ECAs Capabilities

Catherine Pelachaud
LINC, IUT of Montreuil, University of Paris8

ECAs ought to be entities endowed with dialogic and expressive capabilities. They are used in interactive systems in which they can communicate with users. Being involved in a communicative process implies to perceive signs displayed by the other interactants and to emit signs. ECAs ought to have qualities over two main computational domains: perception and generation. We consider another domain, the interaction domain. This domain overlaps with the other two domains, in particular with the perception domain. Nevertheless, considering this extra domain allows us to highlight the capabilities an ECA need to have to be a full and active participants in a conversation either when being a speaker or a listener.

Within the **perception domain**, an ECA must be able to pay attention to, perceive user and the context she is placed in; so as to be able to adapt her (verbal and nonverbal) behaviour depending on the user, her role, and the socio-cultural context she is placed in. At a fundamental level, the ECA should have some notion of her conversational partner, in which emotional state he is, which gestures and facial expressions he displays, in which context he is, which tasks he is undertaken. The agent ought to decide when to start an interaction with a user, when would be the most appropriate time to do so, how long should she maintain the conversation, when should she give back her speaking turn to the user [4].

Within the **interaction domain**, two or more parties exchange messages. Interaction is by no means a one way communication channel between parties. Within an interaction, parties take turns in playing the roles of the speaker and of the listener. The speaker emits verbal and nonverbal signs (such as words, facial expressions, gestures) and senses at all times how the listener acts and reacts to the speaker's speech and behaviors. The listener sends feedback to the speaker on how she understands, agrees, or even feels sympathy for what the speaker is saying. From the perception of these signs, the speaker may decide to adapt his speech and/or nonverbal behaviors by, for example, rephrasing what he has just said if the listener has not understood something, by emphasizing, or perhaps, by modulating what he says [5]. Adaptation does not involve solely feedback management, it can be done through the imitation of behaviors [1], by showing empathy [3], by changing discourse plan [2]. So interaction can be viewed as a balanced perception and generation of messages in that parties adapt continuously to each other during the interaction. Interaction implies this continuous loop existing between interactants: emit, perceive and adapt. While in the perception domain, ECAs are endowed with the function of processing and filtering the signals, in the interaction domain, they are able to interpret and be aware of the signals.

In the **generation domain**, an ECA should be able to display expressive synchronized visual and acoustic behaviors. Even though the behaviors generation and animation of ECAs are the most developed in ECA research, further improvement of these areas are required, especially as regards to a) multimodal integration and the display of emotional behaviours to improve the naturalness of ECAs, and b) expressive behaviors; communication is done via the choice of signals type to be displayed but also via the way the signals are displayed; that is via the manner these signals are produced. We refer to the manner of production of signals as the expressivity of the signal.

References

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