NEW ACCENTS IN DISTANT LEARNING

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Abstract. The conception of the modern distant training system is given alongside with the methodical and organizational issues.

Increasing complexity of information technologies in modern society demands adequate changes in different spheres of human activity including distant learning and education. The educational system needs in additional expenses in order to correspond to the modern IT-possibilities and nowadays challenges.

However, the traditional paradigm of educational processes is somewhat out-of-date and needs both philosophical and technical reviewing. We consider two pivotal concepts forming this paradigm – information technology from the viewpoint of a tetrad **<system, structure, goal, realization>** [1] and a role of the teacher especially in the distant learning.

A system needs a structure to realize its goals. In relation to a distant system learning this structure is essentially based on Internet networking and programming technologies. A distant learning as a system is generated due to the goals of modern society on the basis of IT-technologies. It provides more possibilities in educational sphere for a definite part of population (for instance, invalids, housekeepers, elder people and so on). The structure of a distant learning system is incorporated into the existent organizational structure of the universities (institutions). However, a role of a teacher becomes somewhat fuzzy and unclear. Meanwhile it is evident that the role of a teacher cannot be ignored at all and must be replaced by an adequate system functionality. Thus we emphasize this principal moment – a teacher should not be removed but replaced in a new form of functionality instead. Some drawbacks of the existing distant learning systems are at a great degree connected to the absence of a teacher in a direct sense. This circumstance is not new and is well-known in the psychology of learning. The negative experience of creating automatic learning systems in the second half of the former century is a good testimony in the favor of a teacher. One has not tread down the same rakes twice. This means that a distant learning system has to incorporate a kind of a virtual teacher which performs monitoring, evaluating and process planning in on-line mode [2]. This incorporation presumes two main aspects. The first one is related to the mathematical formalizations enabling full automating of the teacher-student interaction. This aspect deals with the theory of interacting automata under uncertainty factors and requires developing a corresponding theoretical backgrounds. The second interesting scientific problem is connected to a realization of a virtual teacher and consists in natural language processing. This problem as it seems to us can be resolved by creating a text-frame knowledge base including inference machine to ask questions. Let us consider these issues in some more details.

For our needs we use Prolog to demonstrate the approach. The text knowledge base may be for instance as below

clause("potential of galvanic element is presented by figgibs.gif")
clause("potential depends on temperature as $E = a + bT$")
clause("DGT represents the Gibbs energy change")
clause("DGT forecasts the tendency of a reaction")
clause("equilibrium corresponds to DGT=0")

This fragment of knowledge relates to electro-chemistry science. A student may ask different questions of the form *"what potential depends on ?"*, *"what represents DGT ?"*, *"how galvanic potential is presented?"*, etc. First, the inference machine finds the sentences in knowledge base relevant to the question. This technical problem is solved in a way analogous to searching documents by keywords. Then the grammar parsing is performed to find the structural blocks of the question. We consider a triad-based structure of the sentences in the next form

<sentence>::=<subject_block> <verb_block> <object_block>

with the corresponding Prolog rule:

parse(X): – subject_block(X, NB, RX), verb_block(RX,Verb, RY), object_block(RY,OB,_),

where NB, Verb and OB must correspond to the noun_block, verb_block and object_block correspondingly. The block identified as a question member is to be returned as an answer. For instance, if the question is *"what represents DGT?"* then noun_block is *"DGT"*, verb_block is *"represents"* and object_block is *"what"*. By mapping the blocks returned from parsing the answer would be *"the Gibbs energy change"*.

Creating a distant learning system supposes usage of selection criteria. However, the experience shows that the existing systems do not take into considerations a lot of details peculiar to the given educational organization [3]. Therefore it may be more reasonable to use the building platforms as for example Microsoft Office SharePoint Server (MOSS) 2007/2010. The mentioned server possesses all the required facilities needed for a distant learning system realization. In particular, SharePoint Server 2007/2010 has a smart interface integrated in MS Office and provides necessary functionalities in a convenient way. It is easy in study even for novices and enables supporting web-sites. Additional tuning of SharePoint Server 2007/2010 may be performed with the help of utility called SharePoint Designer 2007/2010 and (in less than 5% cases) with Visual Studio 2007/2010.

References

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