An Investigation into Adding Intelligence to Web based Educational Systems

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In this presentation we present a framework for designing and implementing the Web-based Intelligent Education System (WIES). It was designed to provide a web-based intelligent teaching/learning environment which will adapt to the students' different learning styles and lecturers' different teaching strategies.

Keywords: educational system, adaptive instruction, knowledge engineering, Web application

1. OVERVIEW

In traditional Web-based educational systems (e.g. WebCT, BlackBoard), learners are often constrained in their learning by a predetermined method or strategy, the contents are generally static and usually the content cannot be changed without external intervention. This provides a uniform learning experience to all learners, regardless of their background or knowledge. As there is substantial variation in the learning styles, abilities, motivation and goals of learners it was suggested that these web based systems would benefit from the ability to adapt to meet individual learning requirements. An overview of the preliminary work regarding the overall architecture design is discussed and the technologies and prototypes that could be used to implement the system are also described.

2. ARCHITECTURE

The abstract mode used by IEEE's LTSA, is derived from a system engineering perspective of information technology. It is a high-level conceptual model which serves as a general guideline for any actual learning system design; The Dexter model adds some kind of adaptation mechanism into the systems to offer personalized links or navigation tools based on user's knowledge.

The most important aspects of Web-based applications are the information nodes (concepts) and the link structure connecting these nodes. In order to perform adaptation in the Web-based educational system, these information nodes must be given a well-defined meaning; the link structure must be well organized to embody the relationship between these nodes. 1) *Domain Modeling*. The domain model describes the subject domain in term of concepts and concept relationships. 2) *User Modeling*. In order to adapt to each individual user, a model of the user's preference, interest, background, knowledge, etc. must be maintained.. 3) *Adaptation Modeling*. Specific adaptation rules reside in this model to provide this new learning environment with abilities of adaptive navigation support and adaptive content to meet the individual pedagogical requirements.

3. TECHNOLOGIES REQUIRED

In order to fulfil the objectives outlined, our proposed system framework is based on XML technologies. The DM-related concepts and concept relationships could be stored in XML format and constitute the Knowledge Base. By applying external XSLT stylesheet to XML documents we can separate its content from the presentation. A course organizer has been designed for teachers to assemble and organize the course-related contents into a well-structured Concepts Space. To annotate the external material, a resource database called "linkbase" has been built, which enables the system to use it in XSLT stylesheet or XLink "resource" locator or DOM objects to render these external links.

4. CONCLUSION

Making Web educational systems adapt to personal needs is a current topical subject. We hope this presentation is a starting point of further discussion among other colleagues interested in this field.

REFERENCES

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