

ОБРАЗОВАТЕЛЬНЫЙ ПОРТАЛ ДЛЯ ШКОЛЬНИКОВ С ИСПОЛЬЗОВАНИЕМ МЕТОДОВ ИНТЕЛЛЕКТУАЛЬНОГО АНАЛИЗА ДАННЫХ

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Schools Educational Portal with Data Mining Support

In this paper are presented methodological aspects of processing of Educational Portal for pupils of primary school with Data Mining support. This structure of portal consists of four layers that ensure the Portal, support of learning process, individual adaptation for teachers and pupils and intelligent analysis of education result based on methods of Data Mining such as Fuzzy Decision Trees.

As result of present internet and computers time, pupils of the first classes of the primary schools have access to the computer and internet and skills usage of them. This fact should be used in teaching. One of the principal specifics of children character is the acquisition of the most lasting knowledge while playing. Therefore the computer games should be directed to the teaching. Unfortunately, pupils play with computer games without educational tool mostly. Such computer games become obstacle of education, because pupils spend time needed for education by playing games [1]. Analysis of current publications in the area of pedagogy confirms importance of the problem of children addiction to computer games [2]. The acceptable decision in this situation is replacement of such computer games ("detrimental") by the computer games with educational content.

Solution of the mentioned problem has to consider two input factors. First factor is the necessity of computer access by children in the era of information boom. Second factor is the fact, that the most suitable form of the first contact with computer is the form of game. Authors of papers [3] showed that methods of Artificial Intelligence and in particular methods of Data Mining are useful in education process. These methods allow analyzing and estimating of data in education system, visualizing new correlation in data, decide problem with incomplete and ambiguous data etc.

After consultations with the teachers of primary school are developed new portal of computer games for pupils of the first level. It contains games that are focused on the teaching of pupils. Pupils have to revise objects and tasks of specified subject in unobtrusive playing form.

The principal service of elaboration Portal is intellectual analysis of learning process. Pupils' knowledge is estimate based on the intellectual methods. This analysis is based on methods of Data Mining. This Important part of education process is analysis and improving of educational program. Regular educational program does not allow analyzing pupils' answers to discover interesting relations.

These relations can be useful not only in the area of pedagogy but also in the education process itself.

Intelligent methods of data mining are the basis for wide class of tasks. The term intelligent means the choice of solution based on the analysis of the set of existing data, reflecting the retrospective of object or process behavior. Principle of the choice means that as the best solution is chosen the solution which is the most probable in particular situation. Recently, decision trees and decision rules are used as a classification tools. These facts explain the reason, why decision trees and decision rules has become important tool for realization of expert systems and decision making systems.

The Attractive Virtual Educational Portal with the realization of mechanism to support intelligent learning process is developed for the pupils of primary schools at Faculty of Management Science and Informatics of University of Zilina in collaboration with the primary school Zilina-Závodie. Some prototypes of the Portal modules are at <http://fra207d.fri.uniza.sk/>. The Portal development is realized in cooperation with teachers of the primary school and specialist in pedagogics [4].

The Portal is realized as a software solution that consists of 4 basic layers (see Fig. 1). The first layer is Gaming Layer and it's expected creating of the interactive means ensuring communication between pupils in a playful form. The second layer, education layer contains the learning modules and is realized in the form of a set of games. Base of the information layer is the creation of databases. Last layer - Analytical Layer contains a methodologies of intelligent data analysis derived from the learning of pupils.

Proposed structure of the Portal allows achieving principal goal that is pupil involving in learning process by game with intelligent support of this process.

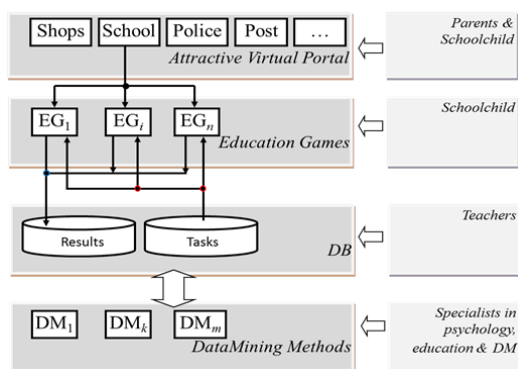


Fig. 1 The structure of Portal



Fig. 2 The input of Portal

The Portal will be including a variety of objects, corresponding to the outside world, e.g. school, shops, railway station, cinema, police, etc. (Fig. 2). Each object has its functional use. For example, building of school opens educational games (math, language, logic, etc.). Correct answers to the tasks in the game will be rewarded by credits. These credits can be exchanged for anything in other objects, such as shop, cinema, etc. in order to change your profile (for example, buying clothes, bicycles and other objects, the organization of trips, etc.).

Analytic layer consists of the original method of data mining developed by the authors of the Portal. These methods make it possible to identify a set of interesting dependencies, useful for education of pupils. Discovery of these dependencies need to clarify the example of experienced and inexperienced teachers. The first has a lot of experience with education of children and use in their work

The analysis at the fourth layer is implementing as Decision Making Support System. We use conception of the comparison of a new case with previous cases and selection most similar among previous cases as decision [5]. The decision making procedure corresponds to the recognition (classification) of the new case and it is the process of moving from concrete examples to general models, where the goal is to learn how to classify objects by analyzing a set of instances (already solved cases) whose classes are known

Existing attractive solutions of portals are oriented to develop logical thinking, but do not support the school education program. In most cases the educational programs are oriented to testing, and if there is some educational part, then it is realized in the form of individual events with minimum game components and simplified graphics. Result of above mentioned facts is that from early age children take a computer as a game tool and not a tool for learning. Consequently it is very difficult to attract such children to use the computer for educational purposes. The methodology of the developed Portal decides this problem and proposed for pupil tools for attractive learning in gaming form.

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This paper is the outcome of the following projects “Innovation and internationalisation of the education - the tool for quality improvement at the University of Zilina as a part of the European educational space”, ITMS code 2611 0230079 and “Quality education by supporting innovative forms, quality research and international cooperation - a successful graduate for practice”, ITMS code 26110230090.

