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Research on the Idea and Construction of " Ideological " Education under the IPSOBP Algorithm

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Abstract: In the context of informatization, the network of ideological education has become a new mode of education. This article first elaborated on the current situation of the development of informatization in ideological education followed by the construction of a genetic algorithm for informational education. Based on this point, this paper designed a “ideological” education model to elaborate on the retrieval and recognition of network retrieval information. Finally, the algorithm is tested, and the IPSOBP algorithm is used to iteratively train the genetic algorithm in the model, and the JMeter software is used to test the algorithm test set. The test result shows that the algorithm and model constructed in this paper pass the test and have certain reliability and stability with the potential for further promotion.

Keywords: Informatization; Genetic algorithm; Teaching model; Communicated by: (to be filled by the editorial)

1. Introduction

In the 21st century when information technology has developed rapidly and scientific achievements have rapidly spread, science and technology have become the first productive force [1]. The online education model is a brand-new teaching model emerging under the current technological background. Due to its own particularity, ideological education is not widely used in the online education model [2]. In the context of big data, the use of the Internet and computer technology to obtain ideological education information resources will become an inevitable trend [3]. With the continuous advancement of China's informatization construction, ideological education information resources also serve as a kind of information resources. In the context of the era of big data, it is necessary to build a platform dedicated to searching information resources for ideological and educational education. It is of great significance to rely on the development model of big data to realize the informatization of information resources for ideological and political education [4] . In China's education system, ideological education is an important part, but due to the lack of management of ideological education resources, the development process is also relatively slow [5]. Through the use of computer algorithms constructing the ideological education information resource system, we can make full use of the characteristics of the big data era and give full play to the advantages of online teaching resources, which can realize further reforms of ideological and political education methods and help China's ideological and political education industry flourish. This is China's important path to the informatization of ideological education [6].

2. State of the Art

Education and teaching based on the informational background began to develop in foreign countries as early as 1996. For example, the United States is currently the country with the largest distance education [7]. In February 2000, the UK Higher Education Fund Council drafted an ambitious "E-university" plan to integrate the strengths of British universities and establish an online university [8]. They plan to provide distance education to the world through the existing Super JANET network system in the UK. The British government will invest 50 million pounds for this purpose in order to compete with the United States, occupying at least 25% of the English-speaking countries' education market, and it attract more than 75,000 overseas distance students by 2005 [9] . The British first set targets for Singapore, Malaysia, Indonesia, China, Argentina and India. As an effective way of lifelong education, Japanese distance education has fully integrated into the overall system of national education and has made special contributions to popularization of higher education and successful realization of the overall development goals of “educated developed countries” [10]. China’s online school has developed greatly in a short period of time. In light of the achievements in the

development of online education in developed countries, the communications industry and academia conducted extensive and in-depth demonstrations and summarized valuable experiences in terms of hardware facilities, teaching concepts and forms of education. Minister Chen Zhili once pointed out that the overall planning and management of modern distance education projects have been further strengthened. The use of software for educational development has had a profound impact on China's education reform. She also pointed out that the education sector will accelerate the pace of building educational information modernization and strongly support the construction of information resources and the development of distance education software. However, China's software education is still at a relatively low level. The glimpse of the leopard in the tube is evident.

3. Methodology

3.1. Informatization education genetic algorithm construction

The genetic algorithm is a computational model that simulates the natural selection and genetic mechanism of Darwinian biological evolution. It is a method of searching for an optimal solution by simulating the natural evolutionary process. A genetic algorithm starts with a population that represents a potentially problematic solution set, while a population consists of many genetically encoded individuals. Individual is actually a chromosome-characterized entity. Because the work of encoding genetic code is very complicated, we often simplify it, such as binary coding. After the generation of the initial population, evolutionary generations produce better approximate solutions according to the survival of the fittest and the principle of survival of the fittest. In each generation, this paper selects the individual and combines the crossover and mutation by means of genetic operators of natural genetics to produce a population that represents the new solution set according to the size of the individual's fitness in the problem domain. This process will result in the fact that the population of the population like the natural evolution of the later generation is more adapted to the environment than the previous generation, and the best individual in the last population is decoded and can be used as a problem to approximate the optimal solution. A large number of information for traditional search engines are listed. This article selects and implements accurate information recommendation. In the information recommendation process, a new type of genetic algorithm and evaluation criteria are selected. It not only sorts according to the accuracy of the algorithm but also provides convenience for the user. In the 1960s, Professor Holland JH of the University of Michigan put forward a genetic algorithm, and his students further applied the genetic algorithm. The genetic algorithm is abbreviated as GA or SGA in the text. The most widely used aspect of genetic algorithms is the use of genetic algorithms to further optimize multivariate function problems. If the function expression of a multivariate function is very clear and has certain analytical properties, it is not necessary to use genetic algorithms for optimal.

solution, but the function is disturbed to a certain extent. At the same time, the requirements for function solving are not very precise. Or the minimum value can be optimized using a genetic algorithm. In GA, the relevant criterion selected is the proportionality principle of adaptive size. In the role of the ith individual under the selection operator, the expected value that continues to exist is $n(f_i / \sum f)$, which has the following formula:

$$\bar{f}(H,t) = \frac{1}{n(H,t)} \sum f_i \tag{1}$$

$$\text{be} \quad n(H,t+1) = n(H,t) \bullet \bar{f}(H,t) / f(t) \tag{2}$$

In the above formula, f_i is the fitness of the i-th string, and $n(H,t)$ is the number of optimization solutions belonging to t-h. The meaning of the selection operator is to increase or decrease the capacity of the type whose fitness level is higher or lower than the average level in the process of transmission, thereby improving the overall quality of the group.

At the level of fitness function, the genetic algorithm does not use the information outside the algorithm in the running process. The fitness function alone is the only basis, so that each individual with different fitness in the population performs comprehensive search. In the algorithm, an objective function in a certain space is set as $g(x)$, and the individual adaptive function in the search space is represented as $f(x)$. The conversion manner of the two in the algorithm can be expressed by the formula:

$$f(x) = \begin{cases} C_{\max} - g(x), g(x) < C_{\max} \\ 0 \end{cases} \tag{3}$$

In the above formula, $C_{\max}$ represents a theoretical maximum input value. When maximizing the search problem, an objective function in the search space that meets the requirements of the search is denoted as $g(x)$, and the individual fitness function in the search space is denoted as $f(x)$. The conversion formula of the two types of functions can be expressed as:

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$$f(x) = \begin{cases} g(x), g(x) > C_{\min} \\ 0 \end{cases} \tag{4}$$

In the above formula, C_{min} refers to a specific value that can be input, and it can also refer to the minimum value among all recent K generations in the current search space.

The above formula is the type of fixed force of the genetic algorithm, and it usually becomes the basic theorem of the genetic algorithm. According to the performance of the genetic algorithm in the process of practice, the genetic algorithm can guide the search direction to the low-order type with high degree of adaptation at the beginning of the operation and use the exchange operator to lower the value in the subsequent operation process. Order information is continuously combined into higher-order forms to achieve a smaller search space.

3.2. The design of "Dasi Zheng" education model under genetic algorithm

Since the establishment of China's campus network in 2002, the special use of software for educational resources has grown from scratch. The accumulation of ideological and political education resources in the network has experienced a long process. In order to highlight the functional characteristics of the system using genetic algorithms, we should actively use the advantages of genetic algorithms, modularize the educational software resources and use the model search method to operate the algorithm in the design process of the education model. The overall structure of the model is shown below.

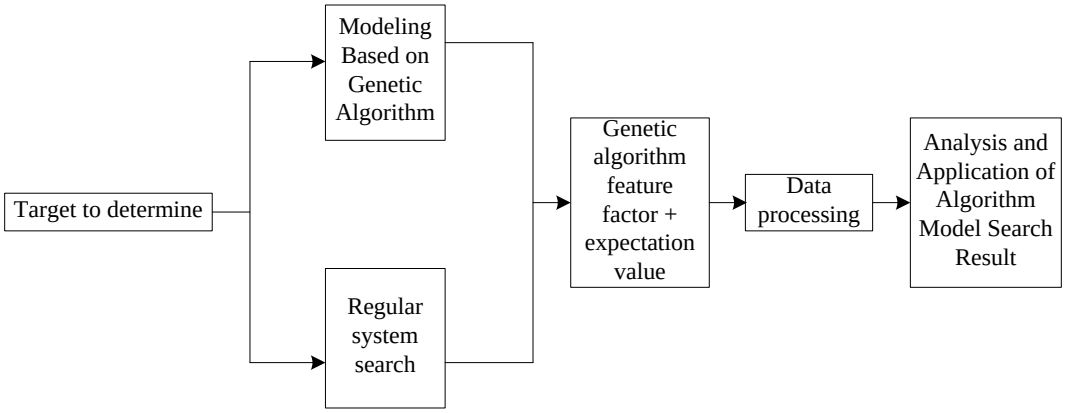

Figure 1. The overall functional structure of the system

In the network information application, this model uses the wrapper to retrieve and identify the retrieval information. The wrapper needs to define the relevant knowledge rules according to the model requirements in advance and input the user to the search information in the page for analysis and identification. It is sent to multiple web servers for retrieval and finally numerous web search results are integrated. It separates and extracts useful information from numerous search information for further identification and further converts them according to the degree of conformity of related information and converts them into use. The format description information of a specific format presents the integrated information more comprehensively to information retrieval users. The overall workflow of the information module is shown in fig. 2.

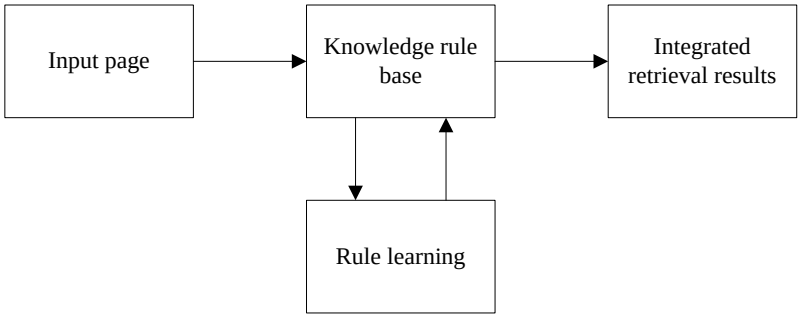

Figure 2. Workflow diagram of system data integration module

For the design of the local database, a new system database in Access was created, and it was named as ideological education network resource management system. Then according to the requirements of system function

design, the division of functional modules, the investigation and accumulation in the previous analysis stage, the required data tables are established in the database. Back-end database design through Access first needs to install the office software (recommended for the above 2000 version). After installing the Access software, open and create a new Access database, and define its own name. Or you can choose to directly create a new background database directly in the new database options in the Visual Basic programming environment, according to the requirements of the above design and module design in the new background database to establish the total system needs of the data table. After the background database is established successfully, we must implement the connection between the background database and the front-end interface. Using Adodb in Visual Basic and setting the Connection property and Recordsource property in the space setting, we can bind the Data Grid space to each other in a simple way. The two controls can be combined to write a back-end database processing program. The background database has been established can be opened through the program, and the background database search, modify, browse and delete operations can be achieved. Based on the above algorithm, this paper has designed the database. The following is the database design table:

Table 1. Question list

Name	field	type	primary	Remarks
Problem Id	id	int	yes	Self increment of primary key
Problem title	title	varchar	no	
Question content	content	text	no	
Question type	typeld	int	no	Foreign key associated to category table
Problem submission time	submitTime	date	no	
Problem solving time	solveTime	date	no	

4. Result Analysis Naltsis and Discussion

4.1. Algorithm function test

In order to ensure the availability of the design system, the system achieving the desired use effect, the system running smoothly and the user getting the best use of the effect, it is important to carry out comparative functions and performance testing of the software. The use of testing can ensure that each function is completely completed and conduct comprehensive treatment of software problems. We first use the IPSOBP algorithm to iteratively train the genetic algorithm in the model. Before the system algorithm processes the sample data line, the weights and thresholds of the system genetic algorithm must be reinitialized, and other parameters in the system algorithm must also be set again. The initial values of initial weights, inertial factors, and acceleration coefficients in the genetic algorithm are set by means of random generation. Before adopting the IPSOBP algorithm to perform a new combination of the model group intelligence algorithm based on the genetic algorithm, three different iteration iterations are selected respectively. In the testing session, 10, 20, and 30 are respectively selected. The choice of three different iteration times for the algorithm is to be able to laterally compare the optimal computational efficiency of the degeneracy system model with iteration times of different genetic algorithms. Based on the feature samples used in the test, the experimental results of the training based on the genetic algorithm using the Ipsobp algorithm are shown in Table 2.

Table 2. The experimental results of different iterations based on genetic algorithm

algorithm	Patterns	Number of iterations	Epoch	Pbest number	MSE
IPSOBP	30	10	243	3	0.03113
		20	437	7	0.04931
		30	295	5	0.03978

In the testing process of the algorithm function, the IPSOBP algorithm is used to perform the iteration number training experiment for the genetic algorithm. In the process of setting the initial parameters, most of the initial parameter settings are determined by means of random generation. Therefore, in the process of using the algorithm to represent the training results, the system model often obtains different cycle values and MSE values. In the above training results table, it can be found that the average value of the cycle after the IPSOBP is completed in the case of different iterations is also smaller, indicating that the genetic algorithm has a good convergence effect. However, it can also be found from the Epoch and MSE values that the training result of the algorithm does not directly relate to the selected iteration number.

4.2 Using jmeter software for algorithm test Set verification

JMeter is written in JAVA language and is a project under the name of Apache Software Foundation. The JMeter design was originally used to stress tests applied to Web applications or systems. With the continuous development and improvement of JMeter, it can now be

applied to other areas and complete relevant testing work. JMeter software can be used to accurately test static resources such as HTML, and it can also test function models of dynamic resources to simulate the execution conditions of computer algorithm models of different algorithm test sets under different conditions, so that the algorithm model can be fully tested.

Based on the constraints of objective conditions, the JMeter test section will complete the entire testing process by the local computer. In the process of testing, the local computer not only serves as a server, but also completes the testing of the client. It bears the related factors of the controller and network functions. Therefore, the local computer with high configuration and good processing performance is selected to complete the test. The key is that its test results are closely related to the performance of the local computer. In order to verify the diagnostic performance of the proposed algorithm model for the many samples in the data set, we obtained the number of iterations of different genetic algorithms and applied the four indicators of fitness f_i, individual fitness $f(x)$, $C_{\max}$ and $C_{\min}$. For further investigation, the error results obtained from the training sample set and the test sample are shown in Figure 3.

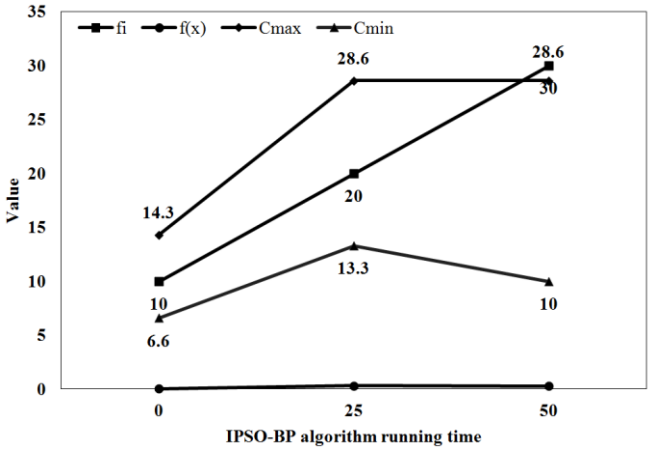

Figure 3. Genetic algorithm experimental sample set and test sample results

From the above results, it can be found that the genetic algorithm studied in this paper can obtain better output classification results under different conditions during training and testing. Compared with the objective expectation value, the proportion of the error sample quantity output by the system model algorithm is within the acceptable range. The algorithm can help users accurately search and display in the ideological education software resource system, so as to provide more accurate search results for the next step of the system's classification and display of teaching resources.

According to the relevant parameters set before the start of the JMeter test, the JMeter software sends a test request to the target system and obtains relevant test data after the server responds. Through the test results shown in the test, in the process of testing the management system of sports games in general colleges and universities, JMeter simulated a total of 70 target clients, and each simulated client made 20 requests for access, that is, a total of 1400 access requests, and the process continued for 46.6 seconds. In the test results, the shortest corresponding time is 12 milliseconds, and the longest response time is 1788 milliseconds. The average corresponding time is 290 milliseconds. Some test results are as follows.

During the testing process, no functional defects were found in the algorithm. The prompt function for saving records when running or shutting down activities was basically completed. There were no stalls, crashes, and slower program execution speeds during the continuous startup and shutdown of the algorithm. Bad phenomena and good convergence (Figure 4). The optimization degree and function of the algorithm are relatively perfect.

Table 3. The system responds to time test results

Thread Name	Label	Sample Time	Bytes
Test the sports management system1-9	Match.list.action.ts	68	528
Test the sports management system1-10	Enrol.listByDepart.AndGroup.action	126	12
Test the sports management system1-5	Match.list.action.qn	27	45
Test the sports management system1-10	competition.listByMatch.action	138	12
Test the sports management system1-3	competition.listByMatch.action	113	975

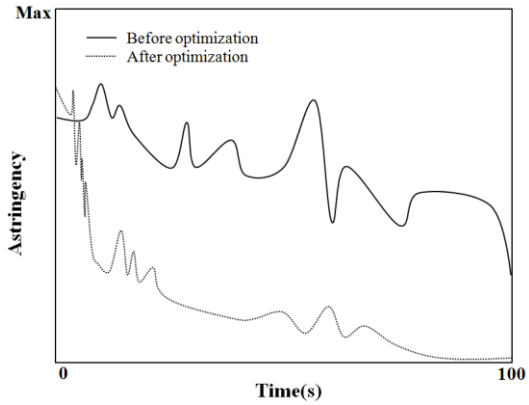

Figure 4. Convergence test of the algorithm

5. Conclusion

This study used genetic algorithm theory to carry out the ideological education model for development and design based on the background of big data. In the detailed design process, this article first introduced the analysis and analysis of the genetic algorithm theory, and it used the advantage of the optimized search function of the genetic algorithm to carry out the information management of the ideological education resources. The "great thinking" under the information background was designed. The teaching model and the acquisition and recognition of network retrieval information in the model are described. Finally, the functional testing of the algorithm and the model and the system stress test using JMeter software prove that the system has certain reliability and stability. In the day-to-day management of political education resource management, the network ideological education resource management system using the genetic algorithm proposed by this research and development can realize the management informatization of ideological education resources. However, due to the limitation of time conditions, there are still some deficiencies in the ideological education model proposed by this study based on genetic algorithms. The database used still has room for optimization. With the repeated use of the system in the teaching process, there may be some unexpected problems that need to be continuously improved in the future.

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