Test Generator System for Adaptive Preliminary Control

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Abstract

Self-control of knowledge is important part of the learning process which lets students figure out gaps in their qualification and prepare to independent tests and exams. This work describes prototype of the system which generates a set of HTML pages presenting test with adaptive properties and including mathematical formulae. Content of the test is described by a teacher in the plain text format with math formulae presented by LaTeX commands. Thus, the prototype developed converts documents in plain text (*.txt) format in to HTML and Java Script format.

The input text file contains the following information: number of tests, titles of topics which will be tested, particular questions for each topic and their possible answers. Every question in the topics' lists may have N choice (N is a parameter which is given through GUI). The only correct answer is marked. If the question or the answer contain a mathematical formula it should be written by LaTeX commands. MathJax library is used to modify LaTeX commands to mathematical notation for HTML pages.

Validation of mathematical formulae in the input file is provided using Levenshtein algorithm and regular expressions. The prototype has a dictionary of most commonly used LaTeX commands describing formulae. Realization of the algorithm compares command in the formula with each word in the dictionary and calculates the coefficient of confidence. If the coefficient is equal to one, then the command is written correctly, if it is between 0.5 and 1 the command might be written incorrectly (or the command is not included in the dictionary) and user will be informed that the error is possible. The prototype also checks match of parenthesis, brackets and braces using regular expressions approach.

The output files are HTML-pages presenting tests where knowledge assessment is done by Java Script. Two web-pages for each topic realize adaptive component of the test. The first one contains few questions. If student passes them successfully then testing system redirects him (or her) to the next topic. If student fails at least one of them, then system gives extended list of questions on the topic for a more accurate knowledge test. At the end of the test a participant gets the report with his (or her) answers. If the answer was incorrect then system shows a correct one with explanation provided.

The prototype GUI is implemented using C# programming language.

Index Terms: Adaptive testing, Cross platform development.