Mixed Reality Games - Augmented Cultural Heritage
Juegos de Realidad Mixta - Patrimonio Cultural Aumentado

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Abstract: *This paper aims at enhancing Cultural Heritage in several ways. Using Augmented Reality and Virtual Reality technologies, we seek to highlight the advantages of understanding and applying hyper worlds in cultural, sociological, psychological and educational fields. For this purpose, we suggest the inclusion of social serious games as the perfect link to a more productive and pleasant experience for users and a more accurate analysis of simulated cultural environments for researchers.*

Palabras clave: Game; social; city; culture; heritage.

This article briefly presents a contribution to Augmented Culture of our ongoing research project HyperUrban, developed by the CiTu - Paragraphe Laboratory, University Paris 8. Our work includes the analysis and design of physical, real, and imaginary simulated environments, that is to say, a mixed reality (Augmented Reality/Virtual Reality). HyperUrban's approach considers the "City" concept as a complex urban space that produces, maintains, exchanges, transfers and transacts information related to services and products. Nowadays, every city contains and belongs to many different "Cities", such as tele-cities, virtual cities or augmented cities. HyperUrban (ZREIK, 2008) presents a fundamental difference in the way it perceives and manages the design process. It considers, on the one hand, information and communication practicing as the kernel of any information management system and, on the other hand, the future city as an integrated media system.

Our current project involves an "in design process" experiment, and the experience that we attempt to generate takes place in the simulated environment of a museum in Paris, France.

This paper aims at enhancing Cultural Heritage in several ways. Using AR/VR technologies, we seek to highlight the advantages of understanding and applying hyper worlds in cultural, sociological, psychological and educational fields. For this purpose, we suggest the inclusion of social serious games as the perfect link to a more productive and pleasant experience for users and a more accurate analysis of simulated cultural environments for researchers.

Augmented Culture

The notion of Augmented Culture (AC) could be seen as the development and improvement of knowledge resulting from the revolution of Information and Communication Technology (ICT), combined with a whole new perspective from the society understanding the world and the relationship with its habitants. This process brings us a new social experience virtually free of any space-time barriers, and it shows the materialization and visualisation of a mixed culture phenomenon in real time.

However, as we reflect on this concept, we can also consider society itself. Society becomes as augmented as the culture that it spreads, as it is connected with a huge number of social networks and virtual worlds which are interrelated and have consequences in physical spaces. That leads us to think of an augmented individual represented by his own digital character (avatar) in several

virtual communities, an avatar (or many) which is part of the individual's personality. Last but not least, we can think of a personality that grows and develops both in the physical and in the virtual world. But before going into details, we must clarify our research field.

Culture and games

Our project clearly deals with the concept of Augmented Culture on many levels. As we observed, most of Augmented Reality, Mixed Reality or Virtual Reality projects have a common aim: developing and enriching culture.

In this context, Culture could be seen as both the means and the end of a process to:
- Acquire new knowledge
- Validate knowledge
- Exchange knowledge
- Question knowledge
- Transfer knowledge

Culture (and knowledge) involves exploring, learning, playing, teaching, making transactions and developing new relationships, very often without any space or time constraints. Our goal is to emphasize the moment when culture involves playing or vice versa.

For the time being, AC is mainly focused on the possibility of exploring "Ultra-Cultural-Spaces" (UCS) (for instance, facilitating immediate access to otherness information). However, AC also allows us to explore "Intra-Cultural-Spaces" (ICS). Our concern is to study ICS as well as UCS, and this is why "play" takes on an important role in our work.

Our research is centred on the concept of "play" and on the social function of games. Johan Huizinga believed that culture was created under the form of games and that it was originally played (HUIZINGA, 1951). The idea suggested by the Dutch sociologist is that culture develops as a game in its primitive forms, and in the game, society questions itself and interprets life.

The act of play was, is and will always be an essential part of all societies and cultures: it's in the nature of human beings to play. Nowadays, thanks to computer networks technology, several forms of games give users (or players) the possibility to mix fictional and real worlds in a fun, pleasant and relaxed activity. Although not always free from social pressures, this kind of situation usually generates more creative environments. Games open the door to creativity and interaction, and also to relationships. In fact, we believe that playing is the most suita-

ble and useful activity to combine many cultures in real time, reuniting men from all over the world in an active and persistent virtual community.

Our analysis is specialized on games commonly known as MMORPG (Massive Multiplayer Online Role Playing Games). These games are only playable online and generally have the particularity to encourage team work to achieve in-game objectives. Players create and integrate in-game virtual communities, but they usually bring their social circles and activities out of these games (and into the physical world). This happens because MMORPGs are heavily charged with multicultural environments and they hosted communities with their own social pressures, occasionally bearing a great influence on users' virtual and real lives.

That is why combining culture and games is vastly important to us. We propose setting up a simple social serious game in an augmented Cultural Heritage space, to observe and study the interrelationships between users and avatars and the whole environment that is generated around them. We consider this a valuable method to make progress in UCS and ICS experimentation. Our main challenge, however, is to design an immersive environment with a high level of influence on its users.

Immersion in a Cultural Heritage Environment

When we read a book, watch a film or play a video game, we are transported into a fictional (or real) world with its own rules, spaces, characteristics and situations: a world in which we are immerse for a period of time. Obviously, this process requires a voluntary act from readers, spectators or players, and it does not guarantee an optimal level of immersion. Marie Laure Ryan considers that "*the degree of precision and the nature of the immersed reader's mental representations depend in part on his individual disposition, in part on whether the focus of attention is character, plot, or setting*" (RYAN, 2001, pages 120-121). According to the author, the level of immersion not only depends on the personal disposition, but also on the spatial immersion (our response to the setting), the temporal immersion (our response to the plot) and the emotional immersion (our response to the character).

In a traditional museum, we can see several time periods and different spaces in a single, unique environment. The background and given information are extremely rich and usually fill the interests of different kinds of

people. But in this case, we barely have the possibility to experiment with the emotional field. In a virtual online real time museum, however, users would be able to create their own personal character (avatar), which serves as the digital connection face to other visitors/users. Additionally, users would have the opportunity to interact with all the objects and artworks from the simulated museum. The inclusion of social games in an online virtual museum will enhance the possibilities. To briefly mention some of them:

- Games that involve an interaction with the space, artworks and users could serve for artistic and cultural design and development. This interaction is useful to analyse users' space appropriation in an environment without boundaries. Indeed, this "liberty" will make a positive effect turning on users' creativity.

- Games that include rich arguments or plots could be useful for educational purposes, as they are an efficient tool for indirect learning (by playing). Museums are provided, obviously, with a huge amount of history. They have the informational potential to produce plenty of appealing games. Moreover, the creation of a personalized avatar will give researchers the possibility to ask every user for their interests. In this way, this learning tool could be optimized and personalized in real time.

- Games that must be played with an avatar could have sociological and psychological uses, not only by studying role playing situations: the possibility to develop an avatar gives players social status in a virtual community. It integrates a hierarchy that evolves depending on users' ambitions. By studying an online simulation in real time, we can analyse the relationship (and its evolution) between the avatars and their users; and also between the avatars and the communities of avatars.

- This experience can also allow us to learn more about new space and time perception paradigms, space construction, own-time management, emotion management, etc. In addition, it could probably extend the analysis to individuals and communities participating simultaneously in both, the physical and the simulated world.

In theory, this simulated environment will give researchers the possibility to take control over the three forms of responses (spatial, temporal and emotional) and to use them in direct association with the interests of users. We will be able to change variables for the purposes of our research and for the needs of the whole virtual community. This way, the immersion process will be very different: if the choices are more personal and the options are wider, it will be easier to reach an optimal level of immersion. This is why we have chosen the Cultural Heritage augmented environment as our ideal domain of experimentation.

In fact, Cultural Heritage has always been a kind of Virtual or Augmented Reality, as it has always taken its visitors out of time and space. This means that visitors are prepared to experience spatial and cultural adventures and to experience different feelings and beliefs on what is written or seen during their visit. But nowadays, users are also accustomed to participating in different communities at once and to living without any space or time limits.

Moreover, this research could also bring about a change in the whole structure of user profiles. In traditional exhibition or museum design (planning), visitors can be assimilated to a sort of determinant avatar designed by the curator. So every visitor is already predefined and predesigned. This explains why some visitors prefer certain places more than others (or some curators more than others, implicitly). The possibility of creating an avatar with no predefined characteristics will help the whole institution of Culture Heritage to gain valuable knowledge about its visitors.

The Experience

In conclusion, our goal is to develop a psycho-social experiment in a simulated museum in Paris, France. On the one hand, we want to prove why and how social games and their immersive nature can be used to raise users' awareness regarding the issue of Culture Heritage. On the other hand, the games we are developing could be used, for instance, to gather data about: individual and collective space appropriation (interactive games with artworks and the environment); individual and collective reactions to unforeseen events (social games based on digital crises in closed spaces); emotion management (social games based on group organisation); identity construction through individual and collective representations (individual games based on the avatar's evolution systems and collective games based on community's hierarchy systems).

Our final objective is to show how these games can be useful to analyse virtual communities and to demonstrate

their social, cultural, economic, political and educational effects on our society nowadays. As we explained, our approach is especially focused on users and their relationship with their avatars, with the virtual environment and with the community generated around it. Our theoretical support is based on the positive results of our last research on virtual worlds (BERTUZZI, 2010). Indeed, we believe that our experiment could be used as a new approach to sociological and psychological studies.

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