DEPARTMENT OF COMPUTER SCIENCE

PhD Degree Oral Presentation

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Time:	19 August 2016 (Friday)
	10:30 am - 12:30 pm (35 mins presentation and 15 mins Q & A)
Venue:	FSC703, Fong Shu Chuen Library, HSH Campus

"Enhancing Student Engagement and Interaction in E-learning Environments through Learning Analytics and Wearable Sensing"

Abstract

E-learning refers to computer-based learning experiences, self-paced or instructor-led, supported and enabled by information technology. Virtual Learning Environments (VLEs), as a major form of e-learning systems, are increasingly adopted in universities and educational institutions for supporting various types of learning. Student engagement is critical for successful teaching and learning in VLEs. In existing VLEs, feeling isolated without adequate supervision from teachers may cause negative emotions such as anxiety. Such emotions may in turn significantly weaken students' motivation to engage in learning activities. In addition, the lack of effective interaction in learning activities also results in poor performance and engagement, even the dropouts from the online courses. In this thesis, we explore a set of approaches and tools to enhance student engagement and interaction in e-learning environments: (1) extract valuable information from the user posts in online course forums to advise the content organization of web pages; (2) instantly monitor and visualize students' interaction statuses in instructor-led learning; (3) identify and highlight the hotspot time slots and contents of the lecture recordings; (4) dynamically provide the biofeedback-based visualization via wearable devices to reduce students' anxiety in self-paced learning.

We present a page-segmentation-based wrapper (eCF-wrapper) designed for extracting learner-posted data in online course forums. It consists of a novel page segmentation algorithm and a decision tree classifier. We also develop a web-based interaction-aware VLE (WebIntera-classroom), which employs a ubiquitous interactive interface to enhance the learner-to-content interactions, and a learning analytics tool to instantly visualize learners' interactions in learning activities. Additionally, we propose a high-granularity Learning Analytics Engine (hgLAE) to play a lecture recording, identify hotspots in a lecture recording and raise students' awareness of these hotspots. Questionnaire survey, interview and case study are conducted to investigate the instruction effect of WebIntera-classroom. Besides, we develop a physiologically-state-aware self-paced learning environment (FishBuddy) to alleviate anxiety and promote student engagement in self-paced learning by using the wearable technology. The between-groups evaluation result shows that FishBuddy is useful in promoting student engagement (i.e., the consistency of engagement), and the students' self-reports indicate that FishBuddy is helpful for reducing anxiety and experience of isolation during the self-paced learning exercises. Finally, the thesis is concluded with a discussion on the future work.

*** ALL INTERESTED ARE WELCOME ***