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ORIGINAL

IMPACT OF IDEOLOGICAL AND POLITICAL EDUCATION ON PSYCHOLOGICAL FITNESS OF COLLEGE STUDENT ATHLETES: A BIG DATA PERSPECTIVE

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ABSTRACT

Ideological and political education (IPE) and psychological fitness are important contents of competence Education in universities, which help students to form good moral qualities and values, and play a significant role in college student athletes' comprehensive development. Strengthening the intervention and management of college student athletes' psychological crisis is of positive significance to cultivate college student athletes' crisis awareness, improve their psychological quality in an all-round way and adapt them to the changeable social environment. Based on data mining (DM), this paper constructs a pre-alarm model of college student athletes' psychological crisis to analyze the influence of IPE on college student athletes' psychological fitness, and on the basis of deeply digging the respective advantages of IPE and psychological fitness education in universities, it further exerts the effect of cooperative education between them. The results show that the accuracy of this method is obviously better than that of the comparison algorithm in psychological crisis analysis, with an accuracy of 98.86%. Therefore, it is feasible to apply the pre-alarm model of psychological crisis in this paper to the coordinated growth of IPE and college student athletes' psychological fitness. Ideology education in colleges and universities (IPECU) should conform to the trend of the growth of the times, and make full use of the good communication carriers of the current Internet + environment to give full play to their communication value.

KEYWORDS: Ideological and Political Education; Psychological Fitness; Pre-

Alarm; Data Mining

1. INTRODUCTION

With the continuous improvement and growth of society, college student athletes are under pressure from family, society and school, and their psychological fitness is not optimistic, especially the negative impact of the Internet on them. Lay emphasis on and attaching importance to college student athletes' psychological fitness has become an urgent task faced by educators (Binfet et al., 2018). With the rapid growth of modern IT, the emergence of big data, cloud computing, AI, etc., put forward new requirements on how to innovate the carrier and mode of IPE for college student athletes (Worthy et al., 2021). The scale, diversity, high speed and value of Internet +'s environment have not only influenced people's business model and management model, but also brought certain opportunities and impacts to IPECU (Ault et al., 2017). The IPECU should also conform to the trend of the growth of the times, and with the help of the good communication carriers of the current Internet + environment, give full play to their communication value and create new ways and methods of IPE in the new period. College student athletes' psychological crisis is a critical state of psychological imbalance when college student athletes meet with learning, work and life events that they can't solve, handle and control (Kalckreuth et al., 2014). Strengthening crisis intervention and management is of great significance to cultivate college student athletes' crisis awareness, prevent the occurrence of crisis events, improve college student athletes' psychological quality in an all-round way and adapt them to the changeable social environment. Traditional IPE often have due regard to college student athletes' political direction and moral character, emphasizes the political function of IPE, and ignores college student athletes' psychological troubles. In this way, the IPE is separated from the psychological fitness education, making the psychological troubles of college student athletes in the new situation cannot be solved in time, which is not conducive to the healthy growth of college student athletes (Sherman, 2019). As the base for training skilled talents, the school aims to comprehensively promote competence Education. Psychological fitness education is not only the basis and premise of competence Education, but also the final result of competence Education. The combination of IPE and psychological fitness education can help college student athletes establish correct values, outlook on life, and emotional outlook, and help college student athletes solve various psychological troubles, achieve comprehensive education, give full play to the role of universities in educating people, and promote the reform of the educational system and the growth of education in universities (Caspar et al., 2013). The rapid growth of the current economy has led to a series of psychological troubles. The psychological troubles of college student athletes have become an important factor threatening the healthy growth of college student athletes. Depression and suicide incidents occur from time to time (Wilks et al., 2020). How to warn

college student athletes' psychological troubles has become a research hotspot. Realizing the organic combination of IPE and psychological fitness education is an effective way to strengthen and improve the IPE of college student athletes under the new situation. Under the current background, competence Education in universities has entered a period of rapid growth, and IPE and psychological fitness education have received extensive attention. Many teachers are studying and exploring ways to combine education (Anthony-Okeke, 2020). It is of great practical significance to seize the opportunity of implementing the strategy of big data and Internet, strengthen the multi-disciplinary comprehensive research on big data and IPE of college student athletes, and explore the changing trend of college student athletes' ideological dynamics under the background of big data (Cheng & Wang, 2024). In order to protect the physical and psychological fitness of college student athletes and have due regard to the psychological crisis of college student athletes, educators need to study the manifestations and causes of psychological crisis of college student athletes, and establish an effective pre-alarm system of psychological crisis of college student athletes through various channels.

2. Related Work

The research goal of big data in psychological crisis prevention is to improve the work efficiency of psychological crisis prevention, provide decision guidance for psychologists or use DM system to replace some screening work of psychologists. Sharples believes that psychological fitness refers to people's most efficient and happy adaptation to the environment and each other (Sharples, 2013). Kutcher believes that psychological fitness refers to a constantly changing mental state. No matter what state it is in, it can have good psychological adaptability, and at the same time, it has vitality and can exert its physical and mental potential (Bell et al., 2015; Kutcher et al., 2016). Antaramian discussed the role of cluster analysis technology in preventing psychological crisis (Antaramian, 2015). Pinder-Amaker et al. put forward the prevention-oriented and campus stratification pre-alarm mechanism, through counselors' data collection, heart-to-heart investigation and other means, or set up psychological counseling institutions to passively wait for college student athletes to expose their problems (Pinder-Amaker, 2012). Fukita et al. proposed that big data, AI and other technologies should be introduced into college student athletes' psychological security pre-alarm, which reflected the current development trend of college student athletes' psychological pre-alarm, but did not give an actual implementation plan (Fukita et al., 2018). Combining neural network and psychological fitness education, Nelsen proposed a psychological fitness assessment model based on BP network algorithm and RBF network algorithm, which provided a new idea for processing nonlinear data (Nelsen et al., 2023). Cuevas et al. established a psycho diagnostic model based on the improved BP algorithm to realize simple mental classification pattern recognition (Cuevas et al., 2010). Wu used the Bayesian Toolbox in MATLAB

to build a Bayesian network prediction model to analyze potential connections between predicted student attributes and psychological test data (Wu et al., 2013). Mahedy uses the artificial neural network toolbox in MATLAB to establish the network structure of the psychological fitness prediction system model based on the BP neural network algorithm, so as to realize the prediction of the psychological fitness of college student athletes (Mahedy et al., 2013). Park et al. introduced the diagnostic experience of psychologists into the expert system for diagnosing mental disorders through the artificial neural network expert system, so as to realize the function of comprehensively detecting and diagnosing the psychological fitness of college student athletes (Park et al., 2013).

3. Methodology

3.1 The Necessity of Combine IPE With Psychological Fitness Education in Universities

Strengthening college student athletes' IPE and psychological fitness education is an urgent need to cultivate high-quality talents in the new era. As the main front of moral education in universities, IPE and psychological fitness education are also related to the success or failure of talent cultivation in universities. IPE cannot only help college student athletes eliminate their personal psychological barriers, but also provide comprehensive education from the ideology level, help them shape a correct world outlook, outlook on life and values, and improve their adaptability and interpersonal skills, so as to adapt to college life as soon as possible and improve their ideological consciousness. Nowadays, with the popularization of the Internet, college student athletes' access to information has been enriched, and their personal ideological and moral qualities have been deeply influenced by the network trend of thought. Coupled with the intrusion of foreign cultures, if the IPE is not strengthened, it is easy to cause college student athletes' ideological and cognitive mistakes and form bad ideological and moral qualities. High-quality talents should not only have scientific and cultural quality and physical quality, but also have good ideological and moral quality and psychological quality (Lunz Trujillo et al., 2021). College student athletes are in a special stage of life, experiencing the role change from high school to university, and are prone to problems such as maladjustment and interpersonal imbalance (Visser & Law-van Wyk, 2021). As an individual student, having a healthy psychology is the basis for calmly facing and actively solving various problems in life. Under the current social background, college student athletes not only have to face the competitive pressure of study, but also have to face the competitive pressure of employment when they are about to graduate. The whole college period is in a relatively tense period. Due to the influence of various unhealthy thoughts in the society and on the Internet, college student athletes are prone to psychological fitness problems and ideological problems (Kahne & Schwartz,

1978). If we can't give them effective education and help, it will lead them to a wrong path. Psychological fitness education is people-oriented, based on the psychological characteristics of college student athletes, and adopts flexible and varied educational methods close to college student athletes' hearts, which is a good reference for IPE (Wattick et al., 2023). At the same time, psychological fitness education should adhere to the direction of IPE. While psychological education and guidance are carried out, the correct political direction, world outlook, outlook on life and values are subtly integrated into it. College student athletes with healthy psychology and sufficient positive energy can better understand and accept IPE, internalize the content of IPE into personal ideas and externalize it into practical actions, and finally improve themselves and enhance their overall quality.

3.2 Psychological DM of College Student Athletes

The vast amount of information data has a wide range of sources and various types, and all kinds of information contained in it are of uneven value, while the information with high real value is scattered and uncertain. Under the traditional mode, teachers occupy the central position in the classroom and firmly grasp the right to speak in the classroom, and the authority of teachers has always been unchangeable. College student athletes passively accept the teacher's indoctrination, lack the right to speak, and are in an unequal dialogue state. In different times, different individuals have different states of mind. IPECU must educate and guide different individuals in a targeted way, and analyze the relationship between college student athletes' thoughts and various events at that time. Only in this way can we make better use of the data dynamically generated by college student athletes and flexibly apply it to the actual IPE. The business process of psychological DM for college student athletes is shown in Figure 1.

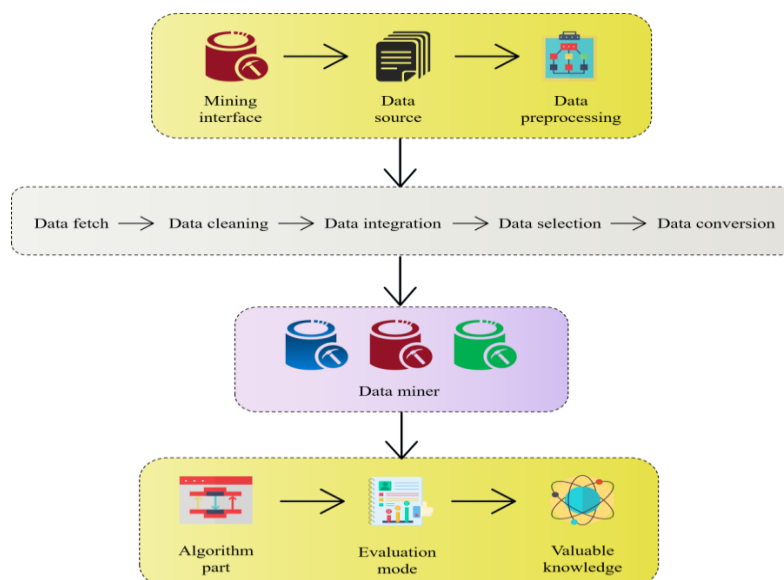


Figure 1: Business process of college student athletes' psychological DM

By using DM to analyze college student athletes' psychological fitness problems, the factors that are easy to show mental problems in psychological fitness data are mined and analyzed, which provides reference for solving and preventing mental problems in time. From the psychological fitness evaluation database collected by a large number of college student athletes, valuable information can be extracted to guide and educate college student athletes' healthy psychology, so that college student athletes' psychological counseling can be more effective. Let the factor set U and the judgment level set V of the object of psychological analysis:

$$U = \{u_1, u_2, \dots, u_m\} \quad (1)$$

$$V = \{v_1, v_2, \dots, v_m\} \quad (2)$$

Fuzzy judgment is performed on each factor in U according to the grade index in the judgment set, and the judgment matrix is obtained:

$$R = (r_{ij})_{n \times m} \quad (3)$$

Among them, r_{ij} represents the affiliation degree of u_i with respect to v_i . After determining the importance index of each factor, record it as:

$$A = \{a_1, a_2, \dots, a_m\}, \quad \sum_{i=1}^n a_i = 1 \quad (4)$$

Synthesized to:

$$\bar{B} = AR = (\bar{b}_1, \bar{b}_2, \dots, \bar{b}_m) \quad (5)$$

After normalization, the following results are obtained:

$$B = \{b_1, b_2, \dots, b_m\} \quad (6)$$

So as to determine the grade of judging college student athletes' psychological crisis. Under the organization of the school, college student athletes' psychological tests are completed through the college student athletes' psychological management model, and the data are stored in the database of psychological census. Psychological work evaluates college student athletes' psychological state by analyzing and screening the data of college student athletes' psychological tests, and the original data of college student athletes' information is stored in the data. According to the classification results generated by the model combined with the evaluation results of the model, the initial output value is optimized, and the final classification results and knowledge rules are obtained, which are provided to psychological staff as decision support. Today's IPECU is in the environment of Internet +. Although "big data" provides an unprecedented amount of information and data, only by

having professional ability of interpretation and analysis, and adopting a brand-new educational model to perfectly connect with it, can we more actively and accurately apply this information to strengthen contemporary IPE, and only in this way can we realize the innovative growth of IPECU under the environment of Internet +.

3.3 Pre-Alarm Model of College Student Athletes' Psychological Crisis

Because of the complexity of the psychological pre-alarm problem, it is necessary to accurately extract the psychological characteristic data of the pre-alarm object, reduce the interference to the pre-alarm object as much as possible, and consider the timeliness of data acquisition. For college psychological pre-alarm, the control center mainly refers to college counselors or psychological counseling institutions, which is the executor of the program, and is mainly responsible for the operation and maintenance of the intelligent pre-alarm system and the processing of college student athletes' psychological abnormal pre-alarm information. When there is an abnormal state, the alarm will be given to the control center, and then the abnormal college student athletes will be dealt with by the control center, so as to realize the closed-loop pre-alarm system with college student athletes as the pre-alarm object. This structure effectively avoids the disadvantages of the traditional system centered on counselors or related institutions, and improves the initiative and timeliness of psychological pre-alarm work in universities by centering on college student athletes. The DM model of college student athletes' psychological pre-alarm is shown in Figure 2.

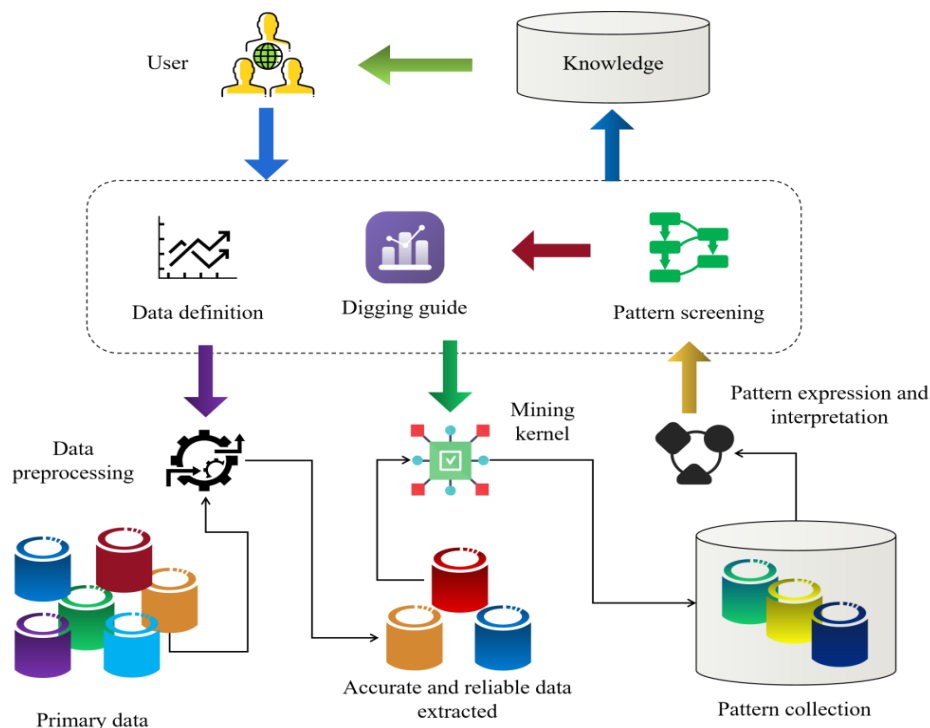


Figure 2: DM model in college student athletes' psychological pre-alarm

The design and implementation of college student athletes' psychological fitness evaluation model is based on the data of college student athletes' psychological fitness, establishing a psychological fitness database and collecting management data. Through the DM function, this paper classifies and analyzes the psychological data of college student athletes in school, and through the correlation analysis of some psychological behaviors, it can grasp the trend of college student athletes' psychological changes in time, and help the teachers of college student athletes' psychological counseling center to effectively prevent and guide college student athletes' psychological troubles. While using data properly to discover psychological status, we should carefully analyze abnormalities. The information gain rate is defined as follows:

$$U(S_0) = E[\sum_{t=0}^{\infty} \gamma^t R(S_t)] \quad (7)$$

The split information is used to normalize the information gain:

$$SplitInfo_A(D) = -\sum_{j=1}^v \frac{|D_j|}{|D|} \times \log_2 \left(\frac{|D_j|}{|D|} \right) \quad (8)$$

$SplitInfo_A(D)$ represents the information produced by dividing the training sample set D into v plans corresponding to the v outputs of the attribute A test. Introduce discount factor γ for weighted summation:

$$U(S_0) = E[\sum_{t=0}^{\infty} \gamma^t R(S_t)] \quad (9)$$

In the formula, U is defined as the sum of the rewards of a series of actions, and U of a state is the current action selection unchanged. Use an idea in reinforcement learning to divide long sequences of action decisions:

$$U^*(S) = \max_a \{R(a) + U^*(S')\} \quad (10)$$

In the formula, S is all the best paths, a is the selected action at the current moment, and S' is the remaining path. The learning rate is often chosen as a tunable parameter that changes as training progresses. The process of gradient descent is expressed as:

$$x += \eta \frac{dy}{dx} \quad (11)$$

According to the interception principle of the optimal path, it is only necessary to calculate:

$$U(S) = R(X) + \gamma \sum_{S'} P(S \rightarrow S') U(S') \quad (12)$$

Where R is the reward value of state S itself. Use this formula to find

the U value of the state S , and get the relationship with the subsequent college student athletes' psychological state.

Big data and Internet technology will help to improve the information processing ability and information feedback ability of ideology educators in universities, so as to predict college student athletes' ideological situation, the focus of campus public opinion and behavior characteristics in a timely and effective manner. With the help of big data platform, ideology educators in universities can pay attention to college student athletes' psychological evaluation data, college student athletes' daily life trajectory and college student athletes' mental state information collected by counselors, and construct a student management model with media integration.

4. Result Analysis and Discussion

The multi-dimensional interactive path big data platform of "information collaboration precise service" can effectively integrate college student athletes' static information and dynamic information, and construct the campus information resource database. In the process of scientific and legal growth of university student work, objective, multi-dimensional and real-time student information data have laid the foundation for universities to use big data processing platform and provide accurate services. On the basis of obtaining the original feature data, the related classifier can be used to recognize the psychological state of the pre-alarm object. In essence, the problem of mental state identification can be equated with the problem of classification. Orthogonal design method is used to make all parameters more reasonable. Compare the output data of DM with the real college student athlete's data, as shown in Table 1 and Figure 3.

Table 1: DM learning Results

SAMPLE SET	PREDICTED VALUE	ACTUAL VALUE
60	0.816	0.828
120	0.754	0.746
180	0.771	0.763
240	0.841	0.853
300	0.809	0.823
360	0.781	0.773
420	0.858	0.872
480	0.768	0.782
540	0.866	0.88
600	0.833	0.845
660	0.786	0.798
720	0.829	0.821
780	0.751	0.765

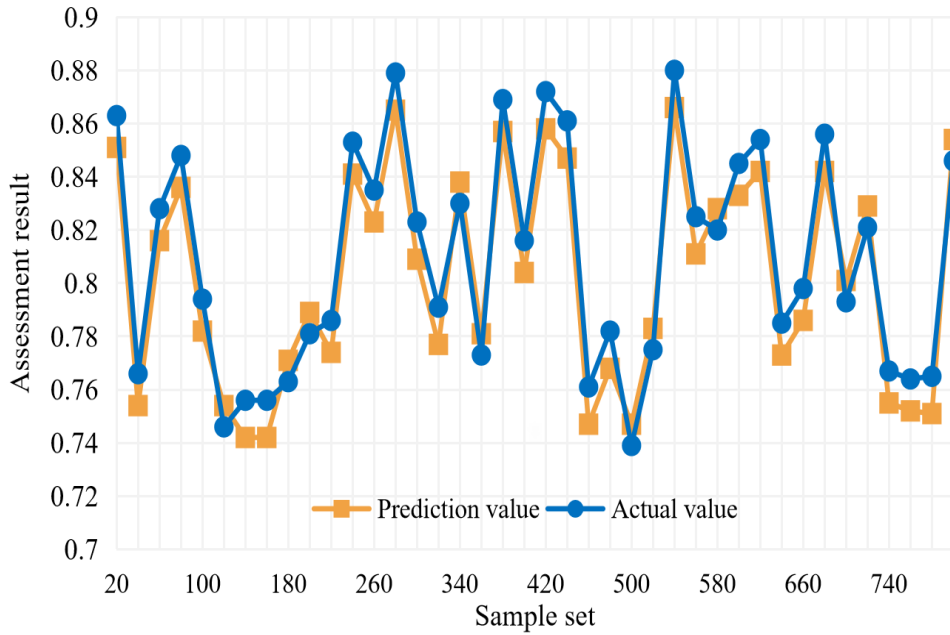


Figure 3: DM learning results

Preprocessing the unsatisfactory data sources can greatly improve the execution efficiency of DM algorithms and the process of knowledge discovery. The performance comparison results of college student athletes' psychological fitness pre-alarm models are shown in Figure 4.

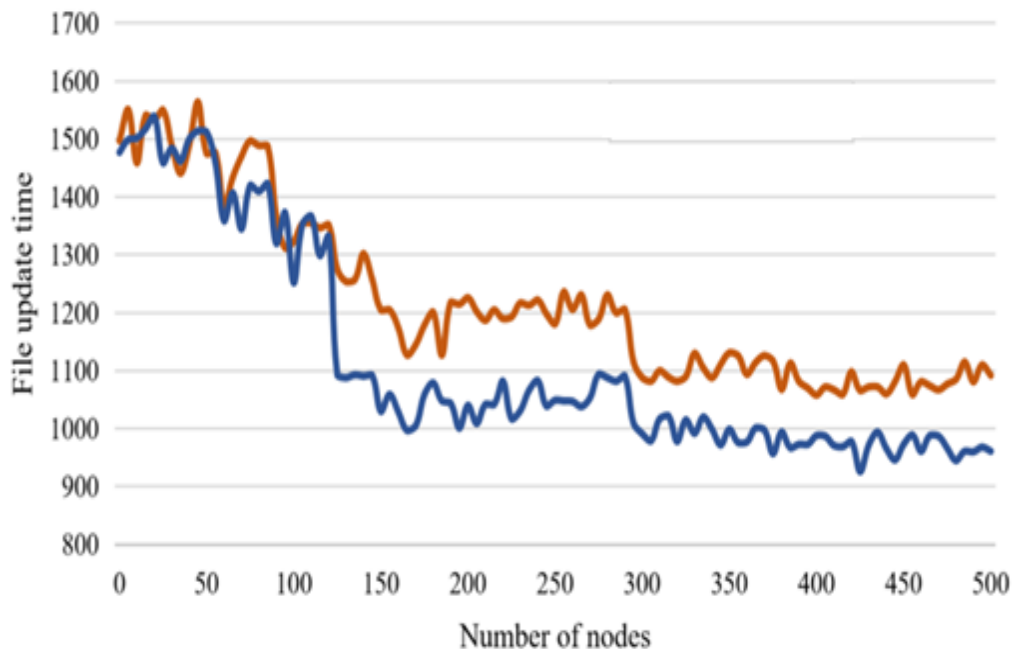


Figure 4: Algorithm performance comparison

By applying the abnormal detection and dynamic tracking technology in the psychological fitness pre-alarm model to the research of college student

athletes' IPE and psychological fitness problems, we can find out the hidden rules from a large amount of data of psychological fitness problems and find out the main factors leading to mental problems. The results of psychological evaluation and expert evaluation output by this algorithm are shown in Table 2. It can be seen that the evaluation results of training samples are in good agreement with those of experts.

Table 2: The evaluation results of experts and the output results of the algorithm in this paper

SAMPLE NUMBER	EXPERT APPRAISAL	ALGORITHM OUTPUT
1	0.96	0.962
2	0.78	0.781
3	0.79	0.795
4	0.77	0.774
5	0.75	0.752
6	0.72	0.718
7	0.79	0.794
8	0.69	0.692
9	0.64	0.643
10	0.78	0.783

Five groups of test data prepared in advance are input into the trained psychological pre-alarm model, and the simulation results and expert evaluation results are shown in Table 3. It is not difficult to see that the simulation results are in good agreement with the evaluation results given by experts.

Table 3: Simulation evaluation results and expert evaluation results

SAMPLE NUMBER	EXPERT APPRAISAL	ALGORITHM OUTPUT
1	0.65	0.654
2	0.67	0.67
3	0.79	0.788
4	0.68	0.681
5	0.71	0.713

The application value of DM, such as rapidity, predictability, accuracy and practicability, can quickly and accurately determine the state and degree of crisis, so as to effectively make crisis intervention plans and reduce or eliminate crises. Under the Internet-based information education mode, the precision of different psychological crisis warning algorithms in college student athletes' psychological analysis is shown in Figure 5, Figure 6 and Figure7.

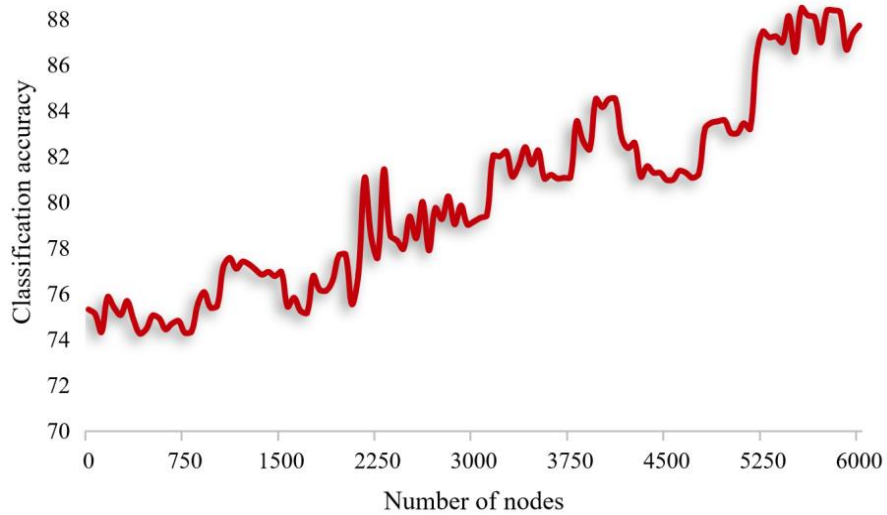


Figure 5: The Prediction Accuracy of the Psychological Early Warning Model in College student athletes' Psychological Analysis

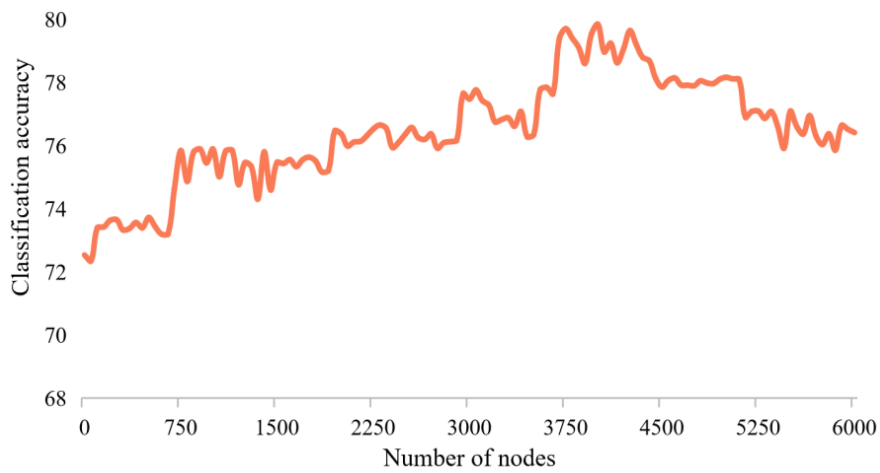


Figure 6: Prediction accuracy of SVM in student psychoanalysis

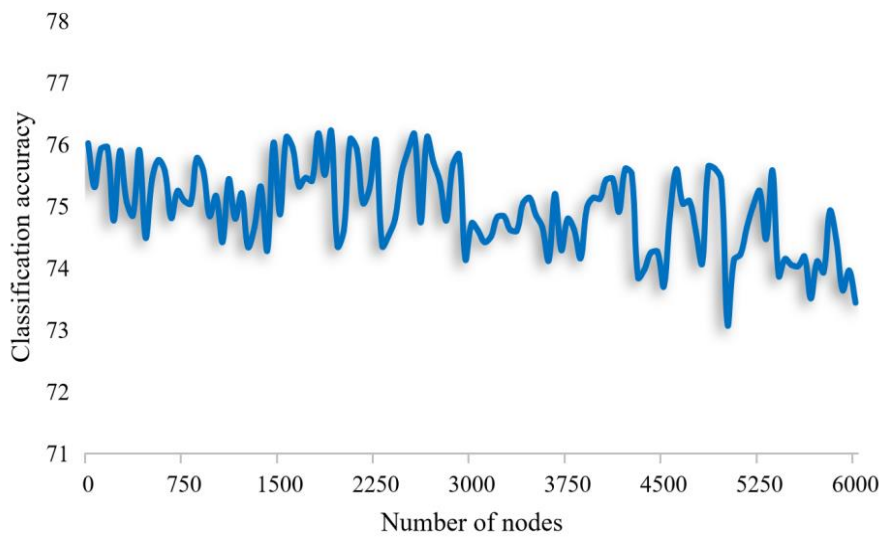


Figure 7: Prediction accuracy of BPNN in student psychoanalysis

Comparing the accuracy and recall of the mental crisis recognition model in this paper with the model, the results are shown in Figure 8 and Figure 9.

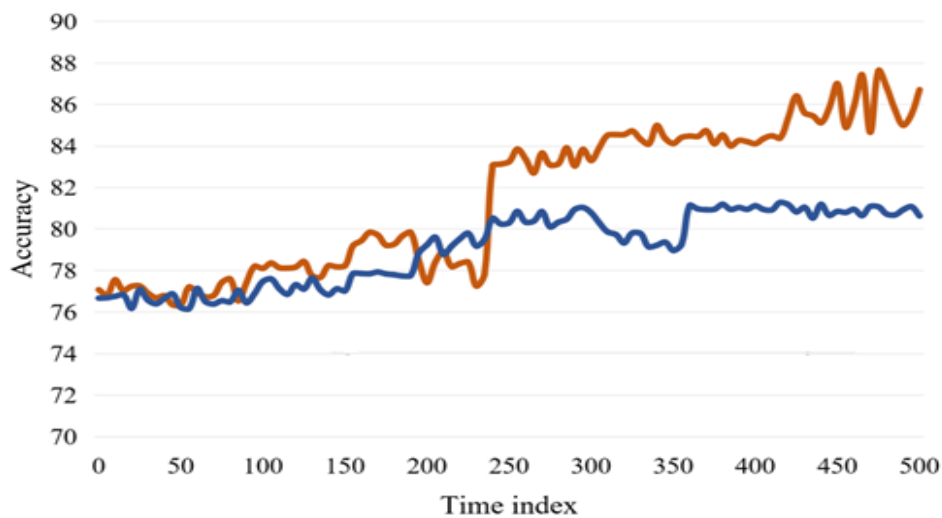


Figure 8: Accuracy comparison

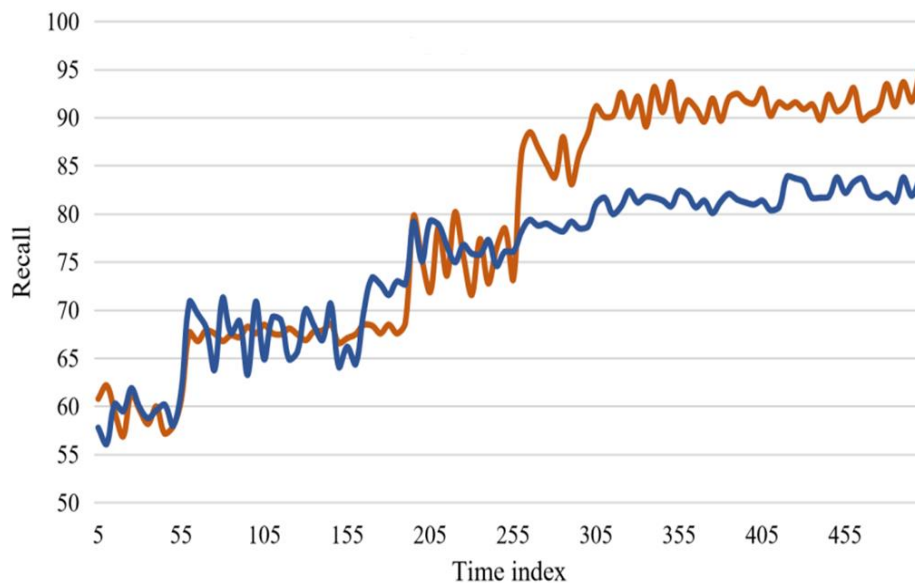


Figure 9: Comparison of recall rates

As can be seen from Figure 8 and Figure 9, after many iterations, the accuracy of this method is obviously better than that of the comparison algorithm in psychological crisis analysis, with an accuracy of 98.86%, 22.45% higher than that of the comparison algorithm, and a recall rate of 97.07%, 17.68 percent higher than that of the comparison algorithm. Therefore, the psychological pre-alarm model based on DM is a reasonable and feasible evaluation model, which is of great significance for the innovation of IPE classroom in universities. In order to reduce the probability of false alarm and false alarm, it is necessary to train student information officers, improve their

sensitivity to college student athletes' psychological dynamics, and collect useful and key information for reporting. Psychological crisis warning is faced with individual college student athletes, especially the phenomenon of missing alarm, which may cause great losses. Relevant personnel should do a good job in crisis intervention and ideological work, affirm their achievements in crisis pre-alarm and matters needing attention in the future, protect their enthusiasm while protecting their own psychological fitness, and improve their professional quality as psychological information officers. Psychological fitness education is a highly professional job. At present, some universities have realized the necessity and urgency of combining IPE with psychological fitness education, and strongly support and encourage ideology counselors to learn psychological fitness education knowledge, participate in the training and grading of psychological counselors, and fully combine theory with practice. The organic combination of IPE and psychological fitness education in universities cannot be separated from the help of professional teachers, and the educational height and efficiency largely depend on the teaching ability and personal accomplishment of education. Therefore, in order to speed up the combined growth of IPE and psychological fitness education in universities, and improve the effectiveness of education, we must fully tap and integrate teachers' resources, realize the optimal allocation of resources, give full play to the advantages of each teacher, build a professional contingent of teachers who combine IPE with psychological fitness education, and improve the overall education level. Educators should fully respect college student athletes' thinking mode and personality, and fully understand and master the information of college student athletes' temperament, personality, values, etc. by using psychological tests and other methods. In addition, only by fully grasping the college student athletes' growing environment, family education, school education and major events that have an impact on college student athletes' psychology can we find out the root causes of college student athletes' problems in school. Under the premise of the combination of IPE and psychological fitness education, universities need to carry out special training for relevant teachers. By combining theoretical training with practical training, teachers' theoretical knowledge and practical experience can be enriched, and contemporary college student athletes' ideological world and psychological fitness problems can be deeply and accurately understood, so as to strengthen the integration of educational work and improve the effectiveness and scientific of education. In the aspect of college student athletes' thoughts and behaviors, DM can enable ideology educators to have a more comprehensive understanding of college student athletes' thoughts and behaviors, find problems in their thoughts and behaviors in time, and put forward targeted improvement measures according to the causes, time and place of the problems, so as to solve college student athletes' material life problems as well as their ideological problems. When promoting and developing the combination of IPE and psychological fitness education in an all-round way, college leaders

and teachers need to base themselves on the educational reality, start with the characteristics and development status of IPE and psychological fitness education, make clear the common goals and combined contents of the two education, dig deeply into the existing textbooks and teaching activities, find out the educational elements contained in them, meet the learning needs of contemporary college student athletes, and simultaneously carry out IPE and psychological fitness education. When dealing with big data, we can construct a mathematical model of college student athletes' growth through college student athletes' behaviors with strong correlation, and improve the accuracy and accuracy of scientific analysis.

5. Conclusions

Traditional IPE often have due regard to college student athletes' political direction and moral character, emphasizes the political function of IPE, and ignores college student athletes' psychological troubles. In this way, IPE is separated from psychological fitness education, and the psychological troubles of college student athletes cannot be solved in time under the new situation. Based on DM, this paper constructs a pre-alarm model of college student athletes' psychological crisis, collects the dynamic data of college student athletes' psychology in time, analyzes the influence of IPE on college student athletes' psychological fitness, and realizes the pre-alarm and prevention of college student athletes' psychological crisis. When dealing with big data, we can construct a mathematical model of college student athletes' growth through college student athletes' behaviors with strong correlation, and improve the accuracy and accuracy of scientific analysis. In the aspect of college student athletes' thoughts and behaviors, DM can make ideology educators understand college student athletes' thoughts and behaviors more comprehensively, find problems in their thoughts and behaviors in time, and put forward targeted improvement measures according to the causes, time and place of the problems. In order to make IT play a better role in psychological crisis prevention, more data cleaning strategies and methods should be tried in practical application.

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