

Fostering Cultural Awareness in Museums and Monuments by Employing Extended Reality



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Abstract

Fostering cultural awareness and user engagement in museums and monuments is fundamental for the successful promotion and valorization of Cultural Heritage. The current work aims at a brief discussion about the possibilities and benefits brought forth by the adoption of immersive technologies such as Virtual, Augmented and Mixed Reality, often jointly termed as Extended Reality (XR), in boosting user engagement and providing meaningful and long-lasting cultural experiences that ensure inclusivity and accessibility to all.

Keywords: Cultural Awareness; Museums; Monuments; Digital Culture; Extended Reality

Introduction

Immersive technologies, namely: Virtual, Augmented, and Mixed Reality (VR/AR/MR), often covered by the umbrella term Extended Reality (XR) technologies, are widely used in cultural heritage, enhancing the visiting experience, improving learning and understanding. XR applications are interactive, can integrate rich informational content, multimedia, 3D objects, tutoring scenarios, and even playful stories. Due to these advantages, XR technologies and applications have found their way into museums and other cultural spaces in various forms and shapes [1].

Extended Reality Applications in Museums and Monuments

Using immersive VR and AR technologies to complement cultural landmarks, archaeological sites, and museums can significantly enhance how we explore and understand our cultural heritage. VR can virtually recreate historical environments, allowing users to explore ancient cities, buildings, and landscapes in a realistic and immersive manner. AR can overlay virtual reconstructions onto the real world, providing users with a blended experience of the past and present.

VR and AR applications, especially with advents in real-time location tracking, image or object recognition, enhanced mobile and web interfaces, high-end displays, artificial intelligence, etc.

[2], can offer guided tours of archaeological sites, providing users with historical context, stories, and information about artifacts and structures. Interactive elements can also be incorporated, allowing engagement with 3D models of artifacts or historical figures. This immersive experience can enhance learning and foster a deeper understanding of history and archaeology.

The remote exploration and XR applications in cultural institutions -museums and monuments- improve visitor engagement and provide new and dynamic ways for a broader range of users to connect with history and heritage. These technologies could make cultural experiences more accessible and inclusive, reaching audiences beyond physical limits, ensuring accessibility for all. This presents a significant opportunity for disabled users to explore archaeological sites, cultural landmarks, and museums remotely, breaking down geographical barriers and discrimination. Afterall, it benefits individuals needing physical access to specific locations, providing inclusivity [3].

Moreover, museums and cultural institutions can utilize XR to create interactive exhibits. Visitors can then use XR-enabled devices to view additional information, animations, or reconstructions when looking at artifacts or exhibits [4, 5]. By harnessing the potential of VR and AR as powerful storytelling tools, users are also allowed to experience historical events or

cultural narratives in an immersive way, thus creating a more emotional and memorable connection to cultural heritage. According to the documentation, VR can be used for archival preservation, creating virtual cultural artifacts and landmarks archives. Digital records help to preserve cultural heritage in the face of physical decay or disasters, while enabling users to interact with its elements without fear of endangering them.

Implementing XR supports collaboration between archaeologists, historians, technologists, and cultural institutions to ensure accuracy, authenticity, and meaningful user experiences. Remote and XR applications enforce collaborative experiences [6]. A typical example refers to the social XR platforms where users can explore museums or monuments together, fostering a sense of community and shared exploration. Another similar case includes collaborative projects, allowing researchers, historians, and users to contribute to the development of virtual exhibits, historical reconstructions and digital representations reviving intangible cultural heritage [7, 8, 9].

Interactive experiences through XR applications about a monument or an archaeological site in history and oral history can serve as powerful tools to engage communities and provide a deeper understanding of diverse social or educational environments. In these areas, developing digital storytelling platforms allows wider audiences to explore cultural histories through multimedia presentations, combining 3D models, photos, videos, and audio recordings [10]. The digital archives of oral history interviews permit users to search and listen to recorded narratives from different cultural perspectives. They implement tagging and indexing systems to categorize oral histories based on themes, locations, or historical periods for easy exploration. Besides, via XR it is more attractive to develop interactive documentaries, enabling users to make choices that influence the direction of the narrative, encouraging active engagement [11].

However, that interaction in Cultural Heritage emphasizes that local and descendant stakeholders should be co-creators in the narrative stories about their ancestors, predecessors, and landscapes. It is worth noting that the interaction highlights the intangible cultural heritage alongside tangible artifacts, such as traditions, rituals, and oral histories. The importance of Intangible Heritage in shaping cultural identities is critical in the 21st century. Also, Digital Heritage is crucial for maintaining collective memory. Digital monuments are a significant part of our legacy from the past, what we live with today, and what we pass on to future generations. According to UNESCO's Charter for the preservation of Digital Heritage, this digital heritage will likely become more critical and widespread [12]. Individuals, organizations, and communities increasingly use digital technologies to document and express what they value and want to pass on to future generations. New forms of expression and communication have emerged that did not exist previously.

Promoting awareness and inclusivity in Cultural Heritage, is

a continuous and evolving process that requires a commitment to understanding and respecting diverse perspectives. By actively involving communities, embracing different narratives, and fostering a sense of belonging, XR can drive Cultural Heritage into becoming a shared and enriching experience for everyone.

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