

# REQUIREMENTS FOR USING MIXED REALITY IN MUSEUMS

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## Abstract

This paper describes the user-centered requirements for developing Mixed Reality (MR) applications for museums, where the environment and context proposes special limitations and restrictions to be considered.

The MR applications should be intuitive with rapid learning curve, easy to carry and use while moving within the museum and robust enough to withhold the daily wear-and-tear of almost continuous use. Specific to museums the used technology should be ubiquitous and non-intrusive in its co-existence with the surrounding works of art.

## Introduction

Latest improvements in portable computing devices have enabled Mixed Reality (MR) applications to emerge in museums and other public spaces around the world. Museum context adds many limitations and restrictions for the applications, since it cannot disturb or compete with the main reason for the visit, i.e. to experience the works of art.

## Museum Context

As all museums have their unique requirements, this paper draws its experiences from the identified challenges of EU-funded AMIRE project developing MR application for the Guggenheim museum of contemporary art in Bilbao, Spain. The conducted study included interviews, a site visit and a questionnaire.

## Environment

The museum facilities are varying depending on the building, location and contents of the museum. Sometimes filled with small detailed exhibitions in showcases or, in the case of contemporary art, large artworks displayed in unison with the surrounding building. In most cases there is no additional furniture. As a public buildings museums must also provide their physically impaired visitor high accessibility.

The same space can exhibit both large and small artworks. The pieces have very small and inconspicuous information tags, so that they do not interfere with the viewing of the artwork and/or the museum architecture. For the same reason the used MR tracking or

marking technology has to be invisible and wireless.

### **User experience**

Very often visitors come to the museum with a friend or family and usually they are not prepared for the visit. This requires for the application to support multi-user experience with adequate depth in the background information. Most of the museums also attract large numbers of foreign visitors so the services must be offered in several languages.

### **Equipment**

Currently many museums offer visitors' maps, audio guides and/or multimedia information systems. Printed materials and audio guides offer more limited possibilities for the delivered information, while the current multimedia systems have a fixed location (Guggenheim 2003). In most cases the MR application, available in limited numbers, can act as an interesting supplementary for the present tools or as a novelty work of art on its own right.

The end user device used for museum application should be lightweight for easy handling and carrying, have a low contact with the body and the appearance should be socially acceptable (no head mounted displays or wearable computing). Also the use of sound is limited to prevent unnecessary disturbance, while physical contact with the works of art is most often forbidden.

### **Works of art**

Museums are constantly changing their exhibitions, including rearranging the permanent collections. An exhibition can change as often as every three months. This places a cost and resource constraint for creating additional MR content for the new exhibition pieces 3-5 times a year.

To make this even more complicated the artworks are not usually owned by the museum, and the owner of that specific piece of art must approve any changes or additions to them (especially something as modern as

adding MR features). Also some museums that have several facilities in different cities or countries must centrally clear any modifications to their exhibitions in order to maintain solid brand (Egaña 2003).

### **Developing MR content for museums**

Museums generally outsource the creation of their IT services, but dedicate a person or a team to maintain and update the application. The use of the art as information content is restricted and the exhibitions are changing rapidly. For these reasons the maintenance user interface, used to update the application contents and prepare a new exhibitions, is very important. The maintenance user interface must have dynamic editing of the art content in order to update information continuously (Träskbäck 2003).

### **Conclusions**

When MR applications are developed for a museum context, it is very important to consider the overall big picture. In art it is important that the used technology does not hinder the visitors' from experiencing the works of art. The MR applications must honor the art and abide by the various constraints discussed in this paper. Most of the requirements are the same for all services designed for the general public, but museums have more restrictions related to the use of information of the works of art. They might not have the needed permissions to augment the pieces or do not wish to alter the original work that the artist has created.

### **References**

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