

## Events

## Documentation &amp; Digital vol. 2

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As reported in the preface of Massimiliano Lo Turco to this collection of researches, the awakening of a “Sleeping Beauty” can be considered as the main topic of this book. “Sleeping Beauty” is a name that comes from a project promoted by the Italian Ministry of Cultural Heritage, regarding a classification work aimed at civic museums, with the ambition of setting up a database of an important selection of works that do not find space in the exhibition areas accessible to the public.

But while there are many “Sleeping Beauty” reality in our area the increasingly use of Internet and the digitalization applied to cultural heritage allows a satisfying dissemination in which storytelling plays a fundamental role in the creation of content, both with entertainment and educational value. Explain processes and experiments to disseminate something hidden, bring to light large treasures that are part of collections only partially exposed is an objective of the researches developed here with different in-depth studies.

The book reports a study day in Turin on June 14<sup>th</sup> 2019, and is made with the contribution of DAD, department of Architecture and Design of Politecnico di Torino, through the “BIM acquisition as Cultural Key To Transfer

Heritage of ancient Egypt For many Users To many Users Replayed-Back to the Future Project”; the day reported the state of art of some researches collected by the same aim and its structure is reflected in the book with apparent simplicity: a first part, entitled “Digital & Physical Models”, collects the research experiences of the project carried through a collaboration between Politecnico di Torino and the Fondazione Museo delle Antichità Egizie of Turin with the support of Compagnia di San Paolo.

A second part, entitled “Databases, semantics & interoperability”, presents a selection of experiences, where documentation is the issue: databases, classified and structured through ontologies, sharing of information using different interoperable platforms, automatic recognition of architectural objects through machine learning techniques. A third part, “Digital Representations for Knowledge, Enhancement & Communication of Cultural Heritage” uses Digital Representation as the main focus, investigating it in its multiple forms: from the most sophisticated theory to the most popular uses. A first question introduces all the research themes: it concerns the urgency that has become more pressing to digitize and disseminate even what it

has, most likely, a lower overall value than what is exposed.

Why our actual cultural condition requests it? There are many reasons.

The digitization of whole cultural heritage sites is often driven by the fear that natural or war events can erase them from our memory; moreover, when we deal with artefacts that are already part of collections or part of a museum, we are mainly encouraged by the desire of a wider circulation in an era of cultural competition among institutions; sometimes digitalization is the last possibility for sharing knowledge. Frequently we face collections that are closed to the public or confined to areas that cannot be visited.

In a country like ours preserving is no more sufficient; we are rich in artefacts but often lacking in dissemination out of our boundaries; we are in an area where historical research is relevant, and it must widen its boundaries, placing itself in relation with other researches and traditions.

The European Commission, the research financed, the organizations that deal with the collection and enhancement of the historical heritage, whether they are artefacts in the open air or museum exhibits, point at the digitization as an essential process for the dissemination of our culture and its transmissibility.



Fig. 1. Flyer of the event.

The creation of the first digital museum collections databases reveals an articulated and rich panorama, full of attempts, or structure researches, where the hot topics deals with acquisition and reverse modelling themes, such as accuracy of the models and reliability; fast or automated methods of form extraction; semantic enrichment, or modelling for virtual or augmented fruition for dissemination.

So even if cultural heritage is transmitted us with a richness of meanings due to the interpretation of the space-time relations that forged it, its life now is restarted by the possibility that the technique offers to show them and

the amount of data that belongs to them, giving development of the way they are used.

As in the next years much physical reality will be largely replaced by a digital reality the historical responsibility that the new digital models assume goes far beyond that of simple contemporary dissemination.

The generation of the - digital twins - of the heritage of the past is the bet on which the preservation of the historical heritage for the next generations is based as well as, in a similar field, the progress of new buildings is based.

The researches here produced brings to light three different lightmotive, „em-

phasizes three research themes that run across three chapters' themes: the method of acquisition and survey procedures as a research theme running; the aim of cataloguing and therefore the semantic enrichment of the objects produced; the possibility to forecast scenarios for future research and development.

The first mainly searched in the chapters by Spreafico, Patrucco, Calvano; Maietti e Balzani; Fanini; Marraffa; Maniello but not only.

The second searched by Maffrici e Giovannini; Niccolucci. The third, crossing all the chapters and

with a prominent presence presence in Palma, Baglioni e Salvatore, Rossi, Oppedisano, Vinti.

The acquisition of the point cloud raises the following themes: assuming the fact that the digital model is a data repository coming from different sources that contribute to the description of the object, the first objective of the acquisition is to produce a metrically accurate 3D model, possibly provided with material representations faithful to the existing one. The point clouds generated by laser scanners or the colorimetric information derived from photogrammetry require skills not easily available, and warn us about issues related to the accuracy of the models. While the lack of accuracy could be negligible in some areas related to the use the survey for entertainment it can't be in the research field. As the accuracy of the point cloud falls proportionally to the number of different acquisitions made post processing phases need high skills to assure good results. More skills in texturizing phases or mesh modelling: reliability is an ambitious goal.

The aim of cataloguing: its structure and organization raises questions from the

earliest stages of model segmentation and semantic enrichment of the objects that are identified within it. The geometric segmentation in itself, sometimes automatically offered by software, may not make sense for some artefacts and implies again the intervention of the researcher that must know the structure of the final database. The enrichment of the model is determined by the materials found as well as by the need for dissemination: sometimes it is necessary to integrate historical information but also managerial or related to the type of maintenance as well as alphanumeric or multimedia data.

The purpose of the database must be defined from the beginning of the segmentation phase being plenty possibilities of its goal. The variables of the single researches offer often tailor-made workflows that demonstrate the state of the art and the difficulty of finding a completely shared procedure or even more model cataloguing standards.

If document digitization procedure of existing paper materials has produced regulations and by now consolidated rules the procedures for the digitization and cataloguing of monuments or artefacts of smaller size is far from such a scenario. A Ministerial decree in 2018 "Adoption of minimum uniform levels of quality for museum and places of public culture and activation of the National Museum System" requires compliance for minimum standards for the correct organization of deposits referring to simple rules for storage of artworks not exhibited. In a foreign context, some large institutions such as the Smithsonian started in defining parametric parameters for the digitalisation of collections, currently offering traces or guidelines to support colleagues to build workflows by creating sustained high speed, high quality digitization pro-



Fig. 2. Work session of the conference.

cesses, by pairing up the digital surrogates they create with the collection records stored in the various collection databases. It is about sharing a responsibility in finding, as Smithsonian says, the best technologies and processes to achieve these goals; to conduct mass digitization projects to test and implement these new technologies and processes; to educate and train ourselves to understand these new approaches; and finally to integrate digitization operations into the day-to-day operations in order to give the world access to the collection sometimes hidden the public. Finally, the topics of future research progress for a wider fruition: as museums have not been immune to the advent of technologies linked to the world of Web-related technologies and

generally to first-generation digitization and to the development of Web Pages (and social media in a second stage) the imminent moment invokes research on the development of interaction between digitalization and technologies 4.0. The museums have realized the potentials of digital technologies on reaching a wide public and increase their attractiveness. Now that digital technologies offer some low-cost scenarios, as user-friendly tools, they multiply the way in which "users" use interactive technologies in their everyday life, including visits to cultural places. We slide towards a digital enjoyment that does not therefore lend itself only to scientific research and dissemination but will allow the introduction of a wider public, friendly user, and all kinds of devices.

All these changes will oblige museums and institutions to think about reinventing themselves in more digital involving ways, where modelled contents accurate and reliable will be probably exported to a wider market; this last one will offer further experiences probably

customized by the single user; founded on previous deep and accurate models previously acquired.

The most vivid legacy that the collection of these writings manifests goes back to a close relationship between a strong need for documentation and

research regarding some works and the need to weave different types of knowledge, from the more formal aspects to those more related to the contents and on this direction will continue the next research to allow the implementation of digital strategies for cultural heritage.

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