

Preface

In recent years new techniques have been proposed for the representation and manipulation of spatio-temporal data that can be usefully applied also in the managing of archaeological data and more in general of cultural heritage information. Indeed, space and time are two crucial dimensions for supporting the interpretation process in the archaeological domain and constitute the backbone of any analysis of artefacts or constructions belonging to the cultural heritage of any village, town or country. Among the others (including ontologies, graph databases, RDF, spatio-temporal relations, evolution modes, virtual reality, etc.) two new research directions are nowadays emerging in the context of the geospatial information science: (i) the approach based on the Building Information Model (or BIM) that aims to describe any construction during its entire life cycle and (ii) the machine learning techniques that allow one to extract and recognize pieces of information from huge image datasets.

Several attempts have been recently performed in order to develop solutions that, exploiting the above listed innovative ideas, aim to support:

- the effective representation of spatio-temporal data collections for enhancing integration, usability and interoperability;
- the processing of raw data in order to identify artefacts and define their allocation in space and time taking into consideration also their uncertainty;
- the reconstruction of ancient structures (buildings, walls, castle, etc.) and the representation of their temporal evolution also in case of completely destroyed buildings;
- the integrated access and querying of the collected data, which are represented in different models and formats.

The main motivation for this workshop stems from the increasing need for bringing together researchers with a computer science background with geographical information scientists to share their research results and find effective solutions for user needs in archaeology and cultural heritage applications.

The workshop proceedings contain three sections. The first section includes the invited keynote papers: (i) *Smart heritage: challenges in digitisation and spatial information modelling of historical buildings*, by Kourosh Khoshelham (University of Melbourne) and (ii) *Mixed Reality for Archeological Data*, by Paolo Fogliaroni (Vienna University of Technology). The second one concerns the *knowledge discovery* topic and is covered by two papers: (i) *Deep learning for archaeological object detection in airborne laser scanning data*, by Bashir Kazimi et al., and (ii) *Spatio-temporal reasoning in CIDOC CRM: an hybrid ontology with GeoSPARQL and OWL-Time*, by Gilles-Antoine Nys et al. Finally, the third section deals with the *knowledge representation* topic and contains the last two papers: (ii) *Enhancing CIDOC-CRM models for GeoSPARQL processing with MapReduce*, by Sara Migliorini, and (iv) *States of knowledge: a basis for a spatiotemporal model of cultural heritage information*, by Pierre Hallot et al.

We would like to thank the authors of all submitted papers. Their innovation and creativity resulted in an interesting technical program. We are highly indebted to the program committee members, whose reviewing efforts ensured in selecting a competitive set of papers. Finally, we would like to express our sincere gratitude to the invited speakers.

August, 28th 2018

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Contents

Smart Heritage: Challenges in Digitisation and Spatial Information Modelling of Historical Buildings <i>Kourosh Khoshelham</i>	7
Mixed Reality for Archeology and Cultural Heritage <i>Paolo Fogliaroni</i>	13
Deep Learning for Archaeological Object Detection in Airborne Laser Scanning Data <i>Bashir Kazimi and Frank Thiemann and Katharina Malek and Monika Sester and Kourosh Khoshelham</i>	21
Spatio-Temporal Reasoning in CIDOC CRM: An Hybrid Ontology with GeoSPARQL and OWL-Time <i>Gilles-Antoine Nys and Muriel Van Ruymbeke and Roland Billen</i>	37
Enhancing CIDOC-CRM Models for GeoSPARQL Processing with MapReduce <i>Sara Migliorini</i>	51
States of knowledge: a basis for a spatio-temporal model of cultural heritage information <i>Pierre Hallot and Roland Billen</i>	67

