Design of Ideological and Political Online Education System Based on Neural Network

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Abstract. In order to improve the performance of the traditional online ideological and political education system, the design of the online ideological and political education system based on neural network is proposed. According to the background of the online ideological and political education project and the analysis of the system demand, the neural network is applied to the structure design of the online ideological and political education system, and the online ideological and political education system module is designed by using the information acquisition module, the standardization module, the self-training module, the self-defining module and the management module of the information model of the online ideological and political education. The online ideological and political education system module is designed by using the language model education module, the optimization module of educational results, the text input management module and the output management module of educational results. The test results show that the online ideological and political education system based on neural network has better performance.

Keywords: Neural network · Ideological politics · Online education system · Feature extraction

1 Introduction

Ideological and political education is the basic way for the Party to exercise ideological and political leadership in colleges and universities, and the fundamental guarantee for effectively fulfilling the historical mission of ideological and political education in the new era. Promoting the quality and benefit of ideological education by means of informationization is of great significance to cultivating college students in the new era, an inevitable choice of the development of the times, and the meaning of constructing powerful and modern applied talents [1]. Ideological and political education, as an important part of the construction of spiritual civilization in China, is also one of the important pushing forces to solve social contradictions and problems. With the development of the times and the continuous progress and deepening of Ideological and political education, the increasing number of Ideological and political education-related documents, how to better access to information and further analyze data on a large number of Ideological and political education documents is also the top priority of Ideological and political

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education research. It is a feasible and efficient program to summarize and deeply analyze a large number of documents with the help of computer related knowledge and natural language processing tools.

Ideological and political education system aims at providing intelligent support for ideological and political education in institutions of higher learning by using Internet, Internet of Things, multimedia and other technologies. At present, a variety of educational models emerge one after another, ideological education needs to be constantly improved and optimized [2]. The ideological and political education system pays attention to the use of new media. The new media has the characteristics of multimedia, which includes not only the visual symbol system, but also the sound symbol system. Using the new media, the content of ideological and political education can be transformed into a "cultural feast" with both visual enjoyment and auditory enjoyment, which makes the content of ideological and political education more vivid. Alice's Rational Emotive Therapy lists 11 irrational beliefs and characteristics existing in people's minds, and develops and establishes new platforms and positions of ideological education. The ideological and political education system is intelligent, integrated, interactive, real-time and other functional characteristics, which highly meets the multi-dimensional needs of colleges and universities to carry out ideological and political education in the new era. It can greatly improve the quality and efficiency of ideological and political education, and has strong vitality and high research and development value [3]. First, it can reduce the burden of teaching preparation. Based on ubiquitous and broadband network, the ideological and political education system can realize the interconnection of massive information, and the sharing of high-quality lesson plans, courseware and learning materials can greatly improve the efficiency of preparing lessons for political teachers; secondly, it can improve the accuracy of teaching. The system can provide functions such as thought investigation and analysis, online communication, forum and so on, and can accurately grasp students' realistic thoughts and different demands. Third, it can enhance the objectivity of teaching evaluation. The system has the function of real-time recording, which can be registered and archived, no matter whether the teaching plan is prepared for class preparation, induction video recording is made during class teaching, or the discussion and cooperation activities are organized after class, and the implementation of personnel, time, content and system is clear at a glance, and the assessment results are more objective and more reliable.

Different from the ideological and political education in our country, there are few such education abroad as "ideological and political education" or "moral education", and there are no teachers specialized in ideological and political education. But this does not mean that there is no ideological and political education abroad, but ideological and political education abroad using relatively hidden education strategies, skillfully avoid the frequency of these political and cultural terms. At present, there is not much research and development of online education platform for ideological and political education abroad, and some domestic scholars have put forward research results. Lee et al. [4] build an educational system based on Moodle by providing a friendly interface to adapt to most students' online learning. The implementation of the website is studied by taking the course of "Multimedia Implementation by Using JAVA" as an example. From the modified Moodle -based educational system, the time for students to browse

each web page can be obtained. By analyzing the recorded information, teachers can find out the factors that affect students' learning performance. Therefore, teachers can evaluate students' learning performance by using the proposed learning performance evaluation mechanism to provide sufficient supporting learning materials for individual students. Zhang J et al. [5] In order to solve the problem that information island and organization are lack of effective management in the sharing of traditional base education resources, a model of education information system based on geographic information system is put forward, including system organization model and system architecture. The principles for the construction of the platform are summarized. Problems that need to be considered are pointed out. The system provides centralized management, expression and scientific analysis of relevant geographic and comprehensive information, describes the spatial distribution of education resources, combines spatial attributes with statistical analysis of education information, and realizes the distribution of education institutions, nearby security schools, micro-natural disaster prevention planning, macro-cutting and regional planning, as well as the implementation and optimization of information query and maintenance tools for the implementation of education resources.

The application of big data and artificial intelligence technology in ideological education is the inevitable choice of the times. Carrying out rich and colorful ideological education is the need of the times and the development of socialist countries. Advanced tools and means of ideological education are the indispensable part of carrying out ideological education in colleges and universities. Combined with the exploration of strengthening and improving college education, this paper puts forward the demand of developing college ideological and political education system, and determines the key technologies to be adopted through detailed investigation, on the basis of which an online ideological and political education system based on neural network is designed and implemented.

Considering the needs of ideological and political education, this paper can extract the texts in different formats and convert them into document formats for subsequent use. The language module is added, and different language modes can be exchanged. It enhances the applicability of the system, provides an operable platform for online education of ideological and political education, and enhances the convenience of education.

2 Structure Design of Online Ideological and Political Education System

According to the background of the online ideological and political education project and the analysis of the system needs, the online ideological and political education system is divided into four layers: presentation layer, business layer, support layer and data layer [6]. The overall structure of the ideological and political online education system is shown in Fig. 1.

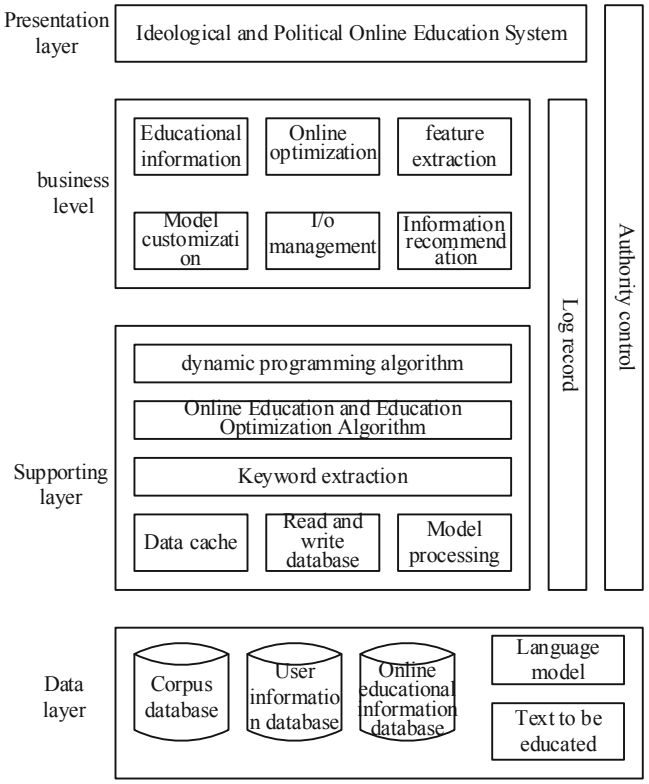

Fig.1. System architecture diagram

Presentation layer

The presentation layer provides the user with the system operation interface by the various options and icons in the system interface, which is convenient for the user to operate the various functional modules.

Business layer

The business layer is the main part of transaction processing, which includes model self-definition, input-output management, online education, online optimization, feature extraction, information recommendation and so on.

Supporting layer

The basic layer provides back-end support for the main functions of the business layer, including algorithm support, data caching, corpus reading and writing, and language model processing.

Data layer

The data layer provides the data needed for the function of the system. The database mainly includes system corpus, user corpus, user information database and so on.

3 Module Design of Online Ideological and Political Education System

The online ideological and political education system is mainly divided into three functional modules: the ideological and political education information training module, the online education module and the feature extraction module. The main functional modules are divided into several sub-modules according to different functions. The overall functional diagram of the system is shown in Fig. 2.

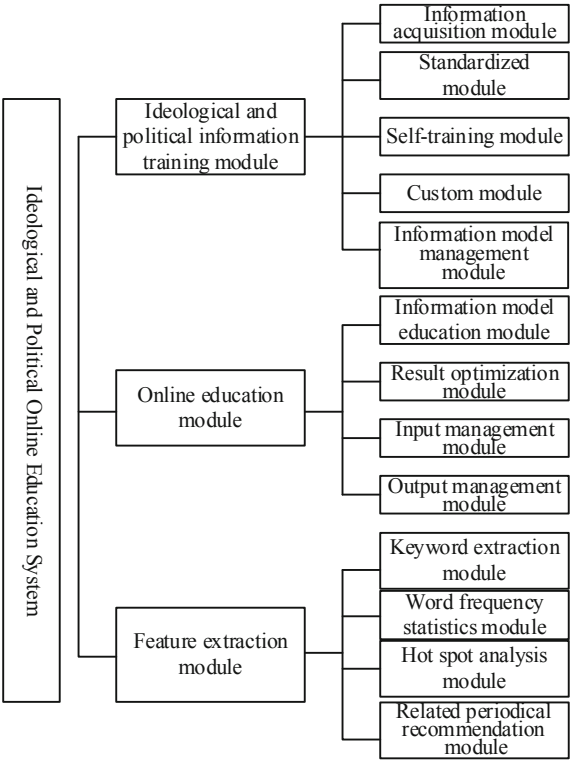

Fig. 2. Overall system function diagram

3.1 Ideological and Political Education Information Training Module

The information training module of ideological and political education includes the information acquisition module, the information standardization module, the self-training

module, the self-definition module and the management module [8]. The main function is to deal with ideological and political education information and model training and management.

Ideological and Political Education Information Acquisition Module
In order to meet the needs of users for the individuation of ideological and political education information model, it is responsible for receiving different types of text documents provided by users and extracting the text from them, so as to prepare for the subsequent training and use.

Information Standardization Module of Ideological and Political Education
After obtaining the information of ideological and political education provided by users, the information can not be used in direct training, so the information of ideological and political education can be standardized and processed to meet the needs of follow-up training.

Model Self-training Module
Based on the standardized ideological and political education information and the corresponding algorithm, some parameters of the language model can be modified to meet the needs of the users.

Model Customization Module
Considering that some segments of online educational results may not meet the needs of users, further optimize the trained language model or system-owned language model through the model customization module, and add some high-weight words to the model to meet the needs of users to the greatest extent [9].

Ideological and Political Education Information Model Management Module
Considering the personalized components of different users and the privacy protection of the model, the customized language model of different users is managed and protected to ensure the privacy and information security [10].

3.2 Online Education Module

Online education module includes language model education module, education result optimization module, text input management module and education result output management module. Users can use the system language model to educate the educational

texts online [11, 12], optimize the results and get the final educational results, and output different types of files according to the needs of users.

Language Model Word Segmentation Module
The language model education module is mainly based on the language model and uses the Viterbi algorithm to segment the text provided by the user.

Result Optimization Module
According to the preliminary results, the result optimization module optimizes the preliminary results by using the optimization algorithm, and can check the difference of the results according to the user's needs.

Text Input Management Module
According to the user's requirement, the text management module is mainly responsible for reading the text in different types of text documents provided by the user, and preserving the original text format.

Result Output Management Module
The result output module is mainly responsible for the output of the final results, and the results can be exported to a number of types of text documents according to the needs.

3.3 Feature Extraction Module

The feature extraction module includes the keyword extraction module, the word frequency statistics module, the research hotspot analysis module and the related journal recommendation module. After getting the results, users can get the key words and word frequency statistics of the text, and analyze the research hotspots according to the key words, and recommend the ideological and political education periodicals related to the hotspots as reference.

Keyword Extraction Module
Keyword extraction module is mainly responsible for the final results have been obtained, through keyword extraction algorithm, access to the corresponding ideological and political education keywords, and through keyword extraction results to prepare for the follow-up analysis.

Word Frequency Statistics Module
Word frequency statistics module is mainly responsible for the final results of the word frequency statistics, and ranking, according to the word frequency statistics results can be more comprehensive understanding of the corresponding text of the main research direction and written expression. At the same time, considering that it can reflect the text information more intuitively, this module provides the function of drawing the word cloud. By analyzing the text information, we can show the primary and secondary information of the text directly by drawing the word cloud, and provide reference for the text analysis.

Research Hotspot Analysis Module
The research hotspot analysis module can analyze the research hotspot of the ideological

and political text according to the keyword extraction module, and can count the research hotspot of the user's history result.

Recommendation Module for Related Journals
The relevant literature recommendation module is mainly responsible for referring to the main research directions of the text to be taught, recommending the periodicals with high relevance in the relevant ideological and political education periodicals that have been included according to the research directions, and recommending the relevant literature on the home page and in the literature recommendation column for the convenience of users to browse and reference.

3.4 System Flow Design

Through the analysis of user needs and in combination with the reality, this paper designs a set of standardized processes for the online ideological and political education system. The complete processes include logging in the user account password, recording the corresponding account education history, customized language model and other data,

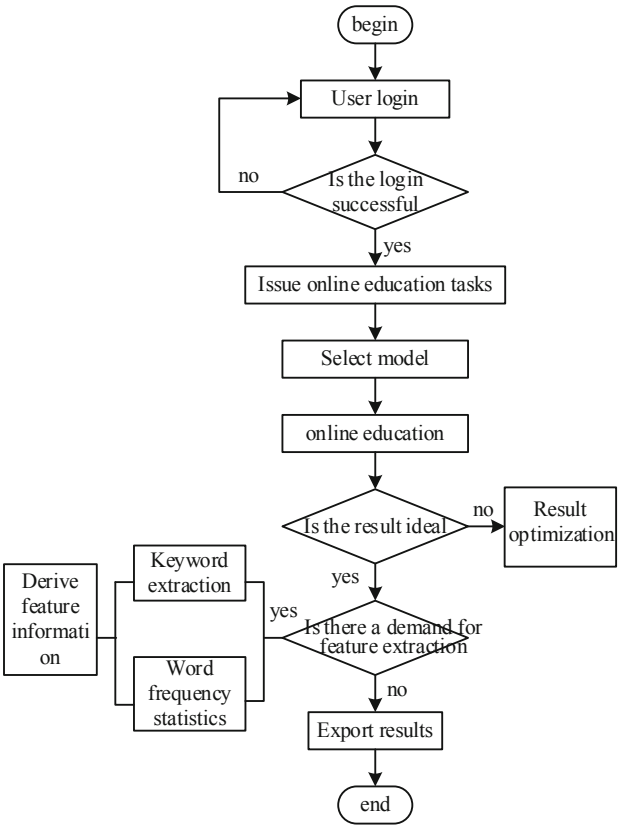

Fig. 3. Flow chart of main functions of online ideological and political education system

and providing online education and follow-up data analysis services in light of user needs [13]. Through the above analysis of the basic process, get the ideological and political online education system main function flow chart, as shown in Fig. 3.

4 System Testing

The system testing mainly includes three parts: system security testing, system function testing and system performance testing. The three parts include different testing contents and emphases.

4.1 System Security Testing

he system security test mainly verifies whether a user can use the system or check the user information of others under the circumstances that the logon information is inconsistent with that of the user, whether the system can operate normally or feed back in time after the user misoperates, whether the corresponding functions of user authority control are improved, and other items. The test results are shown in Table 1.

Table 1. System Security Test Results

Test project	Operation steps	Expected results	Test results
Users access the system without logging in	Try accessing the system without logging in	Unable to access the system, display login interface	Consistent with expected results
User session timeout exit	Multiple user input errors in the login system interface	Prompt login warning and close system	Consistent with expected results
User ultra vires access	Log in the system to enter the person's role account and access the personal information of the non-user	Unable to obtain other user information, access failed	Consistent with expected results
User information encryption	Viewing other user information through database operations and online education information	Database encryption, inaccessible to other users	Consistent with expected results

4.2 System Functional Testing

The results of the system function test on the corresponding functions of the ideological and political education information training module, online education module and feature extraction module are shown in Table 2.

Table 2. Functional Test of Ideological and Political Education Information Training Module

Test project	Operation steps	Expected results	Test results
Viewing Information on Ideological and Political Education	Access to the training interface to view ideological and political education information	Basic information on ideological and political education can be viewed in the file bar of standardized information	Consistent with expected results
Standardization of ideological and political education information	Enter the training interface to standardize the development of ideological and political education information	The information of ideological and political education is standardized and processed into standardized data	Consistent with expected results
View standardized ideological and political education information	Enter the training interface to view the uploaded standardized ideological and political education information	You can view standardized ideological and political education information in the model training file bar	Consistent with expected results
Training on standardized ideological and political education information	Enter the information training interface of ideological and political education model training operation	According to the standardized information of ideological and political education training and get the corresponding information model	Consistent with expected results
Standardized ideological and political education information derived	Entering the Information Training Field of Ideological and Political Education to Export the Standardized Data	The standardized ideological and political education information is exported to the designated location according to the user's needs	Consistent with expected results
Training Information Model Export	To enter into the ideological and political education information training field to face the training information model derived	Export the standardized information model to the specified location according to user requirements	Consistent with expected results

(*continued*)

Table 2. (*continued*)

Test project	Operation steps	Expected results	Test results
Viewing the Optimized Information Model Information	Viewing Optimization Information Model Information into Model Optimization Interface	The model information to be optimized is displayed centrally in the file box consistent with the expected results	Consistent with expected results
Add new information to existing information models	Enter Model Optimization to add new information to the specified model	Optimize the model by adding specified new information to the existing information model	Consistent with expected results

The function test of online education module mainly includes online education, optimization education, uploading documents and exporting results. The test results are shown in Table 3.

Table 3. Online education module functional test

Test project	Operation steps	Expected results	Test results
Upload to be participle document	Enter the online education interface and click the upload document button to upload the education document	The educational document is uploaded successfully, and the relevant information of the educational document is displayed in the file box	Consistent with expected results
Online education	Enter the online education interface and click the online education button to operate online education	The online education process is successful and the result is output to the result output box	Consistent with expected results
Optimizing education	Enter the online education interface and click the optimization button to optimize the results	Optimized education processing successfully, output the result to the result output box	Consistent with expected results

(*continued*)

Table 3. (*continued*)

Test project	Operation steps	Expected results	Test results
Model selection	Enter the online education interface and click the Select Model button to select the existing model for subsequent selection	Show the existing model and provide the basis for subsequent operations by selecting the corresponding model	Consistent with expected results
Output results	Click the Output Document button to output the	Outputs the corresponding file type result document to the specified address based on the final result	Consistent with expected results

The function test of feature extraction module mainly includes keyword extraction and hotspot analysis, and the test results are shown in Table 4.

Table 4. Functional test of feature extraction module

Test project	Operation steps	Expected results	Test results
Upload educational documents	Enter the feature extraction interface and click the upload document button to upload the educational document	The educational document is uploaded successfully, and the relevant information of the educational document is displayed in the file box	Consistent with expected results
Keywords extraction	Enter the feature extraction boundary and click the keyword extraction button to educate the educated text online	Keyword extraction is successful, output keyword extraction results in the left result output box	Consistent with expected results
Hot spot analysis	Enter the feature extraction interface and click the hot spot analysis button to analyze the key words	The results of hot spot analysis show that it is successful, and the hot spot analysis of the corresponding keywords is carried out according to the different results of keyword extraction	Consistent with expected results

4.3 System Performance Testing

The system performance test mainly tests the response time of the system to different operations of the users. In order to guarantee the reliability of the test as much as possible, in the process of testing various purposes, 100 tests are conducted for different test items, and the final results are summarized and the average value is taken as the final test results. In order to ensure the consistency of the test and reduce the deviation caused by different text lengths, 100 texts of similar length are extracted as the test set in the process of treating the ideological and political texts of education, and in the process of testing, a number of testers are found to use the system and recorded to obtain a more appropriate expected result of system performance, which is compared with the final test results as an indicator. Table 5 is the test results of system performance. By analyzing Table 5, it can be found that the online ideological and political education system designed in this paper meets the expected results in terms of user login time, page loading time, response time, optimized response time, keyword extraction time, word frequency statistics time, word cloud mapping time, hot spot analysis time, model self-training time, model optimization time, document uploading time and document output time, and the results are far superior to the expected values, with superior application performance.

Table 5. System performance testing

Test project	Expected results	Actual results	Result
User login time	<3 s	1.01 s	Pass
Page load time	<3 s	1.11 s	Pass
Response time	<3 s	2.88 s	Pass
Optimized response time	<4 s	1.71 s	Pass
Keywords extraction time	<1 s	0.23 s	Pass
Word Frequency Statistics Time	<1 s	0.12 s	Pass
Word cloud mapping time	<2 s	0.89 s	Pass
Hot spot analysis time	<2 s	0.87 s	Pass
Model self-training time	<30 s	21 s	Pass
Model optimization time	<3 s	2.28 s	Pass
Document upload time	<2 s	0.82 s	Pass
Document output time	<2 s	1.12 s	Pass

5 Conclusion and Outlook

This paper puts forward the design of online ideological and political education system based on neural network, and designs the structure of online ideological and political education system according to the background of online ideological and political

education project and the analysis of system demand. The results show that the online ideological and political education system based on neural network has better performance. However, the online ideological and political education system designed by this method does not give much consideration to the design of interactivity. In the future research, the system will be further improved on interactivity to enhance the application performance of the system.

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