WEP Warwick Evans Publishing

International Journal of Computer Science and Information Technology

ISSN: 3005-9682 (Print), ISSN: 3005-7140 (Online) | Volume 3, Number 2, Year 2024
DOI: https://doi.org/10.62051/ijcsit.v3n2.21
Journal homepage: https://wepub.org/index.php/IJCSIT/index

Application of Data Mining Technology in Digital Museum

Yongjia Song *

University of Nottingham University Park Campus Nottingham, Nottingham, NG7 2RD, UK

ABSTRACT

The emergence of data mining technology has adapted to the needs of museums in the current era. This article briefly analyses the significance of digital museums and the application and shortcomings of data mining technology in museum digitization.

KEYWORDS

Data Mining; Digital Museum; Digital Innovation

1. INTRODUCTION

With the development of science and technology and the arrival of the era of big data, the development of traditional museums in time and space is limited, Meanwhile, digital innovation is the inevitable choice to revitalize museums. The digital museum uses data mining technology to make a large amount of data play a deeper meaning, so that the museum can combine history with future, cognition and perception, and better reflect the humanistic feelings of the museum. The digital museum breaks through the previous single mode and provides diversified services for the vast audience more conveniently and quickly, which is also the development trend of modern museums. Therefore, the research on the application of data mining technology in digital museums can promote the innovation and development of digital museums.

2. THE COMPARISON BETWEEN TRADITIONAL MUSEUMS AND DIGITAL MUSEUMS

(1) The meaning of museums

Museums which mainly study, collect, protect, interpret and display material and intangible heritage are generally non-profit permanent institutions serving the society. They has extremely high artistic, educational and historical value. Nowadays, more and more people like to go to museums, especially when travelling in a city. Museums have become a must-visit place for most people. The collections of museums in each place have their own characteristics. People's visits and exchanges between local museums have promoted the development of cultural education and integration. With the development of the times, the innovation of museums also needs to keep up with the pace of the times, integrate science and technology, and expand the functions of museums.

(2) The comparison of traditional and digital museums visiting mode

Traditional museums are mainly exhibited with physical objects. The content introduction of the exhibits is mostly written, which is generally explained by staff or volunteers. When people visit museums, they mainly interact with themselves or between people, not with exhibits. On the basis of the traditional museum visiting mode, the digital museum has increased the interaction between

people and exhibits. Through digital innovation, the Digital Museum displays cultural relics in the form of pictures, texts, sounds, images, and three-dimensional animations, which is a collection of cultural relics information.

(3) The comparison of traditional and digital museums exhibits

Traditional museums will consider many factors when collecting cultural relics, such as geography, climate and space. In larger museums, the museum's collection is very rich. For example, the British Museum collects many cultural relics and treasures from all over the world and the manuscripts of many great scientists. The collection is rich and diverse, which is rare in museums all over the world. The British Museum has a collection of more than 8 million pieces. However, due to space limitations, most of the collections cannot be displayed. The collection resources are digitized, cultural relics information is recorded and displayed in the form of virtual data, and more cultural relics are displayed, which also makes traditional museums more fully open to the public.

3. THE SIGNIFICANCE OF DATA MINING TECHNOLOGY FOR DIGITAL MUSEUMS

(1) Definition and principle of data mining

Data mining technology is to discover, extract and analyse a large amount of data to find valuable and meaningful data in it. It is an emerging field in database research, integrating the theoretical technology of statistics, artificial intelligence, database, visualization and many other disciplines. In recent years, the growth rate of data has exceeded Moore's Law. Data has changed from quantity to quality. From the initial database to today's big data, there are not only structured and unstructured data, but also a large number of disordered and uncertain data. The application of data mining technology can be an era of better combination of data.

(2) The application of data mining in all aspects

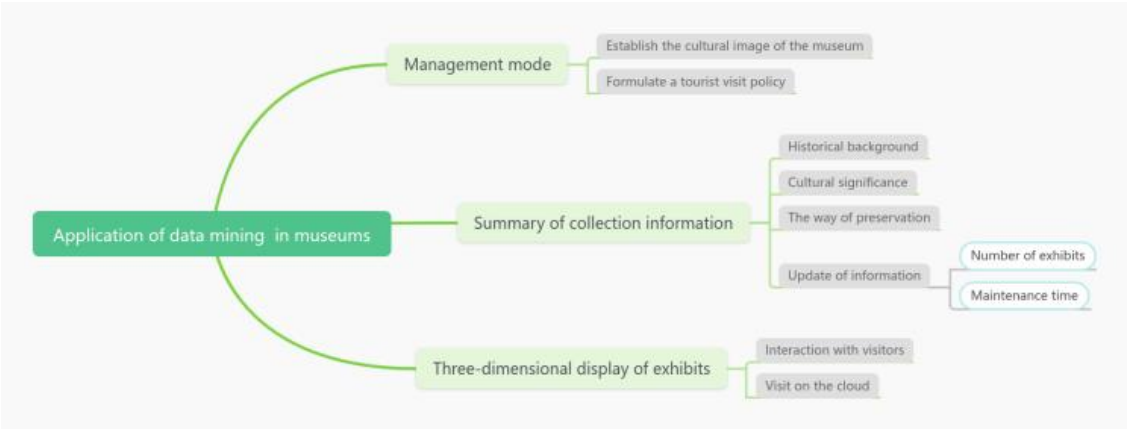

Figure 1. Application of data mining in museums

First, it is the application of data mining in museum management. Through the mining and analysis of the number of visitors and user behaviour data, it can help the museum have an in-depth understanding of the preferences of visitors and establish a core cultural concept in line with the current, so as to improve the cultural influence of the museum. On the other hand, by collecting and analyzing a large number of visitor data, such as the flow of visitors, the time of visiting individual exhibits, etc., establishing a prediction model and accurately predicting the number of visitors in a certain period in the future will help museum managers to adjust the time and number of visitors, do a good job in diversion, and improve management efficiency and tourist body. Sense of examination.

The second is the application of data mining technology in the collection information aggregation. Traditional museums use artificial methods for the information of cultural relics, which consumes a

lot of time and manpower. Data mining technology can extract the characteristics of cultural relics and establish their own archives for each cultural relic, including historical information, background significance, preservation methods, etc. If the information on the exhibits changes, such as the repair time and the number of impressions, the information can also be updated in time by establishing a database. The information summary of the collection can help the staff establish contact with cultural relics in a timely manner and better preserve cultural relics. For visitors, they can also have a more comprehensive understanding of the exhibits and increase their understanding of the exhibits.

Third, the three-dimensional application of data mining technology. Data mining technology obtains the deep abstract features of images through the design of relevant algorithms. Through the collection of information on museum cultural relics, it builds a three-dimensional model and visualizes it, combines sound explanation, narrows the distance between people and objects, and interacts with visitors to improve the fun of the visit. Moreover, the three-dimensional model can span time and space, establish a cloud platform, allow more cultural relics to be exhibited, and at the same time save the cost of visiting.

4. THE PROBLEMS OF DATA MINING TECHNOLOGY IN THE PROCESS OF MUSEUM DIGITIZATION

(1) Insufficient development of visual data mining technology

Data mining algorithms are constantly being improved and improved, and the process of data mining is becoming more and more standardized. New data mining products continue to appear. It can be said that data mining technology is more and more widely used. Visual data mining technology combines data mining with computer vision and develops rapidly. However, its application in digital museums is still very lacking, and most digital museums are still on display in two dimensions.

(2) Lack of management model innovation

From the perspective of the actual situation, museum management is relatively deficient from the perspective of technicians. Due to the lack of advanced data talents, the overall digital service level of the museum will be limited, and it is difficult to adapt to the current construction process of the digital museum. Secondly, there is a lack of training related to digitization. Managers lack data mining and artificial intelligence training, which will lead managers to lack the concept and thinking of digital innovation, which will restrict their management of digital museums.

5. CONCLUSION

In the context of the digital era, the digital transformation of museums must be innovated with the help of digital mining technology. The development and application of digital mining technology will become more and more important in the process of museum digitization. In the process of management, the museum should cultivate data and computer thinking, enhance its own digital innovation ability, attract more and better data talents, strengthen the application of visualization data mining technology, combine history and the present, combine tradition and culture, and better cope with the challenges and opportunities brought by the data era. We will strengthen the digitization of the museum and give full play to the cultural and educational significance of the museum.

REFERENCES

[1] Li Yuan, Pan Minglv. The symbiosis between digital museums and traditional museums [J]. Shanxi Architecture, 2005(03):16-17.

[2] Wu Shengbin. Research on visual excavation technology based on three-dimensional geological bodies [D]. China University of Petroleum (East China), 2020. DOI:10.27644/d.cnki.gsydu.2018.001200.

[3] International Conference on Applications and Techniques in Cyber Intelligence ATCI 2019" , Springer Science and Business Media LLC, 2020

[4] Chenchen Li, Qi Wang. "Research on the Evolution of Digital Technology Innovation System Based on Haken Model", 2022