Chapter 14
A Learning Object Recommendation System:
Affective-Recommender

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ABSTRACT

Emotions play a very important role in the learning process. Affective computing studies try to identify users' affective state, as emotion, using affect models and affect detection techniques, in order to improve human-computer interactions, as in a learning environment. The Internet explosion makes a huge volume of information, including learning objects data, available. In this scenario, recommendation systems help users by selecting and suggesting probable interesting items, dealing with large data availability and decision making problems, and customizing users' interaction. In u-learning context, students could learn anywhere and anytime, having different options of data objects available. Since different students have different preferences and learning styles, personalization becomes an important feature in u-learning systems. Considering all this, the authors propose the Affective-Recommender, a learning object recommendation system. In this chapter, they describe the system's requirements and architecture, focusing on affect detection and the recommendation algorithm, an example of use case, and results of system implementation over Moodle LMS.

INTRODUCTION

Student's emotions are inserted in learning process and influence it. A student could even quit learning due to negative feelings, as confusion, frustration or anxiety. In order to avoid these situations, teachers and mentors have to be able to identify emotional reactions, in order to change theirs approaches to improve learning processes (Picard, 1997).

Affective Computing researches try to improve human-computer interactions, through systems able to identify user's affective state, providing automatic responses to it. Affective Computing is the computing that is related to, arises from or influences emotions in human users, providing skills to make decisions, due to emotion's importance in our lives (Picard, 1995) (Calvo and d'Mello, 2010).

Personalization is an important feature in e-learning systems (Kerkiri et al., 2007), as well as, in u-learning, due to distinct students' preferences and experiences. In this way, learning process could be customized to each student, based on his/her learning style and preferences, in order to improve this process. It is based on the idea that individual methods help students to learn more quickly and effectively, improving their understanding about a subject (Jones & Jo, 2004).

Recommendation systems help users providing personalized suggestions, selecting the probable most interesting items, making useful huge data volume (Adomavicius & Tuzhilin, 2005). U-learning allows anywhere and anytime learning, aware to user's context. With the data and mobility explosion, recommendation systems could help students, in u-learning scenarios, choosing and suggesting learning objects in order to customize this process. The customization could be based on student's preferences, and helps them on make decision processes. Recommendation systems are used to delivery courses adaptively, selecting and suggesting the probable most interesting learning objects to each student. (Khribi et al., 2009)

In order to improve recommendation processes, users' context could be used, since states variables usually influence their preferences. In this way, context-aware recommendation systems arise, as systems that use users' situation variables in recommendation process (Hussein, 2009). In u-learning, student's affective state could be used as a context variable, due to its importance in cognitive processes. In this way, we propose Affective-Recommender, a learning objects recommendation system, aware to student's affective state, in an u-learning scenario. Through student's affective states use, the system aims to select and to suggest the probable most interesting objects, as a teacher that change his/her class approach, based on student's affective reactions. Besides, recommendation systems provide personalization, in this case, making learning customized to each student.

This chapter is divided into six main sections: besides Introduction, in Background is made a revision about the main topics discussed in this chapter; in Affective-Recommender System the proposed system is detailed, with its components and way of work; in Results and Analysis, a system implementation is explained, with a scenario of use, a use case and related works; finally, in Future Researches Directions the work's next steps are discussed and *Conclusion* ends this chapter.

BACKGROUND

In this section, the main broad topics treated in this work are present. First, it's made a revision about Affective Computing topics, as Affect Detection and affective models, and affective relation to learning. And after, recommendation systems are exposed, including their operation way and classification.

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