

AN EFFICIENT ALGORITHM FOR INTEGRATING HETEROGENEOUS ITEMBANKS

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ABSTRACT. *In this paper, we present an efficient algorithm for integrating a collection of heterogeneous itembanks, called Heterogeneous Itembanks Integrator (HIBI). This algorithm is motivated by the desire to integrate itembanks provided by both the publishers and instructors, which more often than not use different content structures. By integrating all the itembanks, HIBI provides for the users of an e-Learning system a central repository of all the items with a consistent content structure that would significantly increase the learning contents available to the users of an e-Learning system. The proposed algorithm starts off with one of the itembanks as a reference itembank. Then, all the items on all the other itembanks are integrated into the reference itembank to create the so-called meta-itembank. Moreover, by treating the meta-itembank thus created as the reference itembank, it can be easily extended by using exactly the same algorithm. Our experimental results showed that the proposed algorithm could provide an extremely high quality result in terms of both the relevance of items and the computation time in Chinese item sets. In addition, the experimental results also showed that the accuracy rate of the meta-itembank described herein ranges from 96.3% to 97.6%.*

Keywords: Itembanks, E-learning system

1. **Introduction.** The learning behavior of human beings has been shifted from the traditional paper and classroom toward e-Learning due to the innovation of computer and the Internet technologies. The way students (learners) and instructors interact has also been changed and extended. In general, to develop a “good” e-Learning environment, it needs to integrate and unify a variety of technologies and theories, for example, Web 2.0 [1], social network [2], ontology [3], SCORM [4], QTI [5], IRT [6], RSS, XML, AJAX [7] and so on. Recently, the focus of traditional e-Learning systems, on digitizing the contents and enhancing the interactivity between instructors and students, has been shifted toward providing “data collaboration”, “information reuse”, “knowledge sharing” and so forth [1, 8, 9]. In e-Learning, *Testing and Assessment* [10, 11, 12, 13, 14] is another important research issue as far as a teaching activity is concerned. Students can understand the