widely regarded as advised sleeping position for a infant opposed to the prone position which is considered as an individual SIDS risk factor [1][6]. In order to enhance the safety of the infant, we propose a pressure sensitive mat which is positioned under the mattress in the infant's bed, to determine different postures and restlessness levels of the infant when present in the bed [7]. Postures that could be detected by the pressure mat module include: sitting, standing, supine- and prone-position. The infant's activity level is determined by analyzing the variation in applied pressure over time. The observed behavior of the infant is transferred to the decision engine.

Decision making

The sensor events generated by the different modalities are aggregated, fused and translated into safety events. The actual interpretation of the safety events is done in the second stage by means of an autonomous decision making process. The process is event driven and depends on the current received sensor event message, current state of the process and previously logged data. The decision making process models the current behavior of the infant and other occupants in the infant's room and updates the information based on the received sensor events. A received sensor event comprises typically several attributes, e.g. parameter values, priority and timestamp. High level sensor

information, relevant for storage, is logged in memory. Different situation dependent services, defined in the third stage are actuated by the decision making module.

Actuation

The actuators and services provide insight on the current situation in the baby room. Most of the baby monitoring systems rely on audio signaling to notify the restless of infants or inactivity (no-breathing). Such signaling can be achieved by transmitting baby sound or audio warnings. Such audio notifications are in some situations not adequate and alternative 'silent mode' notifications are desired. Moreover, modern video baby monitors add a constant video stream to provide visual information about the infant's state. In the proposed architecture, the in-home services are three fold and are excited by the decision engine: (i) Smartphone: The system uses a smartphone application to visualize the status in the infant's room, in particular the child's emotion and posture, and the schedule of entrance/exit of individuals visiting the room. According to the type of event that is detected by sensors, the application displays an alert. (ii) IPTV: An IP-based baby camera attached to the baby crib is proposed that can send its video stream to different connected display devices in the home, e.g. a TV or smartphone. In case the behavior of the infant desires visual feedback to the parent, a notification service is pushed by the decision engine which overrides the TV image or smartphone current view. (iii) Lighting: The infant's activity level or emotional state is associated to a certain color within the light spectrum and is represented by a color LED lamp. Such lighting service could be integrated with the home light atmosphere and provide the parents a way to remotely keep an eye on their child. As an example, blue would indicate that the infant is calm and red would indicate that the child is very agitated. Different levels of restlessness are represented by color grades between these two colors. The level of restlessness is determined by available sensor nodes such as pressure sensor mat, microphones and cameras.

Communication

In order to exchange safety events and data flows, the Universal Plug and Play (UPnP) concept was selected as preferred communication mechanism. UPnP offers seamless device-to-device communication and allows automated device discovery and configuration. A UPnP device can be any entity on the network that implements the protocols required by the UPnP architecture. Devices in a UPnP network announce their presence and defined services to control points present in the network. A control point is an entity in the network that works with the services provided by a device [8]. In GUARANTEE, the different sensor nodes are modeled as UPnP devices, whereas decision making and actuator entities are modeled as UPnP control points.

Conclusions and future work

We present the architecture of an automated system to enhance the safety of infants in the home environment. Behavior analysis and decision making are the key technologies in the proposed architecture. The behavior of the infant and other individuals, e.g. children

and adults which are not necessary directly interact with the infant, is monitored by means of a multimodal sensing platform. In order to minimize the false alarm rate, sensor fusion is performed to obtain a robust estimation of the infant's emotion and identity of individuals approaching the child. Based on the high level safety events extracted from the raw measurement data, reasoning is performed to define the situation context. The reasoning process takes into account aspects such as: infant's sleeping position, sleeping status, anxious and type of anxiety and pattern thereof. The output of the decision-making process offers to the end-user good situational awareness of the infant's behavior and current situation in its room which are potentially insecure. The proposed system mainly focuses on observing and mining the behavior of the infant and other occupants in the infant's room. No direct interaction is performed between the infant and the system; therefore it primarily enhances the role of the parent or caregiver as opposed to other concepts like robot nannies which ultimately functions as a child's caregiver [9]. Although many commonalities exist between our proposed system and robot nannies, especially from a sensory, context awareness and reasoning point of view, the later approach poses significant ethical issues (e.g. emotional attachment and connection with the caregiver) as a robot would mainly substitute the primary caregiver instead of improving its role [10].

In a domestic AmI environment, respecting the privacy of individuals interacting is an important aspect. During the design process of the system, a proper balance between the benefits of an automatic monitoring and invasion of privacy was taken into account. Privacy of individuals is preserved as the reasoning is based on high level sensor events which do not contain personal data. For future work we planned to verify the proposed system from a user perspective. This could be for instance by exposing groups of users to test usage (parts of) the system.

References

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Tutorials

Tutorials

Whereas the general presentations at the conference deal with new and innovative methods in behavioral research, tutorials focus on teaching existing methods. Tutorials provide a valuable opportunity to instruct participants of *Measuring Behavior 2012* in specific methods, techniques and equipment for behavioral research. Tutorials consist of both theory and demonstrations and they cover a wide range of topics related to methods, techniques and equipment used in behavioral research.

Most tutorials are scheduled on the Tuesday, but because of the large number of tutorials, several are taking place on other days during the conference.

The following Tutorials are presented during the conference:

- Integrated CNS and CV Monitoring via Telemetry in Behavior Studies (page 101)

- Psychophysiology Applications Using a Wireless and Wired BIOPAC MP System (page 102)

- Gesture Coding with the NEUROGES - ELAN System (page 103)

- Keystroke Logging in a Windows Environment via Inputlog (page 105)

- Signal-Specific Automated Data Analysis and Batch Processing Using Scripts (page 107)

- The Observer XT: External Data Integration, Selection and Analysis (page 108)

- Analyzing Individual and Inter-Individual Behavior with Theme: Detection and Analysis of Hidden Temporal Patterns and Experimental Effects (page 109)

- How to Use Ubisense Real Time Location System (RTLS) in Research (page 111)

- The 'CamTouch' Standard in Rodent Touchscreen Behavioural Testing (page 112)

- The Sequence Analysis Toolkit for Advanced Analysis of EthoVision XT Data (page 113)

- The MBRose HM-2 Enhancing Animal Welfare in High Throughput Systems (page 114)

Integrated CNS and CV Monitoring via Telemetry in Behavior Studies

Date: Tuesday, August 28
Time: 11:00-12:30
Location: Rood
Instructors: Thomas Penning (Data Sciences International (DSI), St. Paul, USA)

Benefits

This tutorial gives a general overview about telemetric monitoring and covers technical aspects of integrated system setups for behavior / CNS monitoring using new antenna design.

The DSI implantable telemetric devices allow researchers to collect data parameters such as: Temperature, Pressure (blood pressure, bladder, intra-ocular, left-ventricular, etc.), Bio-potential signals (ECG, EEG, EMG, EOG), Respiration Rate, and Motor Activity, etc.

Features

This tutorial will review:

•   Key features for accurate and reliable chronic monitoring.

•   New products for large and small animals.

•   New possibilities by customized antennas for integrative studies with small animals.

Audience

This tutorial is suitable for researchers who might have an interest in combining behavior monitoring with synchronized recordings of physiological data.

Instructor's resume

Thomas Penning has been a sales representative for 6 years with Data Sciences International and works since February 2012 as European Sales Manager at DSI.

Psychophysiology Applications Using a Wireless and Wired BIOPAC MP System

Date: Tuesday, August 28
Time: 11:00-12:30
Location: 42
Instructor: Aleksandar Dimov (BIOPAC Systems Inc., Goleta, USA)

Benefits

In this tutorial you will learn how to perform physiological data collection and analysis using wireless or wired equipment.

Features

Participants will be introduced to:

• New wireless modules for recording physiological data.

• Wireless brain optical imaging and EEG cognitive states analysis.

• Virtual and augmented reality applications.

• Recording and analyzing skin conductance, heart rate, EMG, startle response, blood pressure, etc.

• Educational tools for physiology.

Audience

This tutorial is of interest to anyone who wants to learn about the possibilities for collecting physiological data and the newest available tools.

Instructor's resume

Aleksandar Dimov has been teaching workshops on the topic of physiological data acquisition and analysis since 2006. While at UC Santa Barbara he was an instructor for the Advanced Training Institute for Virtual Reality in Social Psychology. He joined BIOPAC Systems as an application specialist 7 years ago.

TUTORIAL

Gesture Coding with the NEUROGES - ELAN System

Date: Tuesday, August 28
Time: 11:00-15:30
Location: A
Instructor: Hedda Lausberg (German Sport University, Cologne, Germany), Jana Bryjova
              (University of Fribourg, Fribourg, Switzerland), and Han Sloetjes (Max-Planck-
              Institute for Psycholinguistics, Nijmegen, The Netherlands)

Benefits

The NEUROGES-ELAN system is a tool for the empirical analysis of hand movement
behaviour including gesture. It combines the coding system NEUROGES and the
annotation tool ELAN. The Neuropsychological Gesture Coding System (NEUROGES)
is based on neuroscience research, specifically on the evidence that different types of
hand movement behaviour are generated in different brain regions. Furthermore, the
different types are associated with different cognitive (spatial cognition, language, praxis),
emotional, and interactive functions. The NEUROGES system comprises three Modules: I.
Kinesics, II. Bimanual Relation, III. Function. In this tutorial, participants will learn about the
structure and theoretical background of NEUROGES and its application in ELAN. The focus
of the tutorial is on the practical use of the NEUROGES-ELAN system.

Features

Participants will be introduced to:

- The theoretical part (1 hour).
    1   The Theoretical and Empirical Background of the NEUROGES System.
    2   The NEUROGES-Algorithms and Coding Manuals.
- The practical part (5 hours).
    1   ELAN
        1   The basics of media annotation (coding) with ELAN.
        2   Creation and application of Controlled Vocabularies in ELAN.
    2   NEUROGES - Training of Gesture Coding.
        1   Module I Kinesics (Activation, Structure, Focus).
        2   Module II Bimanual Relation (Contact, Formal Relation).
        3   Module III Function (Function, Type).
        4.   (optional: Specification categories: Techniques of Presentation,
                Temporal Structure, Target Location, Execution Hemi-Space, Referent,
                Trigger/Motive).
    3.   ELAN
        1.   Introduction to the search facilities.
        2.   Introduction to assessing inter-rater agreement.

4. Introduction to using the interactive NEUROGES-ELAN learning tool.
5. Gesture coding exercise with the NEUROGES-ELAN coding system.

Audience

Any researcher and student involved in empirical gesture research, apraxia research, non-verbal communication research, or clinical behavioral research in psychiatry and psychosomatic medicine. However, no pre-existing knowledge is assumed. Participants should bring their own laptop and preferably have ELAN installed (http://tla.mpi.nl/tools/tla-tools/elan/download) and downloaded the NEUROGES/ELAN template and example files from ELAN's third party resources webpage (http://tla.mpi.nl/tools/tla-tools/elan/thirdparty).

Instructor's resume

Hedda Lausberg is a Full Professor of Neurology, Psychosomatic Medicine, and Psychiatry. Her main research interests are the neuropsychology of movement behavior and the development of behavioral tools for coding body movement behaviour, such as the NEUROGES system. German Sport University, Cologne, Germany.

Jana Bryjova is a research assistant at the Department of Clinical Psychology at the University of Fribourg. She was trained in NEUROGES-ELAN coding system and has developed an interactive learning tool for a better comprehension of the gesture coding system. University of Fribourg, Fribourg, Switzerland.

Han Sloetjes is software developer at "The Language Archive" department of the MPI for Psycholinguistics and the main responsible person for the annotation tool ELAN. Max-Planck-Institute for Psycholinguistics, Nijmegen, The Netherlands.

Keystroke Logging in a Windows Environment via Inputlog

Date: Tuesday, August 28
Time: 11:00-12:30
Location: 40
Instructor: Mariëlle Leijten, and Luuk van Waes (University of Antwerp, Antwerp, Belgium)

Benefits
In this tutorial you will learn how to use the keystroke logging program Inputlog (www.inputlog.net).

Inputlog is a keystroke logging tool that is developed at the University of Antwerp since 2003 and is used by 300 researcher worldwide. Recently the architecture of the program has been completely revised and new functionalities have been added. At the moment Inputlog consists of five modules:

1.   A data collection module that registers digital writing processes on a very detailed level.

2.   A data analysis module that offers basic and more advanced statistical analyses (e.g. text and pause analysis), and

3.   A playback module that replays the recorded writing session, and

4.   A convert and (5) merge module that allows data conversion and merging of data files from previous logging sessions and other observation tools (e.g. Tobii eye tracking data, The Observer or Morae usability data).

Inputlog is used in the field of various types of writing process research: professional writing, developmental writing, L1-L2 writing, translation studies, etc.

Features
The main objectives of this tutorial are:

•   Explore the possibilities and limitations of new methods and techniques that are currently used to collect data on writing processes, viz. keystroke logging (and eye tracking).

•   Discuss good practices to set up ethnographic and experimental writing process research, also focusing on the complementarity of observation methods.

•   Introduce various analyzing techniques, i.c. general logging data, pause analysis, revision analysis.

- Illustrate integration (and complementarity) of Inputlog data with data from other observation tools and research techniques (e.g., eye tracking data, usability data, retrospective interviews).

- Illustrate advanced analysis techniques used in recent case studies on 'writing from multiple digital sources' (e.g. Twitter, document design in professional writing environments).

Audience

This tutorial is intended for researchers who intend to or who are already conducting writing process studies. There will be no requirement regarding prior knowledge other than a strong interest in writing from a broad point of view. Novice researchers in the field will be provided with an overview of state-of-the-art research techniques in the domain of writing research, and the non-novice will certainly also profit from expanding existing knowledge.

Instructors' resume

Mariëlle Leijten is a post-doc researcher for the Flanders Research Foundation and is situated at the University of Antwerp, Belgium.

Luuk Van Waes is a full professor at the University of Antwerp, Belgium. They are the founders of the keystroke logging tool Inputlog.

Their main research field is Writing and Digital Media (writing from multiple sources, speech recognition, cognitive models, on-line writing centers). They both teach business communication, research methods and digital communication in the Master in Multilingual Professional Communication at the University of Antwerp.

The presenters have organized an international summer school on Writing Process Research: Keystroke logging and Eye tracking in 2011. In 2012 they are invited to present keystroke logging techniques at an international PhD training school at the University of Barcelona.

Signal-Specific Automated Data Analysis and Batch Processing using Scripts

Date: Tuesday, August 28
Time: 14:00-15:30
Location: Blauw
Instructor: Aleksandar Dimov (BIOPAC Systems Inc., Goleta, USA)

Benefits
In this tutorial you will learn how to optimize the analysis of physiological data, from using scripts to obtain measurements to batch processing data.

Features
Participants will be introduced to:

- Writing a basic script to score an electrocardiogram.

- Batch processing all data files in a folder.

- Modification of existing scripts such as electrodermal activity and Heart Rate Variability analysis routines.

- Event-based analysis of physiological data.

- Importing marker data from The Observer XT.

Audience
This tutorial is of interest to anyone who wants to collect physiological data and wants to automate the analysis.

Instructor's resume
Aleksandar Dimov has been teaching workshops on the topic of physiological data acquisition and analysis since 2006. While at UC Santa Barbara he was an instructor for the The Advanced Training Institute for Virtual Reality in Social Psychology. He joined BIOPAC Systems as an application specialist 7 years ago.

The Observer XT: External Data Integration, Selection and Analysis

Date: Tuesday, August 28
Time: 16:00-17:00
Location: Blauw
Instructor: Matthew Mega (Noldus Information Technology, Leesburg, USA)

Benefits

In this tutorial you will learn how to use The Observer XT 11 with external / physiological data, from data acquisition to analysis and export of data.

Features

Participants will be introduced to:

- Setting up a project in The Observer XT 11.
- Acquisition and automatic synchronization of observational and external / physiological data.
- Importing external / physiological data into The Observer XT 11.
- Manual synchronization of external / physiological and observational data.
- Selecting, analyzing and exporting observational and external / physiological data.

Audience

This tutorial is of interest to anyone who wants to collect observational and external / physiological data. We assume a basic understanding of The Observer XT.

Instructor's resume

Dr. Matthew Maga is an Applications Specialist for the North American office. He received his Ph.D. in Psychology (Behavioral Neuroscience) from UCLA in 2009. His work focused on uncovering the molecular and neuroanatomical substrates of reward-motivated behavior, relevant to the fields of addiction neuroscience and opioid pharmacology. He has expertise with behavioral methodologies, as well as extensive teaching experience.

Analyzing Individual and Inter-Individual Behavior with Theme: Detection and Analysis of Hidden Temporal Patterns and Experimental Effects

Date: Tuesday, August 28
Time: 16:00-17:00
Location: Rood
Instructor: Magnus S. Magnusson (University of Iceland, Reykjavík, Iceland)

Benefits
You will acquire understanding and skills regarding the analysis of behavior and interactions seen as the intra- and inter-individual construction and repetition of a particular type of (typically) hidden temporal patterns called t-patterns. The importance of such pattern detection for the detection of effects of independent (experimental) variables also allowing more economical data collection (coding).

Features
Participants will:

- Learn about the use of this methodology and technology through presentation of example studies from both human and animal research.

- Learn how to analyze behavioral and interaction patterns you have detected and answer various questions about their content, complexity, meaning and functional aspects.

- Learn to detect how structure in behavior and interactions may be influenced by independent variables.

- Learn about the new features in Theme 6.0 allowing amongst other the prediction (and retro-diction) of particular behaviors and detected behavior patterns.

The presentation will be in the form of a mixture of a PowerPoint slide presentation (which will also be handed out) and demonstration of the actual use of the Theme program.

Audience
Intended for researchers interested in gaining new insight into the structure and function of behavior and the detection of complex hidden effects of external factors.

Instructor's resume
Dr. Magnus S. Magnusson is research professor, founder and director of the Human Behavior Laboratory, University of Iceland. He is the creator of the t-pattern model and the Theme™ software, which he has developed and applied over more than 30 years during

research at psychological, ethological and anthropological laboratories of European universities including Copenhagen University, the University of Paris (V, VIII & XIII) and the National Museum of Natural History, Paris. Besides a long standing collaboration with researchers at The University of Chicago, he now also works amongst others with researchers at the University of Arizona, the University of California at Irvine and the University of Cambridge, UK and many others. He has lectured and organized workshops in the USA, Japan, and Europe.

TUTORIAL

How to Use Ubisense Real Time Location System (RTLS) in Research

Date: Tuesday, August 28
Time: 16:00-17:00
Location: 42
Instructor: Uwe Zylka (Ubisense, Germany)

Benefits

In this tutorial you will learn what's the core differentiator of Ubisense Real Time Location System (RTLS) compared to other tracking technology and how Ubisense RTLS has been used in scientific research projects.

Features

Participants will be introduced to:

*   Who are Ubisense?

*   Core difference between Ubisense RTLS and RFID / WLAN tracking technology.

*   Components of Ubisense RTLS.

*   Use cases in scientific research projects.

Audience

This tutorial is of interest to anyone who wants to discover the benefits of Ultra Wide Band (UWB) tracking technology.

Instructor's resume

Uwe Zylka is an engineer with extensive experience in AutoID industry and industrial processes. He graduated in 1994 at University of Dortmund and worked for various companies in industrial sector. Since 2010 he is working as Pre Sales consultant at Ubisense.

The 'CamTouch' Standard in Rodent Touchscreen Behavioural Testing

Date: Tuesday, August 28
Time: 16:00-17:00
Location: A
Instructor: Greg Prescott (Campden Instruments, Loughborough, United Kingdom)

Benefits
Translational testing to primates and humans.

Features
CamTouch is the specification of the equipment for touchscreen testing.

Participants will be introduced to:

•   The progressive development of equipment for behavioural testing.

•   The important performance criteria for delivery of stimuli and recording of response.

•   The specification of equipment to the 'CamTouch' standard.

Audience
Behavioural & cognitive psychologists.

Instructor's resume
Greg Prescott is Director at Campden Instruments, originally educated in life science and with 25 years in engineering environments, including, vacuum deposition , electromagnetic shielding and latterly in tools for neuroscience.

The Sequence Analysis Toolkit for advanced analysis of EthoVision XT data

Date: Tuesday, August 28
Time: 16:00-17:00
Location: 40
Instructor: Patrick Zimmerman (Noldus Information Technology, Wageningen, The Netherlands)

Benefits
In this tutorial, you will learn how to use the Sequence Analysis Toolkit (SAT) to carry out advanced analysis of EthoVision XT data.

Features
Participants will learn about:

- Exporting data from EthoVision XT for the Sequence Analysis Toolkit.

- Advanced analysis of zone visits / transitions with the Sequence Analysis Toolkit with examples from standard tests, such as the Y-maze, elevated plus maze and radial maze.

- Analysis of individual bouts of behavioral states (Movement, Mobility, Elongation).

- Integration of EthoVision XT behavioral states with The Observer XT.

Audience
This tutorial is aimed at EthoVision XT users who are interested in advanced zone analysis. We assume a basic understanding of EthoVision XT and The Observer XT.

Instructor's resume
Dr. Patrick Zimmerman is a Behavior Research Consultant at Noldus Information Technology. He is a behavioral biologist with extensive experience in the study of animal learning, behavior, and welfare. Patrick has been working at Noldus IT since 2005. His expertise includes behavior research methods and analysis, integration of behavioral and physiological data, and gait analysis in rodents.

The MBRose HM-2 Enhancing Animal Welfare in High Throughput Systems

Date: Friday, August 31
Time: 14:00-15:20
Location: 42
Instructor: Henrik Johansen (MBRose, Faaborg, Denmark)

Benefits
In this tutorial you will learn how to use the HM-2 system in general from registering incoming animal to data extraction and export of data. Also you will learn how the system may be operated in large scale high throughput setups.

Features
Participants will be introduced to:

•   Registering incoming animals, planning studies and running sessions in HM-Lab.

•   The use of scheduled treatments, skewed start and setting alarms.

•   Selecting filters and extracting data and transfer into std. presentation packages.

•   Study planning and data extracting at your desk using HM View.

•   Inclusion of physiological data and automatic synchronization.

•   Back annotation, extraction of new information, alternative analyzing, feed intake as a welfare parameter.

Audience
This tutorial is of interest to anyone who wants to understand the use and benefits of the HM-2 system and its seamless connection to data presentation packages and physiological data telemetry systems. Previous experience with the HM-2 system is not required.

Instructor's resume
Henrik Johansen is an electronic engineer and one of the two founders of MBRose. After a 25 year career in micro- and optoelectronics design he sought new challenges in the behavioral domain and founded MBRose in 2006 together with Søren Ellegaard, who has provided tailored solutions for behavioral studies for more than 30 years. Henrik has been working with customers to better understand their needs in feed monitoring systems where animal welfare and compliance to the 3 R's is essential. .

User Meetings

User Meetings

User Meetings are sessions organized by the exhibiting companies, usually manufacturers of research software and/or instruments. These meetings provided forums in which users:

- Exchange information and experience with fellow users.

- Learn about the latest product developments.

- View prototypes of new products.

- Discuss product development, release schedules, installation and support procedures, etc.

Schedule
The following user meetings are scheduled:

The Observer XT

Date: Tuesday, August 28
Time: 11:00-12:30
Location: Blauw
Organizer: Niek Wilmink (Noldus IT, Wageningen, The Netherlands)

Aim of the meeting

This meeting is about The Observer XT. The product manager will demonstrate the latest version of The Observer XT and tips and tricks for both novice and experienced users will be presented. The meeting will give users and prospects an opportunity to share experiences and discuss ideas for product improvement. The meeting is open to everyone who works with The Observer XT or who wishes to do so.

Program

- Introduction (Lucas Noldus; Noldus Information Technology, Wageningen; The Netherlands).

- The Observer XT 11 – What's new? (Niek Wilmink, Product Manager).

- Group discussion (assisted by Noldus personnel).

- Observation in the field. What do I need when I am out of my lab?

- Presentation of results.

- Tips & Tricks in The Observer XT (Leanne Looijens, Behavioral Research Consultant).

FaceReader

Date: Tuesday, August 28
Time: 14:00-15:30
Location: Rood
Organizer: Hans Theuws (Noldus IT, Wageningen, The Netherlands)

Aim of the meeting
In this session, users and developers have the opportunity to connect with each other. Users of FaceReader can learn about the latest developments, exchange experiences with other users and discuss possible future developments. Also developers working on FaceReader will join this session.

Program

*   Introduction (Hans Theuws, Noldus Information Technology, Wageningen, The Netherlands).

*   Case study presented by a FaceReader user: "Implicit and Explicit Measures of Emotions in Response to Positive and Negative Food Odours" (Vivian He, Wageningen UR, The Netherlands). Not only the research done with FaceReader, but also problems encountered and solutions that have been found will be discussed.

*   Sneak preview of the new FaceReader 5 (Paul Ivan, VicarVision, Amsterdam, The Netherlands).

*   Group discussion:

    *   Issues faced during expression analysis.

    *   Desired future developments.

Audience
This meeting is organized for users of FaceReader. However, if you are not using FaceReader but are working with other solutions for analyzing emotions, or if you have a special interest in this topic, you are also welcome to join.

Theme

Date: Tuesday, August 28
Time: 14:00-15:30
Location: 42
Organizers: Gudberg K. Jonsson (Human Behavior Laboratory, University of Iceland, Reykjavik, Iceland)

Aim of the meeting
In this session, users of Theme™ will get together to learn about new concepts and features, exchange experiences with other users, and discuss future development.

- **Program**
  An overview of recent research involving the T-pattern model and Theme. Gudberg K. Jonsson (Human Behavior Laboratory, University of Iceland, Reykjavik, Iceland).

- New concepts, features and applications. Magnus S. Magnusson (The creator of Theme™. Director and founder of the Human Behavior Laboratory, University of Iceland, Reykjavik, Iceland).

- Short user presentations. Some case studies will be presented by users of Theme, coming from different research areas. Subjects can be the type of research or tests users are doing with Theme, problems encountered, and solutions that have been found. Theme users who are interested in giving a short presentation are invited to send a short abstract to Gudberg K. Jonsson (gjonsson@hi.is).

- Final discussion: Discussion about possible directions for new developments with Prof. Magnus S. Magnusson, the creator of Theme.

EthoVision XT

Date: Tuesday, August 28
Time: 14:00-15:30
Location: 40
Organizer: Ruud A.J. Tegelenbosch (Noldus IT, Wageningen, The Netherlands)

Aim of the meeting

In this session, users of the EthoVision XT video tracking system, come together to learn about the latest product developments, exchange experiences with other users, and discuss future development, desired product features, etc.

Program

- Introduction (Ruud A.J. Tegelenbosch, Noldus Information Technology, Wageningen; The Netherlands).

- Case studies presented by users of EthoVision XT:

  - Use of automated tracking system across anxiety and depression models in rodents (Dr. J. Adriaan Bouwknecht, Johnson and Johnson, Beerse, Belgium).

  - Monitoring zebrafish larvae locomotor activity using DanioVision (Herma C. van de Linde, B.Sc.; Erasmus MC, Rotterdam,The Netherlands).

- Presentation of research:

  - Automated Recognition of Rodent Behavior at a Higher Level (Elsbeth A. van Dam, M.Sc.; Noldus Information Technology, Wageningen, The Netherlands).

- General discussion.

Workshops

Workshops

Workshops are interactive discussions about specific aspects of measuring techniques. Although there may be formal presentations by workshop participants, it is the intention that the workshop organisers create sufficient space to allow for thorough discussion of the workshop's topic. Research presentations made during a workshop are not normally published in the conference proceedings.

The following workshops are held during the conference:

Tracking Movement Using GPS: Showcases

Date: Wednesday, August 29
Time: 10:00-12:30
Location: Blauw
Chair: S.C. van der Spek (Delft University of Technology, Delft, The Netherlands)

Abstract

GPS is an advancing technology for collecting spatio-temporal data and represents a method to Measure Behaviour. Today this MOVEment data is collected for measuring human, animal or transportation activity. Within these topics subsets can be distinguished, e.g. for humans between cities and rural areas, or between specific, limited and all activities. Within animals there's a distinction between small animals like birds and huge animals like dear and elephants; within transportation between logistics, cars and vessels.

Although the subjects, context and frame of these projects may vary, all these studies use similar methods to collect, process and analyse the data.

The focus of the workshop is on exchanging practical experiences. Central issue of this workshop is showing examples of field studies in which GPS has been used, the showcases. For this workshop we are aiming at a broad set of showcases.

Program

The interactive workshop will include the following showcases:

•   Bluetooth Tracking Ghent Festival
        Nico Van de Weghe
        Ghent University, Ghent, Belgium.

•   Bike-Ability Project, Copenhagen
        Henrik Harder
        Aalborg University, Aalborg, Denmark.

•   EURODEER - animal tracking by GPS devices: 400 individual roe deer
        Francesca Cagnacci
        Edmund Mach Foundation, Italy.

•   HighRise 2012- GPS-Tracking of Inhabitants of High-rise Buildings
        Stefan Van der Spek
        Delft University of Technology, Delft, The Netherlands.

Sponsorship

The workshop is co-funded by MOVE (COST IC0903).

WORKSHOP

GPS Animal Tracking: From Movement Tracks to Behaviour Analysis

Date: Wednesday August 29
Time: 14:00-17:10
Location: Blauw
Chairs: Andrea Kölzch (Netherlands Institute of Ecology, Wageningen,
            The Netherlands), and Tamme van der Wal (Aerovision B.V., The Netherlands)

Goal
Present E-Track project developments and discuss requirements. www.etrack-project.eu.

Abstract
Satellite positioning is a key technology to track animals and monitor their whereabouts. In this way, spatial patterns like foraging and migration of a wide range of animals have been analysed - from geese to elephants. One step further is to measure and analyse social behaviour and interactions between animals and with their environment. The increased positional accuracy of GPS due to the European augmentation system EGNOS (and its equivalent WAAS) and the ever-progressing miniaturisation and power efficiency of devices make enhanced measurements possible. Now we can progress from movement tracks to behavioural analysis.

Understanding animal behaviour and their response to the spatial environment is important for wildlife management and farming. Therefore E-TRACK project develops an integrated system to measure, monitor and analyse animal behaviour. EGNOS enhanced GPS tracks provide the detailed positioning needed to look into animal behaviour. The workshop presents results of the E-Track project and gives the opportunity to discuss and interact on the subject.

Program

- Enhanced satellite tracking for animal behaviour analysis (Lucas Noldus – Project Coordinator E-Track).
  This introduction presents an overview of issues, technology and solutions in animal behaviour analysis based on satellite tracking. Also, the goals and achievements of the project will be presented.

- Requirements analysis (Andrea Kölzsch – Researcher Movement Ecology).
  The results of an extensive survey into user requirements provide focus for E-Track to focus on. The survey outcomes are presented and discussed.

- How to make GPS more accurate (Brian Cresswell – Animal tagging developer).
  GPS technology popping up in everyday devices increases our expectations of technology. Here, the state-of-the-art in positioning for animal tracking is presented and what can be done to improve it.

- Field trials (Frank van Langevelde – Researcher Spatial Resource Ecology).
  The E-Track tags are tested on domestic animals before deploying them in the wild. The first results using our new tags on dairy cows will be presented and discussed.

- Discussion and Interactive session (Tamme van der Wal, and Andrea Kölzsch – Workshop chairs).
  Based on the introductions participants engage in a lively interactive session around the Coolwall. Your opinions, suggestions and critics are collected and ranked, leading to an action-oriented wrap-up.

Measuring Behaviour in Open Spaces

Date: Thursday, August 30
Time: 10:00-13:20
Location: 42
Chairs: Hayley Hung (University of Amsterdam, Amsterdam, The Netherlands)
             Ronald Poppe (University of Twente, Enschede, The Netherlands), and
             Janienke Sturm (Eindhoven University of Technology, Fontys University of
             Applied Sciences ,Eindhoven, The Netherlands)

Open spaces such as lobbies, playgrounds, museums and streets are common locations where people meet and interact with the environment. For various reasons, we might be interested in the behaviour of individuals and groups. Detection of suspicious behaviour or traffic control are typical applications in the areas of security and surveillance. But we can also analyse how people navigate through crowded places, whether children play co-operative or competitive on a playground or whether people are attending items on sale in a clothing store.

When the behaviour of people is analysed, we can also try to influence this behaviour as an interactive system. When displays or actuators are present in the open space, these can be used to navigate people through crowded halls or try to stimulate interactions between people that appear to have similar interests in a museum. An interactive system can even try to seduce people to explore how the system responds to them.

In all these examples, there is a need to robustly identify and track people around the space. Sensors such as cameras, microphones and Kinects are employed and their signals processed to obtain information about the people's locations and movements. Subsequently, we can analyse these to understand the behaviour, either for individuals or for groups. This interpretation is non-trivial as it strongly depends on the spatial and social context in which the behaviour occurs. Moreover, unexpected behaviour and inconsistencies in the tracking make this task a challenging one.

Besides the challenges in proper sensor technology and behaviour interpretation, research on measuring behaviour in open spaces also depends on the availability of labelled behaviours for the training and evaluation of various aspects of the system. This workshop addresses the challenges and opportunities in the analysis and understanding of (groups of) people in open spaces.

Speakers at the workshop include Marco Cristani (University of Verona, Italy), Liesbeth Jans (Fontys Sporthogeschool Tilburg, The Netherlands), Andries Lohmeijer (KITT Engineering, The Netherlands), Ben Schouten (Eindhoven University of Technology / Fontys University

of Applied Sciences, The Netherlands) and Mettina Veenstra (Amsterdam University of Applied Sciences, The Netherlands).

Program

10:00   Introduction (Ronald Poppe, University of Twente, Enschede, The Netherlands)

10:10   Creating Interactive Public Spaces
         Mettina Veenstra
         Amsterdam University of Applied Sciences, Amsterdam, The Netherlands.

10:40   Human behavior analysis for the design of playful interactions
         Ben Schouten
         Eindhoven University of Technology / Fontys University of Applied
         Sciences, Eindhoven, The Netherlands.

11:10   Coffee break

11:30   Social Computer Vision for Group Behavior Analysis
         Marco Cristani
         University of Verona, Verona, Italy
         Social Computer Vision for Group Behavior Analysis

12:00   25 years Motion Interpreted Media Interface Control (MIMIC)
         Andries Lohmeijer
         KITT Engineering, Enschede, The Netherlands.

12:30   Observing physical activity and play in open spaces
         Liesbeth Jans
         Fontys Sporthogeschool Tilburg, Tilburg, The Netherlands.

13:00   Discussion

13:20   *End of session*

Scientific Tours

Besides the wide variety of poster and presentations, the conference program also offers you the unique opportunity to visit some of the premier behavioral research facilities in and around Utrecht. There is no extra charge for participation in these scientific tours. However, there is a maximum of one scientific tour for each participant and the number of tickets is limited. Tickets are available from reception on a first-come, first-served basis. Two of the tours are described below. Information about other tours will be available during the Conference. The exact times of the different Scientific Tours will be given at the Conference.

Motion Capture Lab (Department of Information and Computing Sciences of Utrecht University, The Netherlands)

This tour will consists of a visit to and a demonstration of the optical motion capture lab at the Department of Information and Computing Sciences of Utrecht University. Motion capture is a technique commonly used to drive character motions in games and films, but it is also a technique popular in many other domains where motion and behavior needs to be registered and analyzed in detail.

In Utrecht, we have an optical motion capture system consisting of 14 Vicon MX cameras, and 4 Basler video cameras. The setup is used to do research in a variety of fields. One example is automatic video-based tracking where the optical motion capture data is used as a ground truth. Another example is the use of recorded animations to generate new motions on-the-fly with different kinds of constraints.

During the tour, we will explain in detail how the motion capture system works, and we will show a couple of examples of how the data is used in our own research.

For more information, see http://gametechnology.nl/

Rabobank User eXperience Center

One of the most complete User eXperience Centers in Europe has been installed at Rabobank in Utrecht, The Netherlands. The lab was officially opened on the 12th of March 2012. This UX Center allows Rabobank to conduct in-depth interviews, client panels, usability research, eye tracking, workshops, concept development research, and co-creation.

UX Center
The UX Center is a totally new test environment which offers numerous of possibilities. By controlling light, sound, static and moving images, different situations and surroundings

can be created. As a result, this UX Center is the ideal test environment which really represents real-life situations. New products, such as the recently launched vertical cards are being developed and tested in this UX Center. With this new UX Center the Rabobank gives body to her vision to optimize their services and designs to customer requests and needs.

Usability research and eye tracking
This center comprises of two rooms, a test room and a control room. Through a one-way mirror researchers can observe the interactions unobtrusively. Different cameras and microphones as well as an eyetracker record all interactions in great detail. All devices can be operated from the control room allowing the UX Team to shift focus when desired. The UX team can exactly see where test participants are looking, what they are experiencing, and how they are reacting. The UX Center facilitates user centered design and offers the possibility to provide answers to a wide variety of research questions in the area of user experience research.

Information about other Scientific tours and the exact times of the individual tours will be available at the Conference.

Exhibition

Several companies operating in a broad range of behavioral-related disciplines will exhibit their products at *Measuring Behavior 2012*. Get up-to-date information about what is on today's market for behavioral research! Check out their products: visit the booths and take a look at the product leaflets in the conference bag.

Noldus Information Technology

Noldus Information Technology is a leading developer of software and integrated solutions for animal and human behavior research. With over 5000 satisfied customers worldwide, Noldus creates products for application areas such as neuroscience, psychology, ergonomics, zoology, Human Factors, and entomology. Their solutions are designed to enhance the quality and quantity of data and to make optimal use of human and animal resources.

Noldus keeps a close eye on developments in the scientific community and contributes to these developments by participating in many international research projects each year. All so that they can create products that meet tomorrow's research needs today.

www.noldus.com

Data Sciences International

Combine DSI telemetry with Ponemah software to collect data from conscious, freely moving laboratory animals including blood pressure, heart rate, temperature, ECG, EEG, EMG, activity, left ventricular pressure, and respiration. Record and analyze physiological parameters for days or months from individual and multiple animals. Distributor of iPRECIO infusion pump.

PhenoSys

PhenoSys is a Research and Development oriented company offering unique automated systems in the field of behaviour biology. This includes virtual reality spherical treadmills, touchscreen chambers, animal sorter, systems for activity measurements, and automated home cages. We use RFID-technology (transponder) to provide high throughput solutions for behavioral phenotyping, brain research, experimental psychology, and the diagnostic characterization of animal models for translational medicine.

TSE Systems

TSE Systems is a leading supplier of sophisticated research instrumentation in the global life science market. With over 120 years experience, we provide total customer solutions including expandable, integrated hard- and software platforms for in-vivo studies in neuroscience, phenotyping, drug screening and toxicology. The modular, automated TSE PhenoMaster systems for metabolic and behavioral phenotyping are unique worldwide. An interdisciplinary team of scientists and engineers closely collaborate with customers to provide innovations optimizing our products and developing new approaches.

New
•   PhenoWorld Multi-arena behavioral and metabolic phenotyping
•   MotoRater Fully quantitative kinematic analysis
•   Fish Behavior Automated zebrafish learning & memory and reflex analysis

Ugo Basile

Ugo Basile is the world's leading manufacturer of instruments for Pain and Behavioral Research. With more than 10,000 hits in the major bibliographic search engines, Ugo Basile provides classic and innovative instruments that scientists have been using worldwide since 1963:

•   Rota-rod Plethysmometer
•   Randall-Selitto Analgesy-meter
•   Plantar Test (Hargreaves Test)
•   Dynamic Plantar
•   Aesthesiometer
•   Von Frey Hairs & Electronic Von Frey
•   Orofacial Stimulation Test
•   P.A.M. for Joint Pain
•   Rodent Ventilator
•   Gas Anesthesia

www.ugobasile.com

www.ugobasileUSA.com

Dorset identification

Dorset identification is manufacturar of RFID systems that are used for animal identification. We have been involved in many research projects that required custom build reading equipment.

www.dorset.nu

Smart Eye

Smart Eye provides the market with 3D Binocular Remote Eye Tracking systems that give a person's 3D information on gaze direction, head position and angles, eyelid opening, pupil size and many more - in real time! The systems, available in 60 or 120 Hz, are well-known for its flexibility and robustness, allow free head movements with a large head box and are very accurate, easy to use and fast to initiate. With the powerful analysis software that we provide, you can create dynamic ROI's, heat maps and get the statistics in ISO standard.

Metris

Metris is a trendsetter in the field of Animal Behavior Ultrasound and Sleep Research.

LABORAS – Fully automates behavior scoring of small laboratory animals. Laboras tracks position and detects more than 18 different behaviors; it does not use video or infra-red beams; non invasive and uses home cage! Widely used in Drug development, Safety pharmacology, Toxicology and Phenotyping!

SONOTRACK – A powerful system to record, analyze and playback Ultrasonic Vocalizations (USV). Full spectrum USV analysis from 15 kHz to 125 kHz, Reliable automated USV call counter! Widely valued in - Anxiety, Stress, Pain, Toxicity, Memory, Sexual related and Social Interaction experiments!

SleepSign – Powerful Sleep Analysis Software!

www.metris.nl
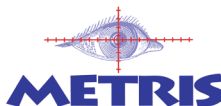
MBRose

We focus on feed intake and activity monitoring in home cage environment solutions and provide complete solutions, hygienic and easy to use with integrated software, providing online data acquisition and recording in database, seamlessly connecting the laboratory with the researchers desk.

www.mbrose.dk

Ubisense

Ubisense offers an award-winning real-time location system (RTLS), which uses small low-power mobile tags with a fixed sensor infrastructure to allow tagged items to be tracked in 3D to within 15cm of their actual position – this is around two orders of magnitude more precise than the more common Global Positioning System (GPS).

The RTLS product is made up of a mixture of physical hardware (the tags and sensors mentioned above), the software that provides the integration between the hardware and existing software applications, specialist applications for core markets, and services to install and maintain these systems.

www.ubisense.net

MindWare Technologies LTD

MindWare Technologies LTD., is a US based company, formed in 2001, and is the premier provider of Integrated Hardware and Software Solutions supporting researchers in Psychophysiology, Cardiovascular, and Life Science research.

With over 40 years of real-world domain knowledge in Psychophysiology and related research disciplines, Mindware Technologies delivers a unique combination of innovative Measurement Equipment, Integrated Systems, and industry Gold Standard Analysis Applications.

MindWare also provides a complete range of services such as Laboratory Design, On-Site and Remote Training, Complete Installation Services, and unparalleled customer support.

Biopac

Biopac develops, manufactures, and supports data acquisition and analysis systems for life science research and education, including wireless Ethernet and USB analog to digital converters, high-speed acquisition solutions, amplifiers, telemetry, logging, transducers, electrodes and accessories. AcqKnowledge software includes scoring and automation routines. BIOPAC is used in thousands of labs worldwide.

www.biopac.com

g.tec

g.tec was founded in 1999 and consists now of two divisions:

- GUGER TECHNOLOGIES OG (development, research and production).
- g.tec medical engineering GmbH (sales, marketing/PR and research).

g.tec is a growing enterprise with two branches in Austria (Graz and Schiedlberg), one branch in Spain (Barcelona) and distribution partners all over the world. All hardware and software development is done in-house by our team of researchers, engineers and developers. g.tec is also an active member in a number of national and international research projects and is active in scientific publishing.

g.tec developed the first commercially available BCI system in 1999 and now sells this system in more than 60 countries worldwide. Our products work with all major BCI approaches (motor imagery, P300, SSVEP and slow cortical potentials), so you can start BCI research within a few hours. The g.tec team tests different BCI technologies on more than 500 subjects internationally to guarantee a perfect working system.

www.gtec.at

Campden Instruments

Campden's Bussey-Saksida touchscreens for rat and mouse has 8 cognitive tests many of which translate to the CANTAB system for non-human and human primates. In vivo electrophysiology is now integrated into these chambers, free from all e.m.c. artefacts. Video recording is also integrated. Three data streams are combined for easy analysis.

Classical operant chambers of lever type and 5/9 hole chambers are available with modularity to the touchscreen chambers and in vivo electrophysiology.

Free and Force exercise systems have applications in eating disorders, exercise physiology and circadian rhythms systems, in motor deficits and sleep deprivation.

Screening tools include startle, forced swim, NIBP, rota-rod and analgesia tools such as hot plate and electronic von Frey.

Social Events

Welcome Reception

The welcome reception will take place in Utrecht. During the welcome reception you can register for the conference, enjoy a drink, and meet international colleagues and friends.

Date: Tuesday, 28 August
Time: 17:30 - 19:00
Venue: Botanical Gardens
Fee: No extra charge

Walking route to welcome reception
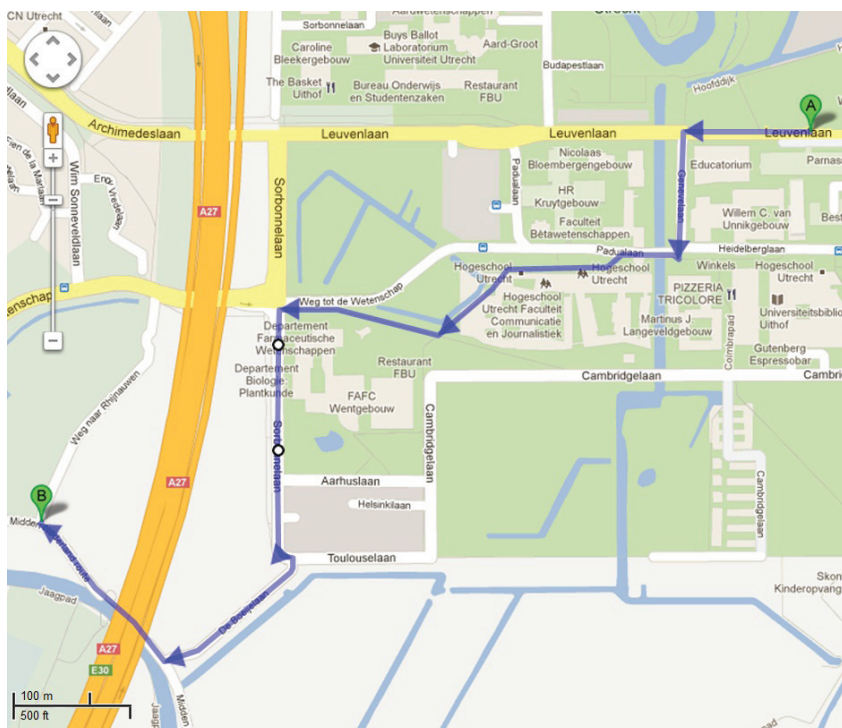
Conference Dinner

This year a conference dinner is included in the registration fee! The conference dinner will take place in Het Oude Tolhuys, which is situated on the outskirts of the city of Utrecht, near De Uithof. The restaurant is located in an old hostel, and many original features have been preserved.

Drinks are included. Transport to the restaurant will be arranged for those who are not able to or do not want to walk (ca. 1.7 km). See the map below for a walking route to the restaurant.

Date: Wednesday, 29 August
Time: 18:00 - 21:00
Venue: Oude Tolhuys

Fee: No extra charge

http://maps.google.nl/

Walking route from the Conference Centre (A) to the restaurant The Oude Tolhuys, Weg naar Rhijnauwen 13-15, Oost, Utrecht (B). The suggested walking route is ca 1.7 km.

City tour & dinner at the wharf

The city walk takes in the Utrecht hotspots, such as the Dom tower, canals, churches and typical alleyways. Additional historic information is provided about Utrecht and what makes it such a special city; perfect for those who are not yet acquainted with it. After a one and a half hour walk you can enjoy a three course dinner at a Balkan restaurant.

Restaurant Balkan Grill Boro is a concept in Utrecht since 1977, and located in the heart of town at the vaulted cellars of the old canal.

All courses can be chosen beforehand. Drinks are included. Transport to the city centre will be arranged. Transport back to hotels will (in principal) not be arranged since most hotels are located in the city centre.

Date: Thursday, 30 August
Time: 18:00 - 22:00
Venue: City center of Utrecht
Fee: € 50,-

Farewell Drinks

Time to say goodbye. Evaluate the conference and exchange final contact information with your colleagues during a farewell drink.

Date: Friday, 31 August
Time: 16:30 - 17:30
Venue: Conference Centre
Fee: No extra charge

Conference Venue

Measuring Behavior 2012 will held in Utrecht, situated in the heart of The Netherlands. Utrecht, home to The Netherlands' largest University, has been an international junction for hundreds of years. Centrally located and easy accessible, the mediaeval city is well known for its cultural historic sites and varied natural surroundings.

Venue
The conference takes place at De Uithof is the campus area of the Utrecht University. Utrecht University, founded in 1636, is a globally leading university that is ranked according to the Shanghai Ranking of World Universities:

- 1st in The Netherlands
- 12th in Europe
- 48th in the world

Some of the buildings on De Uithof have an unusual architecture. The Educatorium Building (where the conference will take place), which was designed by Rem Koolhaas, contains a glass-bottomed walking bridge and circular walls.

Address
De Uithof
Educatorium
Leuvenlaan 21
3584 CE Utrecht
Netherlands
+31(0)30 253 8538

More information on the venue can be found on the web site of Utrecht University: http://www.uu.nl/university/utrecht/EN/factsandfigures/Pages/default.aspx?refer=/EN/utrechtuniversity/factsandfigures

The City of Utrecht
Utrecht city and municipality is the capital and most populous city of the Dutch province of Utrecht. It is located in the eastern corner of the Randstad conurbation, and is the fourth largest city of The Netherlands with a population of over 315,000. Utrecht was first settled in the Stone Age, and was officially founded as a Roman fortification in about 50 C.E. Utrecht's ancient city centre features many buildings and structures from the Early Middle Ages. It has been the religious centre of The Netherlands since the eighth century. Until the Dutch Golden Age Utrecht was the city of most importance of The Netherlands until Amsterdam became its cultural and most populous centre.

Utrecht is host to Utrecht University, the largest university of The Netherlands, as well as several other institutes for higher education. Due to its central position within the country,

it is an important transport hub for both rail and road transport. It has the second highest number of cultural events in The Netherlands, after Amsterdam.

Location of the conference centre

1. Conference centre
2. Bus stop from Utrecht Central Station
3. Location of Welcome Reception

Location of different rooms and areas
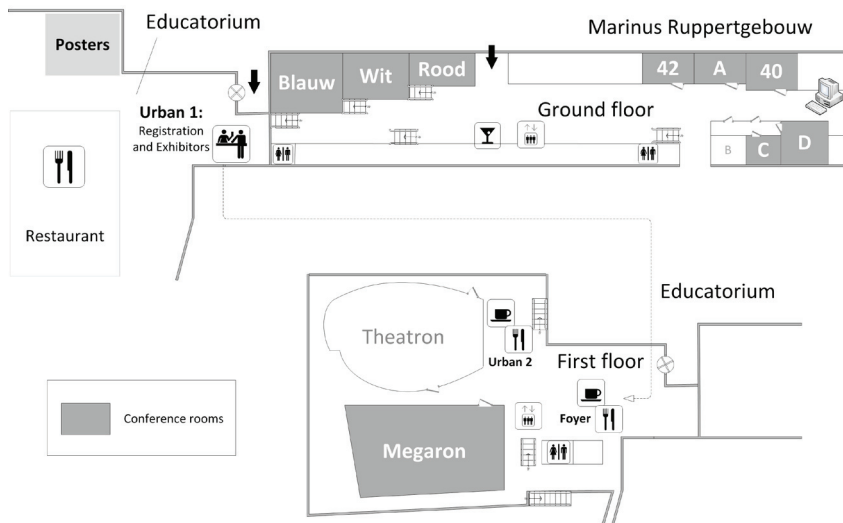
- Ground floor: Blauw, Rood, 42, A, 40, Urban 1 (registration desk and exhibitors), Poster area and Restaurant.

- First floor: Megaron, Urban 2 & Foyer (coffee, tea and lunch).

Practical Information

Language
The official language at the conference is English. The local language is Dutch, but most residents of Utrecht speak English.

Identification
In The Netherlands, you are obliged by law to carry photographic identification (e.g. a passport).

Parking
You can park your car in one of the car parks (see map on page 141). You can buy parking tickets (€ 10,- per day) at the registration desk.

Liability and insurance
The conference fees do not include provisions for the insurance of participants against personal injuries, sickness, theft or property damage incurred during the conference. It is recommended that delegates make prior arrangements for health, accident and other insurance they deem necessary. Neither the Conference Organization nor its sponsors are responsible for any loss, injury or damage - however caused - to persons or belongings.

Credit cards
All major hotels and most restaurants accept credit cards.

Currency exchange and ATM machines
Currency can be exchanged at banks, post offices, and airports. Opening hours are generally from 9:00 to 17:00 on working days. There are ATM machines throughout the city of Utrecht. There are also two ATM machines near the conference centre at Heidelberglaan 1 and Heidelberglaan 2 (see map on page 141).

Internet facilities
Free wireless internet is available at the conference centre.
Wireless network: UU-conference
User name: uuwifi27
Password: ghkwo511

Electricity
Electricity is supplied at 230V (50 Hz) everywhere in The Netherlands. Adapters may be required for your personal equipment.

Lunch
A light lunch is included in the conference fee and will be served daily between 12:30 (12:50 on Friday) and 14:00 in the Foyer and the area Urban 2 on the first floor of the Educatorium. Please take your coffee and lunch from these locations, since there is another conference

going on in the same building during *Measuring Behavior 2012*. You can buy hot meals in the restaurant on the ground floor of the Educatorium (see map on page 142).

Coffee and Tea breaks

Coffee and tea, and other refreshments are free of charge during coffee and tea breaks:

Tuesday	10:30-11.00	and	15.30-16.00
Wednesday	10:40-11:10	and	15:40-16:10
Thursday	10:40-11:10		
Friday	10:40-11:10	and	15:20-15:40

Transport and Tourist information

The easiest way to get to the city centre is by bus: There are direct bus connections (lines 11, 12, and 12S) between De Uithof and Utrecht central railway station. Busses run frequently throughout the day. Tickets for the bus can be bought from the bus driver. You can also buy a public transport chip card (OV-chipkaart). This card works in the entire country. You can buy an anonymous OV-chipkaart at railway station ticket offices and at the Primera shop on De Uithof (Coimbrapad 6-8).

• For more information about the OV-chipkaart see http://www.ov-chipkaart.nl/ (select the language at the top of the page)
• For a database of all public transport connections see http://9292.nl/en/
• General tourist information: http://www.holland.com/global/
• Information about Utrecht: http://www.utrecht.nl/

Information for Presenters

Language
The official language at the conference is English.

Oral presentations
Oral presentations are grouped in General sessions, Special sessions, and Workshops. The durations of the talks is 20 minutes, including discussion. It is advised that authors reserve approximately 5 minutes for discussion and questions from the audience. Talks in all parallel sessions start and finish at the same time. Session chairs will ensure strict timekeeping to enable you to move between sessions.

The conference organization will provide each presentation room with a laptop and a projector. Presenters should bring their presentation on a CD or USB stick. Please prepare your presentation by trying it out on the computer during the last break time before your presentation. Your session chair will be present in the room during that break, please introduce yourself to him or her.

Poster presentations
Location
The posters will be displayed in the area in front of the restaurant on the ground floor of the Educatorium. The number of your poster is the number that was used in the reviewing process. To find the number of your poster, see pages 73-78 or check at the registration desk.

Mounting
Posters can be mounted on Tuesday, Wednesday, and Thursday morning. All posters should be in portrait format. The posters can be a maximum size of A0, that is 84 (w) x 119 cm (h). You can attach your poster to the poster board with double-sided or clear removable tape. Double-sided tape is available at the Registration Desk.

Presentation and poster viewing
In principle, posters stay on display throughout the conference, so poster viewing is possible until Friday, August 31. During the poster session, the presenter is requested to remain at his or her poster as much as possible.

Conference Organization

Scientific Program Committee

- Dr. Andrew Spink (chair, scientific program committee), Noldus Information Technology bv, Wageningen, The Netherlands.

- Prof. Remco Veltkamp (conference chair), Media Studies, Utrecht University, Utrecht, The Netherlands.

- Prof. Gernot Riedel (conference chair), Department of Biomedical Sciences, School of Medical Sciences, University of Aberdeen, Aberdeen, United Kingdom.

- Prof. Berry Spruijt (honorary chair), Behavioral Biology Group, Department of Biology, Utrecht University, Utrecht, The Netherlands.

- Dr. Boris de Ruyter, Cognitive & Behavioral Insights User Experiences Department, Philips Research Europe, Eindhoven, The Netherlands.

- Dr. Emilia Barakova, Department of Industrial Design, Technical University of Eindhoven, Eindhoven, The Netherlands.

- Dr. Egon van den Broek, Professor in Man-Machine Interaction, Technical University of Vienna, Vienna, Austria.

- Prof. Wim Crusio, Research Director, French National Research Council, Talence, France.

- Prof. Robert Gerlai, Department of Psychology, University of Toronto, Mississauga, Ontario, Canada.

- Dr. John Krantz, Department of Psychology, Hanover College, Hanover, IN, USA.

- Dr. Lucas Noldus, Noldus Information Technology bv, Wageningen, The Netherlands.

- Dr. Fabio Paternò, Laboratory on Human Interfaces in Information Systems, Institute of Information Science and Technologies, C.N.R., Pisa, Italy.

- Prof. Vicenç Quera, Department of Behavioral Science Methods, University of Barcelona, Barcelona, Spain.

- Prof. Matthias Rauterberg, Department Industrial Design, Eindhoven University of Technology, Eindhoven, The Netherlands.

- Dr. Hugh Marston, TPP Global Development, Edinborough, Scotland, United Kingdom.

- Prof. Ilan Golani, Department of Zoology, Faculty of Life Sciences, Tel Aviv University, Israel.

Local Organizing Committee

- Natasja Bogers, Chair, Local Organizing Committee

- Andrew Spink, Co-chair, Program Committee

- Melvin de Bruijn, Finances

- Sabine van der Meijde, Conference secretariat

Conference Secretariat

- Sabine van der Meijde

- Nathalie Oostendorp

- Nancy van den Dam

- Mariska Walter

- Sidney Hooijer, Finances