Authoring Tool Generator for Intelligent Tutoring Systems

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Abstract
The Intelligent Tutoring Systems (ITSs) must deal both with strategy and knowledge in order to help students in the teaching/learning process. The knowledge is generally passed on to the students via teaching/learning activities, which may be generated by an Authoring Tool instead of being embedded in the tutor project. This way, the tutoring system can be both simpler and more flexible, providing the expert teacher with more freedom to generate new activities with the assistance of computer science professionals. Considering the diverse knowledge domains focused in ITSs, it looks useful the availability of an Authoring Tools Generator (ATG) to cope with all these different areas. An authoring tool generated by the ATG works as the link between the teacher and the ITS. Therefore, it must contain an easy to use and clear interface for the teacher to define the activities and at the same time must have a low level structure that allows a straightforward interpretation process done by a computer program.

1. Introduction
The authoring tools - ATs - have been used in diverse knowledge areas to allow the generation of computer products. The ITSs generally count with ATs to obtain the learning objects to be used in the tutoring schemes [5]. The use of ATs in the ITS context is very beneficial: it frees the expert teacher of depending on computer professionals and creates learning activities that may be used in different ITSs, with some precautions.

To achieve such benefits we have built an Authoring Tools Generator able to be instantiated to different knowledge domains, according to the expert teacher needs and depending on the knowledge domain database.

2. ATG’s Architecture
The ATGs contains a scheme of primitive functions, which are small software components that implement simple tasks, such as printing a picture or writing down a word on the screen, saying a sentence, reading an answer from the keyboard, etc., and are used as building blocks for the creation of objects. These objects are more complex software components which belong then to a particular authoring tool, and are used to form learning activities for a specific knowledge area.

Therefore, the delivering of the learning activities is possible, since the primitives that compose the objects are known by the learning objects interpreter.

Regarding ITSs, it is necessary to identify exactly the role of the authoring tool. In this paper we are going to consider the role of the authoring tools in the architecture proposed by Carvalho to implement an intelligent tutoring system generator based on the expert overlay approach for the student model [1,2,3,4].

3. Authoring Tools (AT)
The AT implements an integrated environment where a toolbox is available to the expert teacher, with objects to be inserted as steps of interaction with the student, to compose the teaching/learning activities.

The objects are stored in a database and are dynamically assembled in the AT’s toolbox. When an activity is generated, the AT produces a XML file that will be used by the ITS's interpreter while delivering the activity.

The authoring tools is the link between the teacher and the STI. Consequently it must present a clear and comfortable interface, with a high level objects toolbox. At the same time, it must provide a lower level interface to allow the generation of the code of the teaching/learning activities to be interpreted by a computer program.

These two paradigms are standardized and supported by the use of primitives. The primitives are the basis for the creation of objects. The interpreter only deals with the primitives, which are completely isolated and independent of the subject domain issues.

References