

# Learning as Persuasion - modeling and detecting emotions is the key

(POSITION PAPER)

Dirk Reichardt

DHBW Stuttgart, Baden Württemberg Cooperative State University  
70178 Stuttgart, Germany  
reichardt@dhbw-stuttgart.de

**Idea.** Learning in a multi-person learning scenario often means one person has to convince the other or persuade the other person. In this case, emotional cues play a key role for the success of learning – and the efficiency and effectiveness of the learning process. Taking the role of the teacher in a computer mediated learning scenario, you need to make sure that you recognize the emotional reactions of the learner (to adapt your strategy) and to transmit emotional cues as an additional essential part of the communication.

**Keywords:** emotion recognition, image processing, BCI, avatars, psychological models, persuasive computing

## 1 Scenario and Interest

We assume a learning and/or collaboration scenario in which the participants communicate via software, not in a face-to-face situation. This excludes (in most encounters) direct visual information by a video camera as well as (in most encounters) audio information carried by the voice of the participant. The missing communication channel can be added by recognizing the user's emotion (face and gesture recognition, neuroheadset, speech analysis) and transmitting the coded emotion information. The result can be shown either as plain text, simple visualization or via an acting avatar which visualizes the information for the receiver.

In scenarios like this, many student research projects at my university were done and many research papers on topics which are near this field were discussed at the workshop "Emotion and Computing – current research and future impact" ([www.emotion-and-computing.de](http://www.emotion-and-computing.de)) which I organize since 2006. Therefore I'd be interested in participating in the workshop and would be happy to contribute to a new CSCL research agenda.

## 2 Projects and Example Approaches

- Emotion recognition by analyzing facial expressions: In many student projects, image processing tools were built (using OpenCV) which intend to recognize facial expressions of emotions. Explored techniques include optical flow and the Cohn Kanade Database was used as a reference. (see also [1]).
- We analyzed the speech in order to extract emotional cues (without semantics) and to detect the emotional state of the speaker. The latest work implements a service which classifies incoming phone calls which are stored in a mailbox. An emoticon is displayed together with the list of calls such that the user knows what kind of message to expect.
- The latest cooperation with the center of empirical research (Zentrum für Emirische Forschung – ZEF) at the DHBW Stuttgart combines an eye tracking system with a brain-computer interface to analyze the user reactions on advertisements. As a brain-computer interface we used the Emotiv EPOC Neuroheadset. (see [4])
- In addition to recognizing emotions, we implemented sample applications which use avatars to display emotions. One example application is an emotional chat program, which detects the facial expressions and transmits them to the receiver. At the receiver side, an avatar reproduces them.
- In 2009 we presented research results which showed that the existence of an emotional avatar, as opposed to a text based non emotional interface, changes the behavior of a player in the public goods game (which we selected as a nice simulation and testing environment for models of emotion) (see [2]).
- In the field of emotion models we implemented an agent model based on the Orthony, Clore & Collins (OCC) model, which we enhanced by a concept of mood and personality. Many experiments were done including a simulation of emergence of emotions.

## Sample References

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