

Chapter 41

Digital Surveying in Cultural Heritage: The Image-Based Recording and Documentation Approaches

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ABSTRACT

Cultural Heritage is recognized as a priceless asset of human being, which exposes the humanity's achievements over centuries. The need for documentation and preservation of cultural heritage is well known worldwide. Digital surveying techniques are playing a catalytic role towards recording and documentation of cultural heritage. This chapter describes the methodological and technological aspects of image-based recording and documentation approaches acting as the vehicle for the digital surveying of cultural heritage. The chapter not only describes the different technologies and techniques used but also goes to the extent of clarifying several applied implementation issues. Three different examples and application case studies from a small, a medium and a large-scale cultural heritage objects are provided to demonstrate the developments.

INTRODUCTION

Cultural heritage is gradually considered and widely appreciated as an essential part of world social and economic environment. Moreover, the fiscal reimbursements of cultural heritage have most frequently been seen under the lens of tourism development. Nowadays, cultural heritage is faced as a factor of innovation capable of contributing in local and regional growing and enhance employment in local and regional level. It is also considered as a key contributor to social cohesion in the direction of connecting different communities and younger generations while enhancing their identity.

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There is no doubt that this remarkable wealth of humanity must be preserved for the benefit of all; especially for the generations to come. This preservation and related actions should stand on values that are accepted by the international community and are based on scientific research and its results. In the field of cultural heritage conservation, these values are critical to deciding what to conserve, when and how. Actually, they constitute an important factor in the current practices and future prospects as well. Needless to stress that these actions are governed by international conventions to which all civilized countries have agreed.

There are many examples indicating the significant contribution of contemporary technology towards conservation and preservation of cultural heritage, covering all action stages, from archaeological investigation and prospection till recording, documentation, conservation and dissemination. Especially, the role of photogrammetry, i.e. image-based mensuration techniques is catalytic in this process. A huge amount of work has been done all these years and in the full version we plan to provide characteristic examples.

The Cultural Heritage Context: The Need for Recording and Documentation

Metric survey leads to recording and documentation and practically forms the base for planning conservation actions; by mapping the historic environment it can be managed, conserved, and offered to the society. ‘Metric survey’ is the term which describes the practice of precise, reliable and repeatable methods for the geometric documentation of cultural heritage.

The recording and determination of position, dimensions and/or form and shape of monuments is a compulsory part of nearly every cultural heritage conservation project as it was firstly mandated in the ICOMOS Venice Charter in 1964 (ICOMOS, 2015). The examples are countless and are not limited to the following cases. For instance, archaeologists and/or historians are greatly helped to identify the significance of topographic features located in a historic landscape or the size and the shape of an artefact found in an archaeological excavation or site; even a conservator can be helped to schedule all necessary restoration works and budget them on the basis of the accurate 3D model and visual representation of a monument.

Normally, one can find many different representation techniques; commonly it is appreciated by archaeologists, conservators or architects to present such measurements as plans, sections even as outlines plotted on hardcopy, i.e. a simple big piece of paper, for direct use on site and/or during field work. Nevertheless, the rapid development of new contemporary methods and techniques in the field of digital 3D measurement, software development and sensor technology, has stimulated an ever increasing demand for 3D digital information. The impact of digital technologies to the domain of cultural heritage has increased speed and automation of the procedures which involve processing of the digital data and presentation of the results. At the same time accuracy and reliability has been substantially enhanced. However, most important is the ability to deliver to the users new and alternative products, which include two dimensional (2D) and three dimensional (3D) products, such as orthophotos and 3D models. All in all, the digitization of the world’s cultural heritage, be it tangible or intangible is now possible. 3D modelling, on the other hand, is the process of virtually constructing the 3D representation of a cultural heritage object.

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