

## Study of Augmented Reality Based Method for Exhibiting Artistic Works with their Creation Processes

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### 1. Introduction

Art museum exhibits the artworks in term of inspiration and education. It is a relaxation place for one who loves and appreciates art. It is also a place where designers and artists seek inspiration for their works. However, not many people have visited the art museum. Most people have visited an art museum only once or twice in their lifetime, mostly on school trips or tours; not by their own will. This may be due to the facts that not many people can understand or appreciate the beauty or meaning of the artworks.

In order to make a visit to an art museum enjoyable for everyone, we need to provide the necessary information and knowledge for people who lack the understanding of arts while keeping in mind that the additional information will be a value added to another group of people who appreciate and enjoys arts. Mixed-reality is used to give details of artistic works in the exhibition[1]. They use a CG model on the touch panel and GUI menus to give various information to visitor. With inputted data like information about painting and artist or painting techniques in the system's database, the visitor can use those data to help them understand paintings more, but still cannot really understand what the motivation of the artist is or what he/she felt when created the artwork.

We are designing an AR (Augmented Reality) based system that is equipped with the three components: a window for displaying a video of a painting process, an audio path, and a window for overlaying the real image of an artwork and CG images associated with the current contents of the video. With this system, in a step by step manner, the visitor can see and hear the environment in which the artist created his/her work. We consider that this system can attract visitors better than simply showing the information obtained from analyzing the completed artwork. We have conducted a questionnaire-based evaluation of the effectiveness of the concept of the above-mentioned AR based system.

### 2. Approach

#### (1) The proposed system

We considered that audio and visual records of painting process should be presented synchronously with an image that is synthesized by overlaying the CG image associated with the current visual contents onto the real image of the artwork. Therefore, our proposed system consists of three main paths: a painting monitor (AR window), artist monitor (a window for displaying a video of painting process), and voice monitor (audio uttered by the artist during the painting process).

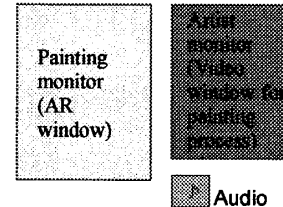


Figure 1: proposed user interface

In Fig.1, the painting monitor basically displays the image in which the real image of the original artwork is overlaid by the CG images that are associated with what is displayed by the artist monitor: for example, in the painting monitor the position the artist is painting in the video displayed by the artist monitor is animated using the color the artist is using. Note that the real image of the artwork is captured by a camera in advance.

Audio path lets the visitor hear what the artist said when he/she created the work. Many artists say out loud what they think or what they feel while working. We can also ask them to add comments in to this audio path. By listening to this, the visitor can better understand what the artist wants to say through the work.

#### (2) Questionnaire

In order to identify the need about this proposed system and the purposes of people who visit an art museum, we've created and sent out a survey to a group of people to gather information. The result of the questionnaire is used for designing this AR multimedia user interface.

There are 7 questions we asked, which are

- (1) Their experience in painting - to compare comments from the participant who have the experience and participant who have not.
- (2) How often they go to the art museum - We will focus on those who do not usually go to the art museum to find out what are the reasons that prevent them from visiting.
- (3) What is their objective when they go to the art museum - to know their purpose will help us to create the system suitable for them.
- (4) What they want to know when they go to the art museum. - have the same objective with question 3
- (5) Opinion about the present art museum
- (6) Functions that they think it will make visiting the art museum more interesting. - To measure whether they interest if we try to built our proposed system.
- (7) Their comment about this questionnaire

In question 6, we specify our proposed system as one of the choices. The other two choices are the multimedia information supply system and a blank space for participant's comments.

The participant who never has a chance to go to the museum will skip the question 3, 4 and 5.

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Questionnaire we sent also included questions asking for the participants' age, occupation and hobby in order to observe the background of each people. The questionnaire also asked the participants to rate themselves in terms of familiarity /comfort in using computer to determine whether or not they will be able to use a computer-based multimedia system.

**3. Results**

We got the result from 50 participants; most their ages ranged between 21 and 30 years old, and are able to use a computer-based multimedia system.

From the result of question (1), most of the participants (72%) have no experience on painting.

From the result of question (2), we find that 60% of our participants have visited the art museum only once or twice in their lifetime and the frequency of the visit is less than once a year. 32% of them never go to the art museum.

Table 1 Results of Question (1)

Frequency Experience	never go to the museum	once in a life time - once a year	more frequently
No experience on painting	15	20	1
Paint as hobby	1	10	1
Arts related career	0	0	2

Based on the results of both questions, we can assume that some of the reasons that prevent them from visiting the art museum are the lack of understanding and interest in the artworks, and the way that the museum exhibits the paintings are not attractive to common people.

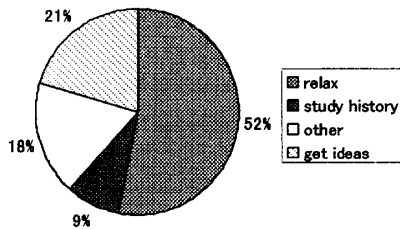


Figure 2: Purposes of visiting art museum

From Fig. 2 which shows the result of question (3), it seems that most of the visitors go to the art museum for the purpose of relaxation. Interestingly, those who answered that they go to the art museum to relax also are the ones who rarely go to the art museum. So we ask this particular group in details and found out that some participants chose to answer relaxation because they feel that going to an art museum is like going to a recreation place such as a park. They don't know how to enjoy watching or looking at the paintings or artworks, so they walk around and leave. 21% of the participants who answered that they visited the museum to get ideas or inspirations are those whose occupations are arts related work. They want to know more in details about the artists' inspirations and painting techniques.

The most important question is how they think if we add the following contents into the art museum (question 6). The answer

shown in Fig.3, "multimedia" stand for the multimedia system which will supply the information varies by the demand of each visitor and "painting process" stand for painting process and artist condition when they create their works (by video).

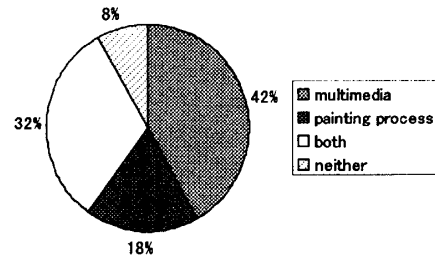


Figure 3: Functions which visitors think it will make visiting the art museum more interesting

From Fig.3 we find that half of the visitors (50%) interested in painting process and artist condition when they create their works. And we also receive comment (from question 4) like they want to know about background of painting and what artists think when they create their work. This result also prove that our proposed system will satisfy them

By the way, we also receive an interesting comment from question 5, as follows:

"In front of the famous paintings or artworks are always very crowded, it makes visitors hard to enjoy watching those works" – This comment let us know that it is not a good idea to put the system directly on or in front of art works, because it will make visitor feel uncomfortable and hard to interact with the system. So we will try to separate it from the artworks

**4. Conclusion and future work**

We still in the data mining phase, so in this paper, we still can not describe about what the main user interface will look like and how can it work in detail. However, we have some idea that should make our proposed system more interesting as follows:

- When visitor select each part of the painting, information about the paint that was use, colors that was mixed, etc. will be shown
- The proposed system could be applied to a comparison system by which anyone's work can be compared with his/her teacher's work. That is, by overlaying one work to the other work; we can easily notice differences between the two works such as color and form. With this system, visitors can understand why the artist painted that way, and how different viewpoints and angles could affect the visitors' perception, etc.

We plan to send out the questionnaire again in order to survey the demand of visitor. And continue on developing the system.

**References**

[1] 恩田 淳、Chiu Pei-Yi、奥 智行、横井 真紀、長 幾朗、大谷淳、視覚次元互動システム:対話的な展示支援システムに関する提案、第3回情報科学技術フォーラム (2004.9)

[2] Leslie Cortes, MD: Designing a Graphical User Interface. Medical Computing Today, May 1997.