DEMONSTRATING THE COLLATREX FRAMEWORK FOR COLLABORATIVE CONTEXT-AWARE MOBILE TRAINING AND EXPLORATION

Jean Botev

University of Luxembourg
Faculty of Science, Technology and Communication
Computer Science and Communications Research Unit
Rue Richard Coudenhove-Kalergi 6
L-1359 Luxembourg

ABSTRACT

The CollaTrEx framework for collaborative context-aware mobile training and exploration is designed for the in-situ collaboration within groups of learners performing together diverse educational activities to explore their environment in a fun and intuitive way. It employs both absolute and relative spatio-temporal context for determining available activities and supports seamless collaboration in spite of temporary connection losses or when in remote areas. This demo showcases the prototype system and front-end implementation for tablet devices, inclusive of new activity types such as contour drawing, which aim at aiding memory retention to provide a more effective learning experience.

KEYWORDS

Location-based mobile learning, context-awareness, in-situ collaboration, tablet-based application prototype

1. MOTIVATION AND BACKGROUND

The proliferation of mobile devices equipped with a multitude of sensors as well as advanced recording and networking capabilities offers an enormous potential for educational applications. The advantages and opportunities of context-aware mobile learning are widely recognized (Sampson & Zervas 2013), but modern smartphones, tablets or wearables with their GPS antennas, magnetometers and gyroscopes, not only allow for establishing precise spatio-temporal context. Their multi-touch screens, high-resolution cameras and microphones, together with the support of various long- and short-range network protocols, call for increased interactivity and collaboration. However, instead of harnessing these capabilities to full effect for a genuinely collaborative and interactive mobile learning experience, they are often left unexploited.

The CollaTrEx framework (Botev et al. 2016) integrates the two paradigms of situated learning (Brown et al. 1989, Lave & Wenger 1991) and collaborative learning (Vygotsky 1978), thus combining context-aware, experiential and social factors. Its prime focus is on intra-group cooperative aspects, i.e., support for active in-situ collaboration within groups of learners exploring their environment. The diverse activities are designed to accommodate various age levels and content ranging from basic, e.g., for city guides or sightseeing, to academic, as for instance in the outdoor collaborative scenarios classified (Vasilou & Economides 2007). Single-user mobile learning scenarios as subclasses of the corresponding, collaborative cases are also inherently supported. To determine which activities are available and to provide a tailored experience both for leisure and academic settings, absolute and relative spatio-temporal context is employed. The framework also supports different on- and offline modes and buffering strategies since particularly in remote areas the necessary infrastructure or proximity between groups of learners cannot always be assumed.

2. DEMONSTRATION

In this demo, we present the CollaTrEx prototype system and the front-end implementation for tablet devices with the various available activities. Collaborative image capturing and particularly the novel contour drawing and detection serve as exemplars for how the active examination of a specific subject can support memory retention to help establish relevant knowledge providing an effective learning experience. Users are able to receive immediate feedback on their input which can be evaluated locally and independent of connectivity status.

Interested parties will be able to try out the application on one or several tablet devices to get a first-hand impression of the user interface philosophy and performance of the underlying technologies and algorithms.

REFERENCES

Botev, J. et al., 2016. CollaTrEx – Collaborative Context-Aware Mobile Training and Exploration. *Proceedings of the International Conference on Design, Learning & Innovation (DLI '16)*. Esbjerg, Denmark, pp. 1-8.

Brown, J.S. et al., 1989. Situated Cognition and the Culture of Learning. *In Educational Researcher*, Vol. 18, No. 1, pp. 253-265.

Lave, J. & Wenger, E., 1991. *Situated Learning: Legitimate Peripheral Participation*. Cambridge University Press, Cambridge, UK.

Sampson, D.G. & Zervas, P., 2013. 'Context-Aware Adaptive and Personalized Mobile Learning Systems' in Sampson, D.G. et al. (eds), *Ubiquitous and Mobile Learning in the Digital Age*, pp. 3-17. Springer New York, NY, USA.

Vasilou, A. & Economides, A.A., 2007. Mobile Collaborative Learning Using Multicast MANETs. *In International Journal of Mobile Communications*, Vol. 5, No. 4, pp. 423-444.

Vygotsky, L.S., 1978. *Mind in Society: the Development of Higher Psychological Processes*. Harvard University Press, Cambridge, MA, USA.