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Data Analysis Model for Training Self-Learning Ability of Applied Undergraduate Students in Large Data Environment

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Abstract: In the future society and development, the talents needed are not only those with strong theoretical knowledge, but also those with strong self-study ability and self-quality. Therefore, it is very important to strengthen students' self-learning ability. At present, the comprehensive quality of college students is not compatible with the training of applied talents, and there are many drawbacks. Under the background of large data, this paper designs and builds a data analysis model for the training of students with self-learning ability in Application-oriented Undergraduate Colleges and universities by using partition clustering algorithm, and selects an application-oriented undergraduate college in our city as the research object to verify. In the study, we call the original model used by the University as model A, and use partition clustering algorithm to improve the original model to form a new model called model B. We compare the differences of operation time and fitness of the two models under different data quantities. The experimental results show that the fitness of model B is 13% higher than model A when the data quantity value is 80 and 34% higher than model A when the data quantity value is 160.Therefore, the new model improved by partition clustering algorithm can improve the accuracy although it takes a long time to operate.

1. Introduction

The core of the scientific outlook on development is people-oriented. To achieve the all-round development of people and improve their quality is the basic starting point and goal of the education of the Party and the State [1-2].As an important basis for the urgent need of personnel training in the country, application-oriented universities play an increasingly important role in achieving this fundamental goal, especially the important content of personnel training in Application-oriented Universities [3-4].In recent years, with the fruitful achievements in the study of self-regulated

learning theory, the cultivation of students' self-regulated learning ability has become the consensus of Applied Universities and researchers [5-6].

With the exponential growth of public and personal data, big data has penetrated into people's work, life and learning. We feel helpless [7-8] with a lot of data. When we analyze data for our daily work, analyze data used in our daily lives, and acquire data generated by knowledge and learning, we all have one thing in common: to meet people's needs and expectations in work, life and learning [9-10].

In this paper, the original model of a university in our city is improved by using the partition clustering algorithm to form a new algorithm. Then two models are measured with different amounts of data, and their operation time and suitability are compared, and their average values are taken as the basis for comparison.

2. Big Data and Self-Learning

2.1. Large Data Environment

(1)The value of big data environment

With the rapid development of cloud computing, the Internet of Things, mobile Internet and smart cities, the field of data collection, processing and management has developed rapidly. New information on the global stage highlights the general trend of explosive growth, which represents an urgent step towards big data. In order to maintain large amounts of data, distributed storage technology in cloud computing and a set of servers show remarkable performance values. Data mining and related artificial intelligence can clarify potential cognitive rules and provide accurate reference for future data decision-making. However, the extension and opening of large data is accompanied by possible data disclosure.

(2) Partition clustering algorithm

The partition clustering algorithm, also known as the partition clustering algorithm, selects the error clustering function as the function of the evaluation criteria. It is sensitive to initial assembly centers and noise points and is prone to fall into local optimum when processing non-curve datasets. The algorithm uses the minimum sum of the distances between the actual data points and other points in each class to represent the complex, effectively eliminating the influence of noise points on the grouping results. First the random data point I is selected as the representative object, then the representative item is replaced repeatedly with the non-representative item, the formula is as follows:

$$Q = A\frac{1}{n}R^{\frac{2}{3}i\frac{1}{2}} \tag{1}$$

By improving the quality of clustering in this way, the best clustering effect is finally achieved. However, as the size of the processing dataset and the number of modules increase, the efficiency of the algorithm decreases. If the wet week is expressed as x, R=A/x, and if the above formula is substituted:

$$Q = A\frac{1}{n}\left(\frac{A}{x}\right)^{\frac{2}{3}i\frac{1}{2}} \tag{2}$$

(3) Characteristic

1) Massive data

The most basic feature of large data is its large amount of data. In the era of big data, data is in

the process of continuous production. The quantity level also gradually develops from three megabytes to small bytes and to the zita byte level.

2) Diversification of data types

Because of the huge amount of data, data types also show the characteristics of differentiation. There are many kinds of data in the large data environment, and new data types are constantly emerging. Everyone receives e-mail, images, and web registration files, which are growing rapidly and becoming an important part of information data.

3) High efficiency of computing power

According to the law of one second, high-value information can be quickly obtained from different types of data in the context of large data. Its functional structure is characterized by a distributed structure, which is based on a large data framework and is very effective in computing power because of the powerful modules. In order to accommodate the large amount of data, the transmission rate can be significantly improved by accessing the data as streams. Now, with the continuous development of data mining technology and search engine technology, data will inevitably have more and more efficient computer capabilities.

2.2. Autonomous Learning

(1) The definition of autonomous learning

Self-regulated learning is a modern learning mode corresponding to traditional learning. In short, self-regulated learning takes students as the main body of learning, achieves students' learning goals, solves problems and improves their creativity through self-analysis, self-study and practice.

(2) The environment of autonomous learning

For students who study at school, the school is the main place to study and the main channel of learning. Teachers and managers are the most important trainers. Self-study requires basic education in school education, supplemented by necessary education, scientific and reasonable family education and social education, so that children can learn to learn knowledge, learn to behave, learn to exercise, learn aesthetics, and learn art. Through self-study, learning to live, learning to communicate, learning to survive, mastering the basic skills of learning, and constantly promoting self-development to meet the needs of modern society.

(3) Characteristics of autonomous learning

Self-regulated learning is the autonomy and self-discipline of the learning subject. Among them, autonomy is the basis of self-learning, the essence of self-learning, and self-discipline is the guarantee of self-learning. Both of these characteristics show the same idea: learning is ultimately a lesson guided and completed by people. Acknowledging and confirming this view undoubtedly plays a very important and realistic role in correcting many unreasonable aspects and thus creates a new educational teaching method and mode.

3. Experimental Objects and Processes

3.1. Experimental Objects

In order to verify the application of partitioning clustering algorithm in the data analysis model of self-learning ability training, we select an application-oriented undergraduate students' self-learning ability training data analysis model in our city to test. There are 11 majors, 42 classes and about 3,500 students. The proportion of males and females is approximately equal.

3.2. Experimental Processes

(1) Method selection

During the development of large data partition clustering algorithm, the development direction is determined according to the fitness function. Fitness is a manifestation of the advantages and disadvantages of timesheets. The stronger the fitness, the better the influence of timesheets. Therefore, the physical state function immediately determines the speed of course optimization and whether the best solution can be found, which requires the development of an appropriate physical condition function (expected value).

(2) Experimental steps

Based on the data analysis model of self-learning ability training in experimental colleges and universities, this paper adds a partition clustering algorithm to form a new model. For the convenience of experiment, we call the original model model A, and the new model based on the original model B. Based on different amounts of data, the operation time and fitness of A and B models are compared and their average values are obtained.

4. Comparison of Experimental Results between Two Models

Comprehensive practical ability puts forward higher requirements for the training of applied talents. Based on the basic practical and professional abilities, including personal cultivation, learning and acceptance, communication and coordination, organization and management, innovation and so on. This is also the goal and requirement of quality education in our country.

The improvement of individual self-learning ability is necessary for the improvement of comprehensive practical ability. Therefore, in order to improve their own ability, three points must be achieved. First, self-regulated learning is the external manifestation of the learning mechanism of the student subject, which is the synthesis of the students' attitudes and learning strategies. It is the ability of trainees to guide and control their own learning, which can be achieved through certain methods, such as the ability to set learning goals, the ability to select different learning methods, the learning activities for different learning tasks, the ability to track the learning process and the evaluation of learning effect. Third, self-regulated learning is a learning mode, that is, under the long-term control of the overall teaching objectives and the guidance of teachers, students formulate and complete specific learning objectives according to their actual learning status and needs. Of course, there are two premises for this learning mode: students have the opportunity to learn independently, and the educational mechanism provides space for self-learning.

4.1. Comparing Operation Time between Two Models

In recent years, although our country has made a lot of research and efforts on how to train talents, the cultivation of self-learning ability can not meet the needs of society, resulting in a serious gap between the talents trained by schools and social talents. The main way to measure the quality of an education model is by calculating the time span of the expected results. The shorter the time it takes to achieve the results, the more effective the method will be and more opportunities will be provided. In different university models, all data is not static. This change is not only caused by the change of the teaching staff, but also by the improvement of students' self-learning ability. Generally speaking, students with strong autonomy in learning will achieve higher grades, and vice versa. In this experiment, the comparison of operation time under different models is shown in Table 1 and Figure 1.

Table 1. Comparison of operation time of two models

	A	B
200	72	100
800	2	368
1600	1056	1122

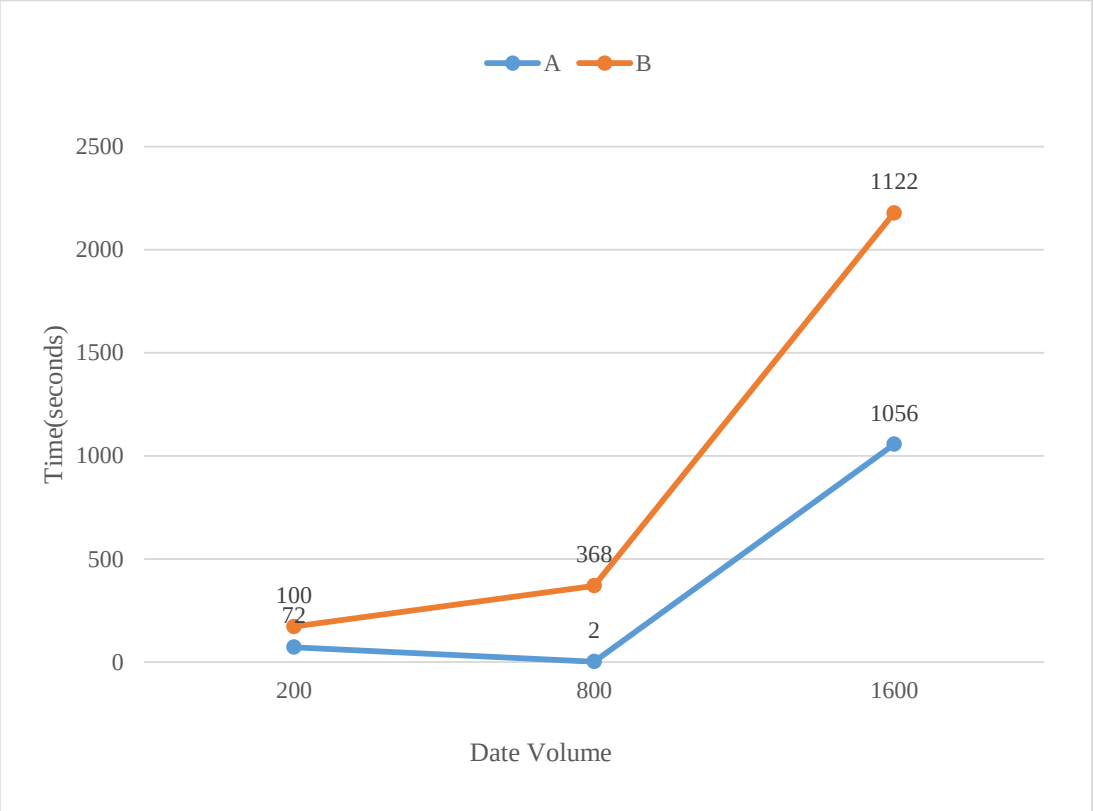

Figure 1. Comparison of operation time of two models

Comparing the data in Table 1 and Figure 1 shows that model A takes less time to compute than model B. When the amount of data used is 200, model A is 72, model B is 100, model A is 2, model B is 368, model A is 1056 and model B is 1122 when the amount of data is 1600.When the data quantity is large, although the absolute value of the gap is increasing, the relative difference between the two models is actually decreasing.

4.2. Comparing the Fitness of Two Models

Fitness is the main index to describe the individual performance and driving force of genetic algorithm. From the biological point of view, normal conditions are equivalent to the sustainable competition of "survival of the fittest", which is very important in the genetic process. The mapping relationship between objective operation and individual adaptability of optimization problem can realize the objective function of optimization problem in the development process. Therefore, we compared the fitness of the two models, and the comparison results are shown in Table 2 and Figure 2.

Table 2. Fitness comparison of two models

	40	80	160
A	73	132	150
B	109	145	184

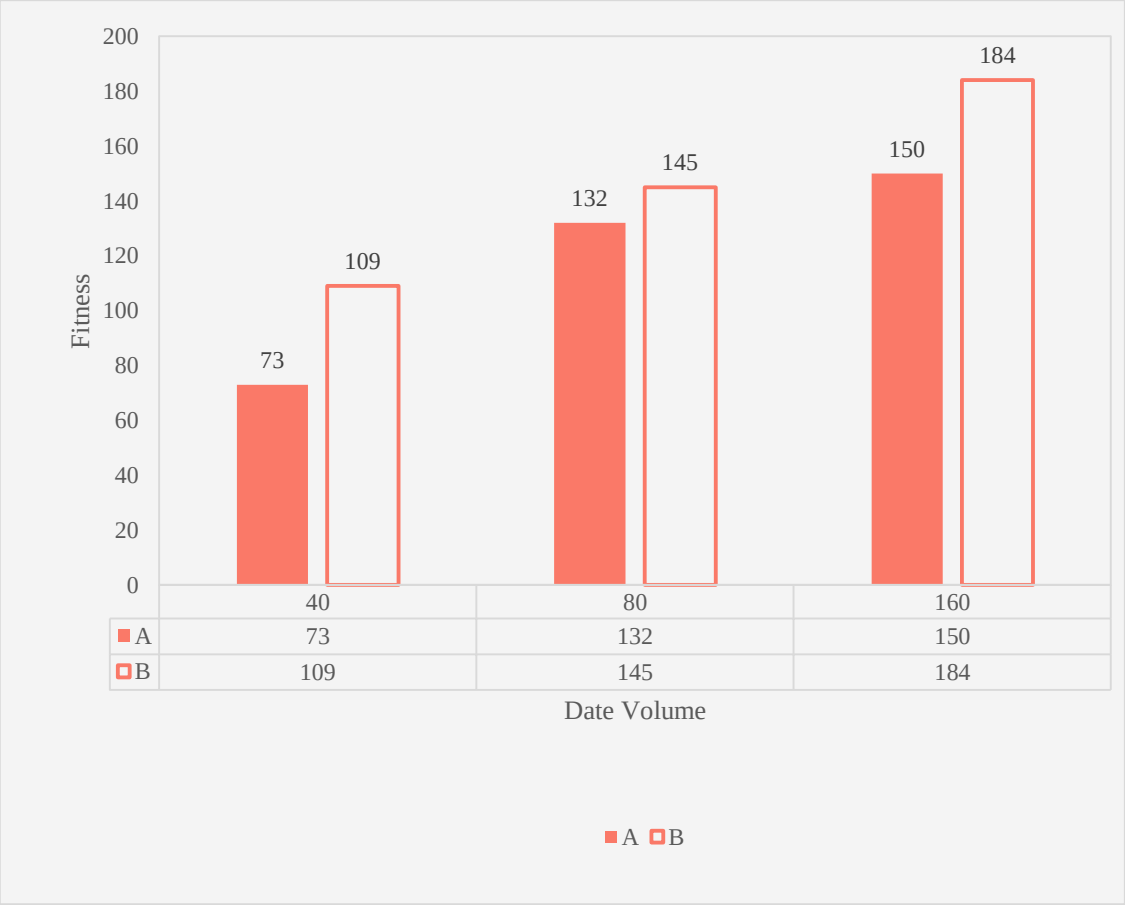

Figure 2. Fitness comparison of two models

From the data analysis in Tables 2 and Figure 2 above, it can be seen that the fitness of Model B is better than Model A. Model A has a fitness of 73 and Model B has a fitness of 109 when the value of data amount is 40. Model B has a 13 higher fitness than Model A when the value of data amount is 80 and Model B has a 34 higher fitness than Model A when the value of data amount is 160.

5. Conclusion

Training talents with self-learning ability is the need of social development, which is the best response to the challenges of the new century. In order to adapt to the rapid development of science and technology and to the requirements of rapid professional change and frequency, our knowledge is not enough, everyone must learn to study independently. In the future, if our students are competitive, if they have great potential, if they have the ability to acquire knowledge in the information age, it basically depends on whether they can understand life. How to teach students how to learn has become an important issue in the educational stage, which is highly valued by

many countries in the world. Self-regulated learning has become the key to human survival in the 21st century. Cultivating students' self-regulated learning ability can greatly promote the efficiency of classroom learning. At the same time, it is the key to the implementation of quality education and the need of classroom teaching. Classroom self-study is not only an individual behavior, but also refers to students not only blindly follow the teacher's requirements and behavior, but also make full preparations before class, actively participate in the class, check if after-school time is insufficient, fully display their initiative and enthusiasm, get rid of the restrictions on learning and dependence on teachers. Really realize that learning is self-learning, not educators or other people. Be your own learning supervisor, which can effectively improve the efficiency of classroom learning.

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Data Availability

Data sharing is not applicable to this article as no new data were created or analysed in this study.

Conflict of Interest

The author states that this article has no conflict of interest.

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