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INTERACTIVE
MULTIMODAL
INFORMATION
MANAGEMENT

IM2 Newsletter

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News

MLMI 2008
5th Joint Workshop on Machine Learning and Multimodal Interaction
8-10 September 2008
Utrecht, The Netherlands

Idiap booth at the ICT 2008
Europe's biggest research event for information and communication technologies
November 25-27, 2008
Lyon, France

Cover Story

A major event
The NCCRs on Affective Sciences and IM2 organize a joint Summer Institute

After four previous and very successful events in Martigny, Montana, Lausanne, Morat, the IM2 Summer Institute will take place at the ArtFurrer Hotels, Riederalp, September 1-3.

This year, the great novelty is that this major event will be organized jointly with the NCCR of Affective Sciences. A hundred scientists from the two NCCRs will meet to foster collaborations between their different research areas. Topics for common investigation will be discussed and brainstormed.

On Monday, the event will start with a workshop called GEKO ("Get to Know each Other"): the GEKO is similar to a brainstorming session in order to identify common interest between the NCCRs, discuss scenarios of potential collaborations, create interest groups centred on interdisciplinary themes and finally stimulate informal discussions and contacts. On Tuesday, parallel sessions of scientific talks and workshops have been programmed. Finally, the third day will be dedicated, among others, to a long poster session.

More information available:
http://www.im2.ch/summer-institute-2008

Overview of the program

Monday 01.09.08	Tuesday 02.09.08	Wednesday 03.09.08
	09:00-10:00 **GEKO (Phase III)** Outcome of day 1 by each interest group **Moderator**: T. Ebrahimi	09:00-12:00 Poster Session
	10:00-10:30 Coffee Break	
10:45-11:05 Travel Mörel - Riederalp	10:30-12:30 Parallel session: Scientific presentations	
12:00-13:30 Lunch	12:30-13:30 Lunch	12:00-13:30 Lunch
13:30-15:00 Welcome and quick presentation of IM2 and Affective Sciences **Speakers**: H. Bourlard & K. Scherer	13:30-16:00 Parallel session: Workshop 1) Multimodality in emotions and for their assessment Workshop 2) Multimodal data management and annotation 3) Sensing and predicting nonverbal behavior in face-to-face communication	13:30-14:30 Conclusions of thematic workshops **Speakers**: Chairmen
15:00-16:30 **GEKO (Phase I)** Presentation & scenarios **Moderator**: T. Ebrahimi		14:30-15:30 Outcomes and conclusions **Speakers**: H. Bourlard & K. Scherer
16:30-16:45 Coffee break		16:00-16:20 Travel RiederAlp - Mörel
16:45-18:30 **GEKO (Phase II)** Interest Groups and working items **Moderator**: T. Ebrahimi	16:30- Social Activities	16:24-16:33 Travel Train: Mörel - Brig MGB-fo/bvz
19:00- Dinner	19:00- Dinner	

idiap RESEARCH INSTITUTE

FNS·NF FONDS NATIONAL SUISSE SCHWEIZERISCHER NATIONALFONDS FONDO NAZIONALE SVIZZERO SWISS NATIONAL SCIENCE FOUNDATION

CyberCamp'08
HMI INTRODUCED TO 40 HIGH SCHOOL STUDENTS

The Department of Informatics of the University of Fribourg (Switzerland) organized this summer 2008 the second edition of the CyberCamp. The CyberCamp is a camp lasting four days, enabling forty young and interested high school students coming from all the regions of Switzerland to discover the world of computer science.

The event was sponsored like last year by the Hasler Foundation, which has the commitment to promote research and training in computer science, as well as new the Promotion Foundation of the Department of Informatics itself.

The participants were taken care of by a multi-lingual team of professors, assistants and students. Seven workshops focusing not only on theoretical content but emphasizing on the practical exercises were scheduled on the program. The participants learned that computer science is much more than using simple office programs but actually a young, recognized and challenging science.

Further, they discovered the world and evolution of the human-machine interfaces: from ENIAC, the world's first computer, up to modern tendencies of the development of symbiosis between computers and humans with multimodal interfaces. Also fields like security, logistics and their mathematical background, the concepts of the Web 2.0 and the creation of programs for mobile phones didn't miss out. The highlight of the week was surely the robot competition especially prepared for the CyberCamp 2008.

In this context, Denis Lalanne (head of IM2. HMI) and René Sommer (from Logitech and pioneer in the development of the mouse) gave a 3h tutorial to introduce to the 40 high school students the field of Human Machine and Multimodal Interaction.

We hope this event will attract numerous young women and men in the field of computer science.

Department of Informatics:
http://www.unifr.ch/informatics

CyberCamp:
http://cybercamp.unifr.ch

Hasler Foundation:
http://www.haslerstiftung.ch

Fribot:
http://www.fribot.org

Contact:
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IM2.HMI HEAD
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Participants of the CyberCamp'08

Ferran Galán, Idiap research institute, IM2.BMI
METHODS FOR ASYNCHRONOUS AND NON-INVASIVE EEG-BASED BRAIN-COMPUTER INTERFACES.
TOWARDS INTELLIGENT BRAIN-ACTUATED WHEELCHAIRS

Ferran Galán started at Idiap research institute in 2005 under the supervision of Pr. J. del R. Millán and successfully defended his PhD thesis at the Univ. of Barcelona on June 19, 2008.

Ferran's thesis received the highest honors and has been recommended for the 2010 Doctorate Award conferred by the Doctors' Senate of the University of Barcelona.

His PhD was done in the framework of IM2.BMI and funded by the European project MAIA *(http://www.maia-project. org)*. His thesis entitled «Methods for Asynchronous and Non-Invasive EEG-Based Brain-Computer Interfaces.

Towards Intelligent Brain-Actuated Wheelchairs» proposes methods to enhance the robustness of asynchronous and EEG-based brain-computer interfaces for brain-controlled wheelchairs.

Its three main contributions are the detection of transitions in EEG to guide post processing algorithms, the use of canonical variates analysis as a feature extractor with canonical solution for multi-class BCI, and the introduction of neural frames recognition approach to guide alternative decision making processes.

Ferran's thesis was instrumental in the development of the first demonstration of continous mental control of a real wheelchair in a natural environment by mental imagery.

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*Ferran Galán,
Idiap research institute*

SSPNet
A NEW EU-FP7 NETWORK OF EXCELLENCE GRANTED TO IDIAP AS COORDINATOR

IDIAP will be the leading house of a new European Network of Excellence that will start at the beginning of 2009 (preliminary information available at www.sspnet.eu). The name of the new project is "Social Signal Processing Network" (SSPNet) and the coordinators are Alessandro Vinciarelli (IDIAP, active in IM2.MCA) and Maja Pantic (Imperial College London). SSPNet aims at laying down the foundations of Social Signal Processing (SSP), the new domain, still in its pioneering phase, at the interface between engineering and human sciences. In simple terms, the goal of SSP is to develop artificial social intelligence, i.e. to make computers capable of sensing, interpreting and generating social signals. These are complex constellations of nonverbal behaviors through which humans convey relational attitudes like empathy, agreement, affiliation, dominance or conflict.

The effectiveness of social signals is evident in the figure below. When asked to describe this scene, around half of the interviewed subjects provide the correct answer, i.e. the individuals form a couple and they are fighting. Such an accuracy is possible even if only limited information is available: the interaction is intense (the mouths are wide open and the hand of the woman is far from being relaxed) and the portrayed individuals have

a strong relationship (the interpersonal distance can be so small only when people are close friends or belong to the same family). The SSPNet will try to "teach" computers socially adept behaviors by sensing, interpreting and generating the behavioral clues shown in the picture (as well as many others). To address an intrinsically interdisciplinary problem like Social Signal Processing, SSPNet includes not only engineering groups expert in analysis and synthesis of human behaviors and social interactions, but also psychologists and social scientists working on cognitive modeling of human behavior.

The engineering side is composed of IDIAP Research Institute (CH), Imperial College (UK), University of Edinburgh (UK), Technical University of Delft (NL), CNRS (F), University of Twente (NL) and DFKI (D). The human sciences side is composed of University of Geneva (CH), University of Roma Tre (I) and Queen's University Belfast (UK). The members of the consortium are convinced that SSP must be the result of a tight collaboration between human science and engineering researchers. For this reason, they will try to establish a new scientific domain where research is done in a different, and truly multidisciplinary manner. In this perspective, both human science and engineering researchers are keen to change their way of working.

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Figure: Evident social signals
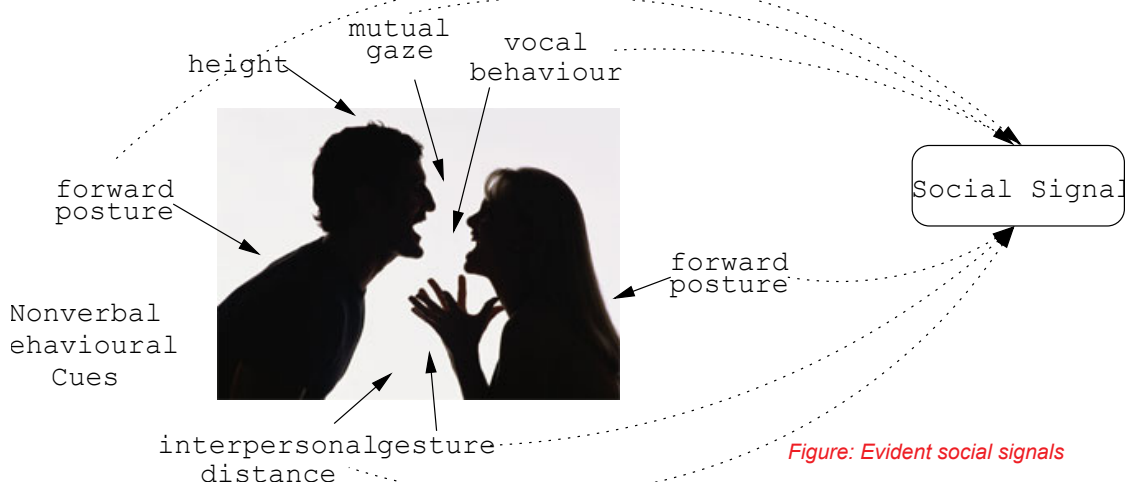
Roman Bertolami, University of Bern, IM2.VP
ENSEMBLE METHODS FOR OFFLINE HANDWRITTEN TEXT LINE RECOGNITION

Foman Bertolami, University of Bern

This thesis investigates ensemble methods for offline recognition of English handwritten text lines. Multiple recognisers are automatically generated from a single base recognition system. Combining the output of these multiple recognisers provides the final ensemble result.

The underlying recognisers are based on hidden Markov models. One model is built for each character. Based on the lexicon, word models are derived by concatenating character models. A statistical language model is used to build text line models by preferring more likely word sequences over unlikely word sequences. A post processing step calculates confidence values for each recognised word.

Ensembles of recognisers are generated based on variation of the training data, the features, and the system architecture. Because the output of

a handwritten text line recogniser is a sequence of words, most existing combination methods cannot be applied directly. The combination has to be performed in two steps. First, the word sequences are synchronised by a string alignment procedure. Second, a decision strategy derives the combination result for each segment of the alignment. For this purpose, confidence-based voting, a statistical decision method, and a decision method that includes language model information are used.

The experimental evaluation on a large set of images of handwritten text lines indicates that the proposed ensemble methods can significantly increase the performance of an offline handwritten text line recognition system.

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Upcoming Events

MLMI 2008
September 8-10, 2008, Utrecht,
http://www.mlmi.info

MLMI 2008 - 5th Workshop on Machine Learning and Multimodal Interaction

The MLMI series brings together researchers from the different communities working on the common theme of advanced machine learning algorithms applied to multimodal human-human and human-computer interaction.

Several events are also associated to MLMI 2008:

- The AMI Career Day will provide an opportunity for young scientists to talk to representatives of companies working on meeting technology and prepare the next steps of their careers.
- A special session on user requirements and evaluation of multimodal meeting browsers/ assistants.
- A workshop on the evaluation of automatic speech recognition systems for Dutch.
- An interproject meeting on the evaluation of space-time audio processing.
- A student poster session.

The workshop website has more information about the program, venue and satellite events: *http://www.mlmi.info*.

Looking forward to welcoming you in Utrecht,

- Andrei Popescu-Belis, Idiap research institute (Programme Co-chair)
- Rainer Stiefelhagen, University of Karlsruhe (Programme Co-chair)
- David van Leeuwen, TNO (Organization Chair)
- Anton Nijholt, University of Twente (Special Sessions Chair)

ICT 2008
November 25-27, 2008, Lyon
http://ec.europa.eu/information_society/events/ict

ICT reviewers selected Idiap, research institute to demonstrate technologies resulting of research done in the framework of IM2 and various European projects, among others:

- Bi-modal Biometric Login System
- Face detection system
- Presentation acquisition system (Klewel)

What is ICT 2008?

ICT is the Europe's biggest research event for information and communication technologies

This year's ICT event - the largest research event in Europe in 2008 - will present:

- European Union priorities in ICT research for over €2 billion of funding available in 2009-2010
- The major current technological trends which impact upon strategic research planning
- Public research policies to stimulate research and innovation

Conference themes:

- Inventing the Future: ICT technologies for the future, featuring
- Innovative Europe: new markets, new sectors, new players
- Impact through Policy

ICMI 2008
October 20th, 2008, Chania (Greece),

Special Session on Social Signal Processing at the International Conference on Multimodal Interactions

Organizers:

M.Pantic, A.Vinciarelli, H.Bourlard, A.Pentland

Program:

A.Vinciarelli, M.Pantic, H.Bourlard, A.Pentland: Social Signal Processing: Artificial Social Intelligence through Nonverbal Behavior

S.Favre, H.Salamin, J.Dines, A.Vinciarelli: Role Recognition in Multiparty Recordings using Social Affiliation Networks and Discrete Distributions

S.Petridis, M.Pantic: Audiovisual Laughter Detection Based on Temporal Features

D. Jayagopi, S. Ba, J-M. Odobez, D. Gatica-Perez: Predicting two facets of social verticality in meetings from five-minute time slices and nonverbal cues

F.Pianesi, N.Mani, A.Cappelletti, B.Lepri, A.Zancanaro: Multimodal Recognition of Personality Traits in Social Interactions

TIC Workshop
September 11-12, 2008, EPFL & Idiap

A CH-F TIC workshop will be held on September 11 at EPFL and on September 12 at IDIAP, with about 20 French delegates representing 3-4 national research networks, IM2 and MCIS, the EPFL NCCR on mobile communication.

A mix of talks will be given by the French visitors and the reseachers of both NCCRs.

Selected publications

Social Signal Processing: A Survey on Nonverbal Behaviour Analysis in Social Interactions.
A.Vinciarelli, M.Pantic, H.Bourlard, A.Pentland
To be presented in the «Brave New Topic» session at the ACM International Conference on Multimedia, Vancouver (Canada), 2008.

Machine Learning for Multimodal Interaction
A.Popescu-Belis, R.Stiefelhagen
Proceedings of MLMI 2008, Utrecht, 8-10 September 2008, LNCS 5237, Springer-Verlag, Berlin/Heidelberg, 362 p.

Reference-based vs. task-based evaluation of human language technology.
A. Popescu-Belis
Proceedings of LREC 2008 ELRA Workshop on Evaluation: Looking into the Future of Evaluation: When automatic metrics meet task-based and performance-based approaches, Marrakech, 2008, p.12-16.

Neural network based regression for robust overlapping speech recognition using microphone arrays
W.Li, J.Dines, M.Magimai.-Doss, H.Bourlard
To appear at interspeech-2008, Australia, 2008.

The SRI-ICSI Spring 2007 Meeting and Lecture Recognition System
A.Stolcke, X.Anguera, K.Boakye, Ö.Çetin, A.Janin, M.Magimai-Doss, C.Wooters, J.Zheng
In Multimodal Technologies for Perception of Humans, Lecture Notes in Computer Science, pp. 450-463, 2008.

A writer identification system for on-line whiteboard data, Pattern Recognition
A.Schlapbach, M.Liwicki, H.Bunke
Vol. 41, 2381 – 2397, 2008.

A novel approach to online handwriting recognition based on bidirectional long short-term memory networks
M.Liwicki, A.Graves, H.Bunke, J.Schmidhuber,
Proc. 9th Int. Conf. on Document Analysis and Recognition, 2007, 367 – 371.

Using entropy as a stream reliability estimate for audio-visual speech recognition.
M. Gurban, J.-Ph. Thiran
In 16th European Signal Processing Conference, Lausanne, Switzerland, August 25-29, 2008.

Semantic clustering of images using patterns of relevance feedback.
D. Morrison, S. Marchand-Maillet, E. Bruno
In Proceedings of the 6th International Workshop on Content-based Multimedia Indexing (CBMI'2008), London, UK.

Demonstration : HephaisTK, "une boîte à outils pour le prototypage d'interfaces multimodales.
B. Dumas, D. Lalanne, R. Ingold
To appear in Proceedings of the 20th International Conference on Interaction Homme-Machine (IHM'08), Metz, France, September 2008, ACM Press.

Asynchronous Detection and Classification of Oscillatory Brain Activity.
R.Chavarriaga, F. Galán, J. del R.Millán
Proc. 16th European Signal Processing Conference.