Application of Big Data Technology in English Teaching Innovation

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Abstract: With the rapid development of database and computer network technology, traditional data analysis methods can no longer meet the needs of people's lives and work. The traditional data method only uses statistical analysis theory to perform simple summary statistics on the data, without considering the ambiguity and uncertainty of the data. In order to solve the shortcomings of the existing methods, big data came into being. High-dimensional, uncertain, vague, and noisy data are used to mine potential, implicit, and useful information and patterns to improve people’s market decision-making capabilities and assist people in giving feedback on the basis of past experience. The future development trend and so on. Although attempts to innovate in English teaching are continuing, there are still shortcomings. In order to solve the problem of English innovation, this paper adopts the Apriori algorithm and will conduct research on English innovation. Using the methods in this article, through the combination and calculation of the previous innovative methods of English teaching, we find a set of reasonable English teaching methods. According to calculations, this method can improve students' learning ability by 14%.

Keywords: Big Data, Internet, Apriori Algorithm, English Teaching Innovation

1. Introduction

1.1 Background and Significance

With the rapid development of computer technology, computers are inseparable from people's daily production and life. People can collect and store data through computers, but in recent years, this data has grown exponentially. From the beginning of 2010 to the end of 2020, the data has increased by 50 times [1]. In recent years, global data has exploded. The term "big data" has always appeared in the public [2]. In terms of big data, people from all walks of life have not given an acceptable definition, but big data basically includes the following three basic characteristics: large-scale, diversity and rapid production start. The definition of big data in Wikipedia is to use some large and complex data sets, which are difficult to process with existing traditional data processing tools [3]. With the explosive
development of global data, the term big data is mainly used to describe large data sets. Compared with traditional data sets, big data usually includes structured and unstructured data, and both require more real-time analysis. In addition, big data also brings new opportunities and new meanings to discover new values [4].

1.2 Related Work
Due to the importance of big data research, more and more research teams are now turning their attention to big data research. And made quite good progress. For example, Obermeyer Z has made in-depth research on the innovation of English teaching for the improvement of students' English performance, and has made good progress [5]. But his data range is not very extensive, so his experiment is narrow. It cannot be widely used in the innovative use of big data in English teaching [6].

1.3 Main Content
In order to solve the use of big data for English innovation, this article first reads a large number of Chinese and English literature, and specifically analyzes the application of big data for English innovation [7-8]. Next, this paper studies the basic principles of the association rule algorithm in detail, and combines the functions of the MapReduce programming model to improve the traditional Apriori algorithm, and finally performs calculations [9]. The results show that the use of big data to innovate in English education can improve the self-learning ability of 14% of students [10].

2. Methods of big data technology in English teaching innovation

2.1 Apriori algorithm
Currently, many methods are used in the extraction of educational data. These methods are based on the following categories: prediction, grouping, related models and knowledge discovery. The goal of related rule mining is to find rules in the form of IF-THEN. If some specified variable values are found, some other variables will also have specific values. There is a real case: Wal-Mart supermarket in the United States analyzes supermarket shopping cart data, that is, analyzes the products in the customer's shopping cart to find out the customer's shopping habits. They found that beer and diapers had many opportunities to appear in the same shopping cart, so merchants placed beer and diapers on adjacent shelves. This has increased the sales of diapers and beer, and has brought many benefits to businessmen. Many companies are discussing profit. Association rule analysis is to find the relationship between objects in the data set, also known as shopping cart analysis. The Apriori algorithm was proposed by R. Agrawal and R. Srikant in 1994. It was first applied to Wal-Mart. The main application is to discover data associations from business documents to make business decisions. Apriori has many important meanings:

(1)Support degree A->B. For example, there are two transactions A and B, then support degree support=\( P(AB)\), indicating the probability of simultaneous occurrence of time A and time B

(2)Confidence degree = \( \frac{P(B | A)}{P(A)} \) = \( \frac{P(AB)}{P(A)} \), which represents the probability of event B based on event A. For example, support = 20%, trust = 60%, which means that the probability of A and B occurring at the same time is 0.2, and the probability of B occurring based on A is 0.6. Strong connection rules must satisfy minimum support and minimum trust.

(3)K items set consisting of k items

(4)The set of commonly used items meets the minimum requirements of supporting items. Usually k itemsets are listed as LkApriori. There are two important properties: First: All non-empty subsets of frequent object sets must also be frequent. Second: There must be very few supersets of infrequent itemsets.

2.2 Improvement of Apriori Algorithm Based on Mapreduce
When processing large data sets, the Apriori algorithm will greatly reduce the execution efficiency of the system in the process of finding frequent data sets. The enhanced Apriori algorithm based on MapReduce designed in this document introduces the MapReduce Map and Reduce functions in the Apriori algorithm. MapReduce can process a large amount of data at the same time, which greatly improves the efficiency of finding public objects. Through parallelism, the Apriori algorithm can process large amounts of data without being limited by the computing power of the computer. The main ideas of the improved algorithm are: (1) Usually create a k-item set in the Map phase, use a connection function in it, and then combine k-1 object sets to create a candidate k-item set, and then the data set is used as a key, The degree of support is used as the value. The task of the reduction phase is to merge the values of the same key and perform a trim operation, that is, to filter objects larger than minSup (minimum support). Energy creates relevant rules based on the received frequent data sets. The most important step here is to find all non-empty suitable subsets based on the frequent data sets and meet minConf (minimum confidence).

3. Experiments of Big Data Technology in English Teaching Innovation

The following is a test paper survey of teachers’ teaching situation, mainly taking the improvement of some students’ English learning enthusiasm and academic performance, from which big data is used to research and analyze the innovation of English teaching, and this method can find the most convenient and efficient way to improve students’ English performance. Methods. Cultivate high-level talents with professional knowledge and capabilities. This article mainly discusses student data mining: randomly select 20 students from each class to participate in teacher evaluation. Its main purpose is to improve students’ English ability and autonomy in learning English, and to comprehensively evaluate teachers’ teaching attitudes. Students can use the classroom as a benchmark to evaluate teaching content, teaching methods, teaching effects, teaching attitudes, teaching and learning, overall impressions and areas they think need improvement. Then submit the results, and the system will finally make statistics on the evaluation results and display the information to the teacher. The following only takes students’ evaluation of teachers as an example to illustrate the application of relevant rules in teaching evaluation. Through the student evaluation step, some student data determined by the lottery are collected, analyzed and processed.

4. Big Data Technology in English Teaching Innovation

4.1 Students’ English Learning Enthusiasm

Through experiments, we can get the results and enthusiasm of students for the changes in English teaching methods under the background of adopting big data. The data is shown in Table 1:
Table 1: big data-based innovative English teaching on student performance

| Student ID | English score before the experiment | English score after test |
|------------|-------------------------------------|-------------------------|
| 175021     | 96                                  | 101                     |
| 175022     | 101                                 | 112                     |
| 175023     | 75                                  | 78                      |
| 175024     | 88                                  | 96                      |
| 175025     | 95                                  | 101                     |
| 175026     | 120                                 | 121                     |
| 175027     | 118                                 | 117                     |
| 175028     | 96                                  | 99                      |
| 175029     | 104                                 | 112                     |
| 175030     | 112                                 | 115                     |
| 175031     | 95                                  | 103                     |
| 175032     | 75                                  | 88                      |

Figure 1: big data-based innovative English teaching on student

According to the experiment, it can be seen that the students' academic performance has been improved after the English innovation education. Of course, there are also problems in their performance that have caused the academic performance to drop a little. This is just an example. Through the analysis of big data, we can conclude that the English experimental and innovative curriculum model has made great progress for students. And the enthusiasm of the students in the course of class has also increased a lot. Therefore, English curriculum innovation has great potential for students. We can not only take this opportunity to improve students' performance, but also enhance students' enthusiasm for learning. Innovation in English teaching has great potential.

4.2 Improving the Education Evaluation System and Promoting the Individual Development of Students

In addition to written tests, the innovative teaching evaluation content of English teaching also
includes oral tests. Traditional oral tests take up a lot of time in the classroom. Using the online education platform, students can learn online through electronic products at any time. We can realize students' enthusiasm for learning English through the online education platform. The online education platform can provide students with matching words for learning English and texts and other reading assignments after attendance. The system will score based on the students' spoken English. The teacher uses this technique by clicking the audio button. You can listen to each student’s pronunciation, understand the student’s English pronunciation objectively, and correct it in time. Learning analysis technology allows teachers to understand students’ English learning from multiple aspects, instead of a single written assignment. Moreover, the audio data can be stored in the background database for a long time, so that teachers can learn about the changes in students' oral English from the beginning of the semester to the end of the semester, and combine formative evaluation and summative evaluation. The teacher evaluates the student’s work completion, interactive communication and final evaluation of the course. Form a more complete evaluation system.

4.3 Teaching Evaluation
In teaching evaluation, classroom teaching quality evaluation occupies an important position in the entire university teaching evaluation system, because the classroom is the main way for students to acquire knowledge. The quality of teaching is the key to a student's proficiency in a class. Higher education plays a key role. Comprehensive evaluation of computer intelligence for classroom teaching quality is not only helpful for improving teaching quality, but also important for cultivating high-quality talents.

How the classroom teaching is carried out, its evaluation has a certain degree of uncertainty, people’s different evaluation results, how to obtain useful information from a large amount of data, in the past, teachers' teaching results in the classroom were mostly quantitative analysis or multiple factors Quantitative evaluation of indicators, which is subjective and one-sided, or is affected by prior knowledge, and the resulting evaluation cannot accurately and completely reflect the impact on objective things. For this kind of object uncertainty, the traditional accurate scoring method is inappropriate.

Therefore, at the beginning of the campus network, new technologies must be introduced in the evaluation process to solve the problems they face in the formative evaluation of teachers.

Correlation rules are a method of extracting data. Export and analyze large amounts of data, and extract key data that helps decision-making. Connection rules are a way to analyze data information in depth. Therefore, we have introduced association rule technology in the evaluation of classroom teaching quality. Through the evaluation of the teaching indicators of students in the classroom of campus teachers, mining data collection, and in-depth analysis of the internal connections between the data, the formative evaluation of teachers is realized. , Fundamentally solve the problem of subjective experience and excessive workload in classroom teaching quality evaluation of campus network teachers, and provide more objective, scientific, fair, and logical methods and means for formative teaching quality evaluation in the classroom. At the same time, the implementation of the system plays an important role in promoting teachers' classroom teaching and guiding teachers to improve teaching quality.

5. Conclusions
The main purpose of this article is to innovate the teaching content of English teaching through big data. Through experiments, the following results are obtained: in the innovation of English teaching, students' learning enthusiasm and academic performance have been significantly improved. From this we can see that the innovation of English teaching is very beneficial to students. But there are also shortcomings: our sample range is too small, which may cause the accuracy of the data to be not so high. In the follow-up time, we will continue to expand the scope of experiments to verify whether big data can help English teaching innovation and what methods can be used to maximize students' performance.
References

[1] Charles Hampden-Turner. Teaching Innovation and Entrepreneurship[J]. Revision A Journal of Consciousness & Transformation, 2016, 30(3):69-78.

[2] Yun, Zhao. Research on the College English Teaching Innovation Methods based on the Theory of Multiple Intelligence and Language Cognitive[J]. International Technology Management, 2016(5):25-27.

[3] Zhao Y. Research on the College English Teaching Innovation Methods based on the Theory of Multiple Intelligence and Language Cognitive[J]. International Journal of Technology, Management, 2016, 000(005):P.25-27.

[4] Hong Y, Ning J. Innovation of Contemporary English Teaching:Effective Teaching Mode[J]. International English Education Research, 2019, 000(002):P.69-71.

[5] Rui W, Ying W. Curricula Innovation in Chinese College English Listening Teaching[J]. Campus English (first ten days), 2016(13):54-55.

[6] Xu L, Jiang C, Wang J, et al. Information Security in Big Data: Privacy and Data Mining[J]. IEEE Access, 2017, 2(2):1149-1176.

[7] Akter S, Wamba S F. Big data analytics in E-commerce: a systematic review and agenda for future research[J]. Electronic Markets, 2016, 26(2):173-194.

[8] Sun Y, Song H, Jara A J, et al. Internet of Things and Big Data Analytics for Smart and Connected Communities[J]. IEEE Access, 2017, 4:766-773.

[9] Zhang Y, Qiu M, Tsai C W, et al. Health-CPS: Healthcare Cyber-Physical System Assisted by Cloud and Big Data[J]. IEEE Systems Journal, 2017, 11(1):88-95.

[10] Baccarelli E, Cordeschi N, Mei A, et al. Energy-efficient dynamic traffic offloading and reconfiguration of networked data centers for big data stream mobile computing: review, challenges, and a case study[J]. Computers & Chemical Engineering, 2016, 91(2):182-194.