The Innovation of English Course Teaching Model Based on Artificial Intelligence Technology

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Abstract: The current Chinese English teaching is still in the traditional teaching mode, which lacks the stage of intelligence and information assistance. Therefore, how to make full use of the existing artificial intelligence technology for teaching service has become a difficult problem in front of the teachers and students. First, the connotation and implementation of the diagnosis algorithm are introduced. Secondly, based on artificial intelligence, the possibility of innovation in the teaching model of English course is proposed by using the diagnostic algorithm and data mining. The final algorithm is tested. The conclusion is: through the diagnostic algorithm designed in this paper, we can effectively evaluate the Chinese English teaching mode, and help to achieve the innovation of English teaching mode.

1. Introduction

As far as China's computer English teaching assistant system is concerned, it is in the initial stage of development. It is slow to develop and cannot meet the needs of many major and primary schools in English teaching (Du H et al.2016) [1]. Under the background of continuous development and progress of information technology and wider application, the traditional teaching mode of blackboard + chalk, textbook plus data is still used in English teaching. However, the teaching of electrification is only at the stage of listening to the recording. And the teachers themselves energy limits, cannot be effective for marking all operations. The exam does not have a scientific and reasonable tool to deal with the students' papers and analyze them. The problem - oriented teachers can only develop qualitative analysis and fail to carry out quantitative analysis (Ge X et al. 2017) [2]. This resulted in the process of teaching in the big problem, learning efficiency is relatively low. In addition, a considerable part of the school computer waste is very serious, the root of which is that the utilization rate of the computer room is not high in most schools. Practical use is only used in information class, and a small number of multimedia teaching is not effective, so we cannot effectively use this information aided teaching method (Guiyu et al.2016) [3]. Artificial intelligence is AI; the full name of its English is Artificial Intelligence. The concept of artificial intelligence and artificial intelligence from the two aspects of understanding, the so-called artificial means of artificial intelligence based on the human civilization, is the product of human wisdom and intelligence; it refers to an artificial intelligence computer or other device can simulate human intelligent behavior and the way of thinking (Loukides M et al.2016) [4].

2. State of the Art

Learning English is "Practice makes perfect." process, but the product form has been faced with many difficulties, especially the training of oral English is more prominent: traditional K12 Education (from kindergarten to high school) curriculum system has been to test for the essence of education coordinates, escape; even 46 college level exams are not oral test, it is difficult to get attention (Shi J G et al. 2016) [5]. In the white paper on spoken English in China, the ability of the Chinese people to be ranked the top of the Chinese people's ability to improve. With the popularization and deep application of artificial intelligence technology, the artificial intelligence of the English education industry has also been popularized. With Machine Translation, for example, Machine Translation has made considerable progress. It takes advantage of artificial intelligence, in

some fields, which provides a college graduate's average English level (Tang L. 2017) [6]. In the oral language industry, AI learning software combined with AI can make the system self learning ability through the deep learning model of recurrent neural network, and improve the correlation between students and the most appropriate learning content of the student (Wang H. 2016) [7]. Technology and data is the two core of artificial intelligence. Through database, we can identify English recognition engine for Chinese language researchers, and achieve data collection of English learners' learning trajectories, and targeted learning optimization (Jihong Z.2017) [8].

3. Methodology

3.1 Diagnosis Algorithm Implementation

The rule engine has two kinds of reasoning methods: forward chain method and reverse chain method. It corresponds to the two ways of thinking of human deduction and induction. The core algorithm is the Rete algorithm, which is the most efficient algorithm used in the production system at present. It is also the only decision support algorithm which has nothing to do with the number of execution rules (Hacohen Y et al.2017) [9]. Drools is an open source project based on this principle and implemented in the Java language, and its rule engine's reasoning steps are as follows:
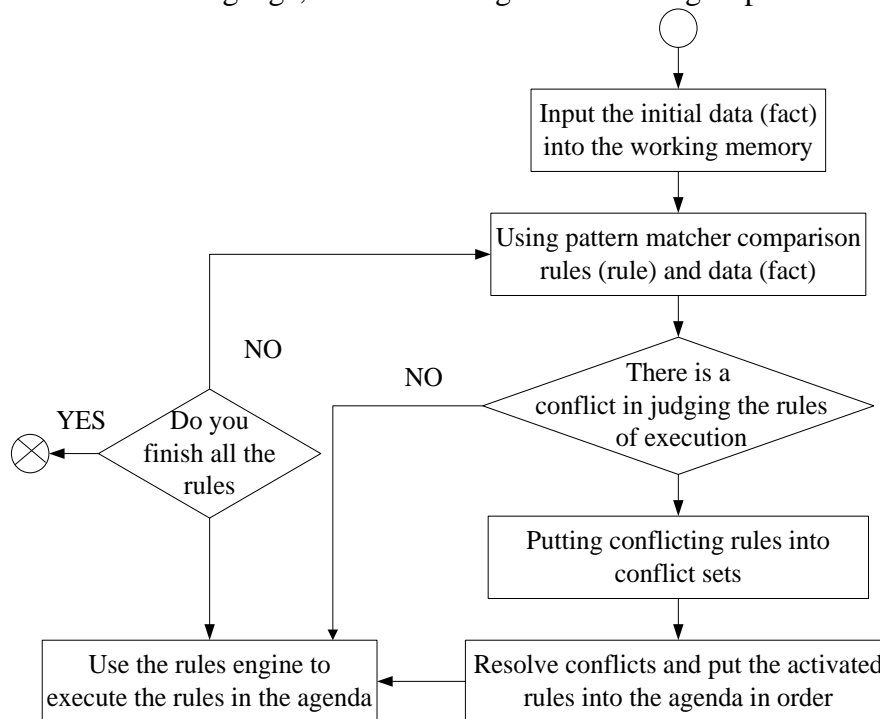

Fig.1 Drools Schematic Diagram

As far as the process of composition evaluation is concerned, many students will encounter the problems of misspelling words and errors of word deformation. This kind of situation represents the students' access to the relevant grammar points, but the basic vocabulary is not familiar. Students cannot get a relatively high score in expression, so we must take effective measures to deal with this problem. But some scholars put forward the way of dealing with word variants instead of corpus. This method is mainly based on edit distance, so it has some limitations (Sharath B N. 2016) [10].
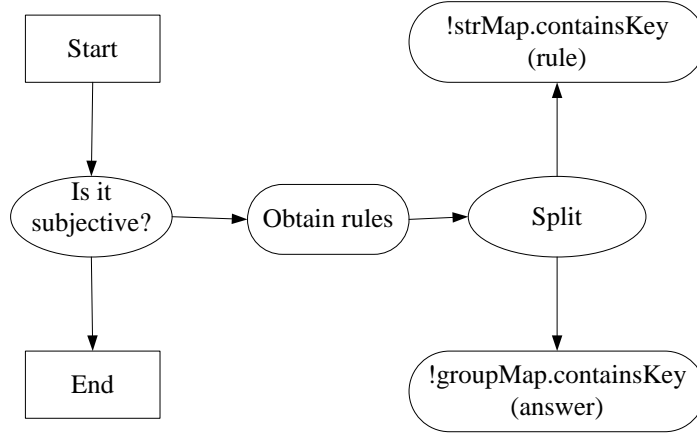
Fig.2 Composition Rules Initialize the Drools Flow Chart

In the case of misspelled words, it is actually to check whether the two string forms are similar. If one of them is based on a string, it is observed how many times the other string is edited on the basis of the base word. The total number of editing operations is called the edit distance. It is very obvious that the difference between the relatively larger string and the original string is relatively large. Therefore, in the related application process of text editing, pattern search and approximate matching, there is difference between edit distances applied in bounded quantitative mode. The common applications include the approximate matching recognition of DNA molecular structure and the approximate matching of sentence patterns.

For a sentence, the difference between the answer string and the corresponding string of the corpus is the edit distance. The similarity between the two sentences can be obtained by using the minimum distance from the two sentences. In terms of the words that make up a sentence, it is necessary to define the form of the deformable form in the lexical corpus. If you do not have the minimum marginal distance, define whether the threshold is misspelled according to the length of the word; if it is misspelled, it is recorded in the wrong word library. In this way, the students quickly understand the shortcomings of their existence. Common string editing types include character inserts, character deletions, character transposition, and character replacement. Based on these four character editing operations, the editing distance can be solved by the dynamic programming algorithm, and the edit distance is formally defined.

For the input string $p_m = p_1 p_2 p_3 ... p_m$ and the standard string $W_m = w_1 w_2 w_3 ... w_m$, where $D(P_m, W_n)$ represents the edit distance between P_m and W_n. In all editing operations that transform Pm into W_n, insert operation is to insert Wj after PI, delete operation is to delete p_i, replace operation is to use W_j, change p_i, and transposition operation is to exchange p_{i-1} and p_i location. It is recursively defined as follows:

$$D(P_i, W_j) = \begin{cases} 0 & i = j = 0 \\ \infty & i < 0 \, or \, j < 0 \\ D(P_i, W_{j-1}) + 1 & \text{insert} \\ D(P_{i-1}, W_j) + 1 & \text{delete} \\ D(P_{i-1}, W_{j-1}) + S_{ij} & \text{replace} \\ D(P_{i-2}, W_{j-2}) + R_{ij} & \text{transposition} \end{cases} \quad (1)$$

Among them: when I, j<=0, $p_i = w_j = \otimes$

$$R_{ij} = \begin{cases} 1, p_i = w_{j-1} \quad and \quad p_{i-1} = w_j \\ \infty \end{cases} \quad (2)$$

$$S_{ij} = \begin{cases} 0, p_i = w_j \\ 1, p_i! = w_j \end{cases} \quad (3)$$

The specific algorithm can be used for the Lang toolkit in the Apache common. The time complexity of the algorithm is O (m * n). If you want to improve the efficiency, we can choose an improved algorithm for editing distance.

3.2 Report Design and Data Mining

In the middle school English test diagnosis, a score is finally calculated if only the answer is to the computer for intelligent evaluation of the students. As a result, teachers and students should not be satisfied. It is an important aspect of the intelligent assessment that the students make an immediate diagnosis and give a rich and intuitive diagnosis after the students submit their answers. In the diagnosis of the subjective and objective topics of the test paper, many of the obvious intermediate results are recorded in the middle table. For example, all kinds of questions of the answer wrong number, fraction, the baby of her knowledge, and knowledge of the input option value, the right and wrong ability essay master the grammar and so on. These intermediate results cannot be presented to the user, there are two reasons: one is the data of these results is not obvious, the user did not understand its meaning, so we must carry on the data mining, user concerned data to intuitive charts and figures show; two is these intermediate data in large-scale applications will produce data a large number of redundant, affect the performance of the system. Therefore, the data need to be managed in a unified way, and it is necessary to redesign it, which is designed for report design and data mining.

The design of the report mainly includes the design of the database and the design of the chart. The design of specific database can see chapters; graphic design mainly refers to the class and students in the horizontal and vertical through the free char to draw charts, which refers to the transverse city schools, school classes and classes within students, students can be considered from the longitudinal perspective of previous examination data; mining is mainly analyzes the integration of the intermediate data through the storage process, the final report in accordance with the design requirements into a database and presented to the user.

3.3 Database Optimization

The optimization of a database can usually be done by optimizing the network, hardware, operating system, database parameters, and applications. The most common optimization is to upgrade the hardware. However, under limited resource conditions, the performance improvement of network, hardware, and operation system and database parameters is only about 40% of the performance improvement of database system. The rest of the 60% system performance enhancement comes from the optimization of the application; the optimization of the application can usually be divided into two aspects: source code and SQL statements. Because the SQL statement consumes at least 70% to 90% of the database resources and the optimization of the SQL statement does not affect the program logic. Therefore, the author uses the caching technology of HIBERNATE and the storage process of the database to optimize it. It is found that the performance is better and more remarkable by the actual test. Small data operations are mainly optimized by HIBERNATE, which can be configured with two level cache ehcache. The two level caches is the global cache of Session Factory level. The cache mode and strategy can be determined according to specific business needs. The caching approach has Class caching, query caching, and Collection caching; the cache policy has read-only, read-write, and nonstrict-read-writeo. For queries involving large amounts of data, batch update and delete operations are unified by JDBC API for batch processing or by calling stored procedures. In this case, the issue of resource release is especially important. Usually one database access involves the following three object resources: Connection, Prepared Statement /Statement, and Result Set. We should take the most conservative approach to the release of these three kinds of objects. We want to achieve the safest and most thorough release of resources.

4. Conclusion

With the rapid popularization of artificial intelligence and the development of Internet

technology, artificial intelligence technology has more space to be developed in English teaching. In view of the shortcomings of the current traditional English teaching model, this paper proposes an online intelligent diagnosis evaluation scheme. Through the automatic correction of subjective questions and objective questions and individualized design of diagnosis results, the system will become auxiliary teaching software with many functions such as teaching, diagnosis, testing, and feedback and so on. In the process of research, design, implementation and testing of standardized test questions and non standardized test questions diagnosis and evaluation algorithm in the intelligent diagnosis system of English, a personal and class test case is designed. After testing the non standardized questions such as composition and sentence translation, the error is within the scope approved by the middle school teachers, and the performance meets the requirements of the production environment. The system has realized the data collection of the students' ability to use English language knowledge comprehensively, and let the teachers have a comprehensive and meticulous grasp of the whole class. It has pointed out the direction for educational reform. At the same time, it saves the cost and reduces the workload of the teachers. It is of great practical significance.

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