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Report on the 2006 Summer School at Genova

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1   Introduction

The third HUMAINE Summer School took place in Genova from the 22nd to the 28th of September 2006 and was organized by InfoMus Lab-DIST in its new site at Casa Paganini. The school was attended by 80 researchers both from HUMAINE and from other groups. Presentations were given from HUMAINE partners, invited speakers and external researchers.

The school was divided in two main parts: firstly a 2-day workshop on "Multimodal Synchronization of Affective Expressions" and a symposium on computational models of emotions (both organized in collaboration with Geneva Emotion Research Group), and secondly separate sessions with presentations about proposed topics, tutorials and experimental activities.

This report provides a summary and timetable. Detailed information including overheads is available electronically via the HUMAINE portal.

2   Schedule and content

The workshop covered topics related to the analysis of the multimodal nature of emotional processes.

The first day introduced the issue of synchronisation in various contexts. Tanja Banziger presented the GEMEP (GEneva Multimodal Emotion Portrayals) database, a large video and audio corpus of acted emotional expressions. She showed how it is being annotated to allow analysis of sequential phenomena.

The workshop went on with two invited speakers. Ipke Wachsmuth presented his work on the affective agent 'Max', which controls sequences of actions using dynamic principles in the context of a dimensional representation of emotion. Magnus Magnusson introduced the issue of identifying repeated patterns of behaviour in time, which is central to empirical work on sequencing expressive behaviour. Daniel Arfib, Catherine Pelachaud and Hannes Pirker then described research work which analysed the importance of synchronisation in different context – synthesis and transformation of speech, interactive ECAs, and analysis of videos showing emotional behaviour.

The second day contained extended presentations on tools and resources needed to understand sequencing in emotional behaviour. Magnus Magnusson gave an extended introduction to the THEME software for detecting sequences; Thierry Pun and Guillaume Chanel talked about pattern recognition in peripheral and central signalling; and Rene te Boekhorst showed how to model discrete changes in continuous dynamical systems. Jean-Claude Martin and Marcello Mortillaro presented their research on emotional experience and emotional interaction and communication using multimodal data.

On the third day the symposium on computational models of emotions took place.

Klaus Scherer and his colleagues of Geneva Emotion Research Group presented how theory of emotion and research on expression and neurophysiology can inform computational modelling. The symposium focused on the presentation of the 'Blueprint for emotional competent agent', related to WP3 work. Further, Etienne Roesch presented the 'Grid study'. In the afternoon of the third day the young researchers' session took place.

The fourth day was dedicated to the two main topics proposed in the call of the school: (1) 'Relations between movement/gesture and emotion' and (2) 'Emotion in social cognition and interaction'.

In the first session five presentations were given. Ginevra Castellano and Elisabetta Bevacqua presented an ECA agent that senses, interprets and copies a range of full-body movements from a person in the real world. Jean-Claude Martin gave a presentation about perception of movement expressivity in emotional TV interviews. Nicolas Ech-Chafai talked about gesture expressivity breaks in a conversational interaction. Giorgio Merola presented his work on 'gestures while reporting emotions in sport'. Finally, Marina Ousov-Fridin presented a computational model for body expression of emotion in human-computer interaction.

The session on emotion in social cognition and interaction started with Nicole Novielli, who gave a presentation about dynamic modelling of interpersonal stances towards an ECA based

on linguistic and acoustic features. Arnaud Blanchard talked about modifying affective bonds depending on the quality of interaction. Radoslaw Niewiadomski gave a presentation on social context based emotion expression. Zerrin Kasap presented how to increase the feeling of presence with affective modalities.

The fifth day was mainly dedicated to the workshop on sequential analysis for the study of emotion by Rene te Boekhorst. Further, Artemy Kotov talked about simulating speech behaviour of artificial agents in emotional situations. Finally, the invited speaker Vincenzo Tagliasco gave a presentation on artificial consciousness; the EU IST projects ENACTIVE and S2S^2 were presented by the respective coordinators Antonio Frisoli and Nicola Bernardini.

The sixth day was dedicated to practical sessions. First, a tutorial on analysis of gesture and full body movement was given by Antonio Camurri and Gualtiero Volpe of DIST and George Caridakis of ICCS. The EyesWeb platform for the analysis of expressive gesture was presented by Donald Glowinski and Barbara Mazzarino. Further, Ginevra Castellano and George Caridakis gave a presentation of the multimodal data (face, gesture and speech) collected during the school. Finally, Ben Knapp presented how to design an integral music controller, introducing bio-sensing and emotional state estimation as a component of gestural control of sound synthesis.

The last day of the school DIST, with the collaboration of Ben Knapp and Carol Krumhansl (Cornell University), prepared the set up for the Premio Paganini concert-experiment. Participants of the school were involved into the discussion and preparation of the experiment.

The aim of the concert-experiment was to investigate the relations between movement/gesture and emotion, with particular focus on the role of imitation and empathy in processes regulating cognition and action during a musical performance. During the experiment, five violin players (included the semi-finalist of the Paganini International Violin Competition Diana Jipa) were asked to play a melody (a canon by J.S. Bach, from the *Musical Offering*) in different emotional conditions.

Two methods were applied and compared: in the first case, musicians played the melody after being induced into a specific emotional state; in the second one, they were asked to play in order to drive an audience in the same specific emotional state. Each musician played both alone and with another violin player; in the latter condition, they could play both with and without the possibility of seeing each other (using a movable wall).

Multimodal data were collected during the performance: video data (four b/w video cameras: two on the stage at 50fps, and two from the top of the auditorium of the Casa Paganini at 25fps) to measure the motor activation of the musicians; audio data (four microphones to record both direct instrument and environmental sound); physiological data (ECG – electrocardiogram; EMG - electromyogram), detected by means of the BioMuse system provided by Ben Knapp.

3   Conclusions

- All the participants enjoyed the school, as a very helpful occasion to exchange ideas and to reinforce collaborations;

- The workshop on 'Multimodal synchronizations in affective expressions' collected experiences of researchers working on the synchronization of signals coming from different modalities;

- The symposium on computational models of emotions enabled the participants coming from different disciplines to put together clear guidelines for the WP3 work;

- The concert-experiment was a successful attempt to allow participants working on the definition of an official experimental activity. Further, the concert-experiment was an important occasion to gather relevant multimodal data that will be used by different partners in joint research activities.

- Materials and data from the school will be available from the HUMAINE portal and from the InfoMus and Casa Paganini web sites.

4   Full timetable

Thursday 21 September	
6.00-8.00 pm	Registration and welcome
Friday 22 September	
Workshop on Multimodal Synchronization in Affective Expressions	
9.00-9.15 am	Welcome address
9.15-10.30 am	**Opening the workshop** (Klaus Scherer) **Presentation of the database** (Tanja Banziger)
10.30-11.00 am	Coffee break
11.00 am -1.00 pm	**Modelling communication with a virtual human** (Ipke Wachsmuth)
1.00-2.30 pm	Lunch
2.30-4.15 pm	**Identifying repeated patterns of behaviour in time** (Magnus Magnusson)
4.15-4.30 pm	Coffee break
4.30-5.00 pm	**Time warping of a piano (and other) video sequences following different emotions** (Daniel Arfib)
5.00-5.45 pm	**Annotating, extracting and generating synchronized expressive behavior** (Catherine Pelachaud)
5.45-6.15 pm	**Featuring the GEMEP corpus: experiences and future plans** (Hannes Pirker)

	Saturday 22 September
	Workshop on Multimodal Synchronization in Affective Expressions
9.00-11.00 am	Demo of the software THEME (Magnus Magnusson)
11.00-11.30 am	Coffee break
11.30 am -12.45 pm	**Pattern recognition in peripheral and central signalling** (Thierry Pun)
12.45-2.30 pm	Lunch
2.30-4.00 pm	**Modelling discrete changes in continuous dynamical systems** (Rene te Boekhorst)
4.00-4.15 pm	Coffee break
4.15-5.45 pm	Examples of the diversity of research using multimodal data (emotional interaction and communication, emotional experience) (**Jean-Claude Martin**, Federica Cavicchio, **Marcello Mortillaro**)
	Sunday 24 September
9.00-10.45 am	Presentation of the **Blueprint for emotional competent agent** (Klaus Scherer and colleagues): Presentation on how theory of emotion and research on expression and neurophysiology can inform computational modelling
10.45-11.15 am	Coffee break
11.15 am -12.30 pm	**Presentation of the Grid Study** (Etienne Roesch, Johnny Fontaine, Klaus Scherer)
12.30-2.30 pm	Lunch
	Sunday 24 September
	Afternoon: Young researchers' session
2.30-2.50 pm	**ERDA: An Empathic Rationale Dialog Agent** (Megalie Ochs)
2.50-3.10 pm	**High level prosody related features: through the construction of a model for emotional speech** (Loic Kessous)

3.10-3.30 pm	**Implications of embodiment from an emotional software agent perspective** (Stefan Rank)
3.30-3.50 pm	**Emotional body movements** (Ahmad Shaarani)
3.50-4.10 am	Coffee break
4.10-4.30 pm	Affective multimedia interaction grounded on a cognitive science approach: interpreting indirect measures of emotion and modeling the affective relationship to multimedia content (Olivier Villon)
4.30-4.50 pm	Generation of facial emotional expressions based on Scherer's psychological theory (Amandine Grizard)
4.50-5.10 pm	Avatar expressions with Scherer's theory (Marco Paleari)
8.00 pm	Social dinner
	Monday 25 September
	*** Morning: Session on Relations between movement/gesture and emotion***
9.00-9.30 am	**Full-body motion analysis for animating expressive, socially attuned agents** (Elisabetta Bevacqua, Ginevra Castellano)
9.30-10.00 am	**Perception of movement expressivity in emotional TV interviews** (Jean-Claude Martin)
10.00-10.30 am	The pianist's body during performance. Differences in emotion management and perception (Isabella Poggi)
10.30-11.00 am	Coffee break
11.00-11.30 am	**Gesture expressivity breaks in a conversational interaction** (Nicolas Ech Chafai)
11.30-12.00 am	**Gestures while reporting emotions** (Giorgio Merola)
12.00-12.30 pm	**A computational model for body expression of emotion in human-computer interaction** (Marina Ousov-Fridin)
12.30-2.30 pm	Lunch

Afternoon: Session on Emotion in Social Cognition and Interaction

2.30-3.00 pm	**Dynamic modeling of interpersonal stances towards an ECA based on linguistic and acoustic features** (Nicole Novielli)
3.00-3.30 pm	**Modifying affective bonds depending on the quality of interaction** (Arnaud Blanchard)
3.30-3.45 pm	Coffee break
3.45-4.15 pm	**Social context based emotion expression** (Radoslaw Niewiadomski)
4.15-4.45 pm	**Increasing the feeling of presence with affective modalities** (Zerrin Kasap)

Tuesday 26 September

9.00-10.30 am	**Workshop on Sequential Analysis for the study of emotion** (I) (Rene te Boekhorst)
10.30-11.00 am	Coffee break
11.00-12.00 am	Workshop on Sequential Analysis for the study of emotion (I) (Rene te Boekhorst)
12.00-12.30 pm	Vital signs treatment and fusion in e-learning applications (Stefano Scotti)
12.30-1.00 pm	**Linguistic approaches to human-robot emotional speech interaction** (Artemy Kotov)
1.00-2.30 pm	Lunch
2.30-3.30 pm	**Towards Artificial Consciousness: the "what problem"** (Vincenzo Tagliasco)
3.30-4.00 pm	ENACTIVE EU IST Project presentation (Antonio Frisoli)
4.00-4.30 pm	S2S2-Sound to Sense, Sense to Sound- EU IST Project presentation (Nicola Bernardini)
4.30-4.45 pm	Coffee break
4.45-6.15	Workshop on Sequential Analysis for the study of emotion (II) (Rene te Boekhorst)

Wednesday 27 September	

Morning: Tutorial on Human Full-Body Movement and Gesture Analysis

9.00-11.00 am	Human full-body movement and gesture analysis computational models and computer tools (**DIST**, **ICCS**)
11.00-11.30 am	Coffee break
11.30-1.00 pm	**Collection of multimodal data** (DIST, ICCS)

Afternoon: Tutorial on Multimodal Gesture Analysis

2.30-3.30 pm	**Designing an integral music controller: introducing bio-sensing and emotional state estimation as a component of gestural control of sound synthesis** (Ben Knapp)
3.30-4.30 pm	Experiments with EyesWeb and BioMuse finalized to building the experimental setup for the concert Premio Paganini (I) (DIST, Ben Knapp)
4.30-4.45 pm	Coffee break
4.45-6.00 pm	Experiments with EyesWeb and BioMuse finalized to building the experimental setup for the concert Premio Paganini (II) (DIST, Ben Knapp)

Thursday 28 September	

Building the experimental setup for the concert Premio Paganini

9.00-11.00 am	Presentation of the experimental setup for the Premio Paganini concert Discussion and validation of the scenario, hypotheses, and procedure with Antonio Camurri, Ben Knapp, Carol Krumhansl
11.00-11.30 am	Coffee break
11.30-12.00 am	Conclusions: definition of the final specifications for the experiment
12.00-1.00 pm	Technical set up on stage; videocameras and microphones with EyesWeb, BioMuse (I)
1.00-2.30 pm	Lunch

2.30-3.30 pm	Technical set up on stage; videocameras and microphones with EyesWeb, BioMuse (II)
3.30-6.00 pm	Rehearsals and refinement of the setup
9.00 pm	Public Concert