Expressiveness in virtual talking faces

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Abstract

In this thesis, different aspects concerning how to make synthetic talking faces more expressive have been studied. How can we collect data for the studies, how is the lip articulation affected by expressive speech, can the recorded data be used interchangeably in different face models, can we use eye movements in the agent for communicative purposes? The work of this thesis includes studies of these questions and also an experiment using a talking head as a complement to a targeted audio device, in order to increase the intelligibility of the speech.

The data collection described in the first paper resulted in two multimodal speech corpora. In the following analysis of the recorded data it could be stated that expressive modes strongly affect the speech articulation, although further studies are needed in order to acquire more quantitative results and to cover more phonemes and expressions as well as to be able to generalise the results to more than one individual.

When switching the files containing facial animation parameters (FAPs) between different face models (as well as research sites), some problematic issues were encountered despite the fact that both face models were created according to the MPEG-4 standard. The evaluation test of the implemented emotional expressions showed that best recognition results were obtained when the face model and FAP-file originated from the same site.

The perception experiment where a synthetic talking head was combined with a targeted audio, parametric loudspeaker showed that the virtual face augmented the intelligibility of speech, especially when the sound beam was directed slightly to the side of the listener i.e. at lower sound intensities.

In the experiment with eye gaze in a virtual talking head, the possibility of achieving mutual gaze with the observer was assessed. The results indicated that it is possible, but also pointed at some design features in the face model that need to be altered in order to achieve a better control of the perceived gaze direction.