Frame Based Approach to Construction of Intelligent System for Student Knowledge Control

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Abstract – **The frame based approach to construction and preserving of knowledge structures in the form of objects, domains and rules are given and its applications to the student's knowledge control problem are proposed.**

Keywords – **Knowledge Control, Intelligent System, Knowledgebase, Rules.**

I. INTRODUCTION

In proposed research we are dealing with a conception of intelligent system **[1]**, as the system with artificial intelligence. By this choice we mean using of such system in a wide range of applications, mostly in the context of distance learning system (DLS) development and intellectualization of existing DLS. By the same time the application area for expert system (ES) is much smaller, and they are much harder to expand in full-fledged application. But the detailed exploration of existing experience in the area of expert system application for computer-based education is very useful and desired before the building of the more generic intelligent application especially for areas of Distance Learning system and Computer Supported Learning.

II. FRAMED NOTATION FOR KNOWLEDGE LEVEL CONTROL WITH CONSTRAINED MODEL

So, the main goal of proposed research is knowledge management exploration by means of efficient knowledgebase's and their application to the task of student's knowledge level control in wide scope intelligent systems in the general framework of DLS and in the form of local applications. In this approach we differ the internal system knowledge's that are presented in the form of knowledgebase (KB) and of the external student knowledge's (ISK), what is the main objective of projected intelligent system application. The internal knowledge's we are presenting by the means of their structuring according to the next formal notion:

$$KB = \{ObjectsSet, RulesSet, DomainsSet, TasksSet, FormsSet, FunctionsSet\} \quad (1)$$

All knowledgebase entries are created by the corresponding options and dialogs which are utilized in the framework of knowledgebase editor. The frame structure of this utility can be constrained by the follow frames:

$$KBEditor = \{MainMenu = \{Files, Edit, Options, Help\}, Toolbox\} \quad (2)$$

The compound element ObjectsSet is designed for preserving information about student knowledge control objects which are used in the system as follows

$$ObjectsSet.Editor.Select = \{\{Questions, Result\}, \{AddBox, ChangeBox, DeleteBox, SetBox\}, Ok\} \quad (3)$$

Every ObjectsSet entry is described by own dialog of the form:

$$ObjectsSet.Object = \{name = Question\} \rightarrow \{attributes = \{question\_1, ..., question\_5\}\}, options[enumerated, logical, number], AddBox, ChangeBox, DeleteBox, Ok, Cancel\} \quad (4)$$

where we specify the name field and their attributes of the one of type: logical, numerical and ranged. Generally for evaluation of users input intelligent systems are using a universal approach which consists in categorization of predicted user choice. And dialog between system and user flows in way of simple ordinary or multi choosing from system generated list or by creating the ranged values. Consider some learning problem P from the intelligent system learning problems database $P_{set} = \{P_i\}, i = 1...n_1$, which have $j-$states, $P = \sum_j P^j$, $j = 1...n_2$.

Definition 1. By constraint for the $j-$ state of learning problem P, P^j we will mean an ordered set $[Constr_r^j, Constr_s^j, Constr_v^j]$, where $Constr_r^j$ is a relevant constraint from the set of imposed constraints $Constr_{set}^{P^j}$ on the current learning problem state $Constr_{set}^{P} = \left\{Constr_k^{\{P^j\}}\right\}$, $k = 1...n_{constr}$ where n_{constr} - are the number of constraints imposed on the solution set of learning problems $Solution_{set}^{P_{set}}$. $Constr_s^j$ is a constraint that is satisfied and $Constr_v^j$ - is a cconstraint that is violated.

III. CONCLUSION

Thus, the using of developed intelligent system for knowledge control which is based on expert systems methods allows with higher probability an certainty to find out the qualities of students knowledge's and to generate feedbacks.

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