

# Complex Model of the User in Adaptive Learning Environment with Use XML-Technology

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## 1 Introduction

The most efficient with standpoint of the scholastic process is considered that learning environment, in which is used adaptive hypermedia system.

The components of any adaptive hypermedia system are:

- 1) Application Domain Model (ADM) - a set of concepts and concept relationships,
- 2) User Model (UM),
- 3) Adaptation Model (AM) – the techniques to adapt presentations to user model

## 2 Complex User Model

As user model in environment, consisting of interconnected component, is offered take the complex model.

Complex model consist of

- User Model, providing adaptive work with reference or lecture material
- Learner Model, used by system when work start with learning component.

The feature of such model is that we separate adaptation at a level of interface and adaptation of process of the education. Under consequent work first with learning component, but afterwards with reference we get the integration to learner model with user model. At the same time, reference information is given adaptive knowledges got during education.

Mathematically complex model F write so:

$$F: \begin{cases} M_1 = (V, R) \\ M_2 = \{P_1, P_2, \dots, P_n\} \end{cases}$$

where F- complex model,  $M_1$  – a learner model,  $M_2$  - a user model.

V- a quantity of the nodes in semantic network of the application domain, R - a quantity edges,  $P_i$  – i-s user feature.

The learner model  $M_1$  is created on base XML-technology. Mathematically  $M_1$  is acyclic graph, in which nodes correspond to the term, but edges – term's relationship. The user model  $M_2$  is either relational database or text file.

XML will allow hierarchical to dispose information before any required depths. On the strength of what model of the presented sort suits for work with semi-structured data.

Model F contains some metadata on components learning environment and structured information on concept's graph about move of the education.

## 3 Prototype of the Environment with Complex Model

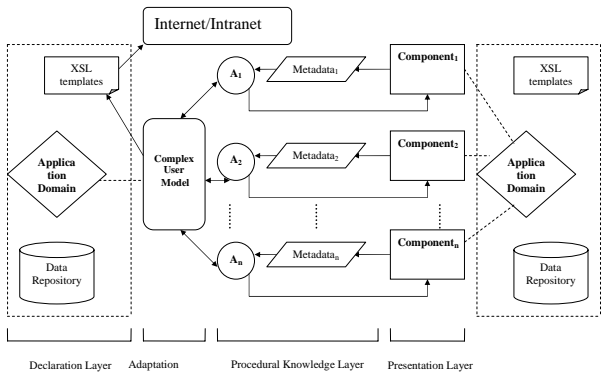


Figure 1: Run-time system architecture

The run-time system has four-tier architecture (Fig. 1).

Components adaptive hypermedia systems match up with level of the structure data, i.e. application domain model corresponds to the declaration layer, user model – adaptation layer, adaptation model - procedural knowledge layer (agent's procedures). The presentation layer is virtual.

The important property learning environment is that it allows to put data through XSL-patterns in internet/intranet for viewing and analysis by teacher. Review is realized both by learners and by separate component.

## 4 Conclusions

We offered the approach in building of the user model for adaptive learning environment composed of several components, founded on complex model. We proved the choice XML-format for such model.

The result of work is making the prototype adaptive learning environment on technical discipline, with integrated complex user model.

The architecture of the environment is designed in accordance with structure adaptive hypermedia system.