Studies on Behavior Expressivity for an Embodied Conversational Agents

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Our aim is to create affective embodied conversational agent able to display expressive behaviors. Expressivity refers to the manner of execution of a behavior; how large an arm gesture is, how powerful, how fast the stroke is, etc. Our model of behavior expressivity is based on perceptual studies by Wallbott (1998) and Gallaher (1992). Six dimensions have been defined that act directly on the behavior phases. For an arm gesture, *spatial extent* modifies the wrist position making the arms more or less extended in space; *temporal extent* specifies the speed of the stroke, that is the speed of the wrist movement during the stroke phase; *power* acts on the acceleration of the stroke; *fluidity* specifies if consecutive gestures are continuously or hectically coarticulated one in another; *repetitivity* repeats the gesture stroke; and finally *overall activity* is related to the overall number of gestures.

We have applied this model in a number of exploratory studies. In some of these studies the values of the expressivity parameters were computed automatically using image analysis technique; in other they were extracted from manual annotation of video corpus. Expressivity values may act over the whole animation of the agent; they may be changed at every instant of the movement to make an agent react instantaneously to some data stream; they may get different values on every gesture or even on a particular phase of the gesture. These exploratory studies are based on various data types: video corpus of acted data or real data, 2D cartoon animations, literature survey.

One of our research issues is to study behavior representation: finding what information needs to be encoded, at which levels of representation does a behavior need to be described, how to encode dynamism in behavior. Another aim is to use the result of these exploratory studies to refine the implementation of our expressivity model.

References

Wallbott, H.G.: Bodily expression of emotion. European Journal of Social Psychology 28 (1998) 879–896

Gallaher, P.E.: Individual differences in nonverbal behavior: Dimensions of style. Journal of Personality and Social Psychology 63 (1992) 133–145