

On the Opera Theatre Simulation

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Abstract

In this paper we develop some considerations on multimedia applications, starting from the experience gained by implementing a multimedia representation of an opera theatre: namely the Teatro alla Scala di Milano. After a hyper-realistic approach influenced by current trends in multimedia applications we are now considering a more abstract approach, in order to stimulate the aesthetic experience of a virtual spectator.

Keywords: multimedia design, virtual reality, theatre simulation.

1. Introduction

The Interactive Theatre [1] is a communication project, based on web technologies and virtual reality, to represent an opera theatre, the Teatro alla Scala in Milano. The project includes an interactive 3D reconstruction of the building, enriched by animation and simulation, a tool for real-time construction of baroque dance choreographs [2] and a hypermedia on the theatre [3].

The virtual theatre is finalized to improve the quality of engagement in users, promoting an active behavior and triggering involvement, strengthened by different degrees of imitation of reality. We want to provide languages through which users can act upon objects to transform them. To this end, we selected among available technologies those resulting more seductive: besides text, images, video, audio and voice, we used motion capture, QuickTime@VR (QTVR from now on) nodes and VRML 2.0 (Virtual Reality Modeling Language) model.

Initially in the project a 3D reconstruction of Teatro alla Scala has been foreseen as fulcrum and interface to the whole application. The 3D reconstruction shows the building outside and inside, the stage and the backstage, which can be explored by users. The interactive navigation

provides an original view of the theatre *machina*. The opera *Armide* by C.W. Gluck (1714-1787) has been chosen as a case study: the movements of the scenes are reconstructed, as during the performance, providing an experience different from the actual one. In fact spectators may not fully appreciate the complexity of the process of staging a performance and have little idea of the backstage.

This first implementation was also finalized to reproduce the theatre and the performances as realistic as possible, in view of our goals of documenting the theatre activities. After this experience we are now moving to a different perspective: representation should involve not so much the object itself, the performance in our case study, but the effect and meaning that is induced by it in the receiver.

In the first prototype, *The Interactive Theatre* also stages performances by virtual dancers. A puppet on a stage, located in an ideal theatre, performs baroque choreographs. Given the formal structure of the baroque dance, it has been possible to reconstruct it and to implement a 3D model of a dancer whose movements are synchronized to the music [2].

2. The 3D Model

A 3D model of the theatre has been constructed from technical drawings adopting AutoCAD 13. The model has been converted into VRML 2.0 by

exporting the AutoCAD model in 3DS format at first, then in VRML 2.0 format. Texture maps have been applied on the model surfaces, in CosmoWorlds, which has been adopted also to program some simple animation. Acoustic cues have been implemented by using VRML 2.0 features for sound spatialization.

The immersing experience offered to users has been augmented by simulation: the sounds of instruments being tuned, the dimming of the lights, the curtains being raised give the emotion of the onset of the performance. The performance is documented by showing the scene movements and video sequences of the actual performance are displayed on the virtual stage.

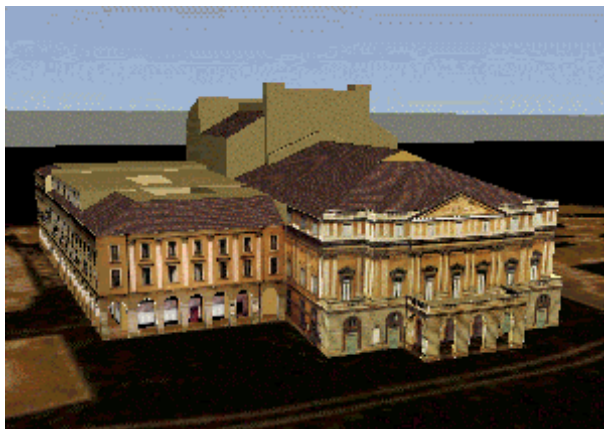


Figure 1: *The exterior of the model mapped with photographs.*

3. Reality Representation

The representation of reality, though faithful and rich in figurative details, is always an interpretation, that provides the explanation that the author wants to convey. It is important to remind that at the end of the representation process there is an object different, not necessarily as close as possible, to its real referent. This diversity is the consequence of a process of choices, selections of details to be represented and emphasized. Even though the number of details that one chooses to represent may be substantially less than the lost ones, nevertheless the receiver may not perceive the loss of information. It is interesting to note that the representation may be strongly evocative of the real object, even when users are fully conscious of the fiction. Besides author's interpretation, the receiver as well, gives his subjective interpretation actively recomposing the message [4].

Users engagement is a complex mixture of perceptual, cognitive and emotional factors.

Spectators of a theatre performance are subjected to an esthetic experience, through active production of sensorial perceptions, *aísthesis*, not just to the production of critical ideas. In the multimedia representation of the theatre performance, it is important to pay attention to and exploit the interaction among different sensorial channels activated in spectators, to try to reproduce the complexity of the theatrical experience.

To exploit this phenomenon it is necessary to move away from multisensorial applications, which are typical of to-day multimedia productions, towards synesthetic applications, which provoke subjective sensations different from the directly stimulated ones [5]. In multisensorial representations there exists a correspondence among sensations, which we can describe as mimetic. By mimicry of reality we mean that the different sensorial channels, activated by the representation, are in the same relationship as in real object. For instance, a TV broadcast of a theatre performance is mimetic.

On the other side, in synesthetic perceptions we produce metaphors and not mimicry, transferring meaning from one sensorial system to another. Being based on metaphors, synesthetic experiences are limited by extreme iconicity and hyper-realism, since they prevent the process of re-constructions of the represented object through sensorial and imaginative co-operations. In particular we note that users' consensus and emotional adhesion often follows the iconicity degree in low-level competence or occasional users.

In the first prototype of the application most of the choices made in the representation go in the direction of a naturalistic mimicry. For instance, the exterior of the building, the interior of the main hall are texture mapped with photographs; most of texts of the history of the theatre are descriptive, rich in citation of dates, names and places, referencing pictures and QTVR nodes when adequate; the multimedia representation of the opera *Armide* contains again pictures, drawings, notes and even the animation of the scenes, as in reality. This approach responds to a critical intention of documenting the building, but it not satisfactory if we consider its functionality, which is not grasped in this view.

Multimedia production, so far, has not yet fully exploited the sophisticated technology available and has not yet developed a mature capability of using technical effects to put in relationship sensorial channels, in ways different from reality. We covered this same experience in our first prototype and are now looking for different paths to follow in

order to stimulate a deep aesthetic experience, also in virtual users.

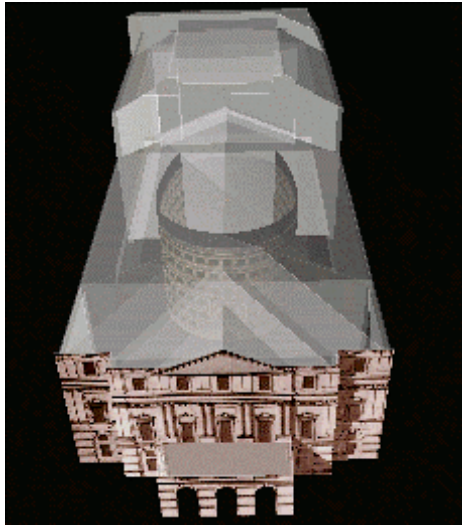


Figure 2: *The model mapped with less realistic picture, the original drawings by Piermarini and a historical print of the same time.*

An example of an alternative approach has been explored in the module of the virtual dancer in the theatre. The dancer is a puppet with no somatic features, because irrelevant to the communicative purpose. The only important features emphasized are the articulations and the key points used in the motion capture. The puppet is located in an ideal theatre where the information are reduced to those relevant to convey spatial relationship between the dancer and the volume of the hall. This choice comes out from the need to focus users attention on the dance choreography, preventing digression on irrelevant elements.

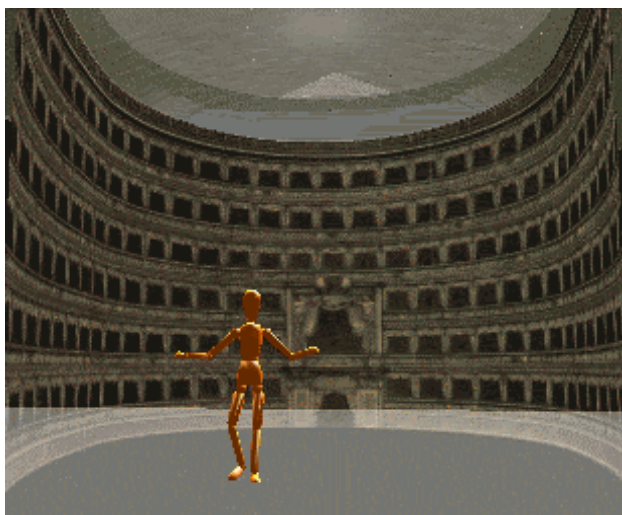


Figure 3: *The virtual dancer on an ideal stage.*

4. Acknowledgements

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5. References

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