Track2. Context-aware Adaptive and Personalized Mobile Learning Systems

Organiser: Demetrios G. Sampson
Research Assistants: Panagiotis Zervas, Sergio Eduardo Gomez Ardila

Adaptive and Personalized Learning is an emerging research field that is recognized as one of the fourteen (14) most important engineering research challenges of 21st Century by the National Academy of Engineering\(^1\). As a result, during the past years there is a growing interest for this research field by researchers in Technology-enhanced Learning (TeL). This has lead to several research initiatives world-wide that investigate the potentials of the educational paradigm shift from the traditional one-size-fits-all teaching approaches to adaptive and personalized learning (Loa et al., 2012; Tseng et al., 2008; Brusilovsky & Henze, 2007; Boticario & Santos, 2007). The key benefits of this approach are that learners are provided with adaptive and personalized learning experiences that are tailored to their particular educational needs and personal characteristics towards maximizing their satisfaction, learning speed and learning effectiveness.

On the other hand, the widespread ownership of mobile devices and the growth of mobile communications industry have offered a number of benefits to the end-users of mobile devices including: (a) instant interpersonal and group communication, (b) location-aware information delivery and personalized assistance based on users’ preferences and needs and (c) ubiquitous communication and interaction with smart devices and objects (Mascolo, 2010; Sharples & Roschelle, 2010; Herrington et al., 2009). Mobile devices are recognized by the Horizon Report published by the New Media Consortium’s Horizon Project\(^2\), as an emerging technology with the potential to facilitate teaching and learning strategies that exploit individual learners’ context such as, learners’ different prior knowledge, interests, learning styles, learning goals, as well as current location and movements in the environment (Jeng et al., 2010; Johnson et al, 2009; Cobcroft et al., 2006). More precisely, mobile devices can (a) engage students to experiential and situated learning without place, time and device restrictions, (b) enable students to continue learning activities, initiated inside the traditional classroom, outside the classroom through their constant and contextual interaction and communication with their classmates and/or their

\(^1\) http://www.engineeringchallenges.org/

\(^2\) New Media Consortium’s Horizon Project is a comprehensive research venture established in 2002 that identifies and describes emerging technologies likely to have a large impact over the coming five years on a variety of sectors around the globe (http://www.nmc.org/horizon)
tutors, (c) support on-demand access to educational resources regardless of students’ commitments, (d) allows new skills or knowledge to be immediately applied and (e) extend traditional teacher-led classroom scenario with informal learning activities performed outside the classroom.

This has led to an increased interest on context-aware adaptive and personalized mobile learning systems that aim to provide learning experiences delivered via mobile devices and tailored to the educational needs, the personal characteristics and the particular circumstances of the individual learner or a group of interconnected learners (Liu & Hwang, 2009; Hwang et al, 2008; Yang, 2006). More specifically, context-aware adaptive and personalized mobile learning systems can significantly enhance learning experiences by: (a) providing learners with personalized learning experiences in real-world situations and (b) detecting and recording learners’ behaviour for providing them with adaptive feedback and support (scaffolding).

Nevertheless, different aspects have to be considered when aiming at providing learners with adaptive and personalized learning experiences within context-aware mobile learning systems. These aspects could be summarized as follows (Graf & Kinshuk, 2008):

♣ What kind of learners’ contextual information can be used in context-aware mobile learning systems for dynamic adaptations and personalization?
♣ What type of adaptations can be performed in context-aware mobile learning systems based on this contextual information?

The course will introduce you to personalization, adaptivity and context-awareness with focus on ubiquitous and mobile learning and provide you with generalities and concepts, through techniques, design, authoring, delivery and evaluation – all in connection with the respective learning theories and with intense discussions and hands-on activities. Moreover you will be led to explore topics related to the strategies and applications of context-aware ubiquitous and mobile learning and it will identify and discuss major research challenges and open research questions in the field.

Reading List

Course Organisers


Spector (Eds), "Ubiquitous and Mobile Informal and Formal Learning in Digital Age", Springer, 2012


**Others**


Demetrios G. Sampson has received a Diploma in Electrical Engineering from the Democritus University of Thrace, Greece in 1989 and a Ph.D. in Electronic Systems Engineering from the University of Essex, UK in 1995. He is a Full Professor of Digital Systems for Learning and Education at the Department of Digital Systems, University of Piraeus, Greece, a Research Fellow at the Information Technologies Institute (ITI), Centre of Research and Technology Hellas (CERTH), and an Adjunct Professor at the Faculty of Science and Technology, Athabasca University, Canada. He is the Founder and Director of the Advanced Digital Systems and Services for Education and Learning (ASK) since 1999. He has been a Visiting Professor at the School of Computing and Information Systems, Athabasca University, Canada (2010), the Information Management Department, National Sun Yat-sen University, Taiwan (2011) and the University of Tunis (2012). His main scientific interests are in the area of Learning Technologies. He is the co-author of more than 285 publications in scientific books, journals and conferences with at least 1300 known citations (h-index: 20). He has received 7 times Best Paper Award in International Conferences on Advanced Learning Technologies. He is a Senior and Golden Core Member of IEEE and he was the elected Chair of the IEEE Computer Society Technical Committee on Learning Technologies (2008-2011). He is Co-Editor-in-Chief of the Educational Technology and Society Journal (impact factor 1.011, 2011). He is also a Member of the Steering Committee of the IEEE Transactions on Learning Technologies, Member of the Advisory Board of the Journal of King Saud University - Computer and Information Sciences, Member of the Editorial Board of 18 International/National Journals and a Guest Co-Editor in 20 Special Issues of International Journals. His participation in the organization of scientific conferences involves: General and/or Program Committee Chair in 31 International Conferences, Program Committees Member in 296 International/National Scientific Conferences. He has been a Keynote/Invited Speaker in 42 International/National Conferences. He has been project director, principle investigator and/or consultant in 64 research projects with external funding at the range of 14 Million € (1991-2016). He is the recipient of the IEEE Computer Society Distinguished Service Award (July 2012).