

Using Facial Expressions to Display Empathy in ECAs

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Recent research has shown that virtual agents expressing emotions toward users have the potentiality to enhance human-machine interaction (Partala & Surakka, 2004; Prendinger, 2005; Picard & Liun, 2007). *Empathy* is commonly defined as the capacity to “put your-self in someone else’s shoes to understand her emotions” (Pacherie, 2004). Several empathic virtual agents are already been developed. They express empathy in different ways. For instance, in Prendinger & Ishikuza (2005), the virtual agent uses specific sentences (such as “I am sorry that you seem to feel a bit bad about that question”). In Ochs *et al.* (2008), the facial expression is used by supposing that empathic facial expressions of emotion are similar to expressions of felt emotion of the same type. Finally, virtual agent’s expressions of empathy are generally fixed intuitively and are not evaluated.

In this paper, we propose and evaluate a novel approach for the expressions of empathy using facial expressions like superposition and masking. Compared to other expressive empathic agents (e.g. Reilly, 1996; Ochs *et al.*, 2008) our agent uses two types of facial expressions *simple* and *complex* ones. By simple facial expressions we intend spontaneous facial displays of emotional states (which can be described by one-word label) e.g. display of anger or contempt. The term *complex facial expressions* (Niewiadomski, 2007; Niewiadomski & Pelachaud, 2007) describes expressions that are the combinations of several *simple* facial displays (e.g. superposition of two emotions) or that are modified voluntarily by the displayer (e.g. masking of one emotion by another one). Aiming at finding the appropriate facial expression of an empathic ECA we have examined both types of expressions in empathic situations.

The results of the evaluation show that people find more suitable facial expressions that contain elements of the emotion of empathy. In particular, complex facial expressions appear to be a good approach to express empathy.

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