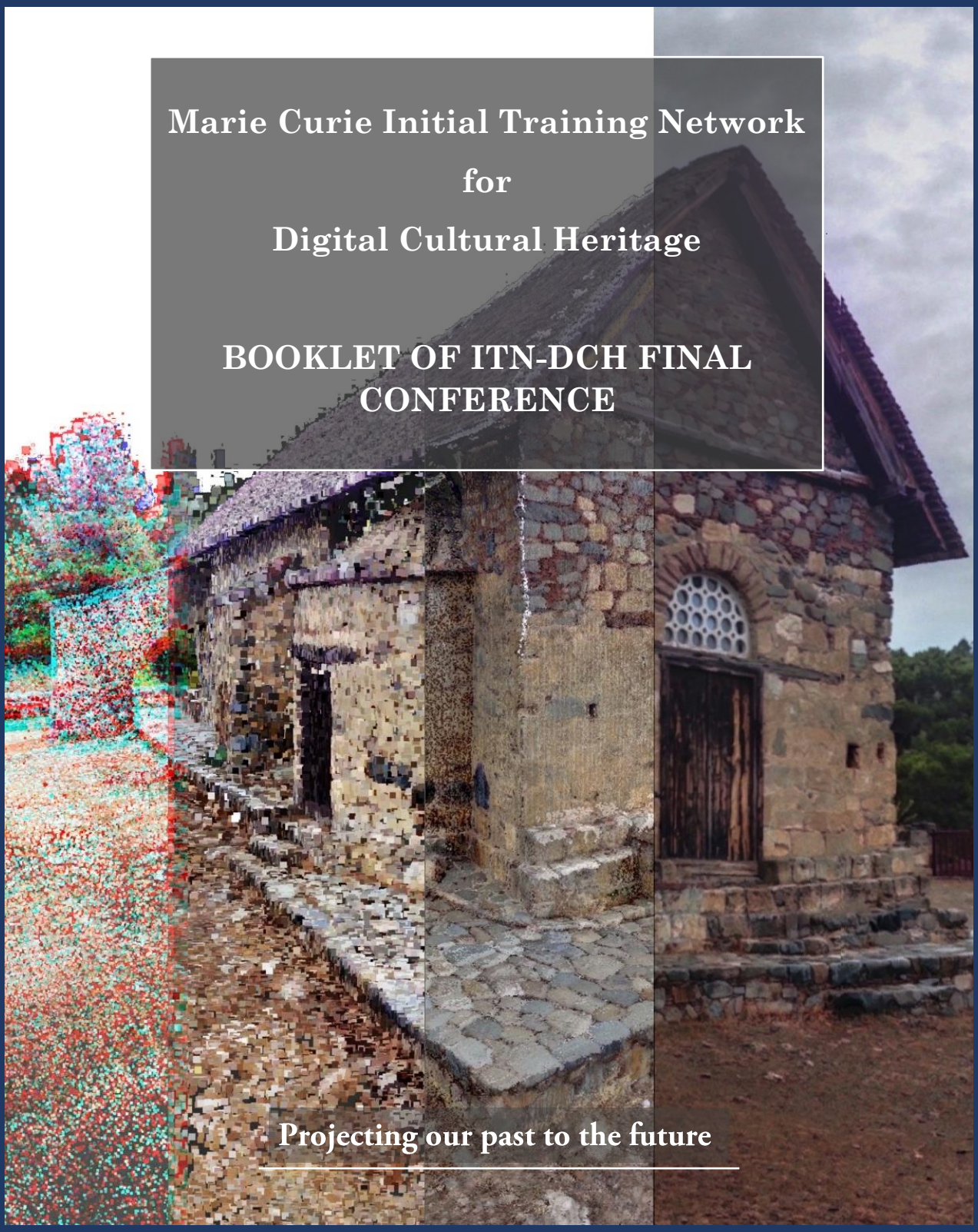
Marie Curie Initial Training Network

for

Digital Cultural Heritage

BOOKLET OF ITN-DCH FINAL CONFERENCE



Projecting our past to the future

This project has received funding from the European Union's Seventh Framework program for research, technological development and demonstration under grant agreement no 608013.

ITN-DCH: THE PROJECT

The "**I**nitial **T**raining **N**etwork for **D**igital **C**ultural **H**eritage: Projecting our Past to the Future" with acronym **ITN-DCH**, is the first and one of the largest Marie Curie fellowship projects in the area of the e-documentation / e-preservation and CH protection funded by the European Union under the FP7 PEOPLE research framework. The Project started on the 1st of October 2013 and its consortium comprises of 14 full partners and 10 associate members covering the entire spectrum of European CH actors, ranging from academia, research institutions, industry, museums, archives and libraries. The project aims to train 20 fellows (16 ESR's and 4 ER's – 500 person months) in the area of CH digital documentation, preservation and protection in order to create them a strong academic profile and market oriented skills which will significantly contribute to their career prospects. The consortium and the fellows training programme is supported by a prestigious advisory board.

ITN-DCH aims -for the first time worldwide- to analyze, design, research, develop and validate an innovative multi-disciplinary and inter-sectorial research training framework that covers the entire lifecycle of digital CH research for a cost–effective preservation, documentation, protection and presentation of cultural heritage. CH is an integral element of Europe and vital for the creation of a common European identity and one of the greatest assets for steering Europe's social, economic development and job creation. However, the current research training activities in CH are fragmented and mostly design to be of a single-discipline, failing to cover the whole lifecycle of Digital Cultural Heritage (DCH) research, which is by nature a multi-disciplinary and inter-sectorial research agenda.

ITN-DCH targets all aspects of CH ranging from tangible (books, newspapers, images, drawings, manuscripts, uniforms, maps, artefacts, archaeological sites, monuments) to intangible content (e.g., music, performing arts, folklore, theatrical performances) and their inter-relationships. The project aims HTML Source Editor to boost the added value of CH assets by re-using them in real application environments (protection of CH, education, tourism industry, advertising, fashion, films, music, publishing, video games and TV) through research on (i) new personalized, interactive, mixed and augmented reality enabled e-services, (ii) new recommendations in data acquisition, (iii) new forms of representations (3D/4D) of both tangible /intangible assets and (iv) interoperable metadata forms that allow easy data exchange and archiving.

The duration of the project is 4 years and is coordinated by the Digital Heritage Research Lab of the Cyprus University of Technology.

ITN-DCH: THE FINAL CONFERENCE

ITN-DCH Final Conference will be held on 23rd – 25th May 2017 at Olimje, Slovenia and is an international event for the professionals of multiple disciplines and scholars working in the Digital Cultural Heritage domain. The aim of the conference is to bring together experts, stakeholders and researchers from the cultural domain and, addressing the current challenges, start a dialogue that will lay the foundation for the creation of a multidisciplinary community of practice.

Digital Cultural Heritage is a complex domain that requires new requires new skills, advanced techniques and constantly upgrading know-how; for the fulfillment of which a multilevel training and an interdisciplinary collaboration among experts is necessary in order for common methodologies and best practices for the profound understanding of our past to be established. It is important to create a forum of discussion where diverse leading academic scientists, researchers, practitioners and educators are brought together to exchange and share their experience, as well as confront each other on the challenges and advancements in each of their domain. The scope of the conference is, therefore, to:

1. Encourage interdisciplinary and innovative analysis in the cultural domain
2. Promote synergies and knowledge exchange between the participants
3. Develop multidisciplinary connections for future development
4. Disseminate the results of innovative research
5. Publish the results of applied work as well as innovative concepts that would help shape our current understanding of cultural heritage

AGENDA OF ITN-DCH FINAL CONFERENCE

ITN-DCH Final Conference on Digital Heritage Agenda - www.digitalheritage2017.eu					
TIME	**23-May**	**TIME**	**24-May**	**TIME**	**25-May**
8:00	Registrations	8:00	Registrations	8:30	Registrations
	Poster Exhibition		**Poster Exhibition**		**Poster Exhibition**
8:30-9:00	Opening Ceremony	8:30-9:30	**Keynote Speaker:** **Prof. Alex Yen** Asian-European Digital Cultural Heritage Network	9:00-11:00	**Session V: Visualisation, VR, AR and Serious Games**
		9:30-10:30	**Keynote Speaker:** **Dr. Pavlos Chatzigrigoriou** Digital Heritage for Creative and Sustainable Communities		
9:00-10:00	**Keynote Speaker:** **Eleanor E. Fink** From Virtual Databases to LOD Clouds: The Quest for Universal Access to DCH	10:30-11:00	**Session II: 3D Modelling and Reconstruction in CH**		
		11:00-11:30	COFFEE BREAK	11:00-11:30	COFFEE BREAK
10:00-11:00	**Session I: Digital Data Acquisition in CH, Processing and Archiving of Data**	11:30-13:00	**Session II: 3D Modelling and Reconstruction in CH**	11:30-13:00	**Session V: Visualisation, VR, AR and Serious Games**
11:00-11:30	COFFEE BREAK				
11:30-13:00	**Session I: Digital Data Acquisition in CH, Processing and Archiving of Data**				
13:00-14:00	LUNCH	13:00-14:00	LUNCH	13:00-14:00	LUNCH
14:00-15:30	Workshop - Workflow for the Integration of Heritage Digital Resources	14:00-16:00	**Session III: Ontologies and Metadata in Digital CH**	14:00-19:30	**Conference Excursion**
15:30-16:00	COFFEE BREAK	16:00-16:30	COFFEE BREAK		
16:00-18:30	Workshop - Workflow for the Integration of Heritage Digital Resources	16:30-18:15	**Session IV: Reuse and Assessment of Digital Cultural Heritage Data**		
19:30	FREE	19:30	SOCIAL DINNER	19:30	FREE

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CONFERENCE VENUE: THE HOTEL

The ITN-DCH Final Conference on Digital Heritage will be held at the premises of the Wellness Hotel Sotelia, located at the beautiful and picturesque village in eastern Slovenia.

The specialty of the Wellness Hotel Sotelia lies in close connectedness to nature. Moreover, its position, diverse structure, green roofs, and large light areas create the feeling of harmonious connectedness with the surrounding nature.

Figure 1: Wellness Hotel Sotelia. Source: Hotel Sotelia website

Contact details

Zdraviliška Cesta 24, 3254 Podčetrtek, Slovenia

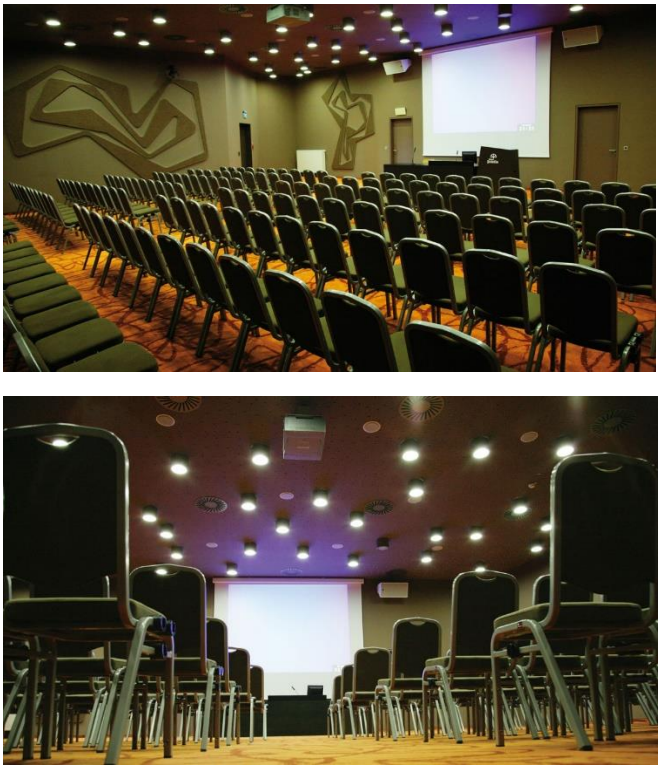
Show Google map

+386 3 829 78 36

info@terme-olimia.com

CONFERENCE VENUE: CONGRESS HALLS

The available halls of the Wellness Hotel Sotelia, where the conference will be held in one of them are being shown below:



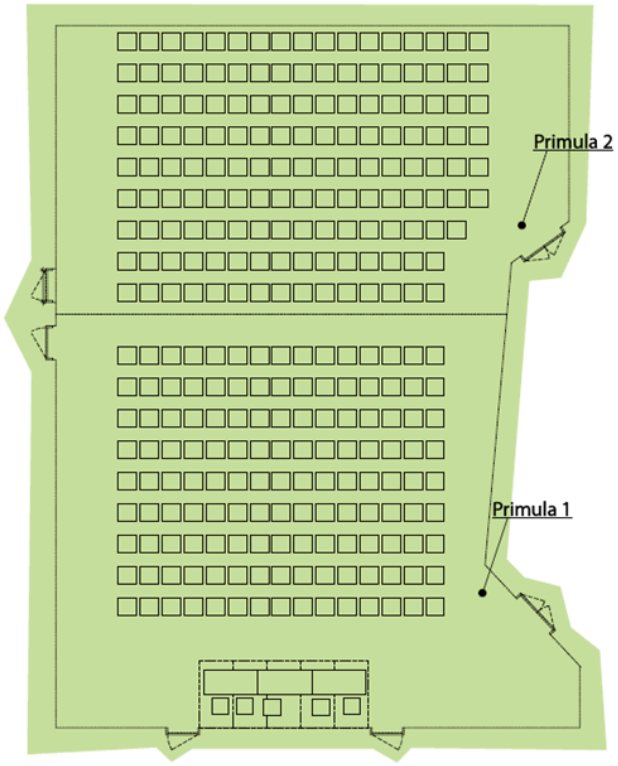


Figure 2. Primula 1 & Primula 2 rooms (left); Layout of the rooms (right). Source: Hotel Sotelia website

Both rooms are soundproofed and provide all the necessary latest technological equipment required to organize a conference

CONFERENCE VENUE: TRANSPORTATION

Participants may reach the venue using one of the transportation methods listed below:

From Ljubljana

FROM LJUBLJANA AIRPORT (LJU) TO LJUBLJANA BUS STATION (LOCATED NEXT TO TRAIN STATION):

- **Bus** 
  Public bus service no.28 operates to and from Ljubljana bus station and runs about every hour. The journey takes 45 minutes, the cost is around 4 Euros and you buy your tickets directly from the driver. There is also a private shuttle service running less frequently but it's a bit faster. The bus station in Ljubljana is small and situated immediately in front of the railway station.

  Departures from Ljubljana airport to Ljubljana
  From **Monday to Friday**:
  5.00, 6.05, 7.00, 8.00, 9.00, 10.00, 11.00, 12.00, 13.00, 14.00, 15.00, 16.00, 17.00, 18.00, 19.00, 20.00.
  Saturdays, Sundays and holidays:
  7.00, 10.00, 12.00, 14.00, 16.00, 18.00, 20.00.

- **Taxi** 
  Should you get a taxi from the taxi rank in front of the airport it will cost about 35 euros.

FROM LJUBLJANA BUS STATION TO HOTEL SOTELIA (PODČETRTEK TOPLICE):

- **Train** 
  You may book your train transportation through the website of Slovenian Railways:
  http://www.slo-zeleznice.si/en/

FROM LJUBLJANA AIRPORT (LJU) TO HOTEL SOTELIA:

- **Shuttle Buses** 
  You may book your private transportation through the website of GoOpti:
  https://www.goopti.com/en/

- **Hotel Sotelia Airport Transfer** 
  The hotel offers airport transfer services from/to Ljubljana airport. For further details on pick-ups and charges you may contact directly the hotel by calling +386 3 829 78 36 and/or by sending an email at info@terme-olimia.com

From Zagreb

FROM ZAGREB TO HOTEL SOTELIA:

- **Bus and Taxi** 
  You may take a regional bus to take you to Desinić for about 47km and an estimate cost of 5-7€. For more information about schedules please click on Presecki Grupa's website: http://www.presecki.hr/promet/hr/prijevoz/
  Then you may hire a taxi to take to Podčetrtek for about 11km which will cost you approx. 10€-13€.

FROM ZAGREB AIRPORT (ZAG) TO HOTEL SOTELIA:

- **Shuttle Buses** 
  You may book your private transportation through the website of GoOpti: https://www.goopti.com/en/
- **Hotel Sotelia Airport Transfer** 
  The hotel offers airport transfer services from/to Ljubljana airport. For further details on pick-ups and charges you may contact directly the hotel by calling +386 3 829 78 36 and/or by sending an email at info@terme-olimia.com

COMMITTEE

Conference Chairs
Ioannides, Marinos

Paper Review Chair
Carboni, Nicola

Local Organizing Committee
Bellido Castañeda, Diego

Carboni, Nicola

Chatzigrigoriou, Pavlos

Domajnko, Matevž

Kržan, Meta

Leventis, Georgios

Nikolakopoulou, Vasiliki

Papaeftymiou, Margarita

Žarnić, Roko

International Scientific Committee
Bellido Castañeda, Diego

Carboni, Nicola

Chatzigrigoriou, Pavlos

Domajnko, Matevž

Leventis, Georgios

Nikolakopoulou, Vasiliki

Papaefthymiou, Margarita

KEYNOTE SPEAKERS

Eleanor E. Fink

Eleanor E. Fink has held senior positions at the Smithsonian, J. Paul Getty Trust, and World Bank. She is one of the founding directors of the Getty Center in Los Angeles where she initially formed and headed the Getty Vocabulary Program and later became director of the Getty Information Institute (GII). As director, she oversaw the Getty's flagship scholarly art history research databases including the *Census of Antique Art and Architecture Known to the Renaissance*; *the Bibliography of the History of Art*; and the *Provenance Index*. She positioned GII around the concept of universal access to art information and promoted national and international collaboration among institutions. The National Initiative for a Networked Cultural Heritage (NINCH), Getty Vocabularies, Categories for the Description of Works of Art (CDWA), and Object ID are some of the products of her leadership. At the World Bank, she initially served as Senior Cultural Heritage Specialist to the President and then as point person for the Bank's relationships with private foundations. During her tenure at the Smithsonian American Art Museum, she was Chief of the Office of Research Support. She managed several national art research database projects that were created to help the scholarly and museum community better understand the history and significance of American art. Most recently, she initiated and manages the American Art Collaborative Linked Open Data project (AAC) that brings together 14 U.S. museums interested in erasing data silos to provide seamless access on the subject of American art across museum collections. Eleanor serves on several advisory committees including the Department of Art and Archaeology at Princeton University, the EU ViMM project, and Marie Curie Research Program on Digital Cultural Heritage (ITN-DCH). She is a former director of the Museum Computer Network and a former President of the Visual Resources Association.

Presentation title: From Virtual Databases to LOD Clouds: The Quest for Universal Access to DCH

Abstract:
Since the dawn of antiquity, the world's cultures have collected their artifacts and produced written records to shed light on the connections that give meaning and bind civilizations together. These artifacts are sign posts for understanding the story of mankind: where civilization originated, what civilization achieved and what it can teach us. Unfortunately, the written records or documents about artifacts are recorded in a variety of formats thus challenging our ability to make connections and understand and translate their meaning. In the age of information and communications technology the need to establish standards and use common formats to allow data to be interchanged and more easily accessed has created additional challenges. In a networked society information that deviates from the norm can easily become lost information. Also while most museums in Europe and the western world have created websites enabling the public to learn about their institutions, browse a sampling of their collections, and read about their educational programs, there is as yet no way to search across all museum websites at once in order to learn and gain a fuller understanding of the work of particular artists, the scope of a particular style or historic period. In essence we are in an age of data silos. You have to know where to begin looking or which institution has works by a specific artist or school in order to begin a search.

Fortunately, as the cultural heritage community becomes more knowledgeable about the need for standards and as technology advances we see new opportunities to simplify access and interconnect the rich data that carries information about civilization: This presentation traces the development of some of the key Metadata and Vocabulary standards in use and how Linked Open Data provides us with the ability to create virtual databases instead of data silos.

Alex Ya-ning Yen

Alex Ya-Ning Yen is Associate Professor, Department of Architecture and the Director, Center for Cultural Sites Rehabilitation and Development, China University of Technology, Taipei. He holds a Ph.D. in Architectural History and Theory, Southeast University, China, 1997 and a M.A. in Architecture, National Cheng Kung University, Taiwan. His research specialties cover the history of architecture and urban environments, cultural heritage conservation and architectural design. Professor Yen chaired the 25th International Symposium of the International Committee for Documentation of Cultural Heritage (CIPA) in 2015 and is an associate member of the Executive Board. He is Director of both the Architectural Institute of Taiwan and the Association for the Conservation of Cultural Property of the Republic of China.

Presentation title: Asian-European Digital Cultural Heritage Network

Abstract:
The 21st century is a digital era in which every field of human life has connected closely with digital technology, tools, platforms and big data. In view of the great maturity achieved made in digitalization, the preparation for cultural heritage preservation has become an important task comprising the integration of research results and a thorough discussion about the standard exchange format for various data. The Bureau of Cultural Heritage, Ministry of Culture, R. O. China (BOCH) established an integrative mechanism and network: the “College of Cultural Heritage” (CH College) for the research, education and implementation of conservation in 2014. There are 3 faculties: research, education and industry in this college and 28 universities have participated in 118 different projects. Digital techniques play an important role among these various projects, which include data acquisition, underwater imaging, motion capture, AR, VR, BIM and 3D reconstruction etc. and cover both the tangible and intangible fields. Some important outcomes were integrated into the education faculty. The CH College mechanism is a new idea which can link the potential research energy in universities with the on-site requirements. The partnership between the GOV and EDU sectors provides a long-term cooperation platform to make their contribution for the conservation of Cultural Heritage. This requires not only joint efforts from the government, research institutes and academia but a mutual cooperation between different disciplines. On this basis Taiwan, possessing excellent technology, experience and geographic location, is able to bring together Asia and Europe to integrate research results in all respects, to discussing thoroughly the standard exchange format for various data and to share experiences with other Asian countries.

Dr. Pavlos Chatzigrigoriou

Pavlos is a Civil Engineer with MSc in Architecture (Conservation and Restoration) and a second MSc in Environmental City Planning. He moved and worked as an Engineer in Municipality of Hermoupolis because of its rich cultural heritage, in the age of 30. Almost immediately he started as a side project the documentation of the Historic Buildings of Hermoupolis. Soon National Technical University of Athens got interested in this idea of digital documentation and research on an optimum conservation plan. The project became a PhD and in 2012 he successfully defended his Thesis with a grade 10/10. The project was named HERMES, (HERitage Management e System). In 2013, the first presentation of HERMeS in Marseille – France won the "Best Paper Award" in a milestone international event, the DIGITAL HERITAGE Conference with 450 participants. After that, he decided to upgrade HERMeS using open source platform. His effort leaded him in 2015 to the prestigious Cultural Heritage European Union prize "The Europa Nostra Award," among 269 proposals. At the same year, he represented Greece in Luxemburg at the 8th Public Administration Best Practises Conference. In 2016, he was an invited speaker by European Commission to "Culture Forum", a major event for culture with 980 participants. He was an invited speaker -and a winner of the "Best in Heritage" award- in September 2016 in Dubrovnic Croatia, where 44 awarded speakers from all over the world are presenting their ideas on protecting cultural heritage. In 2016, he was a Marie Curie post-doc fellow in Cyprus University of Technology working in the renowned Digital Heritage Research Lab. Today, his research effort focuses on creative reusing of Digital Cultural Heritage for education and the possibilities of connecting tangible and intangible Cultural Heritage with digital tools. He is one of the five members of European Union's Cultural Heritage Prize on category "Education, Training and Raising Awareness". He is president of the board in the non-profit NGO "Heritage Management e-Society".

Presentation Title: Digital Heritage for Creative and Sustainable Communities

SESSIONS

Tuesday 23/5

- 08:30-10:00 **Opening Ceremony**
  Keynote speaker: Eleanor E. Fink
  Presentation title: From Virtual Databases to LOD Clouds: The Quest for Universal Access to DCH
- 10:00-11:00 **I. Digital Data Acquisition in CH, Processing and Archiving of Data**
  Chairs: Matevž Domajnko, Diego Bellido Castañeda
- 11:00-11:30 Coffee Break
- 11:30-13:00 **I. Digital Data Acquisition in CH, Processing and Archiving of Data**
  Chairs: Matevž Domajnko, Diego Bellido Castañeda
- 13:00-14:00 Lunch
- 14:00-15:30 **Workshop - Workflow for the Integration of Heritage Digital Resources**
  Chairs: Nicola Carboni, George Bruseker
- 15:30-16:00 Coffee Break
- 16:00-18:30 **Workshop - Workflow for the Integration of Heritage Digital Resources**
  Chairs: Nicola Carboni, George Bruseker
- 19:30 Free

Wednesday 24/5

- 08:30-09:30 **Keynote Speaker:** Prof. Alex Yen
  Presentation title: Asian-European Digital Cultural Heritage Network
- 09:30-10:30 **Keynote Speaker:** Dr. Pavlos Chatzigrigoriou
  Presentation title: Digital Heritage for Creative and Sustainable Communities
- 10:30-11:00 **II. 3D Modelling and Reconstruction in Cultural Heritage**
  Chairs: Roko Žarnić, Meta Kržan
- 11:00-11:30 Coffee Break
- 11:30-13:00 **II. 3D Modelling and Reconstruction in Cultural Heritage**
  Chairs: Roko Žarnić, Meta Kržan
- 13:00-14:00 Lunch
- 14:00-16:00 **III. Ontologies and Metadata in Digital Cultural Heritage**
  Chairs: Nicola Carboni, Vasiliki Nikolakopoulou
- 16:00-16:30 Coffee Break
- 16:30-18:15 **IV. Reuse and Assessment of Digital Cultural Heritage Data**
  Chairs: Marinos Ioannides, Pavlos Chatzigrigoriou, Georgios Leventis
- 19:30 Social Dinner

Thursday 25/5

- 09:00-11:00 **V. Visualisation, VR, AR and Serious Games**
  Chairs: Margarita Papaefthymiou, Vasiliki Nikolakopoulou, Georgios Leventis
- 11:00-11:30 Coffee Break
- 11:30-13:00 **V. Visualisation, VR, AR and Serious Games**
  Chairs: Margarita Papaefthymiou, Vasiliki Nikolakopoulou, Georgios Leventis
- 13:00-14:00 Lunch
- 14:00-18:45 **Conference Excursion**
- 19:30 Free

WORKSHOP: WORKFLOW FOR THE INTEGRATION OF HERITAGE DIGITAL RESOURCES

Tuesday 23rd May 2017 | 14:00-18:30

Chairs

Nicola Carboni, CNRS MAP, Marseille France (ITN-DCH ESR Fellow)
George Bruseker, ICS-FORTH, Heraklion Greece (ITN-DCH ER Former Fellow)

Description

The aim of the workshop is to introduce the participants to the concept of linked data and to a selection of data curation tools that can be used for re-using and integrating data from across data silos (including examples from tangible and intangible heritage), including a demonstration of how to semantically map them. The tutorial will make use of open source tools and existing standard resources from the cultural heritage domain in order to demonstrate this process. Emphasis will be laid on the transformation of existing resources (CSV, XML etc.) into RDF, through the use of data transformation mapping tools. The workshop will last a half day and it will promote a hands-on knowledge of several important tools that are daily used by professionals in the field. Participants will finish the workshop with a greater familiarity with both the overall workflow and strategy for creating linked data but also a basic hands-on knowledge of a number of different software and data tools that would allow them to create and manipulate their own linked data by taking advantage of existing resources in the different communities (CH, public administration, GIS, etc.). They will also have been introduced to the role of Ontologies in integrating data and how to use a mapping tool to harmonize data at the schema level to a formal ontology standard.

Topics

The workshop focuses on the following topics and related subjects:

Data Cleaning:
Merging/splitting, Clustering, GREL, Cell Crossing

Data Enrichment (Reconciliation & API):
Wikidata, Geonames, VIAF & ORCID, Getty AAT, Europeana

Data Transformation:
Formal Ontology / CIDOC CRM, Data Mapping Strategies, Creating Schema to Schema Maps, Creating URI Generator Policies, RDFification

Additional Information

Additional information about the workshop can be found under the workshop's tab at the webpage of ITN-DCH Final Conference: http://digitalheritage2017.eu/workshop/index.html.

PAPER SESSIONS

Tuesday 23rd May 2017

TIME	23-May
8:00	Registrations
	Poster Exhibition
8:30-9:00	Opening Ceremony
9:00-10:00	**Keynote Speaker:** **Eleanor E. Fink** From Virtual Databases to LOD Clouds: The Quest for Universal Access to DCH
10:00-11:00	**Session I: Digital Data Acquisition in CH, Processing and Archiving of Data**
11:00-11:30	COFFEE BREAK
11:30-13:00	**Session I: Digital Data Acquisition in CH, Processing and Archiving of Data**
13:00-14:00	LUNCH
14:00-15:30	Workshop - Workflow for the Integration of Heritage Digital Resources
15:30-16:00	COFFEE BREAK
16:00-18:30	Workshop - Workflow for the Integration of Heritage Digital Resources
19:30	FREE

Tuesday 23rd May 2017 | 10:00-11:00, 11:30-13:00

I. Digital Data Acquisition in Cultural Heritage, Processing and Archiving of Data

3D Data Acquisition and Modelling of Complex Heritage Buildings

Federica Maietti et al.

Abstract:
The ongoing EU funded project INCEPTION – Inclusive Cultural Heritage in Europe through 3D semantic modelling proposes a workflow aimed at the achievements of efficient 3D digitization methods, post-processing tools for an enriched semantic modelling, web-based solutions and applications to ensure a wide access to experts and non-experts. Nevertheless, the generation of high quality 3D models can be still very time-consuming and expensive, and the outcome of digital reconstructions is frequently provided in formats that are not interoperable, and therefore cannot be easily accessed. This challenge is even more crucial for complex architectures and large heritage sites, which involve a large amount of data to be acquired, managed and enriched by metadata. In order to face these challenges and to start solving the issue of the large amount of captured data and time-consuming processes in the production of 3D digital models, an Optimized Data Acquisition Protocol (DAP) has been set up. The purpose is to guide the processes of digitization of cultural heritage, respecting needs, requirements and specificities of cultural assets. Since every cultural asset is unique and requires survey, analysis and investigations "case by case", according to many different characteristics and to the main purposes of survey and documentation procedures, the protocol is set as flexible guidelines considering different kind of instruments and devices, different accuracies and levels of detail, etc., in addition to site specifications and the uniqueness of Cultural Heritage. The DAP is also referred to data management (scan registration, data verification) data storage and archive. It is both a methodological procedure and an optimized workflow specification. The INCEPTION project has been applied under the Work Programme Europe in a changing world – inclusive, innovative and reflective Societies (Call - Reflective Societies: Cultural Heritage and European Identities, Reflective-7-2014, Advanced 3D modelling for accessing and understanding European cultural assets). This research project has received funding from the European Union's H2020 Framework Programme for research and innovation under Grant agreement no 665220.

Curious Travelers – Image Matching and 3D Visualisation of Heritage at Risk

Andrew Wilson et al.

Abstract:
Curious Travelers, seeks out real-life curious travelers around the world who have visited heritage sites that are now at risk or have been damaged. The project harnesses digital documentation methods and crowd sourcing to better serve the conservation and management of globally important heritage. The project is designed to provide rapid and substantive output that will be of immediate value. The project was initially devised to provide support to and highlight threatened or damaged sites in the Middle East and North Africa, although it is open to threatened heritage sites around the world. The project combines publicly donated images, together with other online resources to recreate 3D models of monuments and ancient sites using structure-from-motion. All reconstructed content will be placed in context using

relevant site and landscape data. The long-term legacy of this project is the establishment of a framework that can be used anywhere in the world to help preserve vital information about historic sites. By integrating 3D heritage models into a spatial framework developed as a historic environment record tool we are providing the infrastructure for antiquities departments, museums and local authorities to be able to catalogue and manage heritage assets into the future. This project uses state-of-the-art Big Data methodologies to mine the web and social media for images and text, alongside opportunities for the public to engage with the project through crowd-sourcing activities.

Comparison and Methodological Hybridization Between Photogrammetry and Scanner Survey

Guido Guarato, Alessandro Zobbio

Abstract:
In the archaeological field of so-called "mobile finds" one of the most concrete objectives to which it is sought is to standardize and frame the data in recognizable sequences, which can be traced back to certain areas of production and referable to specific physical characters. Today's comparison is perhaps the main tool to achieve this goal: ever more accurate data acquisition methodologies and ever-evolving instrumentation make possible have more and more specific reference curves. In order for these to be properly interpretable and reliable, not only at the local level, it is very important to compare not only the data already filtered but the acquisition methodology of the same. In this sense, the work we present is structured on two parallel tracks that refer to a single class of materials to which a different surface relief and scanning system is applied which aims to demonstrate how complementary projects, by comparison, could be achieve effective framing and a much more complete result both from the methodological and technical and from the scientific point of view, without any particular dispersion of time, energy and resources. Going through methodological reflection paths, the underlying idea of our research takes shape in a material realization that does not want to miss the "practical" applications ever. In this sense, the importance of empiricism and experimental verification emerges, and once identified and structured in terms of criteria, objectives and constraints, the main elements of the analysis, we can consider formalizing expectations, alternatives available and not just desirable.

Holistic e-Documentation: An Innovative Approach for Cultural Heritage

Marinos Ioannides et al.

Abstract:
Proper documentation of Cultural Heritage facilitates the revelation of the “story” that lies behind the monument, while its proper digital documentation is inherently dependent on the evolution of the Information, Communication and Technology. This paper investigates the definition, the analysis and the final decision on how an effective and cross-disciplinary work methodology could be implemented to define data collection process, case study setup, selection and utilization of systems and instruments, knowledge management, implementation of semantically enriched models, and exploitation in various sectors. Holistic approach ensures that the tangible along with the intangible part of the monuments and archaeological sites remain inextricably linked together. In this context, the involved research team(s) through their technical knowledge and experiences provide an update while they approach the monument holistically giving added value to the procedure of e-documentation. However, before

proceeding further with the digital documentation of the cultural asset, its proper classification is needed based on various criteria that characterize its structure, acting as a reference point for the holistic approach. The classification of the cultural asset is completed by the analysis of the stakeholders and policy makers as they are the main legislators and all the decisions along with respective actions that will be taken upon a monument should match accordingly their set guidelines. Considering the burdened structural integrity of the monuments and archaeological sites as well as the risks that threaten it even more daily, the effective application of diligent preservation methods needs to be ensured through this procedure.

Integrated SfM Techniques Using Photo Data Set from Google Earth 3D Model and From Ground Floor

Laura Inzerillo

Abstract:
Structure from motion (SfM) represents a widespread photogrammetric method that uses the photogrammetric rules to carry out a 3D model from a photo data set collection. Some complex ancient buildings, such as Cathedrals, or Theaters, or Castles, etc. need to implement the data set (realized from ground floor) with the UAV one in order to have the roof reconstruction. Nevertheless, the use of UAV is strong limited from the government rules. In these last years, Google Earth (GE) has been enriched with the 3D models of the earth sites. For this reason, it seemed convenient to start to test the potentiality offered by GE in order to extract from it a data set that replace the UAV function, to close the aerial building data set, using screen images of high resolution 3D models. Users can take unlimited "aerial photos" of a scene while flying around in GE at any viewing angle and altitude. The challenge is to verify the metric reliability of the SfM model carried out with an integrated data set (the one from ground floor and the one from GE) aimed at replace the UAV use in urban contest. This model is called integrated GE SfM model (i-GESfM). In this paper will be present a case study: the Cathedral of Palermo.

Efficient Registration of Multi-Platform Camera Networks

Matevž Domajnko et al.

Abstract:
For a complete 3D documentation of large and complex cultural heritage sites, a combination of different acquisition techniques, platforms and processing algorithms are required. In most of the cases, the large size and complex shape of the object may be demanding, while the level of detail needed in particular small scale areas of interest may need ad-hoc customisation during acquisition and processing steps using other methods. Thus, special requirements of such sites' 3D reconstruction imply the sequence of several acquisition techniques towards a multi-scale approach. In this paper, we focus on this multi-scale image-based 3D reconstruction and explore two possible approaches for data registration: processing all image sets of different acquisition scales simultaneously and produce a unique point cloud or, alternatively, independent processing of the image-sets with subsequent point cloud fusion/registration. The ruins of Donaustauf Castle in Germany were chosen as a case study. The topography of the hill, the dense vegetation of the area and the large scale of the monument itself are the main challenges to be considered while setting the camera network configuration and deciding the acquisition platforms. This paper studies efficient ways for registration of image data sets coming from various camera networks of different scale,

sensor and acquisition platform. To this end, two approaches for data integration are evaluated; from one hand the all-in-one solution, i.e. registering all image sets together and thus obtaining a single point cloud and secondly, performing individual registration per image group and subsequent use of ICP for the final fusion of the 3D products.

Assessment of Earthquake Resistance of Monument Based on its Time Evolution 3D Presentation - Case of Asinou Church in Cyprus

Roko Žarnić

Abstract:
Assessment of earthquake resistance of historic monuments encompasses both prediction structural response and prediction of damages of valuable non-structural elements and wall paintings. The main input parameters on which are based computational models for assessment of earthquake resistance of historic masonry buildings are accurate geometric and material properties. In addition, data on changing of structure during the time are essential for prediction of its behaviour during an earthquake. The recently introduced multimodal capturing of geometry and monument surface appearance with indoor and outdoor 3D laser scanner combined with high resolution digital and infrared camera significantly improves the accuracy and quality of data needed for monument assessment. The presentation will focus on the application of the assessment approach using the case of wall paintings reach, stone masonry Asinou Church in Cyprus which structure has developed since 1105 in several steps until today. In the paper, it will be demonstrated how the seismic resistance of structural parts of church from different periods can be assessed by performance-based approach introduced by EU FP7 project PERPETUATE (2010-2012, http://www.perpetuate.eu). Special attention will be paid to explanation of application of 3D information captured by integrated instrument. The presented case is one of case studies carried on within the on-going project EU H2020 INCEPTION (http://www.inception-project.eu) that introduces the idea of ""time machine"" which enables studying of monument as it developed through time and the Marie-Curie ITN-DCH project (www.itn-dch.eu).

Linked Open Data as Universal Markers for Mobile Augmented Reality Applications in Cultural Heritage

John Aliprantis et al.

Abstract:
Integrating the Linked Open Data (LOD) cloud in mobile augmented reality (AR) applications for cultural heritage is a topic that started to emerge more clearly in 2010, and there are already projects that have designed and implemented applications that are based in sources from LOD cloud and visualized with AR techniques, while others discuss the current limitations and challenges on this integration, and underline the future directions and capabilities. The majority of the above works relies on the detected geolocation of the user or his device by various sensors (GPS – global positioning system, accelerometer, camera, etc.) or geo-based linked data, while others use marker-based techniques to link various locations with labels and descriptions of specific geodata. But when it comes to indoor environments like a museum or a library where tracking the accurate user's position and orientation is far more complex, or unprepared

environments without any kind of marker-based tracking methods like the use of radio frequency identification (RFID) tags, how can we define the link between user's selected object of interest (OoI) and its description or metadata from the LOD cloud? This paper proposes a prototype which is based on image identification and matching between frames from the user's camera and stored images from the Europeana platform, that can link the LOD cloud from cultural institutes around Europe and mobile augmented reality applications in cultural heritage without the need of the accurate user's / device's location, and discusses the challenges and future directions of this approach.

Knowledge Management Using Ontology on the Domain of Artworks Conservation

Efthymia Moraitou, Evangelia Kavakli

Abstract:
Conservation is an integral process of collections management aiming to preserve cultural heritage objects in the best possible condition for future generations. Object conservation procedures, such as examination, analysis, diagnosis, preventive or active conservation, require detailed and accurate documentation in textual or visual records which provide valuable information for the future researcher, curator or conservator. Furthermore, conservation requires the awareness of cultural, historical and scientific information from sources both internal (e.g. the museum collections management system) and external (e.g. online database of information on cultural heritage and preservation), which in turn influence the ways in which conservators must approach their work. This integration of different information forms the body of knowledge, relevant to thoughtful decisions on treatment and care of cultural heritage objects. Taking into consideration the diversity of conservation information and associated information sources, the integration cannot be regarded as a trivial task. Therefore, knowledge organization, especially in a concepts level, is necessary. An ontology approach could be applied for knowledge management and clarification of the concepts exact meaning. Such domain ontology could be useful for information systems design, information integration, development of internet services and semantic querying/search, supporting conservators work. This work presents Conservation Reasoning (CORE), a domain ontology developed in the context of a Master of Science Dissertation. Based on knowledge management of conservation information needs and approaches, CORE aims to address the specific requirements of the conservation sector.

Wednesday 24th May 2017

TIME	24-May
8:00	Registrations
	Poster Exhibition
8:30-9:30	**Keynote Speaker:** **Prof. Alex Yen** Asian-European Digital Cultural Heritage Network
9:30-10:30	**Keynote Speaker:** **Dr. Pavlos Chatzigrigoriou** Digital Heritage for Creative and Sustainable Communities
10:30-11:00	**Session II: 3D Modelling and Reconstruction in CH**
11:00-11:30	COFFEE BREAK
11:30-13:00	**Session II: 3D Modelling and Reconstruction in CH**
13:00-14:00	LUNCH
14:00-16:00	**Session III: Ontologies and Metadata in Digital CH**
16:00-16:30	COFFEE BREAK
16:30-18:15	**Session IV: Reuse and Assessment of Digital Cultural Heritage Data**
19:30	SOCIAL DINNER

Wednesday 24th May 2017 | 10:30-11:00, 11:00-13:00

II. 3D Modelling and Reconstruction in Cultural Heritage

3D Visualisation of the Gorenjska Folk Costume

Tanja Nuša Kočevar et al.

Abstract:
The following paper presents the process of 3D modelling and visualisation of a woman's folk costume originating from Gorenjska region. For the purpose of realistic 3D visualisation of the clothing, first of all the pattern and the modelling of a real dress was examined. The 3D visualisation was completed using open source software for 3D computer graphics – Blender. All parts of the costume were modelled on a virtual female body. The complexity of the garment's pattern dictates very precise 3D modelling. The realistic rendering of the costume requires very accurate process of texturing, which follows the modelling process. The materials that were visualised are cotton, linen, wool and brocade. Our goal was to present real materials with some signs of being worn-out. Therefore, the process of scanning and photographing were employed to digitalise real textures. The cloth which is used for shirt (rokavci), is cotton fabric in plain weave that is visibly porous. For realistic 3D visualisation of that sort of fabric, image information of pores and precise extraction of porous structure from the raw photograph is essential. Thus, we researched and established the workflow for porous texture preparation, correspondingly for creation of an alpha map. The results revealed important dependency of image information quality on the lighting condition at photographs acquisition. It was also established that the optimal method for preparation of the alpha map for visualisation of the analysed woven fabric was the method of manual definition of histogram threshold, where the results can be simultaneously visually controlled.

Digital Heritage and Digital Humanities Methodologies: Reliability and Accuracy of Digital Models in Re-Creating Lost Contexts

Rosa Tamborino et al.

Abstract:
Cultural heritage has complex layers of historicity and meaning, which are closely linked to its temporal, spatial and cultural context. Presenting Cultural Heritage digitally has the potential to improve the understanding of tangible cultural heritage because it enables us to visualize changes in meaning and changes over time. The variability of contexts can be re-created to tease out and express variations in use and the reuse. A multitude of data types (drawings, photographs, plans, texts) allows for a reconstruction of a building's life history through time. Each of these historical witnesses also carry their own cultural meaning. Creating digital 3DVR models, which enable the recreation of the contexts, require cross disciplinary collaboration to provide accuracy through a balanced incorporation of historical and archaeological information. As historians, we face the challenge of responding to the demands of an increasingly digital society and to create culturally meaningful ways for public access to historical knowledge. Training the current student body to become skilled in digital humanities theory and practice in Europe is very important in order to create a generation which is prepared to participate in active cooperation between different disciplines and enabling collaborative research. The paper presents

outcomes of student training within the larger framework of an international partnerships in the field of Digital Humanities. The digital approach allows the exploration of a complex network in which buildings are considered within their natural and cultural landscape. Buildings link inhabited territories, and the cultural contexts become visible and understandable in an effective way.

3D Digitization of Selected Collection Items Using Photometric Stereo

Jaroslav Valach et al.

Abstract:
Digitization of exhibits and the creation of virtual exhibitions is undergoing a period of stormy development and is a dynamic area of care for museum collections. The availability of digital models has a major share in the growing trend of on-line access to collections. At the same time, digitization can improve the protection of items and increase their availability for the public as well as for professionals. It can be performed using procedures based on different physical principles and their technical implementation. This paper introduces a technique of 3D digitization based on the principle of photometric stereo. First it describes typical objects, followed by the physical fundamentals of the method and the selected technical solution. A section on the examples of results introduces the application of this method for creating digital models of various objects and, finally, the conclusion discusses on further development of this method in the future.

The LOOM: Interactive Weaving through a Tangible Installation with Digital Feedback

Anastasios Dimitropoulos et al.

Abstract:
The use of hybrid tangible and digital interactions is a recent trend in museums that is gaining popularity due to its motivating nature. Modern science museums usually contain several tangible interactive installations, that let users actively play and experiment with scientific concepts. A similar approach can be applied in museums exhibiting complex devices or processes related to technology and industry. In these cases, the aim is not only to observe the physical artifacts (e.g. machines of the past), but also to be able to actively use them and understand their operation. This paper presents the design, implementation and initial evaluation of a hybrid tangible and digital installation for the Industrial Museum of Hermoupolis in Greece. The installation demonstrates the operation of a Loom and introduces visitors to the laborious process of weaving in the old times. It consists of an interactive physical artifact of a simplified Loom, and a digital screen displaying a virtual animated version of the Loom and the resulting weaved cloth. Visitors are expected to interact with the physical artifact, understand the main steps of weaving, and try to produce a pattern. We have performed two user evaluations of our interactive installation to gain feedback about its usability and effectiveness. The first took place in the laboratory and the second was done inside the industrial museum during a school visit. The results are generally positive regarding usability, fun and learning, and led to a number of observations for the design of this type of applications.

Design Of 3D and 4D Apps for Cultural Heritage Preservation

Dieter Fritsch, Michael Klein

Abstract:
The design of three-dimensional and four-dimensional Apps, running on the main operating systems Android, iOS and Windows is the next challenge in Digital Cultural Heritage (DCH) preservation. Based on experiences developing Apps for archaeology and architecture, the paper introduces with general workflows for storyboard design and App developments. Time is considered as the fourth dimension, for tangible and intangible contents. Therefore, using old photographs, sketches and paintings allows for travelling back in time. The software package Unity is used as a cross-platform engine to create 3D/4D Apps for PCs, mobile devices and websites. One of the main results of the European Project "4D-CH-World" are two Apps of the Testbed Calw: The App "Calw VR" and the App"Tracing Hermann Hesse in Calw". Both Apps are using the 3D models created by Interactive 3D modelling in Autodesk 3ds Max, with 3D data resulting from airborne LiDAR, terrestrial laser scanning, Structure-from-Motion (SfM), and Dense Image Matching (DIM). The 3D/4D models processed in the Autodesk 3ds Max environment have been imported and rendered, according to the recommendations of the Storyboard. The Apps can play audio files and videos, tell stories about every building, if semantic data are available, collected from books, brochures or "from the wild".

The Conservation of Cultural Heritage in Conditions of Risk through the Use of 3D Printing on Architectural Scale

Sara Codarin

Abstract:
Nowadays we are witnessing several demonstrations of damage, destruction, and loss of the collective Heritage, due to ongoing conflicts, emergency risk conditions, and environmental issues. Therefore, new methods of intervention are required, defined by effective response capability and applicability in the short term. The most recent automation systems and 3D printing technologies represent an applied experimentation of the sustainable realization of three-dimensional models obtained by processing digital data with appropriate software. It is believed that they could contribute updating the modalities of management, conservation and fruition of Cultural Heritage. The reproduction of individual components or entire architectural portions are now facilitated by the coordination of digital tools for the three-dimensional survey, digital modelling, and 3D printing. The latter technology, currently subject of media interest in the field of additive digital manufacturing, has recently been applied on the architectural scale, with the aim of elaborating new constructive settings. The use of these technologies is believed to be efficiently dropped within Heritage restoration and conservation frameworks. In the specific case of historical buildings with a potential formal unity, a strategic aspect is related to the individuation of reversible matrix elements, which should consist of proper materials layered down based on the historical building characteristics, designed to reconfigure the volumetric readability of the fabric. Besides, the refining of 3D printing implementation processes can offer a useful contribution to building site security management, reconstruction time rate, overall realisation costs, and innovative design, resulting from the integration of survey systems, computer simulations, and implementation machines.

BIM for Cultural Heritage: The Management of Generative Process for Complex Historical Buildings

Stephen Fai et al.

Abstract:

Building Information Modeling (BIM) enhances the sharing of information during the traditional process for new constructions, but most of the time, it requires high levels of knowledge management for the historical digital model (H-BIM). The innovation in the Digital Cultural Heritage (DCH) domain is supported by the development of Information and Communications Technologies (ICT) and modern tools that are able to transmit morphological characteristics of the buildings in all their uniqueness. The latest research in the field of H-BIM shows a significant emergence of innovative methods and management initiatives for the generation of complex historical elements, leading to the confrontation of the paradigm of regularity (simple geometric shapes) with the new paradigm of complexity (historical building elements). This paper proves the benefits of the BIM for project management of the Centre Block of the Canadian Parliament in Ottawa, Ontario Canada, and shows the results obtained by the introduction of Advanced Modelling Techniques (AMT) during the generative process, reducing time and cost for the creation of the complex architectural and structural elements. The uniqueness of the forms of historical buildings is a real value to be transmitted throughout the building's lifecycle with high Levels of Detail (LoD). Proper management of geometric primitives and Non-Uniform Rational Basis Spline (NURBS) models have guaranteed the conversion of spatial data (point clouds) from laser scanning and photogrammetry (geometric survey) into parametric applications. Paper explores the generative process of the most complex area of the Parliament Hill: The Confederation Hall.

Intangible Cultural Heritage: The Analysis of the Sound Made By The Dacian Draco

Gheorghe Daniel Voinea et al.

Abstract:

Preserving the past is an important task of our generation because of the rapid changes that influence our society. Certain objects or traditions make us feel we are part of something. Since the beginning of the 21st century the recognition and protection of intangible cultural heritage (ICH) has seen an increased importance. The Dacian Draco is a lost cultural heritage of the Dacian people. It has the body of a dragon and the head of a wolf, with its jaws wide open. The wolf's head was made out of bronze or silver and the body was made of a textile material. Perhaps the most interesting part about this artefact is that Dacian Draco was producing a sound which rumors say was unusual and terrifying. The use of such a banner had the role to scare the enemy's horses and discourage their troops. The first step in analysing the Draco is gathering all the archaeological findings such as written descriptions, pictures on ancient urns or columns (twenty appearances on Trajan's Column in Rome), fragments from excavations and so on. The purpose of this paper is to highlight the importance of the Dacian Draco and to present a methodology to obtain realistic sounds that can be used in VR immersive experiences. Our final objective is to create a model of the supposed Dacian draco that is based only on researcher's historical assumptions and the legend regarding the sound it was producing when used in battles.

3D Modeling of Exhibits of The History Museum of Perm University: Preservation, Provision of Access to and Usage of Cultural Heritage Items

Nadezhda Povroznik

Abstract:

Perm State University was founded in 1916 and received the status of the Imperial University which was required to have museums with exhibits for objective demonstration to students. Thus, the Museum of Antiquities and Arts was established to support the educational process in the field of history. At the moment, the Museum has more than 25 thousand items of storage including such collections as ""Ancient Egypt"", ""Ancient Greece"", ""Fine Arts of Europe"" and others. Digitization of the Museum's exhibits is provided by The Center for Digital Humanities and caused by the need to preserve exhibits, provide access to items and expand the possibilities of using objects in research and education. In particular, the course ""3D modeling and virtual reconstructions"" was developed for the preparation of masters in the program ""Digital technologies in sociocultural and art practices."" Workshops on this course involve a variety of practices on the creation and usage of digital objects of cultural heritage. In addition, at the moment a collection of three-dimensional models of exhibits of the ancient Greek collection, represented by specimens of ancient Greek vessels of the 6-2 centuries BC, is being created. 3D Modeling is based on photogrammetry technology. Models created with Agisoft Photoscan and 3DF Zephyr, edited by tools of Mudbox and Adobe Photoshop and published with the support of Sketchfab. At the Conference, the digital collection of 3-dimensional models of the ancient Greek vessels will be presented. The report will consider the theoretical and practical issues of creating 3d-models, using the digital collection in research and education and plans for developing.

Wednesday 24th May 2017 |14:00-16:00

III. Ontologies and Metadata in Digital Cultural Heritage

Digital Cultural Heritage: Semantic Enrichment and Modelling in BIM Environment

Federica Maietti et al.

Abstract:
One of the main challenges in 3D modelling is related to an effective BIM approach for cultural heritage knowledge, semantic enrichment and model management. The ongoing EU funded INCEPTION project proposes an improvement in this methodology by recognising that buildings are a set of elements, organized by spatial relationships determined by an architectural style. Now, a shared library for historical elements does not exist. Starting from the so-called Heritage Building Information Modelling (H-BIM) approach the necessity of the libraries' implementation will be reached by INCEPTION avoiding the oversimplification of the shapes. When used in models of cultural heritage, semantic BIM will be able to be connected to different users (e.g. scholars, technicians, citizens, governments) in support of the user's need for interpretation of the cultural heritage model, in addition to the common BIM features of 3D visualization, technical specification and dataset. The first step in creating semantic BIM for cultural heritage is defining the ontology, a formal representation of knowledge as a hierarchy of concepts within the cultural heritage domain, using a shared vocabulary to denote the types, properties and interrelationships of cultural heritage aspects. For this reason, aiming at the standardization in heritage documentation data handling and management, the INCEPTION project is developing common parameters setting a nomenclature or "glossary of names" as a starting point to semantic enrichment and modelling in BIM environment. The recognition of shapes, either manually or automatically performed, is always possible only if single architectural elements (or their variations) are identified and univocally classified following a shared procedure. The INCEPTION project has been applied under the Work Programme Europe in a changing world – inclusive, innovative and reflective Societies (Call - Reflective Societies: Cultural Heritage and European Identities, Reflective-7-2014, Advanced 3D modelling for accessing and understanding European cultural assets). This research project has received funding from the European Union's H2020 Framework Programme for research and innovation under Grant agreement no 665220.

Metadata Architecture for Cultural Heritage Multimodal Acquisitions

Irina-Mihaela Ciortan et al.

Abstract:
The complexity of cultural heritage (CH) assets demands multimodal acquisitions that are able to offer individual pieces of information which can be interconnected to form a holistic compounded view of the studied object. The need of joint acquisition triggers along the requirement for defining a protocol to store, structure and support the interoperability of the multisource data. In our work, we are conducting the following multiple studies in order to analyze the material, to monitor the behavior and to diagnose the status of CH objects: two high resolution surface data capture techniques - reflectance transformation

imaging and micro profilometry - and a coarse 3D scanning that can be used to support spatial referencing, alignment or capture of the local patches. Given this multivariate input and the primary goal of diagnosis, we have defined a data organization similar to the one used in the medical domain by the Digital Imaging and Communications in Medicine (DICOM) protocol, supporting the concept of multiple studies on a "patient" that corresponds to an artwork or a material sample, organizing a hierarchical data storage with unique and standardized metadata for easy data query and retrieval, and supporting pre-alignment of local patches with respect to the global model.

One Database to Connect Them All – The World's Immovable Cultural Heritage on Wikidata

John Andersson et al.

Abstract:
One piece of the puzzle to successfully protect immovable heritage at risk is to make sure that it is easy to find out what is out there. Structured and easily searchable data has the potential to make that faster, easier and more interesting than ever before. Improving the structure and searchability of immovable cultural heritage data is what the Connected Open Heritage (COH) project is trying to achieve through innovative use of Wikidata, a Wikimedia project aimed at linking open datasets together. Wikidata aims to create a massive resource of facts that can easily be read and edited by both humans and machines. In this paper, we present some of the challenges and lessons gathered while working with processing a world-unique collection of datasets from 50 countries, and creating the methodologies for the data to be added to Wikidata in a standardized and structured form. Furthermore, the lessons from the work of finding and adding data from another 10 countries will be presented. COH is a project by Wikimedia Sverige, UNESCO, Cultural Heritage without Borders and Wikimedia Italia, and financed by the Culture Foundation of the Swedish Postcode Lottery.

Towards a Digital Infrastructure for Illustrated Handwritten Archives

Andreas Weber et al.

Abstract:
Large and important parts of cultural heritage are stored in archives that are difficult to access, even after digitization. Documents and notes are written in hard-to-read historical handwriting and are often interspersed with illustrations. They are weakly structured and largely inaccessible to a wider public, or scientists and other experts. Traditionally, humanities researchers treat text and images separately. This separation extends to traditional handwriting recognition systems. Many of them use a segmentation free OCR approach which only allows the resolution of homogenous manuscripts in terms of layout, style and linguistic content. This is in contrast to our infrastructure which aims to resolve individual pages of a large corpus in which different languages and scripts are intermixed with images. Authors in our use case, a 17,000-page account of exploration of the Indonesian Archipelago between 1820-1850 ("Natuurkundige Commissie voor Nederlands-Indië") tried to follow a semantic way to record their knowledge and their observations, however, this discipline does not exist in the handwriting script. The use of different languages including German, Latin, Dutch, Malay, Greek, and French makes interpretation more challenging. Our infrastructure takes the state-of-the-art word retrieval system MONK as starting point.

Owing to its visual approach, MONK can handle the diversity of material we encounter in our use case and many other historical collections: text, drawings and images. By combining text and image recognition, we significantly transcend beyond the state-of-the art, and provide meaningful additions to integrated manuscript recognition. This paper describes the infrastructure's basic layout and presents early results.

Digital Preservation: How to Be Trustworthy?

Lina Bountouri et al.

Abstract:
The Publications Office of the European Union has started a project for the long-term preservation of its digital publications to a new digital archival repository, which contains legislative collections (such as the Official Journal of the European Union, treaties, international agreements, etc.), non-legislative collections (such as general and scientific publications), master data (such as descriptive, technical and provenance metadata specifications), and other data (such as datasets and web sites). Aiming to safeguard the EU digital publications without any alteration during their life-cycle, we have decided to follow the standards ISO 14721:2012 (Open Archival Information System) aiming to define the model of our digital preservation system, and ISO 16363:2012 for verifying the trustworthiness of the digital archival repository. In this context, we will deal with following issue: how can we be sure that a digital object is the same as when it was created, and that it has not been altered during its life-cycle, both before and after its ingestion to the repository? In other words, how can our digital archival repository be trustworthy? The basic actions of OP towards this direction are following: a) definition of a Digital Preservation Plan, b) definition and preservation of Representation Information (master data and other specifications), c) definition of the designated community and monitoring it, d) implementation of digital preservation strategies, such as fixity, maintaining a read-only archive, keeping two copies in different physical data centres, etc., and e) technology watch of formats, standards and digital preservation strategies.

Online Faculty System and Church Heritage Record: Digital Tools Protecting the Church of England's Heritage

Julie Patenaude

Abstract:
In 2015, the Church of England launched its Online Faculty System (OFS) – a web-based planning portal to process applications for changes to church buildings in its care – and the Church Heritage Record (CHR) – a free and publicly accessible digital database of church buildings integrated with a Geographic Information System (GIS). The OFS was specifically built to simplify the faculty process for parishes. A series of trials had demonstrated that some parishes found it difficult to locate heritage data on their church buildings. To assist them, the CHR was designed to automatically feed heritage data directly into each faculty application thus saving the parishes' time and effort. For OFS users involved in the decision making process, this means that they are always provided with data that has been verified and authenticated by the data officers with the data owners. The Church of England's OFS is the only planning portal in England which is fully integrated with its Historic Environment Record. The development of the CHR has also enabled the Church to begin experimenting with new ways to share its data with external partners. The CHR has developed an OData web-service which returns data in JSON format and follows

the web standard OData Protocol. Our external partners can connect to the web service and obtain key data such as location, church names, and unique. Over the next five years, the Church of England with its partners will be testing out new methodologies of sharing data across multiple sectors and digital platforms.

Semantic Representation and Enrichment of Cultural Heritage Information for Fostering Reinterpretation and Reflection on the European History

Andreas Vlachidis et al.

Abstract:
The modern advances of digital technologies provide a wider access to information, enabling new ways of interacting with and understanding cultural heritage information, facilitating its presentation, access and reinterpretation. This paper describes a working example of connecting and mapping cultural heritage information and data from cultural heritage institutions and venues through the open technological platform of the CrossCult project. The CrossCult project seeks to facilitate a digitally driven history approach which goes beyond the conventional siloed presentation of historical data. The platform aims to enable semantic connections between diverse cultural heritage objects, public view points, points of interests and physical venues. The paper discusses the process of semantically representing and enriching the available cultural heritage data, and reveals the challenges of semantically expressing interrelations and groupings among physical items, venues, digital resources, and ideas. These connections allow reflection and reinterpretation of historical and societal views to be triggered. The paper also highlights the challenges in the creation of the a knowledge base resource which aggregates a set of Knowledge Organization Systems (KOS) based on a carefully selected subset of the CIDOC Conceptual Reference Model, integration of application ontologies and optimised classification scheme based on domain vocabularies. Working Pilots of the CrossCult platform will be used to demonstrate how augmentation, linking, semantic-based reasoning and retrieval across diverse cultural heritage resources have been achieved.

Ontology-Based Data Collection for Heritage Buildings

Andrej Tibaut et al.

Abstract:
In HB domain, reconstruction, restoration and thematic change occur frequently. Reconstruction and restoration are primary processes to preserve the essence of heritage. Thematic change reimburses the stakeholder's investments or provide necessary funds for preserving the heritage. These are complex processes and need involvement of specialized experts whose work significantly relies on work and research of others. Specific to expert's nature of work and reusing others work, appropriate organization of information is needed to support experts' decisions. Innovative application and use of a knowledge-based system may support an HB expert to aggregate data into meaningful information that supports any of the HB lifecycle activities: first expertise analysis, documentation, preventive conservation, restoration, economic aspects of HB, use and management. This paper first investigates differences between traditional database-based collection of real-world data for HB as opposed to ontology-based knowledge capture. Secondly, the need for comprehensive ontology-based data collection for HB suitable for trans-

disciplinary domain experts and stakeholders is highlighted based on real-world HB requirements. Finally, conceptual knowledge-based framework that includes both an ontology for a HB domain and a knowledge base using that ontology is presented. It is expected that the presented framework could enable proactive reduction of time for searching solutions, reduction of risks involved, reduction of unexpected surprises related to impact of costs, time, materials and human resources. The paper is a work in progress in scope of the project COST TD1406 - Innovation in Intelligent Management of Heritage Buildings.

Wednesday 24th May 2017 | 16:30-18:15

IV. Reuse and Assessment of Digital Cultural Heritage Data

Using Innovative Technologies in Preservation and Presentation of Endangered Archives

Aleksandar Jerkov, Vasilije Milnovic

Abstract:
This paper presents an in-depth review on the project "Safeguarding the fragile collection of the private collection of the Lazic family". Namely, University Library in Belgrade (ULB) received a grant of the British Library in the framework of Endangered Archives Programme for this project. The aim of this project primarily was to digitize and thus preserve for posterity extremely valuable private collections. However, our intention was also to introduce the possibility of using new digital technologies in the preservation and presentation of vulnerable archival materials of historical importance in adequate physical space and to provide opportunities for the general public active participation in such activities. This cutting-edge technology is suitable for interactive presentation of materials which are too fragile to leaf through. Fully aware of the importance of the availability and open access to cultural and scientific heritage for achieving the knowledge society and the role of academic libraries in its dissemination, these extremely vulnerable materials will be also presented in the open access repository, which will include research papers based on the materials available within the project. So, the objects will be analyzed both "on the outside" via the metadata and with the help of the software for editing digital repositories and "on the inside" via a concise overview of the content of individual objects. Digital objects structured in this way will grab users' attention and bring back the historical content into focus.

Analysis, Documentation and Proposal for Restoration and Reuse of "Chrysalis" Silk Factory in Goumenissa, Kilkis, Northern Greece

Stavros Apotsos et al.

Abstract:
The building complex of "Chrysalis" silk factory, its surviving mechanical equipment and archive material constitute a unique example of industrial heritage. "Chrysalis" indicates the upsurge in industrial activity in northern Greece in the early 20th century and at the same time the social, economic and political conditions in the wider area of Goumenissa and the region of Central Macedonia. The building is of particular architectural interest with eclectic elements in a rational industrial composition. Thus, it was listed in 1985 as a historic monument by ministry of culture of Greece. During the academic period 2014-2016 it was studied in the context of the Interdisciplinary Collaboration Seminar, key element of the Interdisciplinary Program of Postgraduate Studies "Protection, Conservation and Restoration of Cultural Monuments", Faculty of Engineering, Aristotle University of Thessaloniki. The postgraduate students' team consisted of archaeologists, architects, civil engineers, a rural and surveying engineer, a mechanical engineer and an electrical and computer engineer. The project covers a series of studies on historical research and documentation, surveying, architectural and structural analysis, identification,

interpretation, proposal of reuse, structural reinforcement, the exhibition of the industrial machinery, a museological study and lighting design.

Small Memory Boxes - Returning Documents from the Archive of the Folklore Circle Back to their Owners

Liviu Pop

Abstract:
The ethnological archive from the Faculty of Letters, Babes-Bolyai University of Cluj- Napoca was conceived as a means to complete the Literary Folklore course. The documents are kept on paper, being written down, dictated or following direct field observations, or they represent magnetic tape transcripts. Our intention is to bring the documents from the Archive of the Folklore Circle back into the villages where they were gathered and the results we expect are an increase in the preservation of the traditional immaterial culture in those villages by learning and re-learning the old customs, stories and songs. The documents have been digitized and they are currently added into a database. We are currently having something akin a seed-bank, seeds of a culture that is fading and we would like to replant those seeds back to where they belong. Our intention is to install small memory boxes with the digital versions of the documents. Those boxes will be made out of an installation containing a Raspberry PI that could be accesed via custom made physical interfaces. RFID tags will be hidden inside small objects and will act as triggers, hiding the technical side, making them more friendly and more familiar. A working prototype of a small memory box can be showcased during the conference.

Minimal Functionality for Digital Editions

Federico Caria, Brigitte Mathial

Abstract:
Digital Editions offer more than printed books, yet in a recent survey by Dot Porter it was shown that while digital tools are generally on the rise, digital editions are still not used as much as one would think. We are exploring the hypothesis that low usability is amongst the key factors that keep specialist users away from using editions. So far we have conducted two in-lab experiments to collect mixed data from specialist users. First, we compared three Digital Editions with a task-based approach coupled with both an exit survey and a focus group, and found out that usability is valued higher than content features for the majority of participants. In the second experiment, we compared a digital edition with a PDF eBook and a printed book. The general set-up was similar: we gave the participants ad-hoc designed tasks to solve, observed them (electronically), gave them an exit survey and then asked them to discuss their experience amongst themselves in a typical focus group. As a clear result, we found that most of the participants preferred PDF, not only because of its higher availability, mobility and compatibility with different software, but also because of the inherent usability of having a “search function”, “clearer navigation”, “ability to comment”, and “familiarity with the interface”.

Evaluation of an E-Learning Platform for UNESCO WHL Monuments in Cyprus

Vasiliki Nikolakopoulou et al.

Abstract:
The paper focuses mainly on the evaluation of an e-learning platform that helps the user, in a User Experience (UX)-friendly way, to learn about the different phases of the UNESCO World Heritage listed monuments in Cyprus, their history and architectural value. The main challenge is the re-use of Digital Heritage Data from Europeana. Our proposed model responds to contemporary pedagogical and methodological directions by using innovative digital heritage resources to educate people about these monuments in a holistic way. The result is a responsive educational platform, where every Monument becomes a course addressed to different age groups. To determine whether the design decisions and the content created meet user requirements, teacher and learner needs, a formative evaluation has already been run in an educational context. We implemented (a) semi-structured interviews for our expert-users: three teaching inspectors, (b) questionnaires for our bigger sample of users: an evolving number of teachers (ongoing), and (c) a focus-group session for our main user-group: a classroom of seventeen students with their teacher. This is our first evaluation sample for a Monument-course addressed to primary school learners, aged 10-11. Rich forms of interactions and dialogues recorded from students, in conjunction with inspectors' and teachers' feedback, provide us with a first critical view of the changes that should be made in the platform, the elements that caught their attention, design directions and encouragement to develop further Monument-courses.

Innovative Business Plans for H-BIM Application Related to Alternative Financing Opportunities for Cultural Heritage

Klaus Luig et al.

Abstract:
Within an EU funded project the use and application of H-BIM data is focused at. The project realises innovation in 3D modelling of cultural heritage through an inclusive approach for time-dynamic 3D reconstruction of artefacts, built and social environments. The methods and tools will result in 3D models that are easily accessible for all user groups and interoperable for use by different hardware and software. It develops an open-standard Semantic Web Platform for Building Information Models for Cultural Heritage (H-BIM) to be implemented in user-friendly Augmented Reality (VR and AR) operable on mobile devices. Innovative Business Models for H-BIM application related to alternative financing opportunities for cultural heritage have been developed in order to exploit the results of the project and offer a great opportunity to enrich the share of information of cultural heritage at an enhanced level. Nevertheless, the innovative business modelling process is transferable to other cultural heritage driven projects, as well. At the same time, innovative financing tools offer the possibility to cover the needed expenses without additional funding.

Preserving the Story of Heritage in Ruins Using Online Digital Repositories; The Case of Urbex

Negin Eisazadeh, Barbara Bordalejo

Abstract:
Urban explorers have for some time been producing informal iconographic and textual records of man-made structures which because of being abandoned or inaccessible for the general public, are not usually in the public eye and are often in a state of deterioration and in danger of being destroyed. This interdisciplinary research which connects the fields of architecture, history, conservation, and digital humanities, looks into the materials recorded by the urban exploration (urbex) community and investigates their potential for the protection and documentation of decaying or demolished abandoned architectural heritage sites. For the management and dissemination of heritage information for the abandoned sites, more specifically, the recently demolished Château de Noisy, a famous urbex destination in Belgium, this study explores and builds upon the existing digital resources and looks into various tools and techniques to compile, curate and present this data to narrate the story of abandoned heritage sites. Additionally, through visualisation of data collected, cleaned, and compiled using the Flickr application programming interface (Flickr API) and Python, the changes in the urbex community's activity since their debut on Flickr are observed. This research shows the value of the existing urbex digital data for documentation and potential conservation of abandoned heritage sites and demonstrates how a mindful digital narration of even a demolished heritage site can create an engaging and immersive experience which records and preserves the heritage and its story. Additionally, it can raise public awareness which in the case of deteriorating abandoned sites can lead to their potential revival.

Anchoring Unsorted E-Sources About Heritage Artefacts in Space and Time

Gamze Saygi et al.

Abstract:
When facing the need to document and study "minor" heritage artefacts (those for which no systematic inventory effort has been carried out, and no structured data sets exist), analysts can today try to build on citizen-side contributions such as personal or associative web sites, blogs, or crowdsourced data sets. This is particularly true when the aim of such study is not to depict one particular artefact but to gain some understanding of trends in a collection of artefacts, i.e. spotting patterns in the data sets that can then be analysed and ultimately related to historical, geographical, climatic or other factors. Such a research process starts with the cumbersome tasks of (i) pulling together large and unsorted data sets, (ii) developing means to structure that data (iii) designing solutions allowing for what the whole process is about: comparative reasoning. We introduce a set of open-source visual solutions aimed at supporting analysts in their effort to pull together and make sense of unsorted, raw evidence about heritage artefacts. The objective is to decipher information patterns by filtering and support analysis of various combinations of variables. Our contribution in the field is implementing a hybrid space + time geo-visualisation solution suitable to the very specific nature of spatio-temporal information extraction and experimentation from unsorted e-sources about "minor" heritage artefacts, which are large in numbers.

Thursday 25th May 2017

TIME	25-May
8:30	Registrations
	Poster Exhibition
9:00-11:00	**Session V: Visualisation, VR, AR and Serious Games**
11:00-11:30	COFFEE BREAK
11:30-13:00	**Session V: Visualisation, VR, AR and Serious Games**
13:00-14:00	LUNCH
14:00-19:30	**Conference Excursion**
19:30	FREE

Thursday 25th May 2017 | 9:00-11:00, 11:30-13:00

V. Visualization, VR, AR and Serious Games

Collaborative Tangible Gamification of Built Heritage for Young Museum Visitors

Eslam Nofal et al.

Abstract:
Museums offer an ideal environment for informal cultural learning, particularly for young visitors by allowing them to see the different museum collections and to hear their related stories. Gamification accordingly is an approach that museums follow in order to provide edutainment experience and to attract children. However, most of gamification techniques used in museums offer individual experiences (e.g. small touch screens or personalized applications). Nevertheless, museums recently began to design and deploy tangible user interfaces in order to physicalize the experience with museum objects, which is more collaborative, attract more visitors, and persuade them to explore further. This study aims to communicate tacit knowledge of Egyptian built heritage to young museum visitors by combining tangible interaction with gamification, making their experience more collaborative and engaging. Egyptian heritage is very rich in content, containing many aspects of tacit knowledge which is relatively challenging to communicate, such as architectural qualities, historical values and artistic features. We therefore introduce the approach of tangible gamification, we argue it has several objectives; (a) making museum experience more collaborative and enhances social interaction, (b) actively engaging young visitors by allowing them to physically explore museum collections, and (c) stimulating subtle learning experiences by communicating heritage information during interactions. We propose three different interaction setups for conducting our experimental study in a real museum environment on a scale 1:1 of an original ancient Egyptian tomb-chapel in order to investigate how this approach augments collaboration and social interaction among young visitors, and how this influences their cultural learning.

Exploring Cultural Heritage Using Virtual Reality

Laurent Debailleux et al.

Abstract:
Emerging technologies in the field of Virtual Reality are opening new opportunities which improve heritage education. In this context, a head-mounted display, such as Oculus Rift, facilitates interactivity allowing more realism in an immersive experience. This paper presents an innovative use of Oculus Rift, without any other connected device, in order to allow virtual mobility without constrained navigation. This innovation brings an added value to the existing virtual reality experience by making it possible to fluidify the interaction between the user and the model while valuing the intuitiveness and spontaneity of actions. From an educational point of view, historical metadata linked to the model constitutes an added value for an immersive learning experience. The city of Mons (Belgium), a historical centre and European Capital of Culture in 2015, was chosen as a case study to put the project into practice. The city has many architectural heritage buildings from the gothic and classical periods. In addition, the city's belfry, as example of belfries of Belgium and France, is on the UNESCO World Heritage List. The project is focused on two aspects: 3D city modelling and virtual interaction with Oculus Rift. The 3D model provides

a multilevel overview of the town with different levels of architectural detail, depending on the points of interest for each building. An intuitive interface was implemented where the user, assisted by the tracking system of the Oculus Rift, can request historical information by using a virtual pointer.

3D Pose Estimation Oriented to the Initialization of an Augmented Reality System Applied to Cultural Heritage

Ricardo Moisés Rodriguez Oceda et al.

Abstract:
Augmented reality (AR) applied to cultural heritage intends to improve the learning experience in archaeological sites, not only for visitants but also for researchers. 3D pose estimation is a common problem in applications for AR, object recognition, 3D modeling, among others. AR systems use different methods to estimate the camera pose: edge detection and key-point detection among others. The choice of the method to be used depends on the features of the scenario to be detected. In this work, a comparison study of the main 3D model-based pose estimation methods is performed. In addition, we present the implementation and validation of a pose estimation algorithm, oriented to the initialization of an AR system applied to “Huaca de la Luna”, an adobe brick pyramid built by the Moche civilization in the northern Peru. The proposed algorithm presents two phases, a training phase, where 3D key-points are extracted from a reference image, and a detection phase, where the initialization process is performed by comparing 2D/3D points correspondence using a PnP algorithm. We have compared four variations of the 3D pose estimation algorithm using different methods: SIFT and SURF descriptors for key-point description and EPnP and REPPnP algorithms for PnP pose estimation. Results show a translation error of 1.54 cm, with a mean processing time of 2.78 seconds, a maximum re-projection error of 1.5 pixels and a successful estimation rate of 100% in scenarios with normal and high light conditions.

The VR BAR: Using Virtual Reality to Disseminate the Rehabilitation Project of the Canadian Parliament Buildings

Katie Graham et al.

Abstract:
Since 2013, the Carleton Immersive Media Studio (CIMS) has been in partnership with the Canadian government to document the West Block, East Block, and Centre Block of the Parliamentary Precinct. Using laser scanning, photogrammetry, and photography, an accurate recording of the current condition is created and translated into a building information model (BIM). This data will aid in the planning and management of a multi-year rehabilitation project that will close the Centre Block building down. CIMS saw a need to take the existing content generated from the documentation work and BIM and find a way to disseminate it to the general public through digital storytelling, thus creating the project, The VR Bar. Beginning in May 2017, an installation containing five Virtual Reality (VR) stations will be located in front of the Parliamentary Visitors Centre where tourists go before visiting the parliament buildings. Four short experiences will be available that will show, through 360 videos, aspects of the Centre Block building and rehabilitation project not accessible during the physical tour. Careful selection of the equipment, interface, and style of experience were made to ensure a smooth and quick event for the hundreds of thousands expected tourists ranging in age, mobility, and technological knowledge. The content of The

VR Bar leverages existing gathered data from the documentation and BIM conducted by CIMS, however, through this new application, revisions to existing protocols followed at CIMS will improve the transition from data acquisition, building information model, and digital assisted storytelling through virtual reality.

From the Rock to the Cinema - Pitoti 360 - Turning Rock-art into VR

Frederick Baker, Marcel Karnapke

Abstract:
This paper will discuss the advantages and disadvantages experienced by the Cambridge team who created a 17 minute VR 360 film during the 3D Pitoti research project, that has just been taken into public release in the world's first VR cinema in Amsterdam. The film won the VR animation award in the 3D guild awards 2016. The paper will focus on the interaction between the demands of the author as director and the technical pipeline: from the new 3D scanner capturing the art in 3D on the rocks, to the volumetric cameras capturing the actors in the VR Lab at the Bauhaus and the editing process on the Unity engine. The paper will also talk about the difference between creating tech demos and a finished product for public presentation. The will involve a discussion about naturalism and authenticity in the presentation and animation of material culture in VR.

A New Way of Integrating with Cultural Heritage through the Application of Artistic Style Transfer

Marinos Ioannides et al.

Abstract:
Latest technological advances show that we are into the era of Artificial Intelligence (A.I), where the use of intelligent systems that can actually “learn” and adapt their function, upon exposure to new data, becomes more frequent. In the scientific context of developing computer systems that will apply some fundamental intelligence, the potential of learning techniques is enormous. Hence the field of Cultural Heritage could benefit significantly by discovering and applying innovative non-destructive methods that will act as reference points towards the protection of monuments as well as in the creative representation and re-use of cultural heritage big data derived from the acquisition processes. In this paper, we consider the application of existing Deep Learning methods as a major pipeline towards the re-use of culture related material. Through the proper exploitation of Deep Convolutional Neural Networks, we have achieved an optimal transfer of the artistic style of an image that depicts religious frescoes in an augmented reality (AR) video that shows a virtual priest standing in the altar. Through this algorithmic procedure, the original video is decomposed to its corresponding frames where the style, along with the colors of the provided image, are applied to them. The derived frames are finally composed to form the new color-enhanced video. Our grand vision lies in the expectation that the history of the specific monument can be self-narrated through its frescoes and will provide a fertile ground for future applications to be built upon this state of the art technology.

Virtual Annotation Prototype: Annotating Contemporary Dance in Virtual Reality

Claudia Ribeiro et al.

Abstract:
In order to overcome the limitations of transposing 2D annotations to a 3D environment, we propose a "Virtual Annotator" that allows a user to annotate specific movement sequences and body parts in a three-dimensional virtual reality space. The system was implemented in Unity3D, integrated with the Oculus Rift V2 development kit, where the interaction with the point cloud data is provided by a mobile phone. The development cycle of the virtual annotator involved conducting a focus group with a group of contemporary dancers in order to understand which are the functionalities that the system should support, as well as the type of annotations that are mostly relevant to contemporary dance. The focus group was divided into two main phases: a) a questionnaire on participants' dance experience and technological background; b) another section, where each dancer executes a particular task in the system while providing feedback regarding usability and utility. An initial prototype has already been developed, where is already supported mapping different types of annotations to body parts and their final visualization on a point cloud. This is accomplished by combining point cloud information with skeleton data. This study allowed us to understand the advantages and drawbacks of using virtual reality for this type of applications, as well as the affordances of annotating directly in a 3D environment.

Technologies of Non-Linear Storytelling for the Management of Cultural Heritage in the Digital City: The Case of Thessaloniki

Ofilia Psomadaki et al.

Abstract:
Technology is currently promoting unprecedented changes in urban areas, which are often labeled as smart city developments. This paper presents the main findings of the PhD thesis entitled "Technologies of Non-Linear Storytelling for the Management of Cultural Heritage in the Digital City: The Case of Thessaloniki". This thesis focuses on the dedicated digital storytelling strategies that promote active audience engagement in urban cultural heritage. A collaborative model is proposed and analyzed (in multiple perspectives), aiming at providing an integrated approach to cultural heritage documentation, management and dissemination. The model has been built for the Digital City of Thessaloniki (in Greece), a big city, rich in Cultural Heritage, but with rather poor heritage management mechanisms. The research focuses on practices that promote Cultural Heritage in the Digital City and the prospects for improvement, examining theoretical and practical aspects of engaging people for the collection and interpretation of digital Cultural Heritage (places, artifacts, etc.). The outcome of this research is the development of a new model that fuels audience engagement and collaboration of cultural organizations. A pilot implementation strategy has been employed taking into consideration different perspectives of four different target groups that included art lovers, artists, representatives of cultural institutions and art journalists. A related survey was carefully designed and executed, seeking for formative qualitative and quantitative evaluation prior and after the development of the model. The proposed model brings forward novel technological and methodological guidelines regarding audience engagement, which could be successfully deployed in cities with similar cultural, geographical, and technological features.

Rapid Reconstruction and Simulation of Real Characters in Mixed Reality Environments

Margarita Papaefthymiou et al.

Abstract:
Virtual characters play a fundamental role for attaining high level of believability in Mixed-reality environments and are the key-element for transferring knowledge and presenting scenarios in different Cultural Heritage applications. In this work, we populate our Mixed-reality applications with Virtual narrators which play a vital role in the presentation of Cultural Heritage by give instructions to the users and transfer knowledge about the history of the Cultural Heritage monuments. We strongly believe that Augmented Reality and Virtual Reality environments are a powerful and attractive medium for transferring knowledge to the users, for Digital Cultural Heritage monuments through immersive and interactive experiences. Such Virtual narrators are reconstructed out of real ones and have the ability for verbal as well as nonverbal communication skills. In this work, we compare latest 3D reconstruction methodologies of realistic Virtual characters by capturing real human geometry from simple photographs. This topic of research remains open since there are no straightforward methods of accurate and automatic reconstruction of high resolution virtual characters from real humans without significant human processing of the gathered data.

The EU Virtual Multimodal Museum Project

Marinos Ioannides

Abstract:
Virtual Multimodal Museum (ViMM) is a high-visibility and participative Coordination and Support Action (CSA), funded under the EU Horizon 2020 programme (CULT-COOP-8-2016). ViMM brings together Europe and the world's leading public and private sector organisations working on Virtual Museums and in the wide sector of Digital Cultural Heritage to support high quality policy development, decision making and the use of technical advances. The partner consortium will be supported by an expert Advisory Group in building the ViMM Framework, involving decision-makers and practitioners in defining and resolving issues spread across 7 interlinked Thematic Areas ('the 7 Ds'): Definitions Directions Documentation Dimensions Demand Discovery Decisions Major results will include: i) a highly interactive and wide-reaching ViMM communication platform which will enable focused contributions and discussion by everyone interested, represent excellence in Virtual Museums, and provide a decision-support tool for stakeholders, ii) key events at policy and practitioner/ stakeholder levels and extensive use of the media, iii) a clearer, evidence-based view of the impact of Virtual Museums and Digital Cultural Heritage on society and the economy and iv) a manifesto and roadmap for action to be validated at the final ViMM International Conference in 2019.

Created by the ITN-DCH Fellow:

Georgios Leventis-ER3

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