A Study on Movie-Based Context-Aware Learning

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（別紙様式 2）

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論　文　内　容　の　要　旨

This thesis proposes a movie-based context-aware learning (MBCAL for short) concept as an alternative approach to context-aware ubiquitous learning (*u*-learning) to facilitate contextual learning. As the movie contains extremely rich contexts, it can be a place in where quasi context-aware learning is practiced. In MBCAL, learners learn through situations (contexts) that occur in the movie scenes. Through this approach, richer contextual learning content can be presented with less effort than a context-aware u-learning system does. This idea was raised after recognizing some limitations that may occur in managing a context-aware *u*-learning system.

Researches on context-aware *u*-learning systems have shown that learning from real environment is attractive and effective for learners. However, it requires developers as well as operators of much effort to realize and utilize such a real environment. Developers have to develop a complicated learning application interacting with real environment through various sensors and other smart devices. At the same time, operators have to prepare contextual learning materials that can provide learning tasks depending on dynamic situations. Furthermore, physical devices such as sensor network or other sensing devices deployed in real environment can be out of order by long time operation under severe environment such as outdoors. In addition, availability of real time network connection is another important issue to be concerned. These complexities lead more development cost or limited functionality of the learning system. Therefore, concerning these issues, we propose the MBCAL concept.

In MBCAL, learners learn through situations that occur in the movie scene. In the other words, learning process is given with context-awareness in the imaginary context situated in the movie scene. Since events in the movie are foreseeable, we can describe contexts of the scenes in the movie in advance. The developer does not need special device to acquire the context as well as efforts to know unexpected circumstances in design of the context-aware learning system. Through this approach, various learning situations can be presented with less effort than a context-aware u-learning system does. For instance, we can create a learning task associated with jungle from a scene situated in the jungle instead of managing a learning task situated in a real juggle. These contribute to limit cost and effort to develop and operate the system. In short, MBCAL utilizes movies to facilitate learner’s proactive learning from the context situated in the scenes as ubiquitous learning systems try to do in real environment. A necessary preparation to use the MBCAL system is to describe (annotate) the scenes in the movie with their contexts.

This thesis has the following contributions.

1) This thesis promotes the movie-based context-aware learning (MBCAL) concept, an alternative manner of a context-aware learning approach by facilitating learner's proactive learning from the context situated in the movie scenes as ubiquitous learning systems try to do in the real environment.

2) This thesis introduces a novel movie description (annotation) framework *i.e.* the object-oriented context model (OOCM) to describe the context of the movie scenes. The OOCM functions as a reference model to describe the context of the movie scenes in a unified and formal manner to ensure uniformity of description.

3) This thesis defines the context description language (CDL), a textual language subject to the OOCM. This CDL is designated to facilitate context descriptor (teacher) in describing the move contexts instantly.

4) This thesis introduces the movie-based context-aware quiz generation, representing a movie-based context-aware language learning (MBCALL) system as one potential implementation field of the (MBCAL) concept. The quiz generation system facilitates self-interactive language learning through movie. The system generates quizzes based on the context of the replaying scene, which is described under OOCM framework, trains and examines learners by the quizzes in an interactive manner

Evaluation were conducted to assess performance of both the OOCM and the proposed MBCALL system. Evaluation on the OOCM shows that current version of the OOCM which is integrating the case grammar concept of natural language processing to define classes (context elements) can guide the composer (movie context descriptor) to enrich information included in the movie context. It is indicated by a fact that more OOCM associations describing the movie contexts can be identified and described by the evaluation subjects by referencing the OOCM than without referencing the OOCM.

On the other hand, although MBCALL contributes only 3.09% higher in enhancing learner's learning outcome than conventional learning, we found an interesting indication that MBCALL significantly helpful for certain type of learner. This can be drawn from score of a learner who achieved learning outcome 38.89% higher in MBCALL than in conventional learning. Furthermore, learner's feedback shows high acceptance to MBCALL which is indicated by score of four aspects among five evaluation aspects fulfil the threshold value (mean is 4 or more) and another aspect is 3.8 point. These indications imply that learners mostly feel satisfied to MBCALL.