

Agenda RO-MAN Workshop

“Nonverbal Communication: Importance, Achievements, and Challenges”

Friday, 1st August 2008
9:00 – 13:00
N5, Room T2

9:00 – 10:30 INVITED TALKS

- Prof. Scherer: Authenticity in emotional expression: Production and detection
In the evolution of expression and impression of emotions, the strategic manipulation of expressive signals plays a major role. In consequence, decoders are sensitized signs of faking to allow a judgment of the authenticity of the other's signals expressing reactions and intentions. Encoders do their best to pass their expression of as authentic, especially when it is not. While a major debate in ethology and psychology over the years, this important issue has not yet been centrally addressed in the domain of robots and virtual agents. This contribution will raise a number of fundamental issues, especially with regard to production rules and multimodal synchronisation.
- Prof. André: Challenges for Automated Multimodal Emotion Recognition: From Offline Analysis of Emotion Corpora to Agents with Realtime Response to Emotional Signals
Human conversational partners usually try to interpret the speaker's or listener's emotional cues and respond to them accordingly. Recently, the modelling and simulation of such behaviours has been recognized as an essential factor for successful man-machine communication. So far, most of this research has been concerned with the offline analysis of available or specifically created speech corpora. Most affective-aware applications, such as the interaction with social robots, require, however, that the user's emotional state is recognized in real-time while he or she is interacting with an application. In my talk, I will present various strategies we developed in order to meet the challenges of real-time emotion recognition. I will present a framework for smart sensor integration that is especially suited for real-time multi-channel emotion recognition. Core of the framework is a dynamic buffer management that offers simultaneous and synchronized access to a pool of data streams measuring input of connected sensors or manipulated versions of this input. The work will be illustrated by means of affective interfaces we developed within the European Network of Excellence Humaine (Human-Machine Interaction Network on Emotion) and the European projects e-Circus (Education Through Characters With Emotional-Intelligence And Roleplaying Capabilities That Understand Social Interaction) and Callas (Conveying Affectiveness in Leading-Edge Living Adaptive Systems).

10:30 – 11:00 COFFEE-BREAK

11:00 – 12:00 **PRESENTATIONS** (~10 min each)

▪ C. Wendt: “Physiological Data and Emotion in HRI”

Emotions are an important and omnipresent aspect in every interaction scenario, human-robot interaction (HRI) included. Emotion research has largely focussed on the analysis of speech or facial expressions. Physiological parameters like skin conductance response (SCR) or heart rate (HR) are another common information source in order to evaluate the counterpart’s emotional state. In this talk, the usefulness of physiological measures for emotion recognition will be discussed and results from a study on non-extreme emotions will be presented.

▪ S. Schmidt: “Intention Recognition by Nonverbal Cues”

The talk will explain how human intentions are assessed by means of analysing nonverbal behaviour and how they are perceived by other humans. This will be done with an example application in traffic. The only communication between a driver and a pedestrian here is the nonverbal behaviour. It will be shown how the crucial parameters can be measured by technical means.

▪ E. Schneider: “Gaze-based Interaction”

Since the 18th century eye movements are in the focus of different research fields like medicine, psychology, neuroscience, human factors, computer science, and robotics. Many eye tracking techniques have been developed with various levels of applicability, invasiveness, and spatial as well as temporal resolution. With advances in video and computer technology more and more eye tracking applications enter the fields of robotics and human-machine interaction. An outlook will be presented on the basis of neuroscientific findings of how gaze can be used as a convenient modality of seamless interaction between humans and machines.

▪ S. Stork: "Behaviour and Performance"

Human task performance can be used as nonverbal cue in order to adapt information presentation in human-machine interaction. For this purpose, parameters like error rate, time to complete a task, dwell time on instructions as well as motion parameters like movement onset and movement velocity should be analyzed. Experimental manipulation of task complexity and systematic quantitative analysis of some of these parameters will be demonstrated within a manual assembly scenario.

▪ M. Huber: "Implicit Negotiation in Simple Interaction Tasks"

In industrial settings the workspaces of robots and humans are almost always separated for security reasons. However, the efficiency of industrial production lines could be increased if robots and humans share a common workspace and cooperatively assemble a product. Thus, in our work we address some basic aspects of joint action between humans and robots. We compared human-human and robot-human handing over tasks, one of the simplest cases of physical dyadic interaction. Even such a simple tasks require that both partners agree upon certain parameters. We show that, in human-human handing over, some parameters are optimised over a few trials. These results will provide the background for successful joint action strategies in future human-robot workplaces.

- A. Bannat: "Event Analysis and Interpretation of Human Activity"

In this presentation a concept and its implementation of an ergonomic cognitive assistant system for supporting human workers at complex assembly tasks in industrial environments is introduced. Depending on the level of the user's product knowledge this mixed-initiative system follows and gains knowledge from the human worker's construction steps while it is also able to automatically give hints and instruct the worker whenever needed. The presented agent bases on a closed human-machine interaction loop consisting of the multimodal perception of the worker's action, the comparison with the system's knowledge about the production task, and the displaying of the adequate next assembly instruction step. First experimental results of the assistant system are demonstrated on a simplified use case with the construction of a small toy car using augmented reality display techniques.

12.00 – 13:00 **DISCUSSION**

“HRI and nonverbal communication – where should we go and how?”