Honors thesis

COURSE OF MASTER DEGREE IN
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Abstract

Virtual heritage and gamification: an experiment of virtual reality on the Chapel of S. Eldrado in Novalesa

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In the cultural heritage sector, the technological development of the last decades has played an important role. In the professional field, the extreme flexibility of the new architectural relief techniques exploitable today has improved the level of knowledge of cultural heritage. While on the one hand they have made available new tools for its investigation and documentation, on the other they have generated innovative methods for the dissemination and fruition of the results obtained from these investigations.

The evolution in the technological field has allowed an increase in computing potential even in small-size, affordable devices, which are now able to deal with data flows of remarkable proportions.

The large-scale spread of pocket-sized and network-connected electronic devices has radically changed the way we approach the real world, and has generated interest in an ever-wider public: this has induced new trends even in the fruition of cultural heritage, as the consumption of the information is no longer static and monodirectional, but dynamic and interactive. These two characteristics also belong to another sector, the one of digital entertainment, which in recent years has been merging with other sectors not strictly connected to the gaming world.
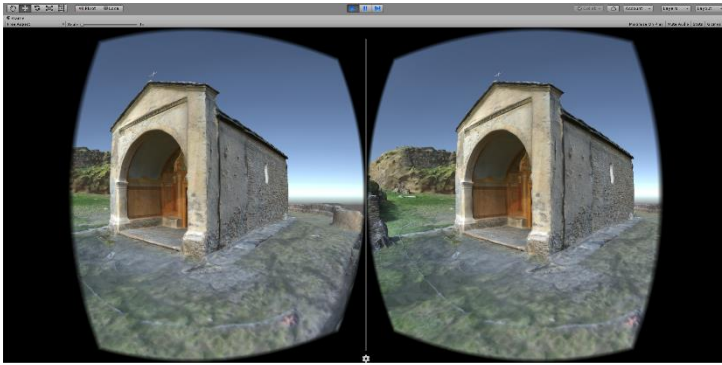
The integration of video game mechanisms in a field other than the entertainment industry, a concept known as "gamification", has led to the creation of new paradigms able to make information more appealing to an audience that becomes more and more "connected".
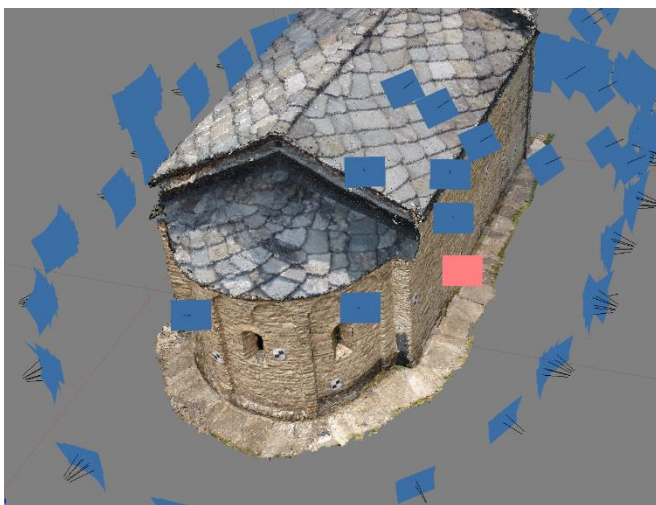
Fig. 1 *Point cloud generated from photogrammetric method*
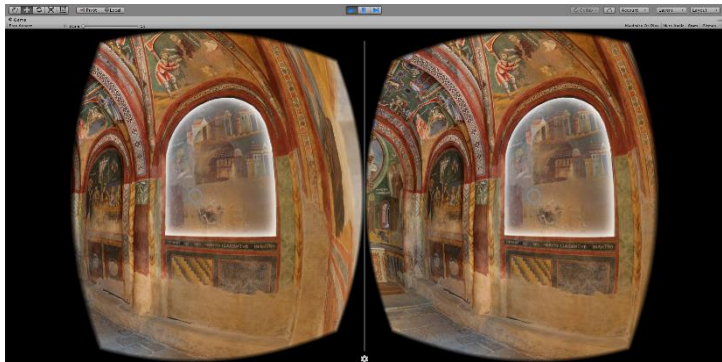
In this sense, the data provided by the new technologies for the acquisition and documentation of cultural heritage offered by geomatics are experiencing unconventional applications in terms of cultural diffusion. Laser and photogrammetric surveying not only constitute innovative techniques for operations such as monitoring the conservation status of a building and / or reproduction of works that are highly faithful to reality (to name just a few of the many applications) but are also finding fertile ground in virtual heritage through data acquired from geomatics.

The diffusion of these data takes place involving digital representation techniques such as virtual reality, a totally immersive dimension, in which the visualized environment is totally digital and interactive, and needs wearable supports to be displayed, better known as stereoscopic viewers, capable of transmitting the virtual scenario directly to the eye by tracking the position of the head in real time. This allows for an immersive experience in which the digital object can be questioned by the user through the same dynamics present in the world of digital entertainment, a factor that is surely recognized by a relatively young audience, but intrigues a wider target audience, becoming a means of communication able to meet today's expectations.

Fig. 2 Stereoscopic view of the exterior of the chapel of S. Eldrado

The thesis focused precisely on the study of this last communication tool, exploiting the photogrammetric survey performed for the Chapel of S. Eldrado, in the monastic complex of the Abbey in Novalesa. It should be pointed out that the category of software dedicated to game design used for the production of the virtual reality setting of the chapel is not designed for exploiting data deriving from photogrammetric clouds. This fact makes all the work a research on the potential of the union between geomatics and game design. The fact that the building houses one of the most relevant examples of Lombard Romanesque painting, along with the fact that it is still used today as a place of worship, its reduced dimensions - that contribute to create an intimate space of prayer - and the difficult geographical position in which it is located, are factors that make the chapel a place open to visits, but not suitable for intense tourist flows.

Fig. 3 Interactive object in the virtual scene

Virtual reality in this context aims at becoming a tool for experimenting with a new way of disseminating knowledge thanks to the creation of a smartphone application through which the photogrammetric model of the building and its frescos can be visited and interrogated through interactive tools that can be activated by the user, which can benefit from the virtual experience even in real contexts distant from the object of study.

The increase in the number of developers and users, combined with the advent of new forms of navigation and learning, contribute to render the results of a cultural transmission through this medium unpredictable: this has made necessary the adoption of a cybernetic approach, rather than a merely technological one, through the course of this work. Particular attention has been paid also to the relationships between communication technologies and the subject of communication.

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