A Plug-in Based Adaptive System: SAAW

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Abstract. The expansion of the *World Wide Web* and the use of computers in education have increased the demand for *Web* courses and, consequently, the need for systems that simplify their production and reuse. Such systems must provide means to show the contents in an individualized and dynamic way, which requires they present flexibility and interactivity as main characteristics. Nowadays, *Adaptive Hypermedia Systems* (AHS) have been released to support these characteristics. However, most of them do not allow the extension or modification of their resources. In this work we present the *SAAW*, a prototype of an AHS that allows the insertion/removal of plug-ins, among them the *iGeom*, an application for geometry learning, that makes it more interactive and dynamical.

1 Introduction

Despite the importance of the mathematics and geometry in the engineering and computer sciences, there are a lot of difficulties in developing mathematical and geometric abilities among the university students, as well as among high school students. In this work we present a prototype of such an AHS, *SAAW* (*Adaptive System for Learning on the Web*). We also present a plug-in for geometry, *iGeom - Interactive Geometry for Internet*. The *iGeom* is a complete multi-plataform dynamic geometry software (*DGS*), that we are developing since 2000. *iGeom* can be freely downloaded from *http://www.matematica.br/igeom*. The *SAAW* isn't available since it is in its first test.

2 The Architecture (SAAW)

The SAAW is an AHS whose architecture is component-based and it is divided in two main sections: the web manager system and the learning enviromment (i.e., plug-in). Thus, plug-ins can be added or removed depending on the target subject. Other AHS have a component-based architecture, for example [2], [3] and [4], but ours emphasizes the learning enviromment. The plug-in is related with the subject domain and must increase the interactivity with the user.
The plug-ins reside in the client and they can be used in automatic student evaluation. This results in a reduction of the work load into the server. A detailed vision of this architecture is shown in figure 1.

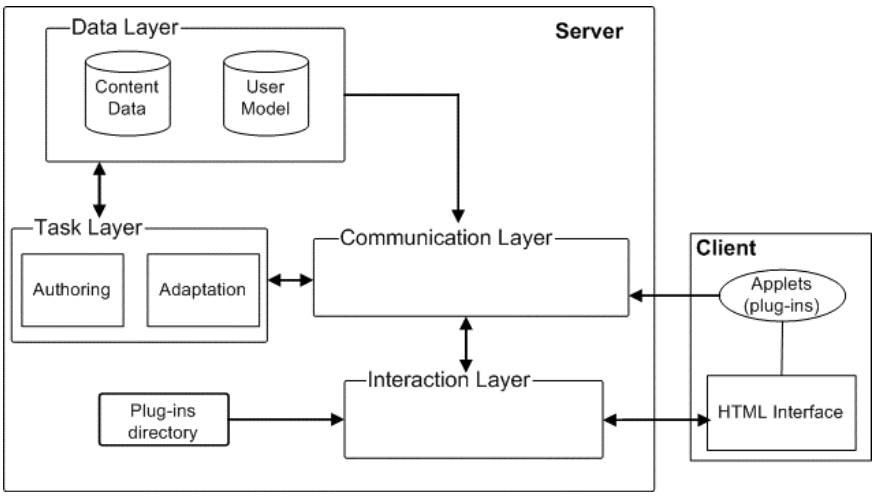

Fig. 1. SAAW. The Adaptive Hypermedia Systems Architecture based in plug-ins

The plug-in is an important part of the SAAW architecture, because they are directly related to the application domain. In addition, they are responsible for the evaluation of the user's interactions and for the largest interactivity with the system.

2 The Prototype and the iGeom

The *iGeom* [1] is a DGS, used to draw any euclidean constructions that are traditionally made with ruler and compass. However, with a DGS the student gets a more precise drawing and can freely move points over the screen. *iGeom* is implemented in Java and can be used as an stand-alone application or as an applet. It has some specific features as "recurrent scripts" and "automatic evaluation of exercises". The use of *iGeom* in *SAAW* allows: the creation/edition of exercises; automatic evaluation; the adaptation of resources, taking into account the exercises evaluation; to communicate to the server results of interactions with the user.

The *SAAW* prototype use the language *PHP*, the database manager *MySQL* and the first plug-in used is the *iGeom*. This prototype dynamically generates *HTML* pages adapted for each course and user, considering the system preferences and the student's model. This prototype (figure 2) is being used by students and teachers in a compulsory discipline offered for an undergraduate course in mathematics in the University of São Paulo (*http://www.ime.usp.br/~leo/mac118/04*).

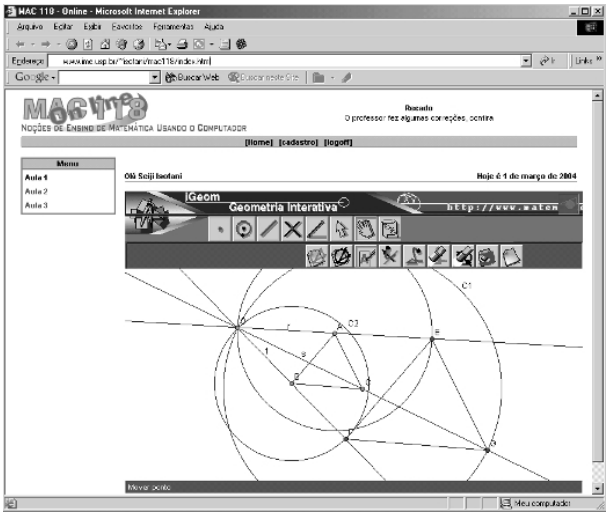

Fig. 2. Resolution of an exercise in the prototype using the plug-in iGeom

4 Conclusion

In this work we present the architecture for an AHS (SAAW), based on plug-ins. The plug-in is responsible for subject related interactivity with user. A prototype (SAAW) of this system is in use with a plug-in to teach/learn geometry (iGeom). The iGeom and SAAW produce an interactive environment allowing: teachers to produce on-line lessons, with automatic evaluation of exercises; students to make geometry constructions directly over the Internet pages; an individualized instruction considering the student navigation style, knowledge level and learning rhythm.

References

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