ABSTRACT

Automatically Detection of Learning Concepts in Intelligent Tutoring System

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Nowadays, researches regarding the integration of intelligent issues on educational support systems has increased in parallel with the rapid growth of computer technology. The researches are associated with problems such as detecting what to teach to students, learning speed, learning style and perception capacity of students. The overall objective of these studies is to develop more efficient educational support systems promoted by traditional classroom training. The solving these issues are difficult, controversial, time consuming and highly non-trivial processes, even for an expert in this field. This thesis analyzes the problem how to determine the learning concepts from an educational material with the intelligent tutoring systems. The extraction of learning concepts from an educational contents is a critical problem. Thus, the problem about the classification of the educational contents can be overcome. In addition, the question of "what to teach to students" can be answered, and the issues of "whether the recommended educational material is related to the learning concepts actually required to teach or not" can be handled by an educational support system.

In this study, firstly, three different corpora have been constructed. The corpora correspond to the "Algebra", "Calculus" and "Computer Science" as learning domains. The educational contents as documents and corpora has been pre-processed. In the next step, the feature vectors have been generated for each word sequence in the documents. The feature vectors corresponds some statistical data such as term frequency and inverse document frequency. Each word string referenced by a feature vector is candidate for learning concepts within the learning domain. In this study, two different methods have been applied: k-nearest neighbour with majority voting algorithm and Multi-Layer Perceptron (MLP) with Levenberg-Marquardt optimization. Recall, precision and f-measure scores have been used for measuring the system performance.

Key Words
Intelligent Tutoring Systems, Educational Technology, Artificial Intelligence, Machine Learning