

3D Facial Animation for Virtual Theatre

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In this paper we present a system aimed at creating a Virtual Theatre for educational and museum applications. In particular, the design of this “artificial” environment allows spreading of new theatrical interactive modalities which lead the final user to interact with Greek and Roman matters in unconventional manner.

The main goal of this environment is the creation of 3D virtual masks able to reproduce particular behaviour for executing specific tasks. Starting from a canonical 3D face model and making use of collected information of typical Greek-Roman masks (i.e. Menandro’s masks), a simplified 3D model has been generated. We have implemented different facial expressions that reproduce mask’s personality associated with each character of a comedy. Partially inspired by Perlin’s puppet, we have developed a complete interactive environment where it is possible to manipulate the model to infer, for each mask, several custom facial expressions (fear, surprise, sadness, disgust, etc.). A noise perturbation of some face’s details has been added to emulate the corresponding unintentional micro-movements.

By using an ad-hoc “3D-Recorder” it is possible to perform a sort of speech and/or facial synchronization with an audio file containing a real actor performance, specifying all relative parameters (i.e. start/end point of speech and/or corresponding facial expression, relative frequency, etc.).

A suitable “3D-player” reproduces the above collected info reconstructing by simple interpolation some missing temporal data; typical scenes containing also the reciprocal interaction between 2 or more virtual actors can be easily assembled and distributed.

The Java framework allows to obtain a cross-platform product without particular constraints due to the local operating system. The scalability with respect to the computational power and available resources is demanded to the JVM (Java Virtual Machine) without requiring manual “tuning” of the source code.