Research on the Application of Clustering Analysis Algorithm in the Construction of Film and Television

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Abstract. With the rapid development of Intemet and the popularization of personal computer, distance network teaching as a new and advanced teaching mode is becoming increasingly popular, and has become a focus in the field of education in recent years, so the research and development of online teaching platform has become a hot topic. However, there are many problems in the existing online teaching platform: the website structure is complex, the level is not clear, the goal is not strong; the teaching form is simple and boring, which can not mobilize the students' interest in learning; the teaching pertinence is poor, and different students adopt the same teaching methods. The existence of these problems has affected the teaching results of online teaching platform to varying degrees, and also restricted the development of distance network teaching.

Keywords: Intelligent teaching platform · Clustering analysis · K-means algorithm · Grid clustering

1 The Importance of Film and Television Culture Education

1.1 The Theory of Film and Television Culture Education

At present, there are many theories about film and television culture communication, among which the book "film and Television Culture Communication" analyzes the content of film and television culture communication in Colleges and universities from the background of humanistic thoughts, and discusses the content and system of film and television culture education in Colleges and universities combined with Digitization and the reform of visual culture system. As we all know, film and television culture is a part of cultural undertakings. The quality of film and television culture communication also affects the reform of social and cultural system. Strictly speaking, the spread of culture depends on the public. Especially in the context of humanistic trend of thought, the concept and thinking of the public have undergone major changes. More and more people take the initiative to accept the art form of film and television culture, Therefore, the effect of film and television cultural communication is closely related to the humanistic spirit, and the two are in direct proportion. In other words, under the humanistic trend of thought, the humanistic quality of the public has opened up a new way for the

M. A. Jan and F. Khan (Eds.): BigIoT-EDU 2021, LNICST 391, pp. 175–180, 2021.
https://doi.org/10.1007/978-3-030-87900-6_21

film and television cultural communication, and is the core of the film and television cultural communication. For example, in the aspect of film distribution, compared with the 20th century, the number of film production, film output, distribution and influence have been improved. In terms of teleplays, China is a big country in the production and broadcasting of teleplays.

1.2 The Main Analysis Angle of Film and Television

Starting from the background of humanistic trend of thought, this paper explores the content of film and television culture education in Colleges and universities. As one of the viewpoints, theory and case are also recognized by the author as an important basis for the reform of film and television culture communication system. Among them, the concept and viewpoint of the public have changed with the improvement of humanistic quality. In the research and understanding of film and television culture, the "exclusion phenomenon" in the traditional mode can be abandoned. Especially in the context of cultural diversity and social informatization, more and more people have realized the practical significance of humanistic quality, which also brings opportunities and challenges to the film and television culture communication, At the same time, it also provides an opportunity for the development of visual culture education in Colleges and universities. In addition, from a theoretical point of view, the author summarizes symbolism and film art, surrealism and visual art, expressionism and film art, postmodernism and film art, etc., all of which can be demonstrated by communication, so it is certain that communication theory has become the basis in the process of film culture education in Colleges and universities [1]. At the same time, due to the influence of many factors, the film and television culture education in Colleges and universities is facing challenges at this stage, and even presents a bad phenomenon that flowers are becoming more and more attractive and colorful.

2 Research on Clustering Analysis Algorithm

2.1 Cluster Analysis Algorithm is Mainly Introduced

With the explosive growth of information, the emergence of massive data and the rapid increase of data dimensions, people can not effectively distinguish the data and get reliable judgment basis. To find the information that users are interested in from these massive data, we must make appropriate processing of the data, so how to effectively organize the massive data, that is, data mining, has become a hot topic It is an important subject and plays an important role in a wide range of fields.

Cluster analysis has been applied in many practical problems. Biologists use cluster analysis to analyze a large amount of genetic information. For example, cluster analysis has been used to discover genomes with similar functions; Clustering analysis can also be applied to web search engines, which divides the search results into several clusters, each cluster captures a specific aspect of the query, and each cluster can be divided into several subcategories, thus generating a hierarchical structure to support users' further query; Cluster analysis can also be used to find polar and oceanic atmospheric pressure patterns that have significant impacts on land climate, etc. in short, cluster analysis is more and more widely used in various fields.

2.2 Clustering Algorithm Analysis Algorithm

2.2.1 The Principle of Cluster Analysis

Clustering analysis is an important task in data mining. Clustering is one of the most common technologies in the field of data mining, which is used to discover unknown object classes in database. This kind of object class division is based on "clustering of birds of a feather", that is, investigating the similarity between individuals or data objects, dividing the individuals or data objects that meet the similarity conditions into a group, and the individuals or data objects that do not meet the similarity conditions into different groups. Each group formed through the clustering process is called a cluster [2]. According to the above description, we get the mathematical description of clustering problem.

According to the above description, we get the mathematical description of clustering problem:

$$\cup_{i=1}^{k} c_i = V \tag{1}$$

$$G_i \cap G_j \cup \cdots \cup G_k = X \tag{2}$$

Members G1, G2 Each class is described by some features, such as representing a class of points in n-dimensional space by their center of gravity or the (boundary) points of relationships in the class, representing a class graphically by nodes in the cluster tree, or representing a class by logical expressions of sample attributes.

2.2.2 Models in Cluster Analysis

There are two types of data structure in data analysis. (1) Data matrix (or object and variable structure) uses P variables (also known as measures or attributes) to represent n objects, such as age, height, weight, gender, race and other attributes to represent the object "person". This data structure is in the form of relational table, or as a matrix of n × P (n objects, n × P attributes).

$$\begin{bmatrix} x_{11} & \cdots & x_{1f} & \cdots & x_{1p} \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ x_{i1} & \cdots & x_{if} & \cdots & x_{ip} \\ \vdots & \vdots & \vdots & \vdots & \vdots \\ x_{n1} & \cdots & x_{nf} & \cdots & x_{np} \end{bmatrix} \tag{3}$$

Cluster analysis originated from statistics, and most of the traditional analysis methods are based on numerical data. However, the object of data mining is complex and diverse, which requires that the clustering analysis method can not only deal with the data whose attribute is numerical type, but also adapt to the change of data type. Generally speaking, in data mining, the common data types of object attributes are interval scale variable, binary variable, nominal, ordinal, proportional scale variable and mixed type variable. Interval scale variable is a continuous measure of rough linear scale.

2.3 K-means Clustering and Grid Clustering

The time complexity of K-means clustering algorithm is O (TkN), where t is the number of iterations, K is the number of clusters, and N is the size of sample space. K-means clustering algorithm has less computation than hierarchical clustering algorithm, and is suitable for processing large sample data. However, the initial clustering centers of K-means clustering are randomly selected, which makes it possible to obtain different clustering results by selecting different initial clustering centers, K-means clustering can only find convex clusters, and can not deal with outliers well. At the same time, it is not efficient in time, and it does not have good scalability.

3 Construction of Film and Television Culture Education Platform

3.1 The Original Intention of Platform Construction

With the development of science and technology art and the improvement of the demand level of human life, film and television art gradually rises and develops rapidly. After music, writing, fine arts, sculpture, architecture and drama, it has the most extensive impact on social civilization. At present, it has been involved in various regions of the world, infiltrated into all aspects of people's daily life, and has increasingly broad and profound repercussions on social life and cultural progress [3]. It is an important and creative subject for physics teaching to apply campus film and television to high school physics teaching. At the same time, campus film and television can combine space-time, audio-visual, dynamic, visual and aesthetic into one, and also become a new and flexible education mode of combining sound and painting. Through the analysis of the requirements of the new curriculum, it is considered that the application of campus film and television can adapt to the requirements of the new curriculum system. Because of its own flexibility and innovation, it can be easily applied to physics teaching and promote the reform of physics teaching.

3.2 The Positive Role of the Construction of the Platform of Film and Television Culture Education

The use of film and television is well adapted to the education mode with the development of students as the main goal. First of all, the use of campus film and television based on the open exploration learning network platform can improve the enthusiasm of teachers to constantly update and restructure the teaching content according to the latest technological development process, and make the curriculum content in school in line with the most cutting-edge technology. At the same time, it can also vividly show the physics knowledge which is difficult for teachers to explain and understand to students. The teachers should use the campus film and television selectively and pertinently, not blindly. As shown in Fig. 1. Clustering results based on Grid.They should adopt different teaching methods according to different teaching contents and requirements, so as to improve the teaching quality better. For example, for the content with strong knowledge and difficult to understand, students can fully display the learning content and experiment details in combination with the latest campus video broadcasting operation process.

Fig. 1. Result of grid-based clustering method

We also use INS data to conduct several K-means clustering experiments and compare the initial clustering centers of each time. It is found that the initial clustering centers are randomly selected for k-means clustering each time, which makes the initial clustering centers of each time very different. As shown in Fig. 1, the initial clustering centers of the first, second, third and fourth times are very different, In the graph, the broken line fluctuates greatly. Obviously, the more the clustering center can not be well captured, the more computation and time the algorithm will pay, and the higher the cost of the algorithm.

4 Development Tools and Models

4.1 Development Tool

After a detailed investigation of the development tools, the system decided to use JSP (Java Server Pages) technology framework to generate dynamic and interactive web server applications. JSP technology is to insert Java program segment (scriptlet) and JSP tag tag into the traditional HTML file (* HTM, * HTM) to form JP file (* JSP). JSP uses tags and scriptlets to encapsulate the processing logic of generating dynamic web pages, access the application logic of resources existing in the server, separate the web page logic from web page design and display, support reusable component-based design, and make the development of web-based applications fast and easy [4]. The web server of this system uses Tomcat 5.0, Tomcat as a servlet container, When the user requests to visit a servlet, it encapsulates the user's request information in the ServletRequest object, and then transmits the request object and response object to the servlet requested by the user. The servlet writes the response result to the servletresponse object, and Tomcat transmits the response result to the user.

4.2 Development Model

It is composed of a system of collecting, storing and transferring information by computer. With the development of science and technology, the expansion of information and

the explosion of knowledge, how to effectively collect information and transfer knowledge has become the development purpose of the system. Therefore, it is very important to develop a system which can give consideration to both development efficiency and operation efficiency and satisfy the asynchronous real-time processing function. The MVC mode is adopted in the development of this system. MVC mode is the abbreviation of "model view controller", which is translated into "mode view controller" in Chinese. That is to say, the input, processing and output processes of an application are separated according to the mode of model, view and controller, and are divided into three layers: model layer, view layer and control layer. View represents the user interface. For web applications, it can be summarized as HTML interface. Applications can have many different views, MVC design pattern only deals with the data collection and processing on the view, as well as the user's request, not the business process processing on the view. The business process is handled by the model.

5 Main Conclusions

Distance network teaching is a kind of teaching method which is paid close attention by many experts and scholars at present. We are constantly improving its teaching mode and implementation mode from different angles and aspects in order to better carry out distance network teaching activities. In this paper, the clustering analysis algorithm and its application in the field of teaching are deeply studied, the traditional clustering analysis algorithm is improved, and the gbkm clustering analysis algorithm is proposed. In this paper, the convergence and effectiveness of gbkm clustering analysis algorithm have been verified by standard test cases, and it has been successfully applied to the actual system – the personalized intelligent learning system of embedded online intelligent teaching platform, which greatly improves the intelligence of the teaching platform.

Acknowledgements. Scientific research team of Xi'an FanYi University XFU18KYTDC01.

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