Ideological and Political Early Warning Mechanism for Emergencies in University Campus Based on Artificial Intelligence

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Abstract. In recent years, campus crises have occurred frequently, which has greatly affected the stability and development of colleges and universities. With the rapid development of information technology, the application of artificial intelligence technology in the field of Ideological and political early warning has become an inevitable trend. It will bring great changes and opportunities to the early warning mechanism of emergencies. Through the analysis of campus emergencies, this paper expounds that strengthening ideological and political education is of positive significance to improve the early warning ability and improve the early warning mechanism of colleges and universities. Using machine learning algorithms such as support vector machine, this paper gives the overall architecture, functional module design and system implementation method of campus emergency ideological and political early warning system based on artificial intelligence. The information system based on artificial intelligence is conducive to establish a positive early warning mechanism of Ideological and political work, effectively resolve contradictions and maintain the safety and stability of the campus.

Keywords: Early Warning Mechanism · Emergencies In University Campus · Artificial Intelligence

1 Introduction

The emergence of artificial intelligence brings new opportunities and challenges to ideological and political education in universities [1]. Under the background of artificial intelligence, big data is introduced into the early warning mechanism of Ideological and political education in universities. The implementation of the early warning mechanism of Ideological and political education based on artificial intelligence technology can enhance the ability of Ideological and political education in universities to control students' public opinion information, ideological behaviours, and various adverse trends, improve the foresight and guidance of Ideological and political education in universities, and promote the development of ideological and political education in universities. This is an important trend in the research of ideological and political education in universities. The existing research on Ideological and political education in universities mainly

focuses on the ideological and political education itself, such as the research on the ideological and political education of a certain group, such as the research on the ideological and political education of farmers, employees of state-owned enterprises and college employees; Put ideological and political education in a theoretical perspective, such as Marx's communication theory and Marx's equilibrium theory. There are few studies on the early warning mechanism of Ideological and political education in the context of a certain background of Ideological and political education in universities, Internet plus, artificial intelligence, and new media. The research on the early warning mechanism of Ideological and political education in universities under the background of artificial intelligence, combined with the characteristics of the new era, extends the ideological and political education itself to the early warning mechanism, which is the expansion and deepening of the research on Ideological and political education. The early warning mechanism of Ideological and political education in universities can monitor, analyse, and evaluate the ideological and information of college students with the help of artificial intelligence related technologies. Compared with the traditional early warning mechanism, the implementation of the early warning mechanism of Ideological and political education in universities with the help of artificial intelligence can realize the real-time of the process, the comprehensiveness of the samples, the accuracy of the results and the convenience of operation. Through research, we can better build a complete research system of Ideological and political education and give full play to the role of Ideological and political education in universities [2].

2 Elaboration of Relevant Concepts

2.1 Artificial Intelligence

Machine learning algorithm is the core of artificial intelligence and the basis of constructing academic early warning model. Support vector machine is one of the important machine learning algorithms [3].

Support vector machine is a kind of supervised learning, which is mainly used for classification and regression analysis. Its goal is to find a hyperplane. The farther the two types of data are from the hyperplane, the better to classify new data more accurately, even if the classifier is more robust. When classifying unbalanced data sets, the effect is not satisfactory. The main reason is that when the traditional support vector machine is trained, whether it is positive or negative samples, their misclassification cost is the same. Based on this theory, Veropoulosk et al. gave different penalty factors to positive samples and negative samples, so that the classifier pays more attention to a few classes to inhibit the deviation of classification surface. In this case, the classification hyperplane objective function with the maximum soft interval will become:

$$min\frac{1}{2}\|w\|^2 + C^+ \sum_{(i|y_i=1)}^{l} \xi_i + C^- \sum_{(i|y_i=-1)}^{l} \xi_i$$

$$s.t. y_i(w.\varphi(x_i) + b) - 1 + \xi_i \geq 0$$

$$\xi_i \geq 0 i = 1, \cdots, l$$

By solving the parameters w and B, the objective function of the super classification hyperplane can be expressed as:

$$f(x) = w^T x + b$$

In the formula, $w = (w_1, w_2, \cdots, w_n)$ is the normal vector, which determines the direction of the hyperplane; b is the displacement term, which determines the distance between the hyperplane and the origin. The normal vector w and the displacement term b together determine the position of the hyperplane. The distance from any point x in the sample space to the hyperplane is shown in the formula:

$$R = \frac{|w^T x + b|}{|w|}$$

We call the two sample points closest to the classification hyperplane in different categories as support vectors, and these two vectors form two planes parallel to the classification hyperplane. The classification interval is as follows:

$$margin = \frac{2}{\|w\|}$$

The basic principle of classification is to normalize the discriminant function so that the positive and negative samples meet |f(x)| ≥ 1. The minimum ||w|| can maximize the classification interval. For all samples to be correctly classified, the samples must meet:

$$y_i(w_i * x + b) - 1 \geq 0$$

Finally, the linear separable problem is solved by solving the convex quadratic programming problem.

2.2 Emergencies in University Campus

In recent years, with the deepening of China's reform and opening and the continuous development of modernization, colleges and universities are facing many development opportunities, but also increased many uncertain factors. The contradictions and crises caused by social transformation have spread to the campus, and some campus emergencies involving a wide range and great harm have occurred in many colleges and universities [4]. Campus emergencies in colleges and universities refer to the public emergencies that occur in or around the campus, are implemented by the teachers, students and employees of the university or take them as the object of infringement, involve the destruction of social and campus order, cause serious damage to personal and property, and affect the reputation of the university. Their characteristics are sudden, rapid intensification, and seriously affect the stability and public security order of the campus. The emergencies on campus can be divided into the following categories. The first category is natural disaster events such as the 2008 Wenchuan earthquake, floods, and typhoons in coastal areas. Such incidents can cause students' psychological panic, cause group mood fluctuations, and easily lead to large-scale chaos in the school. The second category is political group events. Political mass incidents include illegal gatherings,

demonstrations, etc., such as the "Occupy Central" incident of some college students in Hong Kong in 2014. Such events span campuses and even regions, with large scale and great influence. The third category is health disaster events. Health disaster events include epidemic of infectious diseases, food poisoning, fire and explosion, abnormal death, etc. Such incidents have a wide range and wide impact, which will have a serious impact on the school. The fourth category is campus violence. It includes intimidation, group violence, campus unrest and accidental injuries against students on campus, such as fighting, theft, traffic accidents, gambling, alcoholism and so on [5]. The fifth category is personal self-injury. Personal self-injury events refer to self-injury and suicide events caused by their own mental stress or mental illness, such as running away and missing, taking drugs and jumping from a building, etc. [6].

2.3   Ideological and Political Early Warning Mechanism

Early warning mechanism is an organic system for early warning and prevention [7]. Specifically, the early warning mechanism is a set of organic system based on the theory of crisis management and composed of corresponding organizations, rules and regulations, information networks and measures, which provides advance warning of adverse trends or crisis behaviours in the operation of a certain field, and urges relevant responsible personnel to take timely measures to prevent risks. Ideological and political education refers to the social practice that society or social groups exert purposeful and organized influence on their members with certain ideological concepts, political views, and moral norms to make them form the ideological and moral activities that meet the needs of a certain class in a certain society. Ideological and political education in colleges and universities refers to the education that ideological and political educators in colleges and universities exert systematic influence on college students in a purposeful and organized way according to the requirements of the state and society, and transform certain social thoughts and moral qualities into individual ideological consciousness and moral qualities. The content of ideological and political education in colleges and universities mainly includes several key aspects, such as world outlook education, political outlook education, outlook on life education, legal outlook education and moral outlook education [8]. We should adhere to the guidance of Marxism, fully implement the party's educational policy, guide students to correctly understand the current international and domestic social background, understand the world development trend, grasp the characteristics of socialist development, and establish the intention of striving to be the master of the country. The early warning mechanism of ideological and political education in colleges and universities is an organic system based on the theory of crisis management and composed of corresponding organizations, rules and regulations, information network, schemes, and measures. It collects and evaluates the dynamic information of college students' thoughts and behaviours, timely warns the bad trend or crisis behaviours in the operation of college ideological and political education, and urges college ideological and political educators to take measures in time [9].

3 Main Problems of Ideological and Political Early Warning Mechanism for Emergencies in University Campus

3.1 Data Collection Difficulties

With the implementation of smart campus, the informatization level of colleges and universities has been continuously improved, and various student databases have been produced accordingly, such as student achievement management system and campus card system. These databases store a large amount of student information and are constantly updated with the passage of time. However, these databases are independent of each other, and the types in their respective databases are not the same, and the storage format is not the same, therefore, there are difficulties in data collection. In the context of big data, we need not only the information in various databases, but also the ideological information transmitted by the ideological state presented by middle school students in the process of Ideological and political education. At present, there is no professional information collection team in the early warning mechanism of Ideological and political education in universities, whether it is all kinds of online information or offline information [10].

3.2 Data Mining Difficulties

With the rapid development of information technology such as database and cloud computing, data mining technology is also making continuous progress [11]. However, in most colleges and universities, data mining technology is still relatively weak, mostly theoretical learning and research, and may be lacking in practical application. Moreover, in universities, especially in the field of Ideological and political education, there is a lack of professional data mining teachers, and there are difficulties in data mining, which leads to the dilemma of data mining. There are some problems in data quality, one is the phenomenon of incomplete data, the other is the proliferation of false data, which leads to the dilemma of data mining. Data incompleteness is serious. For example, closed data. In the Internet environment and in the process of Ideological and political education in universities, students will receive a variety of ideological information through various channels and record their inner world through various social platforms. However, different data owners are their own arrays and do not realize the sharing and integration of data, thus forming closed data. The object of the early warning mechanism of Ideological and political education in universities is college students. They have subjective initiative and will create some false data driven by interests in the virtual environment of the Internet. It will lead to wrong prediction and judgment, resulting in the dilemma of data mining [12].

3.3 Prominent Data Security Issues

In the context of big data, the data collection in the early warning mechanism of Ideological and political education in universities is a full sample collection, including not only the structured data in the student management database, but also the semi-structured data and unstructured data retained by students on various social media. These data involve information about students' daily life and learning, such as family situation, learning

status, social behaviours, consumption data, etc. which leads to a completely transparent state for students, and private information no longer becomes privacy. In the information age, these values are the most favourable temptations. In order to obtain such benefits, some illegal elements will steal the data, resulting in the data leakage of educational objects, which greatly threatens the security of data. In addition, it cannot completely avoid the possibility of educators stealing and using information, as well as the possibility of modifying information, violating students' private information and endangering students' physical and mental safety, which make the early warning mechanism face great challenges [13].

4 Optimization Paths of Ideological and Political Early Warning Mechanism for Emergencies in University Campus

4.1 Optimize Data Collection System

Data collection system is the basis for the development and operation of early warning mechanism. In view of the weak data collection system in the current early warning mechanism, colleges and universities should break the phenomenon of data positions and data barriers between colleges and departments within the campus, between colleges and departments, and outside the campus, between enterprises, groups, and government departments, strengthen ties, strengthen cooperation, and realize data sharing and sharing. In the process of Ideological and political education in universities, the data related to the objects of Ideological and political education are generally recorded in two databases. It includes the student information stored in the student management database inside the university campus and the relevant information of the objects of Ideological and political education recorded by various social platforms with which the University cooperates. Therefore, the big data sharing platform or big data sharing integration system includes two parts: school data sharing integration system and school enterprise data sharing integration system. Therefore, through big data technology, led by the early warning office and in the charge of the big data research centre, it can connect with the student databases in the school and relevant social media outside the school to promote the realization of big data sharing platform. When establishing the big data sharing and integration system, we should pay attention to the following specifications. Only by formulating the corresponding normative mechanism can we reasonably regulate the abuse, privacy infringement, security, and other problems to realize the standardization of operation and avoid the impact of various problems. Establish data information sharing and linkage mechanism, promote the coordination and sharing of internal information in all aspects, improve the full utilization of information resources, and provide strong support for better formulation and development of Ideological and political education [14].

4.2 Improve Data Mining Capability

Improve big data integration technology and promote the improvement of data screening efficiency [15]. In the Internet environment, coupled with the popularity of smart phones, the objects of Ideological and political education in universities spend their time on the

network all the time, producing a large amount of data. Moreover, the data types are diverse and mixed with all kinds of false data, which interferes with the data processing speed. Therefore, it is necessary to continuously improve the big data integration technology, improve the efficiency of data collection and screening, improve the efficiency of data processing, and realize the timeliness of the early warning mechanism. Improve big data analysis technology and realize the combination of qualitative analysis and quantitative analysis. The research object of Ideological and political education in universities is students, which adopts the qualitative research method. The object of big data is data. Choose quantitative research method and use big data in the early warning mechanism. Its essence is to realize the combination of quantitative analysis and qualitative analysis to enhance the effectiveness of the early warning mechanism of Ideological and political education in universities. Improve big data visualization technology to better present analysis results. The rapid development of image recognition has accelerated the application of artificial intelligence in the field of security. For the occurrence of many emergencies, rapid early warning response can be carried out through the image recognition technology of monitoring places in the video. Through the processing and recognition of monitoring images, many video images can be processed at the same time to effectively prevent and control the whole process of safety accidents. At present, there is a shortage of compound talents with data analysis ability and ideological and political theory knowledge. Therefore, we should constantly improve the big data visualization technology and intuitively present the data analysis results in a more understandable way [15].

4.3   Protect Data Privacy and Security

In the context of big data, we should strengthen the protection of big data privacy, protect data privacy and security, and realize the reasonable and legal application of big data in the early warning mechanism of Ideological and political education in universities. At present, in the absence of big data related legal system, relevant government departments should undertake the work of ensuring data security, strengthen the supervision and guidance of big data collection and management institutions, and severely crack down on illegal and criminal acts such as data leakage and diffusion. Colleges and universities should establish a data security supervision platform. The combination of big data and ideological and political education in universities has attracted more and more attention from colleges and universities in recent years, and some colleges and universities have also conducted preliminary research and application. However, it is still in the stage of preliminary exploration, and the corresponding data security supervision measures are missing. Colleges and universities should pay attention to the establishment of data security supervision platform to ensure that there will be no data theft, in order to prevent the disclosure of privacy information caused by data disclosure, which will have a great negative impact. At the same time, a timely response data protection system shall be established to respond immediately in case of data leakage, track and destroy the leaked data and reduce the consequences of infringement. In addition, the premise of establishing the data security supervision platform. We should first ensure the perfection of data management system in universities. We clearly identify the personnel who collect, store, analyses and use data and their protection responsibilities, and clearly define the

authority and scope of the workers of the early warning mechanism of Ideological and political education.

5 Design and Implementation of the System of Ideological and Political Early Warning Mechanism for Emergencies in University Campus

5.1 Overall Architecture

The ideological and political early warning model is mainly divided into three modules: data source module, data interaction module and ideological and political early warning user interface module. Ideological and political early warning user interface: according to the requirements of the ideological and political early warning system, it is necessary to provide a standard data interface for users' visual operation, and obtain or store data through interaction with the database. Data interaction: the core of this part is to call the ideological and political early warning model to generate the early warning list, export the student scores to be warned and the corresponding library card swiping record data through the database, import the ideological and political early warning model, and conduct data pre-processing operations such as data conversion, data filling and data statistics, Use the constructed ideological and political early warning model to predict grade repetition, get the ideological and political early warning list, save the generated ideological and political early warning list into the ideological and political early warning database, and return it to the front-end page for display. Data source: in order to build the ideological and political early warning system, the school provides the desensitized real data table view for use, and exports the student status data, historical achievement data, all-in-one card consumption data and library card swiping data through table linked query (Fig. 1).

5.2 Function Modules

The system includes three kinds of users: Super administrator, ordinary administrator, and student. It mainly includes the functions of modifying password, remembering password and random verification code. Each user has different access rights. In the login process of the system, by obtaining the user's account, query the type of user in the user table and the relevant contents allowed by the access authority. The ideological and political early warning module mainly constructs the ideological and political early warning model based on the students' historical score data and the library card swiping information data. Therefore, it is necessary to query and export the students' data to be warned. In the system, the user needs to select the corresponding college, grade, semester, class, and other fields to query and export the data. Click the run button, and the background will use the system () function to execute external commands to start the ideological and political early warning module.
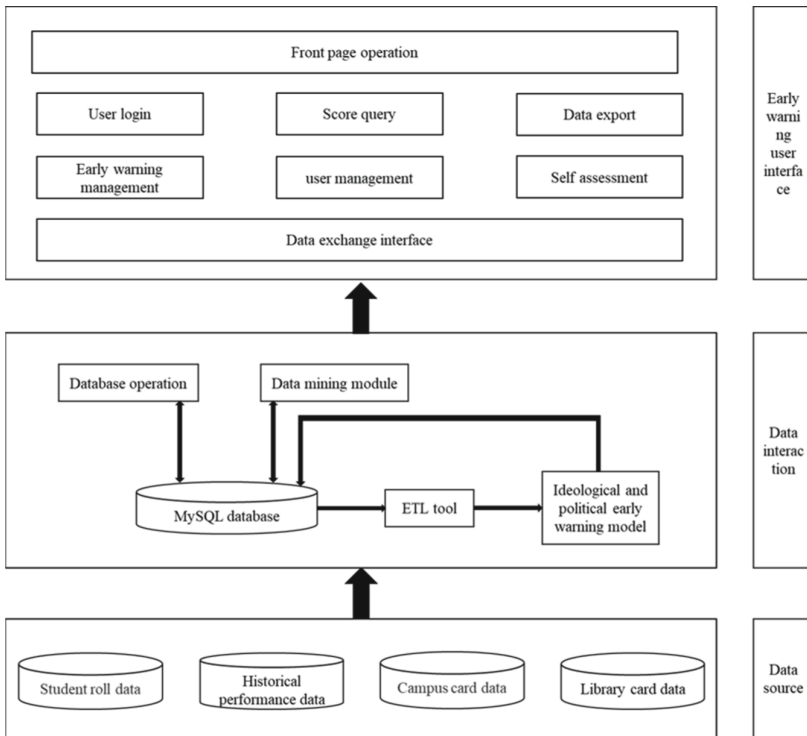
Fig. 1. Overall architecture of early warning system

5.3   System Implementation

The system is mainly composed of data mining and system management. The software environment used is shown in the table. The hardware environment is mainly the computer equipped as shown in Table 1.

   The early warning management module mainly includes three sub modules: user login, export student data and export early warning list. The user login interface of the administrator and teacher of the ideological and political early warning system, in which the account and password are added and saved in the database through the background of the administrator. In order to facilitate viewing the details of each ideological and political early warning, all ideological and political early warning records are displayed to form an ideological and political early warning task list. The administrator can click the "view" button to view the detailed results of Ideological and political early warning, that is, the ideological and political early warning list, and click the "delete" button to delete the corresponding ideological and political early warning record. The system setting module mainly includes three sub function modules: administrator group and administrator log. This part mainly provides a personalized and security system for the ideological and political early warning system. This part adopts the role-based model control model. Firstly, the administrator group is divided into super administrator group and ordinary administrator group. The super administrator group can access all

Table 1. Experimental environment

Environmental description	Parameter
Development language	PHP, Python
Development tool	PhyStrom
Database	MySQL
Database management tool	Navicat
Operating system	Win 10 (64 bit)
CPU	Intel Core i5
Memory	16 G
Hard disk	SD8SNAT-256G
Graphics card	AMD Radeon R7 430

resources in the system, and the ordinary administrator group can only access some system resources. We mainly elaborated the demand analysis of the system, the overall architecture, the database design, the data table design, the detailed design of the function module and so on. Using system () to execute the external command, we realized the combination of the data mining module and the management system, and built the ideological and political early warning system.

6   Conclusions

Based on the understanding and grasp of the early warning mechanism in Colleges and universities, this paper puts forward the components and operation mechanism of Ideological and political education in Colleges and Universities under the background of artificial intelligence. On this basis, we carry out the research with the idea of raising problems, analysing problems, and solving problems. The data mining algorithm in this paper is mainly historical achievement data, all-in-one card consumption data and library card swiping record information. Other information of students, such as students' work and rest data and students' mental health data, has not been studied. Therefore, it is necessary to continuously expand the application of data mining technology in other data and use multi-dimensional data to study and analyse students' ideological situation.

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