

When ICT meets Cultural Heritage

October 26th, 2017.

Le Fonds Belval - 1, avenue du Rock'n'Roll L-4361 Esch-sur-Alzette

Sessions Details

Welcome– Dr. Yannick Naudet, leader of the ADAPT research group, ITIS / HDCE unit, Luxembourg Institute of Science and Technology.

“CrossCult H2020– A mobile App to walk through the city’s history.” – Dr. Ioanna Lykourantzou, Coordinator of the CrossCult project.

European history is an exciting mesh of interrelated facts and events, crossing countries and cultures. However, historic knowledge is usually presented to the non-specialist public (museum or city visitors) in a siloed, simplistic and localised manner. In CrossCult, an H2020-funded EU project that started in 2016, we aim to change this. With an interdisciplinary consortium of 11 partners, from seven European countries we are developing technologies and mobile applications that help European citizens, as well as museum and city representatives, to access history through narratives that highlight cross-border and cross-cultural connections among pieces of cultural heritage, physical venues and citizens’ viewpoints. After a brief introduction to the project’s objectives and innovative technologies (ranging from indoor recommendations for museums, to urban crowdsourcing for smart cities), the talk will present our first findings from Pilot 4, the smart city mobile application “made in Luxembourg” by CrossCult. We will see how, through a coalition of social scientists and computer scientists, we are iteratively developing a fun educational application to enable Luxembourg tourists and residents discover city history, and how city, but also venue, stakeholders can participate in this effort, through our open Living Lab approach.

Take a walk in Esch-Belval with the CrossCult mobile App.

In this hands-on experience, you will have the chance to use the Pilot 4 CrossCult mobile application to walk through and explore the urban district of Esch-Belval from a new fascinating perspective. You will discover how the area transformed from an industrial site to an innovation campus, discuss with other visitors and reflect on how these changes shape Luxembourg’s contemporary and future history.

Keynote 1: “Exploring the Potential Contribution of Mobile Eye-tracking Technology in Enhancing the Museum Visit Experience.” – Prof. Tsvi Kuflik

Current technology offers a variety of ways for context-aware information delivery to mobile users. The most challenging aspect, however, is to determine what the user is interested in. The user’s position is the best available hint, but if we know what the user is looking at and what his or her gazing profile is, we can narrow down the possibly relevant objects of interest. With the advent of mobile and ubiquitous computing, it is time to explore the potential of mobile eye tracking technology for natural, intelligent interactions between users and their smart environment, not only for specific tasks, but also for the more ambitious goal of integrating eye tracking into the process of inferring mobile users’ interests, for the purpose of providing them with relevant services, a research area that has received little attention so far. In this work, we examine the potential of integrating a mobile eye tracker, as a natural interaction device, into an audio guide system for museum visitors. Using it as a pointing device enables the system to reason unobtrusively about the user’s focus of attention and to deliver relevant information about it as needed. To realize this goal, we integrated an image-matching based technique for indoor positioning and an eye-gaze detection technique to identify the user’s focus of attention into two different versions of a mobile audio guide: (1) a proactive version that delivers information automatically whenever user interest is detected, and (2) a reactive version that notifies the user about the availability of this information, thus giving the user more control over information delivery. Furthermore, we developed a conventional museum visitors’ mobile guide system using a smartphone and low-energy Bluetooth beacons for positioning; this guide was used as a reference system. The three museum visitors’ guides were evaluated in realistic settings at the Hecht1 Museum, a small museum, located at the University of Haifa that has both archeological and art collections. The experimental evaluation compared the contribution of the three versions of the audio guide to the visit experience. The results showed that the mobile eye tracking technology, although unfamiliar, and perhaps even immature, was accepted by the participants. The mobile eye tracker audio guide was perceived as preferable to the conventional museum mobile guide, especially with regard to learning during the visit. Furthermore, with regard to proactivity in context-aware systems, the results showed that the participants like to be in control, and that most of them preferred the reactive version of the mobile eye tracker audio guide over the proactive one.

Keynote 2: “Analysis and prediction of museum visitors’ behavioral pattern types.” – Prof. Tsvi Kuflik

Many studies have investigated personalized information presentation in the context of mobile museum guides. In order to provide such a service, information about museum visitors has to be collected and visitors have to be monitored and modelled in a non-intrusive manner. This can be done by using known museum visiting styles to classify the visiting style of visitors as they start their visit. Past research applied ethnographic observations of the behavior of visitors and qualitative analysis (mainly site studies and interviews with staff) in several museums to define visiting styles. The talk presents a work that validates past ethnographic research by applying unsupervised learning approaches to visitors classification. By providing quantitative empirical evidence for a qualitative theory we claim that, from the point of view of assessing the suitability of a qualitative theory in a given scenario, this approach is as valid as a manual annotation of museum visiting styles. Furthermore, the initial definition of a user model is also challenging since it should be built in a non-intrusive manner. Understanding visitors’ behavioral patterns may help in initializing their user models and supporting them better. This talk also reports on three stages of analysis of behavior patterns of museum visitors. The first step assesses, following past ethnographic research, whether a distinct stereotype of behavior can be identified; the second shows that visitors’ behavior is not always consistent; the third shows that, in spite of the inconsistency, prediction of visitor type, is possible.

Keynote 3: “From describing items to telling their stories.” – Prof. Manolis Wallace

The meeting of cultural heritage and informatics has given us standards with which to represent information regarding cultural artefacts; tools to facilitate, and at times automate, the generation of this information; search and correlation capabilities to support both the layperson and the researcher; and intuitive user interfaces to bring culture closer to a broader and ever-changing audience. But is this the end of the line? Is it enough to store and present information about singular items or is something more needed to really have a complete cultural experience?

In this talk we build on feedback from archeologists, museum managers and museum guides and turn our attention to the next logical step: moving the focus from the single item to the whole exhibition and to the narration that accompanies it.

Presenters Short Biographies

Prof. Tsvi Kuflik is the former head of the Information Systems Dept. at The University of Haifa. Over the past ten years, the focus of his work was on ubiquitous user modeling applied to cultural heritage. In the course of his work, a “Living Lab” has been developed at the University of Haifa – a museum visitors’ guide system was developed for the Hecht museum. It is available for visitors on a daily basis and serves also as a test bed for experimenting with novel technologies in the museum. Currently, the system is being used for research on Social Signal Processing where signals transmitted by devices carried by the visitors are used for modeling group behavior, in order to reason about the state of the group visit. Another research direction focusses on the use of intelligent user interfaces in ubiquitous computing within the “living lab”. Where issues like interaction with large, situated displays; interrupt management; navigation support; temporal and lifelong aspects of ubiquitous user modeling are studied. Tsvi got BSc. and MSc. In computer science and PhD. In information systems from Ben-Gurion University of the Negev, Israel. Over the years Tsvi collaborated with local and international researchers, supervised graduate students working with him on this research, organized the PATCH workshops series (Personal Access To Cultural Heritage) and published about 200 scientific papers, out of them 30 papers about this specific research. Tsvi is also a distinguished ACM scientist and a senior IEEE member.

Prof. Manolis Wallace is currently an Assistant Professor at UOP’s Department of Informatics and Telecommunications and the director of the Knowledge and Uncertainty Research Laboratory. He holds a degree in Electrical and Computer Engineering from the National Technical University of Athens and a PhD in “Intelligent knowledge-based systems in uncertain environments” from the same university. His earlier positions include that of project coordinator for the Foundation of the Hellenic World, where he supervised more than 15 national and EU projects with a total budget exceeding 10M€, and chair of the Department of Computer Science of the Athens Campus of the University of Indianapolis, where he founded and directed the graduate program in computer science. Wallace’s research interests include semantics, reasoning under uncertainty and adaptation to the user, areas in which he has edited about 20 journal special issues, books and conference proceedings. He has published more than 80 articles in journals and conferences, is a senior member of the IEEE and a co-founder and permanent Steering Committee member of the Semantics and Social Media Adaptation and Personalisation (SMAP) workshop series.

Dr. Ioanna Lykourantzou is a senior researcher at the Luxembourg Institute of Science and Technology, and the coordinator of the European H2020 project CROSSCULT. Her research focuses on crowd & social computing, computer-supported cooperative work and distributed coordination. She works with an interdisciplinary approach that combines computational methods (machine learning, agent-based modelling, mathematical optimization) with social sciences (personality testing, team building). In the past, she has collaborated with the Human-Computer Interaction Institute of Carnegie Mellon University, INRIA Nancy-Grand Est and the Public Research Centre Henri Tudor (now LIST). She received her PhD degree on applied machine learning from the National Technical University of Athens in 2009 and her Electrical and Computer Engineer diploma from the same university in 2005. Dr. Lykourantzou is the author and co-author of more than 50 scientific papers and her research has attracted funding at national and international level (H2020-CROSSCULT, FNR-RHEA, FP7-Experimedia BLUE). She is part of the Marie Curie and ERCIM (European Research Consortium for Informatics and Mathematics) alumni networks.