

Teaching Experiences in the Digital Humanities Course: Technological Innovation for the Protection and Enhancement of Cultural Heritage

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I. INTRODUCTION

The world's cultural heritage represents an invaluable resource for humanity, a testament to past civilizations, and a bridge to the future. The protection and enhancement of this heritage are crucial, as they form the foundation of our cultural identity and offer educational, touristic, and economic opportunities. Italy, in particular, is one of the wealthiest nations in terms of cultural assets, with a heritage ranging from historical and archaeological monuments to artworks and cultural landscapes. Preserving these treasures requires constant and innovative efforts, especially in an era where advanced technologies rapidly offer new tools to address the challenges of protecting and monitoring cultural assets.

Modern technologies are revolutionizing how we approach cultural heritage conservation and enhancement. The Internet of Things (IoT) allows for continuous monitoring of the conditions of historical sites and artworks, detecting environmental or structural changes that could damage them. Recommender systems can enhance visitors' experiences by suggesting personalized itineraries and additional information, making the enjoyment of heritage more engaging and educational. Augmented Reality (AR) and Virtual Reality (VR) create immersive experiences that bring the past to life, offering new ways of interacting with artifacts and historical sites. The Metaverse is emerging as an innovative platform for enjoying and enhancing cultural assets, creating virtual spaces where heritage can be explored in unprecedented ways. Finally, Artificial Intelligence (AI) provides powerful tools for analyzing and managing cultural data and supporting decisions regarding the conservation and promotion of heritage.

It is essential that the teaching of these new technologies be integrated into all university courses, particularly in the humanities. Humanities students equipped with these technological skills can develop new professional profiles capable of bringing innovative ideas by blending humanistic and digital knowledge. This synergy allows for the creation of original solutions for managing, conserving, and enhancing cultural heritage, opening new research and development opportunities in the humanities. The technological literacy of future professionals in the humanities not only enriches their cultural background but also makes them more competitive and prepared to face contemporary challenges.

This work aims to collect the teaching experiences gained within the Digital Humanities course, specifically targeted at Ph.D. students from the Department of Cultural Heritage Sciences. This course, designed for doctoral students in the humanities, aims to provide advanced technological skills for protecting and enhancing cultural heritage. In an era characterized by rapid technological developments, humanities scholars need to become familiar with digital tools and emerging technologies. The course covers a range of technologies, including the Internet of Things (IoT), Augmented Reality (AR) and Virtual Reality (VR), the Metaverse, Recommender Systems, and Artificial Intelligence (AI), highlighting their potential impact on the field of humanities.

II. METHODOLOGY

The Digital Humanities course is structured into thematic modules that combine theoretical lessons and practical activities. Each module focuses on a specific technology, illustrating its basic principles and possible applications in the context of cultural heritage sciences. The topics covered include:

Internet of Things (IoT): The IoT module introduces students to the use of sensors and connected devices for monitoring and managing cultural assets. Students learn how

these tools can detect critical environmental conditions and provide real-time data for conservation interventions [1].

Augmented Reality (AR) and Virtual Reality (VR): This module explores the use of AR and VR to create immersive experiences that enhance cultural heritage. Students learn the main techniques and detection tools to develop applications that can be used for virtual tours, interactive exhibitions, and historical reconstructions [2].

Metaverse: Students are introduced to the concept of the Metaverse and its applications in the cultural field. The course demonstrates the creation of virtual exhibition spaces that are mostly digital collections and offer innovative educational experiences [3].

Recommender Systems: This module deals with the use of recommendation algorithms to improve the accessibility and enjoyment of cultural resources. Students explore how to personalize user experience through suggestions based on past preferences and behaviors [4].

Artificial Intelligence (AI): The AI module covers machine learning and deep learning techniques for the analysis of cultural data. Students learn how to use these tools to identify and predict conservation issues and automate management processes [5].

At the end of the course, students apply the acquired knowledge by developing final projects. Three significant projects are described below.

1. **IoT Prototype for Monitoring and Protecting Ancient Books:** Students developed a prototype based on IoT devices to monitor the environmental conditions of ancient books in libraries. Using sensors to detect temperature, humidity, and dust, the system sends alerts in case of harmful conditions, allowing timely interventions to preserve the books.
2. **Virtual Environment in the Metaverse:** Another project created a virtual metaverse environment based on the scientific library of the University of Salerno. This virtual exhibition space allows users to explore the library and access information about various books and documents in an immersive way,

using AR and VR elements for an interactive experience.

3. **360° Photo Tour of the University of Salerno Campus:** This project developed a virtual tour of the University of Salerno campus using 360° photographs. The virtual tour, accessible through VR devices, facilitates new student orientation and promotes the university's infrastructure in an engaging way.

III. CONCLUSION

The Digital Humanities course has demonstrated the importance of integrating new technologies in the field of humanities. The projects developed by students show how the use of IoT, AR, VR, the Metaverse, and Artificial Intelligence can improve the protection and management of cultural heritage, creating new ways of enjoyment and enhancement. These teaching experiences highlight the need to train experts capable of combining humanities knowledge with technological skills, opening new avenues for research and innovation in cultural preservation and promotion. The results indicate that future editions of the course could further deepen the use of these technologies, expanding application possibilities and improving student training.

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