USING A HIERARCHICAL DECISION-MAKING SYSTEM IN E-LEARNING

Kuzikov Borys, head of e-learning system laboratory
Sumy State University
b.kuzikov@dl.sumdu.edu.ua

It's clear that not all factors affecting the effectiveness of training can be taken into account using only the information about the content. According to this there has been implemented a two-level decision making system (DMS). The first level of DMS is responsible for the choice of further training strategy and execution of an action related to the chosen strategy (reaction). The second level, if it required by the reaction, selects the desired content based on a model of knowledge and skills of the user.

The research was divided into several stages. In the first stage we make an analysis of the users. On this stage we identified strategies which are used by students after finishing of the knowledge control session (in our case testing). After that there was created DMS based on user activity, which helped us to choose the necessary strategy. For the building of the DMS there was used Information-extreme intelectual technology. It is used by us to find, the optimum in this case, a set of parameters for DMS. The main difficulty with this approach is to analyze the data. The chosen strategy for current precedent is 'successful' if student passes next knowledge control session. Due to DMS, we were able to build individual learning paths based on user behaviour and his knowledge.

When building a DMS, it became clear that the reaction to the same strategy for different user groups is different. To accommodate this feature, we redesigned the DMS using object-oriented approach. The students were divided into 3 basic groups: e-learning students, full-time students and guests. The implementation of the DMS for each of the groups inherits all the properties of the default DMS, but these properties can be redefined. So we got LCMS which can build individual learning paths based on user knowledge and personalized learning strategies. A key feature of implementation is that the precedent is stored only on the lower level of the hierarchy, and these data are provided in both directions. Parent object borrows from subsidiaries the most recent data. Child partially borrows data from the parent, if their own is not enough to teach the DMS. Such data exchange on the one hand, allow to build the DMS in low amounts of initial data, adapting to the characteristics of the object as their accumulation.

An affiliation of the student to formal group does not guarantee the uniformity of criteria for determining the reaction for the behavioural strategies, so we decided to implement one's own DMS for every user, which would more accurately choose a suitable strategy. With a lack of input data, they are borrowed from the parent DMS. With the accumulation of input data personal DMS adapts to its user.

The system which were builded in the third stage allows adjusting the reaction of DMS on a strategy for each user. In fourth step we plan to add a mechanism of clustering, which would naturally divide users on rather large groups with a similar behaviour. For such relatively large groups, there can developed own reactions on user actions. According to their structure the cluster DMS did not differ from basic DMS and are only the additional level of hierarchy. These steps are illustrated in Figure 1.

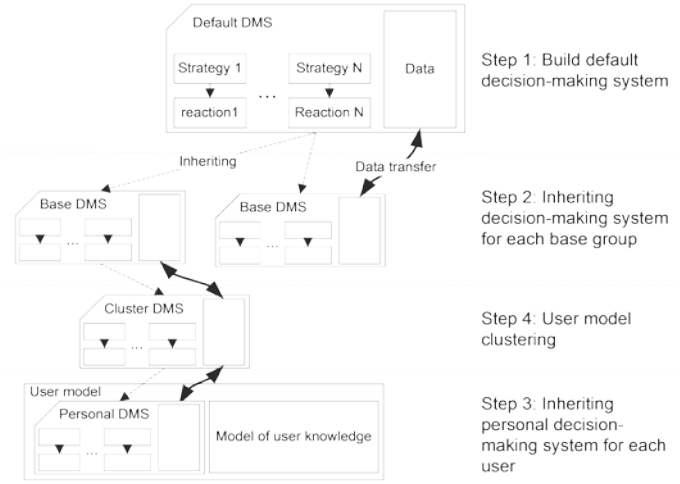

Figure 1 – The scheme of hierarchical of DMS for choosing a LCMS strategy, based on the activity of the student

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