A System to Modify True or False Question Using Exchanging terminologies for Antonyms and Relocating Randomly

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Abstract. As every different question is required to evaluate the learners' abilities anytime and anywhere, we proposed the system that make true or false question in different form whenever applicants take tests. To make the question, various wrong sentences are made not only exchanging the main terminology in the definition sentence with antonym but also negating the sentence to get inverse of the definition sentence. The question test is obtained by relocation of definition sentences and wrong ones randomly.

Keywords: distance education, system to generate dynamic tests, automatic selection of question tests

1   Introduction

As spreading computers, Internet, and smart phones, the range of their applications is expanded at every field in our lives. In the field of education, application program using computer, web application on Internet and apps for smart phone have been developed for learners and applicants. There are several researches at distance education area. As more computers have been supplied and Internet has propagated rapidly, utilization of computer and internet are positively evaluated[1], and among them the distance education site based on web has been focused in the fields of education[2] .

   Distance learning education is the form of an alternative education to complement many problems that occur in a traditional education, so it contributes to solve the centralization problem of training locations as spreading their locations and to supply the high quality of education. However, the important thing in this education is fair evaluation to evaluate the learners' abilities anytime and anywhere. To do this in distance education, there are two groups: automatic selection of test questions and dynamic generation of test questions. The automatic selection of test questions achieved to choice questions from database with sets of questions in complete form according to criteria that examiner made[3,4]. In this case, the form of each question is same as that of the question in database, for example of multiple choice, question,

example of choice items, and the positions of items are fixed. On the other hand, a system to generate dynamic test is a system to extract information about each question from database with sets of questions in incomplete form. The question test is made by completing each question using the information and relocating the completed questions[5,6]. In the case of this system, it has an advantage that every question may be different from the other questions whenever applicants take tests.

In this paper, we propose the system that make true or false question with the above advantage. In a definition sentence, various wrong sentences are made not only exchanging the main key word in the definition sentence with antonym but also negating the sentence to get inverse of the definition sentence. The question test is obtained by relocation of definition sentences and wrong ones randomly.

2   A system to make question tests

In a system making question, the system consists of client, server, and database. The system accepts definition sentences and other information from the examiner and then saves them in the database. The process at the server makes question tests and answer tables and sends question tests to client. The client enables the applicant to get the question test. Such a clients and server system including database is shown in Fig. 1.
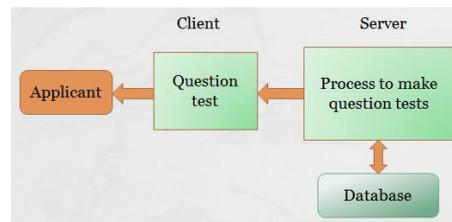

Fig. 1. A system for generating question tests

3. Algorithm for true or false questions using exchange and relocation

To make true or false question, each definition sentence is modified by changing key word for antonym or/and negate the sentence. There are four phases in the algorithm. The first phase is to extract suitable sentence from database. The second phase is the process to make definition sentence wrong. There are two methods to make sentence wrong. One is substitution word in sentence with antonym, the other is to negate the original sentence. For example of the substitution in Fig. 2 (b), it is achieved by replacing TCP at the first sentence by UDP at ww field in Fig. 2 (a), where 'ow' and 'ww' mean 'original key word' and 'wrong word', respectively. The process makes the first sentence in Fig. 2 (b) wrong, and also makes its answer false 'x' in the correct answer field. The other example is to negate the first sentence in Fig. 2 (a) by

replacing 'is' by 'is not' and then make the second wrong sentence in Fig. 2 (b). It is also wrong one like the first example. Similarly, six sentences with two correct ones and four incorrect ones in Fig. 2 (b) are made from two definition sentences in Fig. 2 (a) through this phase. The third phase is the process which randomly relocates both sentences and answer fields produced by the previous phase. The last phase is the process to make question test screen and correct answer one by separating the relocated questions into questions and answers.

No	Definition Sentence	ow.	ww
1	TCP is a connection-oriented protocol.	TCP	UDP
2	UDP is a connectionless protocol.	UDP	TCP

(a) Database

	True or False	Answer
1	UDP is a connection-oriented protocol.	X
2	TCP is not a connection-oriented protocol.	X
3	TCP is a connection-oriented protocol.	O
4	UDP is a connectionless protocol.	O
5	TCP is a connectionless protocol.	X
6	UDP is not a connectionless protocol.	X

(b) Examples to make definition sentences wrong ones

Fig. 2. A process to make definition sentences wrong ones

Algorithm for true or false questions using substitution and relocation is the followings:

[Step 1] Extract suitable information of questions, such as, definition sentences, original key words, and antonyms from database randomly.
[Step 2] if we choose one of three methods to modify or not, generate random number by random function.
[Step 3] For each sentence, substitution is executed for random number with 1, negation for 2, and no modification for 3.
[Step 4] To make answer for the question, set the answers to incorrect for the first two cases, and correct for the last one.
[Step 5] Relocate every question sentence with answer randomly.
[Step 6] To make question screen and answer table, separate relocated question and answer into two part: one is question test and the other is answer table.

4   Implementations and Discussion

The algorithm in previous section is implemented on environments of JSP, apache-tomcat server, file system, and mysql. Fig. 3 shows the screen to show true or false using exchanging key word and negate the definition sentence. For example, the second question is a definition sentence about TCP so the answer is true. The first one and ninth one, however, are made by exchanging TCP with UDP and negating the first, respectively. Thus, the answers of the two cases mean false because the process makes two sentences wrong.

Question Sentence	True	False
1. UDP is a connection-oriented, reliable transport protocol.	○	◉
2. TCP is a connection-oriented, reliable transport protocol.	◉	○
3. UDP is not a connectionless, unreliable transport protocol.	○	◉
4. The transport layer is responsible for the delivery of individual packets from the source host to the destination host.	○	◉
5. TCP is a connectionless, unreliable transport protocol.	○	◉
6. The network layer is not responsible for the delivery of individual packets from the source host to the destination host.	○	◉
7. The transport layer is responsible for the delivery of a message from one process to another.	◉	○
8. The network layer is responsible for the delivery of a message from one process to another.	○	◉
9. TCP is not a connection-oriented, reliable transport protocol.	○	◉
10. The network layer is responsible for the delivery of individual packets from the source host to the destination host.	◉	○

채점

Fig. 3. A screen to show true or false questions modified by exchange and relocation

5   Conclusions

In this paper, we have proposed the system that makes the true or false question test to prevent from cheating when applicants have tests or to decrease boring when learners study. To achieve this goal, the system, first, makes various wrong sentences using exchanging the main terminology in a definition sentence with antonym or negating the sentence including not behind verb be. And then the true or false question test have made by relocating definition sentences and wrong ones.

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