

## **Do Embodied Conversational Agents Know When to Smile?**

Anton Nijholt  
Department of Computer Science  
University of Twente  
PO Box 217  
7500 AE Enschede  
The Netherlands  
anijholt@cs.utwente.nl

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We survey the role of humor in particular domains of human-to-human interaction with the aim of seeing whether it is useful for embodied conversational agents to integrate humor capabilities in their models of intelligence, emotions and interaction (verbal and nonverbal) Therefore we first look at the current state of the art of research in embodied conversational agents, affective computing and verbal and nonverbal interaction. We adhere to the 'Computers Are Social Actors' paradigm to assume that human conversational partners of embodied conversational agents assign human properties to these agents, including humor appreciation.

When we look at research on of human characteristics in the user interface of computers hardly attention has been paid to the role of humor. Especially, when we compare efforts in this area with efforts and experiments that attempt to demonstrate a positive role of general emotion modeling in the user interface, then we must conclude that this attention is still low. As we all know, sometimes the computer is a source of frustration rather than a source of enjoyment. And indeed we see research projects that aim at recognizing a user's frustration, rather than her enjoyment.

Rather than detecting frustration, and maybe reacting on it in a humorous way, we would like to prevent frustration by making interaction with a computer more natural and more enjoyable. For that reason we are working on multimodal interaction and embodied conversational agents. In the interaction with embodied conversational agents verbal and nonverbal communication are equally important. Multimodal emotion display and detection are among our advanced research issues, and investigations in the role of humor in human-computer interaction is one of them.

Interaction in multimodal ways with and between embodied conversational agents that inhabit virtual worlds is the main theme of our research. We envision situations where humans talk to embodied conversational agents in the interface and where it is not clear at all what and who they represent. Are they completely artificial, autonomous, with built-in intelligence, and put in the environment by their owner or designer? Do they represent a human interactor, including aspects of his personality, believes and desires?

An other important question is whether this is done 'off-line' or 'on-line'. Is the human interactor's physical behavior reflected (not necessarily one-to-one) in the animations of the embodied conversational agent? The user or visitor of an inhabited world may interact with these embodied conversational agents, e.g. to engage in an information service dialogue, a transaction dialogue, to cooperatively solve a problem or to perform a task, or to engage in a virtual meeting. Other obvious applications can be found in the areas of education (including training and simulation), electronic commerce and teleconferencing.

In previous years researchers have discussed the potential role of humor in the interface. However, during these years the potential role of embodied conversational agents was not at all clear, and during all these years no attention has been paid to their possible role in the interface.