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Florian Niebling · Sander Münster ·
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Research and Education in Urban History in the Age of Digital Libraries

Second International Workshop, UHDL 2019
Dresden, Germany, October 10–11, 2019
Revised Selected Papers

Editors

Florian Niebling 
Universität Würzburg
Würzburg, Germany

Sander Münster 
Friedrich-Schiller-Universität Jena
Jena, Germany

Heike Messemer
TU Dresden
Dresden, Germany

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Preface

For art and architectural historians, historical photographs, paintings, and drawings of architecture are important sources for research. Over the last few decades, a large number of relevant documents have been digitized and made available to researchers by means of online repositories. These collections provide access to the captured data, but they also provide a greater infrastructure that allows the development of specific research efforts. Digital repositories meet a wide range of needs, from research in humanities and information technologies through museum contexts and library studies to tourist applications. The actual benefit of these applications for users highly depends on the usability, suitability, and efficiency of the technical solutions.

As investigated via a survey involving contributors to major international conference series on digital cultural heritage between 1990 and 2015, the majority of participants are humanists (Münster, 2019). Within the humanities cohort, a majority of around 90% are archaeologists, followed by art historians. With regards to methods used by participants of the survey, in particular statistical analysis, computer vision, or 3D modeling are of relevance. The data of relevance is primarily image and large scale point or polygon data as well as geo-located data and shapes (by GIS) and textual data.

Historically, digital heritage and digital humanities address different aspects of cultural heritage. While digital heritage refers to tangible and intangible cultural heritage objects and their preservation, education, and research (e.g. UNESCO, 2003), digital humanities focus on the application of digital technologies to support research in the humanities. Due to the predominance of textual content, spatial objects and images - as a common subject of both fields - are still a subordinate topic of the digital-humanities. Conversely, humanities-driven research is - compared to the recording, conservation, and exhibition of cultural heritage - a small field in digital cultural heritage. Besides the aspect of general relevance, there are many commonalities in this central area. Both fields share concepts such as the idea of spatialization, extensive information about an object as a basis for research, and a strong connection to the creation and perception of visualization and imagery. Technology and data are also important drivers, although whether the research is primarily data-driven or data-led remains an open question.

In this changing context, the question arises as to how research and education of urban history can be supported by digital libraries. The primary objective of the joint Time Machine Conference and CIPA Workshop on Research and Education in Urban History in the Age of Digital Libraries, held in October 2019 in Dresden, Germany, was to concentrate on the area of tension between the fields of culture, technologies, and education. This book presents major findings and aims to highlight crucial challenges for further research and to encourage debate between the sciences. We showcase contributions on theoretical and methodological issues, application scenarios, and projects, as well as novel approaches and tools. The 41 submissions to the joint event were reviewed by a joint Program Committee in a double-blind reviewing process.

After the conference, 11 papers were invited for this revised and selected papers volume. These cover the following four research areas:

1. **Theory, Methods, and Systematization**

Digital humanities research as an inherently interdisciplinary field has created a high demand for critically reflected methods, techniques, valid strategies, classifications, and quality standards. But do computing methods also lead to new and ground-breaking research questions, approaches, or insights into architectural and urban cultural heritage research? In most cases, the use of computing simply extends nondigital possibilities, without much change to the pre-digital approaches and research questions. Nevertheless, digitalization has dramatically altered research qualities, quantities, and workflows. Against this background, this section includes three articles about methodologies, practices, and standards for utilizing digital technologies for cultural heritage research.

2. **Visualization and Presentation**

Historians in cultural heritage research today are enabled to explore new research directions due to the availability of multitudes of digitized historical photographs in image repositories. Moreover, novel approaches such as the photogrammetric reconstruction of historical buildings from image databases allow for contextualization and intuitive access to data. Typical motivations for accessing these archives and repositories are scientific research, pedagogical applications, and the study of historical sites. These areas require advances in methods for visualization and presentation of data to support the different target groups. This section includes five articles focusing on technical workflows, methods, and tools to support research in the field of urban history.

3. **Machine Learning and Artificial Intelligence**

During the past few years, various new technological opportunities have arisen from big data, Semantic Web technologies, and the exponential growth in data accessible via digital libraries such as EUROPEANA. Data-driven supervised and unsupervised classification approaches have been used to acquire high-level semantic concepts, especially from the interconnection of different types of data. Interdisciplinary collaborations between computer science and humanities disciplines are essential in developing methods and workflows to enable cultural heritage research to exploit machine learning approaches. Two articles are included in this section, exhibiting use cases and best practices of applied machine learning in digital humanities research.

4. **Policies, Legislation, and Standards**

Academic culture, institutionalization of research, and the regulation and management of heritage are approached by international research and infrastructure projects involving key actors and stakeholders in this area. Research infrastructures aim at offering access to a wide range of high-level scientific instruments, methodologies, data, and tools for advancing knowledge and innovation in cultural heritage. Besides the further development of technical infrastructures like research environments and digital repositories, human resources, transnational knowledge exchange and cooperation, social and economic impacts, valorization and dissemination are

increasingly important objects of funding. This last chapter is dedicated to gaining an insight into the implications of international policies for establishing and developing an academic culture, and also to highlighting the challenges and perspectives of cultural heritage on a global level.

We would like to acknowledge the important work done by the chapter reviewers. We also thank the sponsors, Program Committee members, supporting organizations, and volunteers for making the joint event held in Dresden in October 2019 a success. Without their efforts, the event would not have been possible.

July 2021

Florian Niebling
Sander Münster
Heike Messemer

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Florian Niebling
Sander Münster
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