The Role of Digital fixation of Monuments in the Management of Museum Documentation

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In the given research, we attempted to describe our experience in the field of fixing, processing and transferring information regarding a monument by using digital technologies, to demonstrate its significance in the context of functioning of museums, their future development and safety.

Since a scanned document represents indexed and coordinated unison of points, in the essence, it embodies digital archive and its analogue can be used among the methods of maintaining museum exhibition units.

Several key components are involved in the process of scanning: a 3D laser scanner, a high resolution digital camera, a monument, a station of copying, environment, etc (Pic.1,2).

The environmental component includes conditions of temperature, shading, air freshness, and maximum visibility; a monument represents the most important object of information research; with the high resolution digital camera, the monument is fixed photo-realistically on a flat surface in a bitmap format, while with the 3D laser scanner, the information is fixed in a way of vectors in the X, Y, Z coordination space of the points determining the visual of the monument.

During the digital fixation of the monument, a station of copying represents a place, which determines the angle, informationality, and quality of copying. The more such stations, the more the information about the research object becomes.
Documental material received by the way of digital fixation of documents represents a cloud of points, which is interesting for the museum space in its own accord, since it represents descriptive information about the object (Pic. 3, 4).

This process may be represented as fragmented information, which is systematized after processing.

As a result of systemizing scanned and photographed material, it becomes possible to receive a three-dimensional model of the monument.

Throughout the time, the monument changes its appearance, due to its age, environmental conditions (such as fire, earthquake, climate changes, erosion, tornados, etc.) and human impact. Therefore, the scanned material represents a unique document, since it captures the state and appearance of a monument in a specific moment of time.

As a result of ten-year experience, we have accumulated vast informative material concerning digital fixation and processing of received information, established a system of making catalogues and searching information, which made it possible to store, systemize, fragment and identify information received by laser scanning – cloud of points, photo materials and other information related to the process (Pic. 5, 6, 7).
Scanned material covers vector and bitmap types of information which is processed by different programs (Pic. 6,7). Therefore, for such situations, it is possible to use AutoCAD working interface as a draft platform for such system, since the former provides the best access to the above-mentioned information and various types of files (Pic.8.).
It is to be noted that organizations such as ours use only the part of scanned information which concerns our research object. The remaining information, which stays out of register and can be environment-describing factors or artifacts, stays unused or is fully lost or deleted from the database.

In case of interest from the museums, stations of copying and information attached to them can be identified and handed in as a complete archive material.

Therefore, the necessity of cooperation is evident between museums and such kind of professional organizations that are linked to the collection of information concerning historical monuments and artifacts, such as – scientific-educational institutions, photo laboratories, monument protection organizations, etc. This process creates the Interactive collaboration model (Pic.9).

Pic.9. The Scheme of Possible Interactive Collaboration.

At the stage following fixation, systemized information is modeled and photo-realistic processes is modeled by special computer programs, where cloud of points is garmented with existing texture, facture and color, enables fixed information about monument to be transferred to and exhibited in the museum space (Pic.10).
At the final stage, we make a digital reflection of the model of the monument in its natural environment. This way, access to the museum space can be increased, which implies its virtual transfer in the authentic location of the monument.

The generated digital documentation can be used in various ways, including for structuring and expanding digital archive; i.e. storing of generated digital documents in possible in three positions – initial information, systematized information, reproduced photo-realistic information (Pic.11,12,13).
At the last stage the virtual model is fulfilled with the landscape and its components. Which shows the possibility of monuments virtual placement to their native location, as the pattern of mobile museum (Pic.15).


The digital documentation can be used in other directions of museum work:

- Scientific work
- Educational work
- Communication with scientific and educational systems
- Advertising, commercial work
- Monument catalogue-making and works on their improvement
- Management of restoration works
- Research-demonstration works
- Mobile museum.

Complex usage by museums of the archives of presented organizations and co-sharing strategy will take museum work on a new level of development, will increase its potential, will support expansion of museum space, as well as information exchange and collaboration, expansion of target groups, work planning and management.