

# Digitization in Archival Material Conservation Processes

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**Abstract** — The purpose of this paper is the digitization process and the techniques used, in cases of archival material preservation. Digitization as a process, whether it involves old documents and old maps, or audio and video clips, is the most appropriate process not only for the protection, but also for the reuse, upgrading and highlighting of cultural heritage elements. In this paper, the main problems are presented divided into the main categories of archival material (photographic material, printed material, audio, and video material) while at the same time the equipment and means used are presented.

**Index Terms** — Cultural Heritage, Digitization, Instructions, Materials.

## I. INTRODUCTION

Constant developments in information technologies create additional roles for libraries and cooperation that is new in emerging regions of task [1]. Digitization is now a key factor, within the survival and enhancement of history, cultural heritage, science and all the elements that define so-called collective and evolving memories of various societies and ethnicities. It is really crucial that you simply protect the details that are valuable in pictures, photographs, works of art, books, papers, drawings, maps, posters, manuscripts, cinematographic works etc. Some of the above items are destroyed due to time deterioration or occurrence of a catastrophic event (e.g., fire) and others are modified. Intimate cultural goods, like traditions and myths, disappear over time [2].

Let us consider that the availability of cultural products through an organized database equipped with appropriate support and dynamic search tools, contributes to the promotion of Greece or any other country's cultural heritage in the international community, by enriching the web with cultural products within the Greek language.

The entire process of digitization produces electronic substitutes for tangible and intangible assets, saving the knowledge that is valuable contain. This category includes various old manuscripts that are original books, maps, illustrated magazines, works of art, since well as audio and movie documents, invaluable from whichever side we glance at them (from collectors, scientists, art critics, etc.).

## II. THE CONCEPT OF DIGITIZATION

Digitization as it is defined in WhatIs.com, is the entire process of converting information into a format that is digital [3]. The effect is known as digital representation, more

specifically, a digital image, for an object, and electronic type for the signal. Digitization is of crucial importance to information processing, storage, and transmission, because it permits information of a variety in all formats to be carried with the efficiency that is exact same also intermingled.

The acquisition of data in a system is often administered in several ways. The study of those different techniques gives hints concerning the origin of the errors. Through digitization (of maps and diagrams) the main errors that are observed mainly concern the precision of the positioning pointing errors, multiple points (close to one another) and objects captured twice [4].

## III. BASIC INSTRUCTIONS DURING DIGITIZATION

**Photographic material:** In cases where the original material is either in slides or in a film (negative camera), we use the same primary material and not some possible printing of it, because the original material has the maximum possible quality. The most common file type format we use for this process is the Tagged Image File Format (TIFF) format, because is an often-used photo file type, it is relatively high quality, and finally, it is easy to convert to other types of files.

**Printed material:** The printed material for digitization consists of books, newspaper articles, leaflets, manuscripts, and photocopies. This type of material is digitized in TIFF and in some cases (e.g., books) in PDF images, for easier reading of pages.

**Audio Material:** In the case of audio material, the primary sources of the material consist of recorded interviews, narratives, radio broadcasts. For better performance, we will need a digital multi-channel console which also allows for the conversion of proportional sound into digital files simultaneously from 16 channels. The saved files must be in mp3 file format, for the following reasons. This format has an excellent frequency for users of audio fragments. It has a significantly smaller storage volume, and this is one reason for its easier transmission over the Internet while at the same time it is a member of the MPEG family of standards.

**Video:** When the primary file comes from a VHS tape, i.e., low quality original analog material, we usually store the files in the form of MPEG (Motion Pictures Expert Group). This standard is particularly popular for displaying video, sound, and generally multimedia content on the Internet, as the respective files are relatively small in size, Therefore, small withdrawal times. In addition, this template is supported by many public applications to view video files. Sound and video can be combined in the same file. MPEG allows high-quality and relatively small volumes of files to be created.

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However, we usually store all files in a second standard format, depending on the forms we want to be more directly editable, such as my personal choice, the AVI file type format [1].

#### IV. DIGITIZING MATERIALS AND MEDIA

Use As the digitization of documents is a particularly important task, the correct choice of the appropriate digitization system is considered as particularly crucial. We must therefore first analyze the needs of the digitization work entrusted to us. A general principle is the scanners to be used can digitize entire documents in a high-level analysis without attaching too much storage space.

Unlike home scanners, document scanners typically scan between 150 to 300 dpi and at 24bit depth. The greater the analysis and depth of color, the greater the used plays an important role in the everyday life of an office. Functions such as auto-crop, auto-tilt correction, and auto-rotate pages minimize costs and provide optimal results.

The main features of selecting a scanner are (a) to be fast, (b) to be reliable, (c) to be useful, (d) to be small, not to take up much space in general, (e) to be able to scan both sides of a page, (g) support a variety of papers, from business cards to A4 cards. These are all elements that help to digitize effectively with minimal effort.

More generally, we should have prepared an appropriate infrastructure that includes all those devices (scanners, digital cameras, audio, and video digitization equipment, etc.), as well as appropriate software which will contribute to the suitability of the conditions for initiating the digitization process. Of course, it is considered necessary to have an updated computer system with which to connect the devices to the appropriate storage facilities.

Regarding the environment in which the digitization process will be taken place, it should be appropriately adapted both for the correct digitization process, and for the condition of the objects to be digitized. Ideally, it should satisfy specific conditions of lighting, humidity, and at the same time, give particular weight to vibration, noise, and movement of objects. The process of digitization to be successful should be done with very good planning. Then, with proper coordination of the participants as well as the use of the necessary logistical tools [2].

The use of cameras to digitize documents is also recommended. It is mainly used for material that cannot be digitized using scanners. That is, it is used for 3D material, crumpled manuscripts, books, and photography is recommended to be done at a maximum resolution and color depth so that the digital copy is of high quality. It would be advisable to seek the assistance of an experienced photographer who has been involved in digitization projects in the past to perform the photography or to train the staff who will be undertaking the photography.

Specifically, the parameters to be considered are the following:

- Brightness: the amount of lighting available affects the clarity of the photo.
- Size: the size of the light source in relation to the object being photographed.
- Color: The color of light can improve expressiveness,

but also damage the image, reducing the importance of the subject.

- Distance: The distance between the light source and the object affects the relative intensity of the light and its incident surface.
- Direction: The direction of the light rays plays a role in capturing the object. Appropriate lighting angles, especially on objects with reliefs or carvings or engravings, highlight details that may have been lost due to incorrect lighting selection.

If color fidelity is particularly important (e.g., photography of works of art), monitoring the age of the lighting equipment, and the use of a color temperature meter are essential [5], [6].

#### V. CONCLUSION

It is characteristic that Digitization is vital and necessary nowadays for the daily transactions of the citizens. Both younger and older citizens realize the advantages of a digitized and versatile management file. It is generally accepted that document digitization offers better and faster access to information, reduces costs and reduces errors.

Also, the huge importance of digitization is that the study of the material from its digital copy prevents the deterioration and destruction of rare and original items, since during this way the utilization of primary sources is minimized.

Finally, in the case of old documents, maps and diagrams and more general items that are part of the cultural heritage, through the process of digitization, not only their deterioration in time is prevented, as mentioned above, but the documents and maps themselves they can be redesigned, captured with new data and with the help of newer information so that information can be compared with each other, while even, depending on their rarity, they can be highlighted through the internet or an exhibition. In conclusion, digitization has entered our lives permanently, is governed by interdisciplinarity because it is employed by multiple sciences (both theoretical and positive) and in our time may be a one-way street for the gathering and preservation of rare archival material.

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**George D. Malaperdas** studied Environmentalist Cartographer at the Aegean University and completed postgraduate studies at the University of Athens, Department of Geology concerning the Prevention and Management of Natural Disasters. He carried out his PhD at the University of the Peloponnese in the Department of History, Archaeology and Cultural Resource Management. He also realized a post-doctoral program at the University of the Peloponnese.

He is a member of the Laboratory of Archaeometry in Kalamata focusing on the development of new technologies (Geoinformatics, GIS – spatial analysis, topographical surveys, data bases and data entry, geostatistics, remote sensing and photogrammetry). Since 2012 he has tutored in undergraduate courses of Archaeometry, as well as the MSc in Cultural Heritage Materials and Technologies in the University of the Peloponnese (since 2015).

He has also taken part in the organization of the ‘Archaeological Research and New Technologies’ Symposia conducted by the Department of History, Archaeology and Cultural Resources Management in Kalamata every two years since 2012. In the year 2016 he was participated in the Local Organizing Committee of the International Symposium of Archaeometry (ISA), taking place in Kalamata between 15 to 21 of May, and he was also in charge of the technical support of the symposium. Between, 2013-2015 he was a member of the MOCACU (Mobile Care for the Documentation, Characterization and Conservation of Movable Cultural Heritage Artifacts from Remote Areas) research programme. MOCACU was funded by the Swiss Confederation - Federal Office of Culture FOC. He is currently a member of three running projects (a) the MY.SPE.AR. (Mycenaean Spercheios Valley Archaeo Geophysical) Project, in collaboration with Dickinson College, Aristotle University of Thessaloniki, Democritus University of Thrace, the University of The Peloponnese and under the directorship and auspices of the local Ephorate of Antiquities (b) the Kalamata '21- Roads of Freedom research project, which is funded by European Union (ESPA 2014-2020) and (c) the Upper Messenia Archaeological Project (5-years duration).

He has worked in both the private and public sectors as well as in European projects. He has participated and worked in more of 100 completed studies of the Hellenic Public Sector including major Greek development projects. Moreover, he has been involved in topographical surveys and surveys mainly in Messenia and Lesvos. He has experience in the use of topographic surveying instruments as well as in satellite, aerial imaging, and GIS systems. In relation to European projects, he has created in collaboration with the National and Kapodistrian University of Athens, the irrigation network for the whole Municipality of Filiatra area, via GIS, data bases and Remote sensing techniques, participating in the INTERREG III B. MEDOCC European Project. He has also created a digital urban development map using remote sensing and digital photogrammetry for the Hämeenlinna region in Finland.

Furthermore, he has teaching experience of more than 10 years in High and Higher Education institutions in Greece. In particular, he has taught modules such as “Geographical Information Systems”, “Spatial Analysis”, “Geographical Information System Laboratory Courses”, “Management of Natural Environment”, “Urban solid waste and Waste Management”, “Energy and Sustainable Development”, “Management of Natural Disasters – Earthquakes”, “Surveying”, “Surveying Methods Laboratory”, “Environmental Impact Study for Civil Engineers”, “Digital Applications in Archaeology” and “Field Archaeology”. Currently, he is teaching in the Department of Digital Systems in the University of The Peloponnese the courses “Machine Learning”, “Data Mining” and “Data Storage”. He is also teaching “GIS – Introduction” and “GIS – Spatial Analysis” in Cultural Heritage Materials and Technologies MSc in the University of the Peloponnese.