



Statistical Application of Mental Health Data of College Students Under the Background of Informationization

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Abstract. Mental health is an important basic condition for college students to become adults. Educators gradually attach importance to strengthening the mental health education of college students. Traditional colleges and universities on mental health data only stay in the operation of adding, deleting and checking, and do not effectively analyze the potential psychological information of the data. This paper proposes a kind of psychological management system based on K-means clustering analysis method, which uses the idea of data mining to make secondary use of students' psychological data on the basis of traditional system functions. By optimizing the iterative process of K-means algorithm, the valuable part of a large number of precipitation students' psychological data is extracted, and the data model is established to provide decision-making guidance for managers, Scientific management of students' mental health process can not only effectively improve the overall efficiency of psychological counseling, but also play an early warning role in the prevention of risk factors.

Keywords: Data mining · Psychological management system · K-means algorithm

1 Introduction

College students are in the most important stage of life, they have high cultural knowledge and wonderful life experience. But in the face of social pressure and difficulties in life and employment, there are often psychological problems such as inferiority, autism, radicalism, seclusion, depression and so on. Many fields of society have carried out research on the psychology of contemporary college students. The research results show that the proportion of college students in China who need mental health treatment is gradually increasing. More and more college students' mental health problems have been paid attention to by many people in the society. Therefore, it is an inevitable trend to use data mining technology to analyze the mental health data of college students and get the corresponding solutions [1].

Influencing factors of College Students' psychological problems.

(1) Family factors. The behavior and performance of family members have a subtle impact on the growth of children. Children who grow up in a harmonious, friendly,

positive and cheerful family atmosphere will have less psychological problems, and even if they have psychological problems, they will be easier to solve. But if there are some disharmonious factors in the family, such as parents' divorce, domestic violence, family disharmony and so on, children are prone to have psychological problems.

(2) Personal factors. University is a semi open society, students in this circle not only contact with students, teachers, but also with all kinds of people in society. Compared with the optimistic students, the introverted students are more likely to have inferiority complex in the process of communicating with others, and they are not confident in anything, which leads to a sense of frustration.

(3) Professional satisfaction. Some students are not satisfied with their major, even have the feeling of boredom and disgust, and have no clear goal for future development, they just study for the exam. But in this process, there will be a huge psychological gap. When reality and ideal contradict each other and cannot be solved, there will be huge psychological pressure, leading to the emergence of psychological problems.

(4) The interpersonal relationship is not harmonious. Bu Ren university means to live with other students. However, some students don't know how to get along with others better, which leads to two extreme phenomena: some students are generous and popular with others; some students don't know how to get along with others; Some students dare not communicate with others, resulting in inferiority, timidity, and further develop autism; What's more, they often have conflicts with their classmates because they can't deal with the relationship between them well, and then they are isolated by their classmates, causing psychological problems.

(5) Love problems caused by emotional distress. Emotional distress and emotional instability caused by love problems will also bring mental health problems to college students. College students are in adolescence, eager to get the attention of the opposite sex in the process of communication. However, due to the immaturity of psychology and the lack of scientific cognition, there are many unavoidable problems in the interaction between boys and girls.

(6) The psychological anxiety caused by the difficulty of employment. At present, there are millions of college graduates in China every year. In 2017, for example, the number of college graduates reached 7.95 million. In addition, college students who have graduated but not been employed in the past few years have joined the new round of employment. At the same time, in the process of choosing a job, we will encounter a variety of problems, such as dissatisfaction with the work unit and lack of experience, which will bring great psychological pressure to college students.

With the continuous innovation of information technology, all levels of society are facing the direction of comprehensive information development, including college mental health management. In the mental health management of colleges and universities, most schools only simply add, delete and modify the data of students' mental health, and obtain the surface information of data through simple statistical functions, but do not analyze and mine the students' mental health data substantially, so it is difficult to extract the hidden and valuable information from these massive data sets. In order to improve the efficiency of school mental health education, it is necessary to organize and analyze students' mental health data.

2 Overview of Data Mining and Clustering Analysis

2.1 Definition of Data Mining

At present, the society is in the stage of rapid development of information. People store different kinds of data. These data have increased at an unimaginable speed with the continuous accumulation of time. How to extract effective information from these massive data and make effective solutions to meet the future needs, The process of discovering potential value information from massive and complex data sets is called data mining. Mathematical methods are used to derive patterns and implied trends in the data. Because of the complexity of data processing and the huge amount of data to be processed, it is difficult to find the patterns in the data using the traditional data processing methods. So we try to establish the corresponding data mining model, using the data model to analyze and predict other data, we can find the information hidden in the mass of information; different ways of data mining, the results are not the same.

2.2 Related Definitions of Clustering

Clustering algorithm is an important branch of machine learning, which generally adopts unsupervised learning. Using clustering analysis algorithm, the data in the database can be divided into several categories. The distance between individuals in the same category is small, so the similarity of objects in the cluster is high; while the distance between individuals in different categories is large, which has great differences [2].

In clustering methods, the commonly used quantitative methods are as follows:
absolute distance:

$$D(X, Y) = \left\{ \sum_{i=1}^k |X_i - Y_i| \right\} \quad (1)$$

Euclidean distance:

$$D(X, Y) = \left\{ \sum_{i=1}^k |X_i - Y_i|^2 \right\}^{\frac{1}{2}} \quad (2)$$

Chebyshev distance:

$$D(x, Y) = \left\{ \sum_{i=1}^k |X_i - Y_i|^\infty \right\}^{\frac{1}{\infty}} \quad (3)$$

2.3 Steps of Cluster Analysis

(1) Feature extraction: in order to divide the pattern set into different categories, the attributes of the pattern set are very important, and the similarity measure must be defined. The clustering algorithm is to classify the samples with similar characteristics into one

category according to the similarity measure between samples. Therefore, the results of clustering can reflect the inherent characteristics of samples. The related attributes are extracted from the samples as the attribute items of clustering. Another part of the clustering results have nothing to do with the class can not be used as a reference. This will improve the accuracy and robustness of clustering results.

(2) The choice of algorithm: no general clustering technology can explain the implied meaning of multidimensional data set. The choice of clustering algorithm will directly affect the results of clustering. According to the characteristics of data samples and the rules of class accumulation, we can choose different clustering methods.

(3) Parameter setting: select the algorithm to be used by parameter setting according to different applications. In the usual clustering analysis, the classification model needs to be initialized continuously. This will improve the accuracy of the classification model.

3 K-means Clustering Algorithm

3.1 Brief Introduction of K-means Clustering Algorithm

K-means algorithm, also known as k-means or K-means, is a classical clustering algorithm used by many clustering tasks. It is the distance from the data point to the prototype as the objective function of optimization. In this algorithm, the data set is divided into different categories through the iterative operation of function limit, which makes the evaluation index J minimum and the generated class distance close.

3.2 Algorithm Examples

The partition clustering method includes the following three points when clustering data sets:

(1) Selecting a certain distance as the measure between samples, the search process of K-means clustering algorithm is limited to a part of all possible partition space. If the sample similarity between each class is very low, K-means algorithm can often achieve good results. However, if the similarity between the samples is high, further clustering may occur. Therefore, it is possible to obtain the local rather than global minimum solution of the scoring function because of the convergence of the algorithm [3].

(2) Select the criterion function. K-means clustering algorithm will be affected by the selected similarity measurement method. The commonly used similarity measurement method uses the sum of squared error criterion function to improve the clustering performance.

(3) The k-means algorithm is used to measure a certain point in the sample. When facing the clustering problem, the algorithm is more efficient to complete the task. Even in the face of large data sets, the algorithm has high scalability and efficiency.

4 Application of K-means Algorithm in College Students' Mental Health Management

Macro definition of mental health is: refers to a continuous, efficient and able to meet self needs of the psychological state. On the other hand, the definition of mental health

is further strengthened on the micro level: it means that people can effectively coordinate cognition, emotion, thought, behavior and personality in the process of complete psychological activities, so as to adapt to society and keep pace with society. To judge whether the students have the basic mental health qualities are: social adaptability, personality quality, self-control, the ability to distinguish right from wrong, calm and so on. These are the basic criteria to judge the students' mental health [4].

The mental state of college students can often reflect their mental state. These factors are often very important to college students. In essence, students' knowledge acquisition and self-development is also a continuous process of psychological activities and psychological development. In the process of receiving education, students constantly choose and absorb the knowledge they provide, so that their psychology gradually becomes mature from childish. Meanwhile, their psychological quality is constantly improved in this process. Colleges and universities vigorously promote mental health education to improve students' psychological quality, which is one of the effective ways to improve students' comprehensive quality.

The level of students' psychological quality is related to their mental health education environment. From the perspective of students, in the process of education, constantly affected by moral norms, social environment and family expectations and other factors, and improve their personality. From an objective point of view, students in contact with different values, constantly measure, evaluate and regulate the development of their own personality, when certain conditions are met, they will produce personality with personal characteristics,. However, mental health education not only has this kind of passive personality transformation, but also actively guides students in the process of transformation. There is no big deviation in the overall direction, so that students can understand themselves and further understand their own behavior, so as to achieve the purpose of psychological sublimation and personality improvement.

5 Conclusion

It absorbs the advantages of student information management system and integrates it into mental health management. It adopts BS architecture and JavaEE platform as support. Write based on SSH framework, use MySQL database to store data, Tomcat as container. It realizes the unified management of College Students' mental health. The use of MySQL and Java makes the system run well in all major operating systems and servers. At the same time, the B/S architecture ensures the convenience of system access, which can be operated by opening the browser. However, the introduction of SSH framework and Tomcat makes the system lightweight enough to ensure the access speed and system security.

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