

Digital Tools for the emergency rescue of cultural heritage

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Introduction

During the emergency rescue of built or movable cultural heritage in case of a disaster, a potentially large amount of information is collected. This includes basic information, specific types of documentation – both analogue as well as digital –, such as notes, sketches, photographs, video, audio, plans, geo- and 3D-information, furthermore damage and risk assessments, measures applied, relocation of objects, recommendations, etc. What is more, all this data is likely to be produced in a specific (short) time span by different people and teams, often simultaneously. To prepare and plan a rescue mission, manifold types of information are useful to have in advance, such as remote sensing and GIS data, recent photographs or videos from the affected site, information on the affected built or movable heritage, and so on.

In order to be able to handle this data, smart infrastructures are needed which not only enable a project team to organize and access the data during the emergency operation – potentially without permanent access to electricity, internet, etc. –, but also to deliver it to stakeholders such as the entity or people responsible for the affected heritage¹.

The project 'KulturGutRetter'

The German Archaeological Institute (DAI) is currently developing an emergency mechanism for cultural heritage in crisis situations called 'KulturGutRetter (KGR)', together with the Federal Agency for Technical Relief (THW), the Romano-Germanic Central Museum – Leibniz Research Institute for Archaeology (RGZM) and other partners from the Archaeological Heritage Network (ArcHerNet)². The intention behind it is for the expertise that exists in Germany to be concentrated in a team of experts that can act quickly in the event of a crisis to assist in securing, preserving and if need be salvaging objects and buildings. In order to facilitate future rescue missions and to guarantee a consistent and efficient collection of data, KGR is working on systems of data collection, evaluation and processing that can be used before, during and after a disaster.

¹ See Tandon 2018, 47. 62–63.

² <https://www.kulturgutretter.org/en/>

Digital Tools

There is no doubt that, by using digital tools for documenting, the output of information is well structured, controlled and readable independently from hand writing or paper documentation that maybe is exposed to unfavourable weather conditions. But, digital tools nowadays can be so powerful that the amount of data collected can be hard to manage.

Due to these reasons there occur special challenges in the situation of an emergency rescue mission regarding the use of digital tools. The intention is to find a workflow with that, on the one hand, can be obtained as much data and as precise data as possible, but on the other hand reduces the volume of data, time needed for collection and complexity of the tools used to a minimum in order to respond to the situation of an emergency. The tasks that should be considered among others are:

- the tools should be usable with mobile devices.
- the software should be easy to learn without the need of complex training courses.
- the level of possibilities and amount to acquire data should be flexible due to the local situation.
- the tools should work also offline.
- it should be easy to perform small adaptations in the software without having a background in IT.
- the synchronisation of data should be easy and consistent.
- different requirements of different disciplines should be recorded equally.

Since every rescue mission of cultural heritage is different, the flexibility of a system for acquiring data is very important. The situation at the site is dependent from the sort of hazard occurred (fire or flooding or earthquake etc.) and thus the infrastructure available is different as well as the kind of cultural heritage that is in place. There can be a lot of damage at immobile cultural heritage such as building structures, or the focus can be on mobile cultural heritage such as thousand of objects in a museum. Hence the digital tools in use need to cover all kinds of eventualities, and also, only the actual situation on site allows to decide, what kind of information can be gathered and what tools can be used. The options range from simple sketches and photographs up to the use of GNSS devices or UAV support, online as well as offline, with sufficient power supply or not – everything resulting in different kinds of data.

Still, there are a few basic features that should be applicable with every digital approach to rescue cultural heritage in an emergency.

A minimum standard is usually the recording of spatial data. This can be done by preparing drawings, using GPS-information or simply describing the situation enhanced by photographs. For cultural heritage that is relocated during a mission it is highly recommended to use a bar code or similar system to make the objects traceable. Software used must be able to handle these techniques.

Another import issue that has to be executed quickly and accurate is the assessment of the damage that includes also the determination of material. This information is needed as basis for further actions that need to be taken for example to secure dangerous structures. Using controlled vocabularies within a software can be an advantage.

In the case that cultural objects are moved or further processed (cleaning of mobile objects, stabilizing of immobile objects etc.) it is important that the data of the very first assessment is reliable and easy findable within the different groups that work on such a mission. That includes also the transfer of data to other software or machines that are used to restore objects on site.

Finally, also a handover to local authorities must be considered that complies with the legal requirements and for which the data is made easily available without the need for specialized software. Hence, all the data captured with different digital tools must be synchronised and sorted before.

Mobile Applications

In the project of the 'KulturGutRetter' of the DAI in cooperation with the THW and RGZM two applications for mobile devices were chosen in order to cover the requirements described above. QField will be equipped with a special data model for capturing the relevant information for the emergency scenario, and iDAI.field as a mobile version of the field research documenting system that is under development at the moment. The combination of both apps hopefully will provide the full flexibility and the quality of data needed to support the rescue of cultural heritage.

Round Table

This round table intends to discuss on how emergency rescue operations of cultural heritage can be supported/enhanced by intelligent data infrastructures and other digital tools in order to obtain data collections serviceable for the sustainable conservation of any type of cultural heritage affected by disaster. One important question will be how to integrate people on site, such as local volunteers or civil protection forces into systematic data collection on cultural heritage at risk right from the start.

References

Tandon, A. (2018). First Aid to Cultural Heritage in Times of Crisis, 1. Handbook, Rome/Amsterdam, 176 pages. Available at https://www.iccrom.org/sites/default/files/2018-10/fac_handbook_print_oct-2018_final.pdf (Accessed: 29 October 2021).