Research on the Integration of Big Data Information in New Art

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Abstract: With the deep integration of new generation digital information technologies such as 5G, cloud computing, big data, the Internet of Things, artificial intelligence, and blockchain with the cultural and creative industries, art will undoubtedly break through traditional concepts and generate new disciplinary directions with the changes of the times. As a multidisciplinary new art field, how to introduce big data information technology, how to choose a more understandable model for art students, how to fill the gaps in related technical foundations, and how to cultivate innovative talents for the integration of art and industry in the new art field are all the directions of this article's research and exploration.

1. The Integrated Cultivation Model of Art and Engineering in New Art

The teaching content of New Art transcends traditional disciplinary boundaries, integrating knowledge and skills from multiple fields such as art, technology, and humanities, aiming to cultivate new art talents who meet the development needs of the digital era. This type of talent typically possesses various abilities such as interdisciplinary, technological application, innovative thinking, and humanistic literacy[1].

The New Four Subjects and New Art are both emerging in the new era, emphasizing interdisciplinary, innovative, and the integration of technology and art. The New Art is based on the the New Liberal Arts,combining the characteristics and development of art[2].It emphasizes the deep integration of art, technology, humanities and other fields, and cultivates new art talents with interdisciplinary, technological application, innovative thinking, and humanistic literacy abilities. The integration of art and engineering is an innovative talent cultivation model that combines art and engineering. It aims to cultivate engineers with artistic literacy and innovative abilities, as well as artists with engineering skills and aesthetic awareness. This training model breaks the boundaries between traditional art and engineering disciplines, achieving interdisciplinary intersection and integration. The talent cultivation model of art and engineering integration has the characteristics of innovation, crossover, and practicality. It can not only improve students' comprehensive quality and employment competitiveness, but also bring new impetus to economic and social development. At present, many universities both domestically and internationally are actively exploring and practicing talent cultivation models that integrate art and engineering, in order to cultivate more versatile talents with innovative and practical abilities. Our university(BIFT) has established a new art major-"Art and Technology", exploring the integration and innovation of art and technology, and promoting the high-quality development of art education.

2. Exploration of Big Data Information Technology in the Art Field

Big data technology refers to the ability to quickly obtain valuable information from diverse and large-scale data, including data collection, preprocessing, storage and management, analysis and mining, visualization, and other technologies[3]. Mainly including the following categories:

A. Data storage technology: including distributed file system (DFS), NoSQL database, etc., efficient storage and management of big data.

B. Data processing technology: including batch processing, stream processing and graph calculation, which is used to process and analyze a large amount of data.

C. Data mining technology: including machine learning, data mining, etc., through the analysis and mining of data, extract useful information and knowledge.

D. Data visualization technology: including data charts, data visualization tools, etc., which are used to present big data to users in an intuitive and understandable way.

E. Big data security technology: including data encryption, data security storage, etc., to ensure the security and privacy of big data.

For art colleges and universities, the application of big data information technology in art should focus on the following aspects:

1) Application of data visualization. The works or materials in art design can be presented in a digital way, such as displaying some elements or features in the works by means of data charts, dynamic data visualization, etc., so that the audience can more intuitively understand and feel the level of the works, and then a digital exhibition of graduation design with science and technology can be realized.

2) Expansion of data coverage. Through big data technology, more comprehensive sampling of art works can be carried out, so that the sample can be turned into a complete sample, so as to obtain more accurate information. In addition, through the analysis of the data of the art market, it can also provide reference for the trend, promotion and sales of works of art.

3) Data analysis in artistic creation. Through data mining and analysis of a large number of art works, we can find the rules and characteristics, so as to provide creative inspiration and materials for artists. For example, through the data analysis of historical paintings, we can find the preferences and changes of painters in composition, color, lines and other aspects in different periods, so as to provide enlightenment for contemporary art design.

4) Virtual reality and augmented reality technology. Through virtual reality and augmented reality technology, artistic works can be vividly presented in front of the audience, which can be touched and interactive, so that the audience can appreciate and understand the works personally, so as to enhance the expressiveness and communication effect of art.

In a word, the application of big data information technology in art can make art works more comprehensive and accurate display, and can also provide artists with more creative inspiration, and promote the further development of the art. At present, the application of big data information technology in the cultivation of new art talents is also gradually expanding. New art talents are the ones who meet the needs of the development of the digital era. They need to have the abilities of interdisciplinary, engineering application, innovative thinking and humanistic quality. The application of big data information technology can provide technical support for the cultivation of new art talents. The expansion and application of big data information technology can further promote the cross integration of art and other disciplines. Through the cross integration with computer science, data science and other disciplines, more new art forms and creative methods can be explored, providing more comprehensive and effective support for the cultivation of new art talents, and promoting the continuous development of art innovation.

3. Research on Big Data Information Technology in Art Teaching

In the teaching practice of new arts, combined with the actual situation of our students and majors, we —focus on the application of big data visualization in the teaching.

Data visualization is a new display method in digital exhibition. It presents data information through images, charts, maps and other forms, making data more intuitive and easy to understand[4]. Data visualization makes the data vivid and vivid. It can transform boring digital data into graphics with artistic sense and visual impact, and show the life and spirit of art. Data visualization visually presents data information through charts, maps and other forms of expression, so that massive data can be better understood. It can also further master the multi-dimensional data relationship and timely discover the trend of data. At present, digital exhibition has become the mainstream display mode of art disciplines, and it is also one of the main means to improve the scientific and

technological quality of students' works in art disciplines.

In the actual teaching process, we mainly break the science barriers of art students through the idea of "learning-practicing-designing[5]" through case teaching. Based on the previous programming course Python, we designed two teaching cases with different focuses.

3.1. Using Big Data Information Technology to Crawl Web Information and Visualize Output

In the face of massive web data of various industries, it is a more commonly used mode to analyze and display in visual mode through technical means. In the actual teaching process, we introduce film rate data source, extract the film name, year, score and number of evaluators, analyze the film market, and complete the whole process of data collection, analysis, processing and display through data crawling. Through this case teaching , students can clearly understand the process of big data analysis, and use the python programming tools they have learned to realize the visual display of big data, laying a solid foundation for the later digital exhibition. For students of different majors, we encourage them to use different professional data sources to crawl the effective data related to their own disciplines. Through data collection, data analysis, demand display and code mode, students are very interested in this kind of output mode of automatic visualization for complex and massive web data and dynamic big data, which also further expands their enthusiasm for learning big data and other related information technologies. It has laid the seeds of interest and solid foundation for later learning related courses. The following figure 1 and 2 are the results of the web page data crawling status chart and Top 10 film rating histogram.

```
0 Data crawling completed!
25 Data crawling completed!
50 Data crawling completed!
75 Data crawling completed!
100 Data crawling completed!
125 Data crawling completed!
150 Data crawling completed!
175 Data crawling completed!
200 Data crawling completed!
225 Data crawling completed!
All Data crawling completed!
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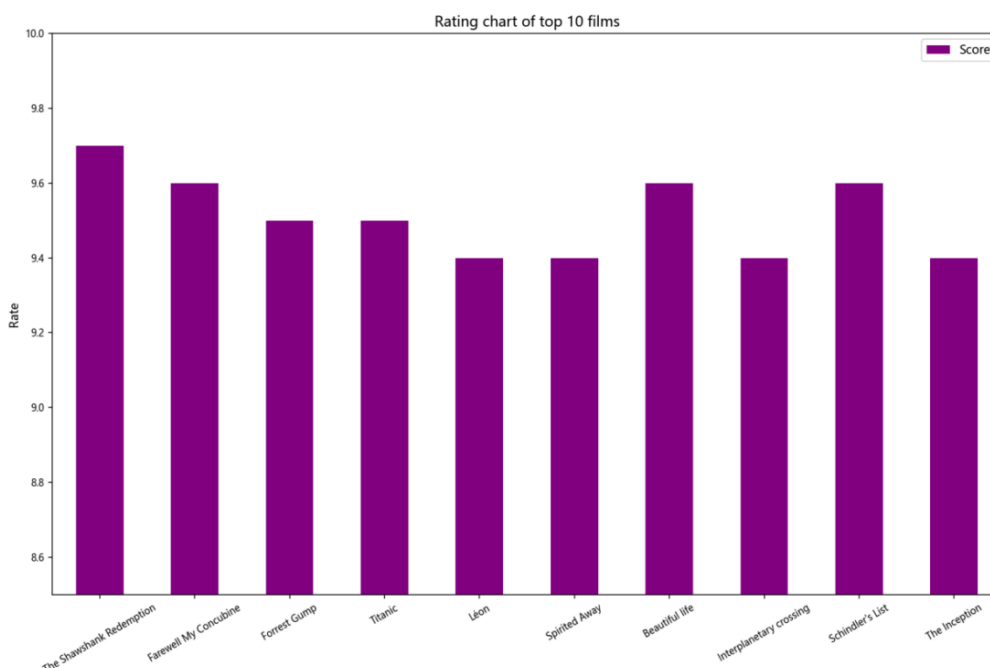
Figure 1 Data crawling state chart.

Figure 2 Top 10 film rating histogram.

3.2. Data matching extraction using image technology

Image matching is a common technology in image processing and computer vision, which is used to find the similar area between two or more images[6]. Art disciplines are closely combined with computer vision, so we design this case teaching to extract and recognize image.

Taking the common playing cards as the original image, we started with basic recognition and realized image matching using OpenCV. Through algorithm analysis and visual introduction, students understood the basic matching principle and implementation method, and then proposed the application of face recognition in big data information technology. Through this teaching case, the basic course of Python in the early stage is further expanded, combined with big data information technology, and extended to the in-depth learning in the later course group, establishing a complete course system, which serves as a bridge between the preceding and the following. Through the favorite cases, the technology and life have been brought closer and easier to understand. The students have not only consolidated the early Python foundation course, but also understood the application of big data information in visual processing. At the same time, they are also full of interest in the following in-depth learning and other related courses, and full of expectation for the later implementation of face recognition and other large-scale design. The teaching effect of mutual assistance. Figure 3 is the information extracted playing cards of the student works:
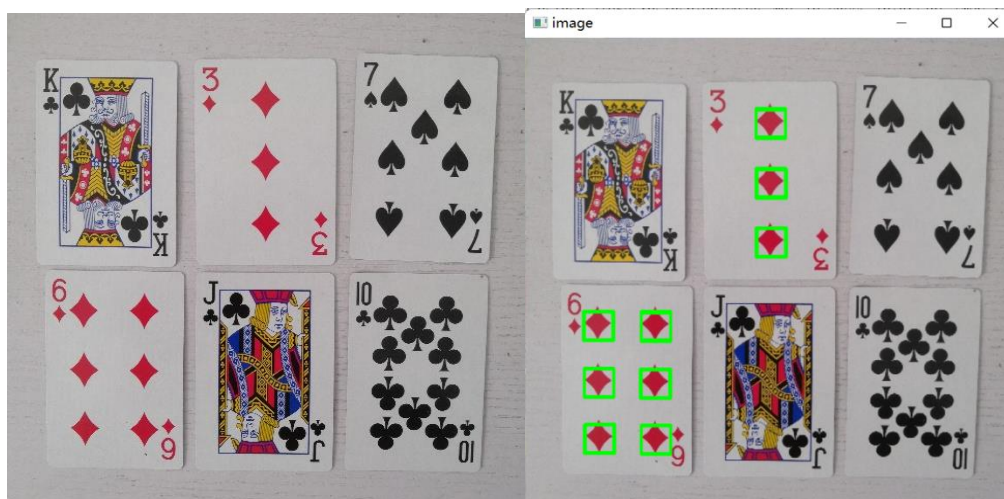

Figure 3 Information extracted playing cards.

4. Summary and Outlook

The Ministry of Education issued the Declaration on the construction of the new liberal arts, which made a comprehensive plan for the construction of the new liberal arts[5]. The revitalization of liberal arts education is related to the future of China's higher education. As an important part of the humanities sector, art disciplines upgraded to categories undoubtedly need to stand at a higher level for strategic planning and top-level design[7]. From a strategic perspective, building a "new art" in an all-round way and promoting the high-quality and high-level development of the art discipline is a necessary measure to build a cultural power in 2035[8]. From the technical perspective, a series of scientific and technological information technologies, such as big data, artificial intelligence, virtual technology and blockchain, have penetrated into the art field. The "new art" must keep up with the trend of the times and respond to the real needs in a timely manner in order to truly help improve cultural confidence. In order to achieve theoretical breakthrough, practical innovation and all-round expansion in the construction of "new arts", we must deepen our understanding of the application of science and technology in the field of art, the integration of production and education, and the functional attributes. The new art discipline is adapt to the development of the times and aims to cultivate new art talents that meet the needs of the development of the digital era. New art talents need to have the abilities of interdisciplinary,

technology application, innovative thinking and humanistic quality. In short, the cultivation of new art talents needs to focus on interdisciplinary teaching, technology application, innovative thinking and humanistic quality, so as to meet the needs of the development of the times and provide strong talent support for social cultural development and artistic innovation.

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