# Interactive Virtual Journey in G.Fattori's Paintings

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## ABSTRACT

*In this work we present a new method for the fruition of artistic works that is integrative to the traditional museums' presentation.*

*The work has been organized as an interactive Virtual Environment in which the user can navigate. The whole environment has been organized for the best fruition. Animation and interaction effects have been inserted for facilitating navigation.*

*In what follows, the principal adopted solutions are shown as well as the organization of the environment and the interaction system.*

## 1. Introduction

The field of Computer Graphic (CG) mediated artistic applications is a novel emerging sector of research.

Several programs have been achieved in the field of CG and Virtual Environment (VE) in such a way that it is now possible to support the minimal graphical quality that is necessary for the quality required by artistic applications.

C.Vasilakis et al. [1] in 1998 produced a digital three-dimensional reconstruction of the famous Velasquez's painting named *Las Meninas*. Such a work consists of a C.A.V.E. [2] like application allowing the users walking inside the Velasquez's opera.

F.A.B.R.I.CATORS [3] in 1997 produced a Virtual Reality interactive journey into the Leonardo da Vinci's masterpiece *L'Ultima Cena*. In such a work, the visitor can visit the painting in all its details.

PERCRO presented at Mediartech'98, Florence, Italy, an interactive visit of several Italian historical monuments and churches: this installation exploited robotic systems which behaviour drove VR entities and camera movements in real-time.

C.Evangelista in [6] presents a VE for navigating within a 3D reconstruction of the Giovanni Fattori's painting *La Rotonda di Palmieri*.

In this work we present a new method for the fruition of artistic works. An environment in which a user can feel himself immersed in a reality that is different from that of a typical museum, has been designed and realised; the user, in each instant of time, can feel himself involved in work of arts study and perception.

## 2. The Virtual Museum

In the presented interaction paradigm, the user can move itself inside a 3D graphic representation and achieve from the environment both visual representations of the paintings and specific information that are related to them. By analysing the existing solutions in the state of the art, in general the Virtual Museum (VM) concept can lend itself to a twofold interpretation:

1. As a simulated copy of the real museum physical space. In this case the VM is conceived as a 3D virtual architectonic copy of the existing museum, in which the same entities visible in the real Museum are reproduced, but in a simulated digital way;
2. As new realisation of a 3D abstract space. In this case the digital spaces and the works are completely redesigned in order to keep into account ergonomic and mobility factors related to Virtual Environment (VE) interaction. Original works for these applications take place in such a space.

In both types of VM, the opera's presentation in a VE takes advantage of the visual sensorial

modality. The user is immersed in a VE where some pictures or sculptures are presented to him/her by using the same criteria used for the disposition in a real museum. The user is capable to move himself inside the VE.

As far as the fruition criteria are concerned, no innovative concepts have been introduced with the first (and commoner) case of VM realization.

The added values of such an approach consists in the following aspects:

1. The digital copy of the real museum is unbounded from the physical constraints imposed by the placement of the original copies. Consequently the replication of the VM can be placed in any remote or network place as far from the original work as the user is. This can be summarized in the concept of Home Museum.
2. When multisensorial VEs are considered, the extended capabilities of the interaction environment allow the user to perform actions forbidden in real museums such as to touch the artworks, examine them from a very close viewpoint, move them. This can be summarized in the "Museum of the Pure Form" concept (M.Bergamasco, 1998 [4]).

On the other hand, the realization of a VM as an exact copy of the real museum spaces leads to great design problems in order to match the real space geometry onto the constraints given by VE appliances.

Once more, the geometrical complexity of some real spaces can overcome single machine or designer capabilities and can require resources that are overwhelming with respect to the effective environment need.

We observe that this approach to the VM does not fully exploit the whole capabilities offered by VEs. In fact, the computer graphic multimedia technologies are used only like instrumentation for work of art representation, and do not add any characteristic to fruition mechanisms used in a real museum. Therefore, there is a functional under-use of these technologies for implementing the same work of art interaction paradigm already used within the conventional media they want to replace.

In the following we will refer to VM as a means for exploiting all the potentialities offered by VEs. Once more, our concept of VM is as an abstract 3D synthesized world. In this approach,

the VM allows the realization of new types of museum both considering their contents and the interaction:

- The VM will allow the realization of unfeasible real museums, as for example those including an author whole collection, exhaustive thematic collections, and so on.
- VM can integrate ordinary fruition with Computer Graphic effects such as overimposed information, texts and animations.

## 3. Virtual Museum Design

An important real museum characteristic is the capacity of putting the entities of interest along visit paths that are opportunely studied. From an architectonic viewpoint, the museum design is conceived as a job depending on the relations between the disposition of showcases or station representing the objects of interest and a correct and efficient visitors traffic system.

This problem is very common in museums that are located in antique palaces or buildings. It has been resolved principally by the exploitation of the objects of interest arrangement in according to regular, often symmetric dispositions that recover spaces like galleries or large rooms in which the visitor can enter and, by following an established route, eventually exit from the same point of entrance.

Therefore, the museum designer and trustee must arrange in a consistent and significant way the exhibition material in according to the spaces just described.

The disposition criteria generally followed, can use temporal evolution aspects "geographic" sequences, different artistic "schools", and taxonomic aspects.

In the case of a VM, the architectonic design should be completely revised. The demand of a physical space where the interest objects are shown is now replaced for the need to have great computer hard disks for the storage of the works of art models, both 2D like pictures, paint or photographs and 3D like sculpture models.

The demand of a good work displacement in order to allow an efficient traffic system is now replaced from the demand for a multiple endpoint displaying system which allows a parallel access for multiple users. The material to show in a VM

can be stored on a dedicated server in such a way that more users, which are located in different geographic places, can access simultaneously.

Therefore exhibition spaces, which are now virtual, the traffic and the access time do not constitute a problem anymore. On the counter-side new exhibition constraints will be imposed from the technical specifications of the "Virtual Show Room": the capacity of server hard disk, the graphical resolution, the communication network capabilities and the specifications of the haptics interfaces will play a fundamental role in this new context.

Moreover, when dealing with a VM, the problem of correctly ordering and presenting the material to be shown is now tied to newer and different constraints. The access to physical spaces and the traffic problem does not influence anymore the design. Conversely, a proper design should keep into account the technical development aspects related to the constraint imposed by computer capabilities and to the interface's ergonomic aspects. VM entities, such as paintings and related information, should be placed in such a way to be easily accessed from the user. VM proper concept, such as links or animation, should be carefully designed in order to achieve a natural and comfortable interaction with the users.

In a traditional museum the exhibition must be designed according to the museum architecture, whereas a VM is designed ad hoc for the particular kind of artworks and exhibition that we want realize. In such a way VM can emphasise those aspects that can be hardly shown with traditional methods. For example, the comments given to visitors can be synchronized with special effects that outline the portion of the artworks of interest.

## 4. The Fattori Virtual Museum

The G.Fattori[1] VM is an interactive VE in which a user can feel himself immersed in a reality that is different from that of a typical museum. The museum allows the user to perceive and analyse some author's works.

The environment can be navigated by means of journeys on platforms (virtual rooms) that reproduce the typical colours of G.Fattori

[1] G.Fattori (Livorno, 1825–Firenze, 1908); italian painter belonged to Macchiaioli style. Macchiaoli style gave enphasis to *macchia* pictorical tecnique.

paintings. All the elements used for creating the environment have been taken from Fattori works such that the typical style of the author, the *Macchia*, permeates not only the copies of the paintings but the whole VM too. User fruition is enriched with some informative cards that can interactively appear upon user request and that automatically disappear whenever the user changes his visual target.

The museum layout has been designed to allow a simple and practical visit. In fact, it is composed by a succession of platforms that are interconnected (by bridges) in sequential order (Fig.1); the exhibition is organized on these platforms. A linear path results visitable easily from users that are not accustomed in VE navigation, too. In fact, the work has been conceived for being used by a typical visitor of a traditional museum and then it is very important to guarantee the sense of direction and the movement simplicity and to keep alive the exploration's interest.
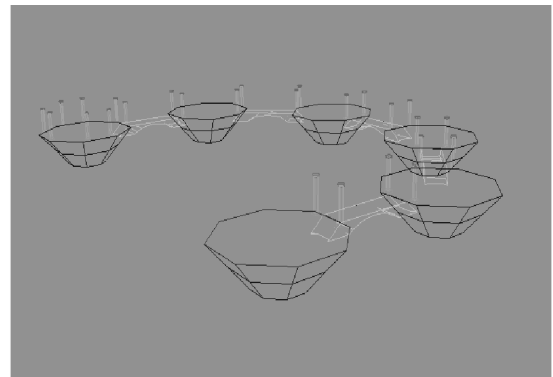


Fig.1: The VM layout

The environment has been realized by remaining faithful as far as it is possible to the artist style (Fig.2). Each particular has been characterized from the colours and the features of Fattori; the platforms' floors, the sea, the sky and the horizon have been obtained from some paintings.

Fig.2: The opening scene of the VE

A theme related to the author or to his works is developed on each platform. Next to the full-blown paintings, both particulars obtained by the paintings and preparatory drawings have been inserted in the VM (Fig.3). These particulars are presented like 2D images, which have the characteristic of being always oriented in the observer direction.



Fig.3: Signora Martelli's Room

The fruition is enriched with hypertextual information. During the journey, the user can read some sentences that may be both G.Fattori's maxims and significant sentences obtained from art review essays (referred to the artist or to his works). Other information have been inserted and they are interactive. They have been organized in cards which are recalled if the user want. Their contents (the title, the realization period, the pictorial technique used, review sentences) are specific of a work or a particular placed inside the museum. When the user viewpoint comes near to

an opera or a particular, it becomes active. By selecting an active object, the relative informative card appears in order to give detailed and exhaustive information (Fig.4). This approach is very useful for an in-depth analysis of the paintings and drawings.

The sound effect is another characteristic of the VE; the music accompanies the user during the visit.

All these effects have been thought to allow an interesting visit as regards the contents and to allow an agreeable travel as regards to relaxing effect due to colours and music.



Fig.4: An informative card

## 5. A Virtual Museum Overview

When the visit starts, the user is received at once by the artist. In fact, on the first platform there are some shapes that are obtained from old photographs representing G.Fattori; moreover, there are texts representing some of his thoughts. Since the first scene (Fig.1), a surreal athmosphere with bright colours and particular features is shown.

On the other platforms, the works of art are presented. In each platform, an author's characteristic has been emphasised. In Fig.3, the *Signora Martelli room* is shown. On this platform the painting's colours have been emphasised by covering the floor with the soil displayed in the painting. On the other platforms, some particulars extracted from the paintings have been inserted by respecting a specific theme.

The last platform is dedicated to the *Battle* theme. In this platform they have been

represented several soldiers engaged in fighting. The War was one of the most recurrent themes in the author's artworks. In this platform, particulars obtained from preparatory drawings have been placed. The user can discovery each of them on the painting and he is helped in this operation by a flashing selection.

All the platforms are placed on an isle that is covered with a collage of some Fattori's works.

A light movement of the sky and of the sea avoids the stationary sense of the environment.

## 6. Technical Features

This work has been conceived to run on low cost platforms. In fact, our opinion is that the utility of this type of realisations must to be connected to the possibility of a high diffusion, too.

To obtain an interactive displaying, the implementation of new advanced techniques for the geometrical-descriptive database managing has been necessary. Such techniques allow an optimised use of processing and graphic rendering resources available. To this aim, high-performances 3D graphic libraries (VRlib [5]), developed at PERCRO, have been used.

The work realization has been organized into three phases.

The first phase of the work has been the design and the realization of the environment that contains the VM. Intentionally, we have created an environment that is simple and easy to visit and that emphasizes the aspect of presentation of the works and the interactive informative contents. The VM has been built by the use of three-dimensional modeller.

The second phase of the work has been the texturization part. Intentionally, we have emphasized the artist's characteristics creating a pictorial atmosphere inside the VE in order to make feel the user immersed totally in a picture. Some samples have been got from various paintings and then they have been placed on various environment components, in order to form a collage of original paintings' parts. Moreover, details obtained from paintings or subjects obtained from preliminary drawings or sketches relative to works in exposition have been inserted in some platforms.

For each painting, an informative page exists and, when requested, appears inside the environment. The user can read it in each moment.

For pages' composition and management, a proper tool has been developed in our laboratory. This tool allows the organization of informative contents on the page. These informative contents consist of images and texts that can be placed in various ways. Moreover the tool, when the painting is selected, allows the displaying of the page in the virtual environment.

## 7. Conclusions

Besides the aspects previously described which are strongly didactic and of cultural impact, the point on which we have focalised our work is the use of low cost platforms that can be integrated easily in museums making the proposed product easily accessible.

The application may be displayed on a large screen in order to give to several users at once the possibility of viewing the visit path. The user can control the VE by a joystick; with the joystick motion the user can walk on the platforms and can admire the various works. He can recall the informative page associated to a painting and read its contents by the painting selection.

For this work, the operas' collection has been limited to a single author; moreover the artworks are only a part of these realised by the author. It is possible thinking to an extension of this work in a wider context in terms both of quantity of the exhibited works and of information that can be recalled from the user in short time.

## References

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