

Comparing Emotional vs. Envelope Feedback for Virtual Agents

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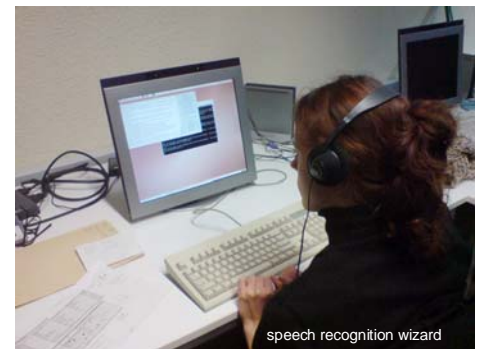
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Embodied Agents are intelligent user-interfaces that interact with the environment by their virtual body, which enables them to communicate face-to-face. Opinions in the scientific community differ about what makes an Embodied Conversational Agent (ECA) effective. Cassell & Thórisson concentrated in „The Power of a Nod and a Glance“ (1999) on the concept of emotional and so-called envelope feedback¹ and their impact on the effectiveness of communication between agent and user. They demonstrated that the users rated the agent more positive in the envelope condition (e.g. with regard to lifelikeness). We thus conducted an enhanced experiment on the effects of emotional and envelope feedback.

Experimental Design:

no feedback	EMO
ENV	EMO + ENV

- **EMO**tional feedback (EMO): including smiling while greeting and leave-taking, smiling when the status of the emotional-system is positive, giving compliments (“Your clothes are cool”)
- **ENV**elope feedback (ENV): including saying “pardon” when MAX doesn’t understand the context, saying “hm” while subjects is talking and saying “yes” in the beginning of his conversational part when MAX got it right



Dependent Variables:

- the participants’ emotional status after the experiment (questionnaire)
- the evaluation of MAX (questionnaire)
- analysis of the videotapes of the sessions whether the participants mimicked the nonverbal behavior of MAX

Moderating variable:

- Unwillingness-to-Communicate-Scale
- the participants’ computer skills.

Total sample: N=70

Factor emotional feedback: With emotional feedback N=35; Without emotional feedback N=35

Factor envelope feedback: With envelope feedback N=36; Without envelope feedback N=34

First results:

The participants emotional status was measured by 20 items (5 point scale) in the questionnaire. The factor analysis resulted in three factors “unhappiness”, “stress/strain” and “interest”.

We found that the participants in the emotional feedback felt significantly more interested ($F(1;69) = 4.534$; $p = .037$; $\eta^2 = .63$). There were no findings for the other factors.

In addition, the participants significantly more often recognized smiles in EMO than without EMO ($\chi^2 = 9.130$; $p = .003$). And in EMO the participants tended to rate the gestures of Max as helpful for the communication ($F(1;69) = 2.888$; $p = .94$; $\eta^2 = .43$).

Summed up we thus conclude that the higher frequency of smiles resulted in a higher status of interest in the emotional feedback.



1: emotional feedback means emotional expressions which give feedback about the sender’s emotional state; envelope feedback means mechanisms which support the conversation by giving a feedback whether the dialog partner wants to take the part, listens to you, understands your point etc. or not

References:

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- Kopp, S., Allwood, J., Ahlsen, E., Grammer, K., Stocksmeier, T. (to appear): Modeling Embodied Feedback in a Virtual Human. In I. Wachsmuth & G. Knoblich (ed.), *Modeling Communication With Humanoids And Robots*. Hamburg: Springer.
- Burgoon, J.K. (1976). Unwillingness-to-Communicate Scale: Development and Validation. *Communication Monographs*, 43, 60-69