



*SSPNet is a European Network of Excellence fostering and supporting research activities in Social Signal Processing, the new, emerging domain aimed at bringing Social Intelligence in computers.*

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## Editorial

The International Workshop on Social Signal Processing, flagship event of the SSPNet, will take place this year in the beautiful town of Florence on October 29th, in conjunction with the ACM International Conference on Multimedia.

The workshop has received a large number of submissions of high quality, an excellent sign of vitality for SSP. The accepted works cover a wide range of domains that include the synthesis of smiles via embodied conversational agents, the analysis of attitudes associated to postures, the automatic assessment of personality, the recognition of human actions, the use of facial actions in tagging scenarios, cognitive models of social signals, socially aware speaker segmentation and conceptual models for turn-taking. In other words, an extensive exploration of the most important nonverbal behavioural cues, of their psychological aspects, and of the role they have in both analysis and synthesis of human behaviour. Last, but not least, some papers show how SSP can improve technologies typically based on different approaches, certainly a promising research avenue for our domain.

The program is further enriched by four exceptional keynote talks that will be given by the SSPNet Scientific Advisory Board Members: Justine Cassell, Jeff Cohn, Toyooki Nishida and Alex Pentland. This will make the workshop an excellent opportunity to learn about the latest and most important trends in the SSP community.

After the positive feedback we received last year in Amsterdam, we hope that the new edition of the SSP Workshop will be equally appreciated by all participants.

We look forward to meeting you in Florence!

**- Alessandro Vinciarelli**  
**(Coordinator, University of Glasgow/Idiap Research Institute)**

## Analyzing Social Signals: The Workshop on Predictive Models of Human Communication Dynamics

This workshop, held August 4-6 in Los Angeles, California, brought together 28 researchers and 12 students to share knowledge, advance the field, and roadmap the future. Organized by Louis-Philippe Morency of the Institute for Creative Technologies of the University of Southern California and Nigel Ward of the University of Texas at El Paso, the workshop covered both scientific and applied issues.

The organizers suggested the perspective that human face-to-face communication is a little like a dance, in that participants continuously adjust their behaviors based on verbal and nonverbal displays and signals, and observed that a topic of central interest in modeling such behaviors is understanding the patterning of interlocutor actions and interactions, moment-by-moment. Humans are good at this: they have an amazing ability to predict, at a micro-level, the actions of an interlocutor; and it has been shown that better predictions can correlate with more empathy and better outcomes. Today much is now known about some aspects of communication dynamics, turn-taking for example, but much less about others. Thus there is a growing interest in developing predictive models of communication dynamics, able to integrate previous and current actions from all interlocutors to anticipate the most likely next actions, of one or all interlocutors.

The workshop addressed this topic very broadly. Presentations featured recent advances in machine learning and experimental methods, and recent findings from a variety of perspectives, including conversation analysis, social signal processing, adaptation, corpus analysis and modeling, perceptual experiments, and dialog systems-building and experimentation. Speakers also addressed various challenges and opportunities involved in the creation of more accurate and more comprehensive predictive models of human communication, and applications and potential impacts including

- Interactive systems - robots, embodied conversational agents, intelligent virtual agents, spoken dialog systems etc. - that understand and interact with people in more natural ways.
- More accurate understanding and indexing of recorded dialogs and meetings,
- The ability to describe and teach cultural norms,
- The ability to diagnose mismatches in behavior and expectation that hurt effective communication in the workplace and in social relationships,
- Deeper understanding of various communication disorders,
- A better understanding of human nature.

The workshop format included invited talks, demos, posters, break-out sessions, discussions that continued on through meals and late into the evenings, and a closing session that identified a number of key research questions and challenges (see <http://cs.utep.edu/dynamics/>). A follow-up workshop, with a focus on modeling and learning algorithms, will be held at the 24th annual conference on Neural Information Processing Systems (NIPS) in December, organized by Morency and Ward together with Daniel Gatica-Perez.

- Nigel Ward (University of Texas at El Paso) and  
Louis-Philippe Morency (University of Southern California, Institute for Creative Technologies)

## Symposium on Automatic Analysis of Human Behaviour at the 20th Biennial Congress of the International Society for Human Ethology

On the 1st of August 2010, Marc Mehu (UNIGE) chaired a symposium on automatic analysis of human behaviour at the 20th biennial congress of the International Society for Human Ethology. The symposium's aim was to introduce new methods for behaviour analysis to scientists working on the biology of behaviour. Speakers presented a series of research that used automatic measurements of behaviour and the benefits and limitations of using automatic analysis of behaviour. The symposium consisted of four talks, two of which were given by SSPNet members (Marc Mehu, UNIGE, and Dirk Heylen, UT). The other two talks were given by Karl Grammer, professor of human ethology in the Department of Anthropology at the University of Vienna, and by Daniel Messinger, professor of developmental psychology at the University of Miami. Different disciplines were therefore represented in the symposium (social psychology, developmental psychology, human ethology, computational linguistics). The audience consisted of approximately 50 participants, who were fairly responsive given the discussions that followed the presentations.

This symposium originated with the observation that, despite the rich source of information available in social interactions, researchers seem to have lost interest in observational studies of behaviour. Marc Mehu argued that this situation is partly due to methodological issues inherent to the measurement of behaviour. The difficulty for human observers to systematically extract information about behaviour dynamic and movement quality constrained researchers to use less precise categorical measurements. Automatic analysis promises to provide a solution to the problems inherent to traditional behavioural research in that it could enlarge the range of measures currently available and make behavioural coding more efficient.

A typical example of how automatic analysis can be successfully applied is the study of dance (presentation by Karl Grammer). Traditional annotation systems are not suitable for empirical research on dancing because they neglect qualitative changes in behaviour and rhythm. Karl Grammer argued that automatic motion analysis allows a more accurate recording of rhythmic motion and a better understanding of the information conveyed through dancing like for instance, personality.

Applied to research on emotional expression, automatic analysis provides continuous and precise measurements of the intensity of facial displays, which has been used successfully to examine dynamic patterns of behaviour in mother-infant interactions (presentation by Daniel Messinger). In particular, automatic analysis revealed time-dependent changes in a) the strength of influence during mother-infant play, and b) smile strength, eye constriction and mouth opening as continuous markers of positive emotion in children. The generalization of this approach to other types of interactions was discussed.

The last presentation addressed the importance of head orientation in naturally occurring conversations. Dirk Heylen presented how continuous tracking of head movements by automatic methods has been used to detect specific aspects of conversation such as the speaker's turn, and the expression of attitudes such as dominance, interest, agreement and disagreement.

All in all, this symposium showed that the development of automatic methods for the analysis of nonverbal behaviour promises to deliver a new set of tools that will expand our understanding of the functional aspects of human behaviour.

- Marc Méhu (UNIGE)

## Discussing Social Signals in Belfast

The QUB team hosted a meeting in Belfast on July 5, 6, and 7. In addition to enjoying Irish cuisine & traditional music, and watching the World Cup, the attendees met to discuss conceptual frameworks and important theoretical principles. Only a limited number of attendees were invited to facilitate discussion and debate in a round table format. The attendees were Alessandro Vinciarelli (University of Glasgow), Marc Shröder (DFKI), Isabella Poggi (Roma Tre), Marc Méhu (UNIGE), and Dirk Heylen (UT), as well as the members of the QUB team (Roddy Cowie, Ellen Douglas-Cowie, Hastings Donnan, and Paul Brunet).

The first day was dedicated to presentations, thereby allowing each invitee to present the ideas and principles from their respective perspective (note: powerpoint presentations are posted on the SSPNet intranet). From these talks, commonalities and more frequently differences were raised and questioned. The second day began with a presentation from Hastings Donnan on the role of culture in SSP from an anthropological perspective. Afterwards, the group debated issues and ideas raised the previous day. A perfect consensus did not occur, nor was it expected; however, the group did manage to find cohesion on some issues, and recognize other issues as being important to SSP despite having differing opinions about these issues.

From these discussions, the group decided to write a declaration of Belfast as a document that not only represents the achievements of the meeting, but also to help guide SSP research. The declaration addresses the respective and mutual SSP-related goals, topics, and challenges for the human sciences and the technologies. Furthermore, the interactions between SSP and other disciplines, and the ethical obligations of the SSP researchers are provided. The document is currently being prepared by Roddy Cowie for distribution.

Finally, the group proposed a special issue in the Journal of Multimodal User Interfaces on the conceptual principles of SSP. A call for papers will soon be made available on the SSPNet website. All members are encouraged to submit.

- Paul Brunet (Queen's University Belfast)

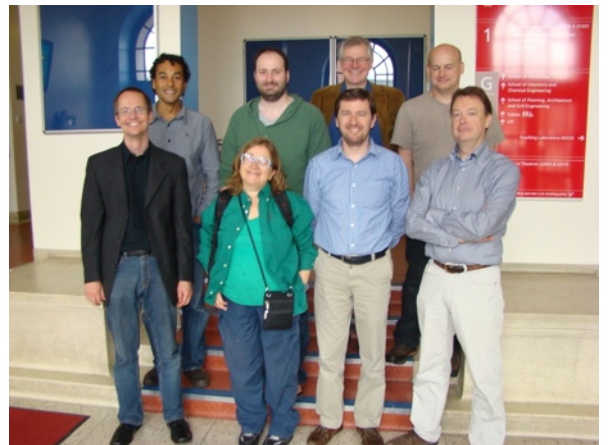
## SSPNet@eINTERFACE'10: thank you SSPNet

SSPNet co-sponsored eINTERFACE'10 which was held from 12 July to 6 August in Amsterdam. During these 4 weeks, students gathered together to work on projects related to multimodal man-machine interfaces. In addition, tutorials and keynote presentations were given by several SSPNet-researchers (Marc Schroder, Anton Nijholt). Our team (Dennis Reidsma, Herwin van Welbergen, Khiet Truong, Iwan de Kok, Bart van Straalen - University of Twente, Sathish Pammi - DFKI, and Daniel Neiberg - KTH) worked on a 'continuous interactive ECA' who can deal actively with responses and interruptions from the user. Typically, ECAs communicate through a classical so-called push-to-talk turn-taking paradigm: one person (i.e., the user or the system) speaks at a time. Our aim was to build an ECA that breaks that paradigm and that can react continuously on responses of the user since that is what humans also do: they are constantly in interaction with each other. The ECA developed is a virtual route guide who explains a route on the map to the user. In order to create rapport and to check whether the user is still understanding and following the ECA, several feedback elicitation techniques were built in. For instance, prosodic (pitch contour, pauses) and gaze behavior were adjusted (based on findings in the literature) in such a way that it would invite users to give feedback. In order to deal with cooperative feedback (e.g., backchannels) and interruptions (e.g., 'barge-ins', 'wait wait I don't understand'), online classifiers were developed to decide whether the ECA should stop talking when the user begins to speak while the ECA is still speaking. And if the ECA is interrupted by the user, the ECA should deal with this interruption gracefully. The ECA was built in the Elckerlyc framework, developed by the University of Twente (<http://hmi.ewi.utwente.nl/showcase/Elckerlyc>). These 4 weeks have been very fruitful and preliminary experiments with the ECA have already been performed. Subsequent experiments have been planned and we will continue to work on social signals and continuous interactive ECAs. For more information on eINTERFACE'10 and our project, see <http://interface10.science.uva.nl/program.php> where you can also find tutorials and keynote presentations given at the workshop.

- Khiet Truong, Dennis Reidsma, Herwin van Welbergen (University of Twente)

### Selected publications

- ◆ M. Charfuelan, M. Schröder and I. Steiner (2010). "Prosody and voice quality of vocal social signals: the case of dominance in scenario meetings", in Interspeech 2010, Special session on Social Signals in Speech.
- ◆ P.M. Brunet, M. Charfuelan, R. Cowie, M. Schröder, H. Donnan and E. Douglas-Cowie (2010). "Detecting politeness and efficiency in a cooperative social interaction", in Interspeech 2010, Special session on Social Signals in Speech.



Attendees at meeting in Belfast, 5-7 July 2010

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