CULTURAL HERITAGE CONSERVATION? A MULTIDISCIPLINARY TEAM PLAY!

Multidisciplinary work is crucial for cultural heritage sustainability. Ensuring that professionals, academics, and technicians of different fields work together and communicate their results can make a real difference when making decisions about conservation. A key factor to that is assessing the quality of their individual results and finding ways to combine them most efficiently.

A RESEARCH TALE BY

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From monumental architecture to historical artworks and archaeological artifacts, tangible heritage possesses essential values tied to culture, religion, aesthetics, and production techniques of a historical period. The importance of heritage conservation stems from the need to preserve these values and the sense of continuity and identity that heritage provides for future generations. However, all heritage assets are subject to damages that may result from human activity or interaction with the environment. To ensure their preservation, we have to document, assess, and monitor these damages over time. In this way, we can effectively contribute to decision making about conservation.

International organizations and incentives whose purpose is to ensure heritage sustainability, as well as decades of international experience in conservation, suggest that to record the state of preservation of tangible heritage, we need specialists of many different fields to work together, which means to have as a result, multidisciplinary information. Recorded information about a heritage asset can relate to historical, architectural, geometrical, structural, chemical, environmental, and other characteristics and come in many forms, such as written records, sketches, damage drawings, photos, measurements, and digitally constructed models. Often, these data are studied separately and not processed as a whole by a multidisciplinary team, which can lead to misinterpretations regarding the state of the heritage asset.

The aim of my research is to investigate the properties of the different types of data that a multidisciplinary team produces when recording the state of a heritage asset and to find better ways to combine them in order to boost efficiency and avoid mistakes. The data I am more frequently dealing with are photos, thermal measurements, three-dimensional data about the geometry, and descriptive information about the materials and their damages. In order to make them "interact" and better describe the state of heritage, I use as common "language" their common properties, such as their position in 3D space, while keeping in mind that very different techniques have been used to collect the various types of information, meaning that they have to be first corrected in many ways before they become compatible. Then, by consulting with the multidisciplinary team members on how to interpret the results according to their different expertise, I use the combined data in a digital 3D environment collectively to derive conclusions about the state of preservation of the heritage asset. The results can be in the form of 3D digital models, where the various damages (cracks, loss of authentic materials, alteration of the colors, crusts, and other surface irregularities) are highlighted in different ways, or 2D maps of all these alterations.

There are many examples in the past, from incomplete documentation (mainly of stone heritage) that were not led by multidisciplinary teams, resulting in nonobjective results about the state of preservation and consequently misled decisions about restoration. On various occasions, these mistakes have worsened a heritage asset's condition instead of ensuring their protection. Thus, guaranteeing that conservation teams consist of experts with different backgrounds, who can effectively communicate, and combine their work results in a comprehensive way to all, is essential for the sustainability of heritage.

Combination of multisource multidisciplinary results (from left to right): image at the visible spectrum; image at the near infrared spectrum; image at the thermal infrared spectrum; laser scanning-produced point cloud.