

The Role of Big Data on Computer-aided Animation Design

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Keywords: Big data; Computer animation; Big data analysis; 2D animation; 3D animation.

Abstract: In order to explore the development of computer-aided animation design under the background of big data and have an in-depth understanding of the promotion effect of big data on the animation design industry, in this research, the application of big data in all aspects of the computer-aided animation design industry is objectively elaborated, including animation design technology, animation design dimension development, animation design products and other fields. Combined with the appropriate big data analysis and processing model, computer animation evaluation recommendation system architecture model, etc., the great value brought by the application of big data technology to the entire animation design industry chain is comprehensively measured. The results show that in the era of big data, computer animation design technology has made great progress in character image, scene, and story application, and has more visual effects than traditional animation design. The development of computer animation from 2d to 3d also makes the animation effect more realistic, even threatening the real actors. In addition, with the application of big data technology, the timeliness and accuracy of animation design have made a qualitative leap. Therefore, big data has been involved in all aspects of computer animation design industry, guiding the rapid progress of computer animation.

1. Introduction

With the vigorous development of computer network technology and digital media technology, tablet computers, smart phones and other mobile terminals are widely popularized. People's production and life are becoming more and more convenient, and they can carry out various online communication activities anytime and anywhere in their spare time, including online shopping, chatting with friends, or watching all kinds of exciting videos. However, due to the complexity and exposure of the Internet, any behavior of people on the Internet will be recorded and gathered together into data that can be used for analysis and research, which contains great value. This is the era of big data [1, 2]. Big data, cloud computing, and the Internet of things are called the three revolutionary technologies of the IT industry. As one of the rising stars, the development and application of big data has attracted people's attention. Big data technology involves various industries including Internet, biology, catering, telecommunications, medicine, animation, entertainment, etc., and plays an important role in social production and life around the world [3-5]. Of course, for many ordinary people, big data is just a very fashionable but unfamiliar term, which is only related to the technology giants and talents. But in fact, big data is still around almost everyone, in every corner of the globe, even if people don't pay attention.

In the context of this big data era, the development of computer animation design industry is naturally influenced by big data technology [6], and even involves various industrial chains from investment to finished animation products. In particular, with the increasing cultural needs and appreciation level of people, the upper limit requirements on animation products are increasingly high, and the innovation of animation design level is of vital importance [7].

Based on this, in this study, the development and reform of computer animation design technology, animation design dimension, timeliness and accuracy of animation design products in the era of big data are elaborated. In addition, combined with big data analysis and processing model, computer animation evaluation and recommendation system framework model, the application of big

data technology to the entire computer animation design industry is comprehensively measured, so as to indicate the impact of big data on computer animation design.

2. Big Data

Big data is an information asset that has a huge collection of data and can't be captured, managed, and processed by conventional software in a short time, and needs a new processing mode to have stronger decision-making power, insight and discovery power, and process optimization ability. As a new tool to provide knowledge services, it is pushing the Internet industry to upgrade from information technology to data technology, and the final data may become a vital natural resource for human beings [8]. Big data is mainly divided into structured, semi-structured, and unstructured data [9], and the detailed characteristics are shown in table 1. Of course, the real value of big data lies not in piling up huge data information, but in the connection between data and data and targeted processing of these data with practical significance. Therefore, the core problem of big data is to quickly and accurately mine data with great value from massive data [10, 11]. The basic process of big data processing is shown in figure 1.

Table 1. Characteristics of big data

Attribute	Description
Proportion	Unstructured structure is the main part.
Quantity	There is a huge amount of data, which cannot be compared with traditional data.
Dimensions	Multidimensional, which can be described from multiple angles
Timeliness	Data is closely related to human activities and changes rapidly.
Repeatability	Most of the data show endless repetition.
Fluidity	Data can flow to generate value

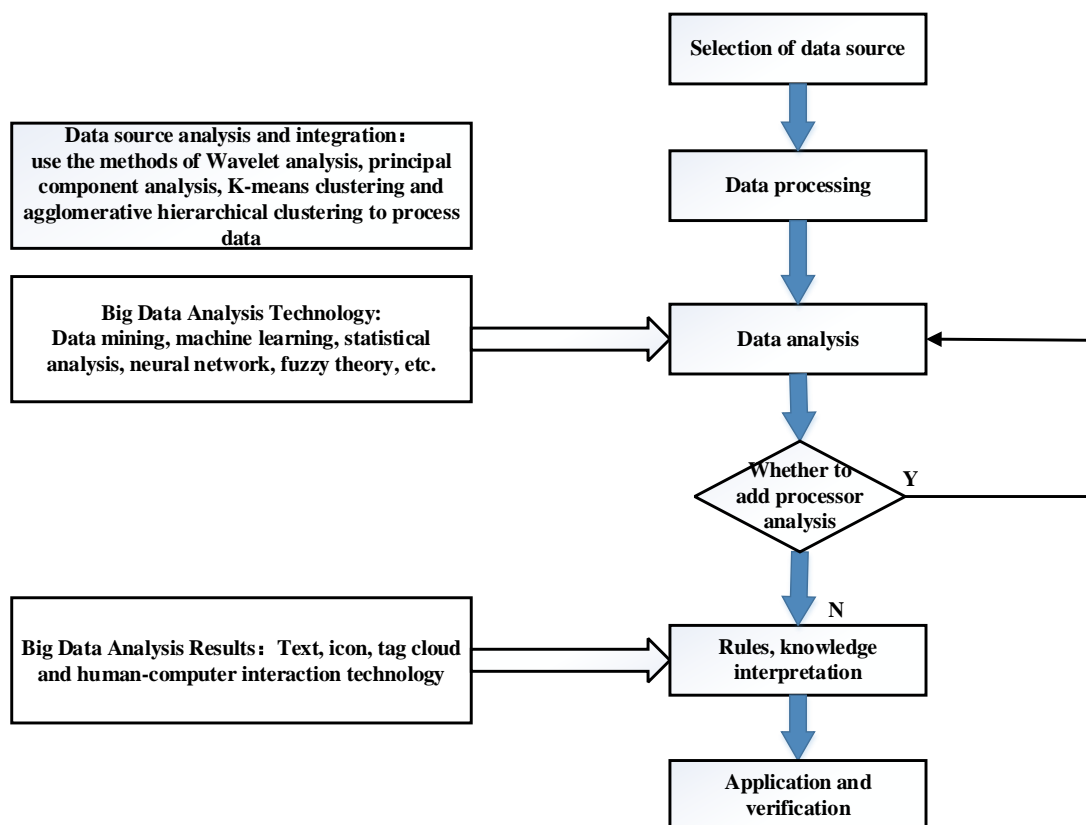


Figure 1. Basic flow of big data processing

Against the background of the era of big data, the application of various big data processing models is a very practical and necessary means to further develop computer animation design with the help of network big data processing technology, and to push the field of computer animation into a new era with better and faster development [12, 13]. Figure 2 is a big data processing architecture model of computer animation industry based on Internet technology. This model can improve the efficiency of big data collection, deepen the level of information processing in the field of computer animation, and put forward the development strategy of computer animation design more reasonably.

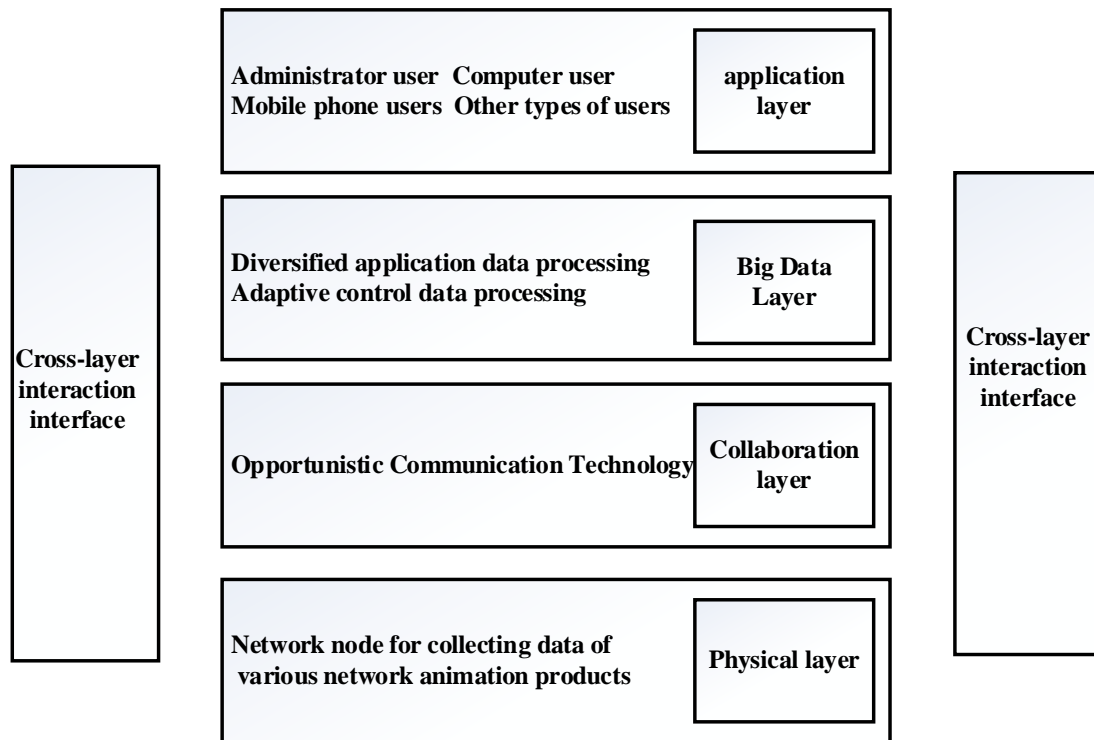


Figure 2. Big data processing architecture model of computer animation design industry

3. The Application of Big Data in the Field of Computer Animation Design

3.1 The Transformation of Computer Animation Design Technology in the Era of Big Data

With the continuous promotion of big data technology, digital media technology has already shown a rapid development trend, which is embodied in the sources, dissemination, and storage of data. And computer animation design, which relies on digital media technology, has also undergone great changes. The traditional animation design needs to rely on manual drawing to a large extent, and the whole process is very complicated. Obviously, the product quality of its animation design has been unable to meet the growing needs of people's perception. With the application of big data technology, the process of computer animation is disruptive and has a qualitative leap in the technical level. Modern computer animation has long been free from the constraints of traditional animation expressions, visual effects, and picture tension. It takes people away from individual images, texts, or audio, making computer animation more artistic and attractive, and expressive in various forms. For example, in the specific design of animation, people can combine different scenes with different music backgrounds to bring diversified visual and auditory effects to animation design, which is more artistic.

The application of big data technology to computer animation design can make the “moving” of animation work no longer a pure imagination, so that people can enjoy more dynamic effect of animation design works. In addition, its character image is more vivid, and the scene is more real.

3.2 Dimension Development of Computer Animation Design in the Era of Big Data

Computer animation is a kind of artistic means in motion. Its principle is to use the visual retention of human eyes to play continuous motion pictures quickly in sequence, and then human vision will regard them as continuous movements. According to the way of expressing objects, it can be divided into two-dimensional animation (2D) and three-dimensional animation (3D). Two-dimensional animation has a history of more than 100 years. From the first two-dimensional animation “*Humorous Phases of Funny Faces*” to the present, many classic animations have been born, such as “*The Lion King*”, “*Tom and Jerry*”, “*Pleasant Goat and Big Big Wolf*” and other excellent animation design works at home and abroad. With the application of big data, computer graphics imaging and graphics processing technology of computer 3d animation came into being. This is an all-digital image generation animation. Compared with two-dimensional animation, 3d animation has stronger performance effect, which can highlight the realistic feeling and stereoscopic sense of scenes and characters, making it easier for the audience to feel the animation world constructed by designers on the scene. There are also many classic works, such as “*Finding Nemo*”, “*How to Train Your Dragon*” and the domestic 3D film “*NE ZHA*” released in 2019. 3d technology has also been successfully introduced into the field of animation and live-action films, full three-dimensional 3d modeling style and live-action make it complement each other. In addition to the introduction of 3D computer technology as an aid, the use of 3D printers has greatly improved the picture quality and viewing effect. These three forms of 3D animated feature films are very popular. For example, “*Paddington*” and “*Garfield*” are both popular animated and live-action films.

The development of computer animation from two-dimensional to three-dimensional can be regarded as a big sign of the development of the era of big data. At present, it is clear that audiences prefer the visual experience presented by 3d animation technology. With the continuous development of related technologies and software, 3d animation images are getting closer to real things, and their realistic visual effect is almost the same as that of real actors. For example, this year's “*Alita: battle angel*”, the main character is almost indistinguishable from the real actors except for a pair of big eyes with 3D features. It can be concluded that 3d animation has surpassed 2d animation with the help of big data technology and has become the mainstream trend of animation development in the future.

3.3 Timeliness and Accuracy of Computer Animation Design in the Era of Big Data

Computer animation design itself serves the audience. At the beginning of the design, it is necessary to have a deep understanding of the actual viewing needs of the audience. Then the created animation works may be supported by the entire audience market. Otherwise, even if it is elaborately produced by a big-name technician and director, the work created by it may be unpopular. In the past, people needed to spend a lot of manpower and material resources to understand the types and styles of computer animation design that audiences are currently concerned about through various effective channels and platforms, so as to decide to create a certain type of animation works. However, the tastes and preferences of the audience are always changing rapidly, so the operation efficiency is too low, and the mobile Internet era, which focuses on the timeliness of products, is greatly discounted, and the animation products will miss the best time to release. In the era of big data, by adopting relevant big data analysis technology, people can shorten the survey time to “day”, so as to quickly predict the market change trend in the next few months or even years. Together with the animation design capabilities of the platform, the animation design works based on the audience's preferences are produced and released in time. And people can build a complete evaluation and recommendation system (figure 3) for analysis and acquisition based on big data technology.

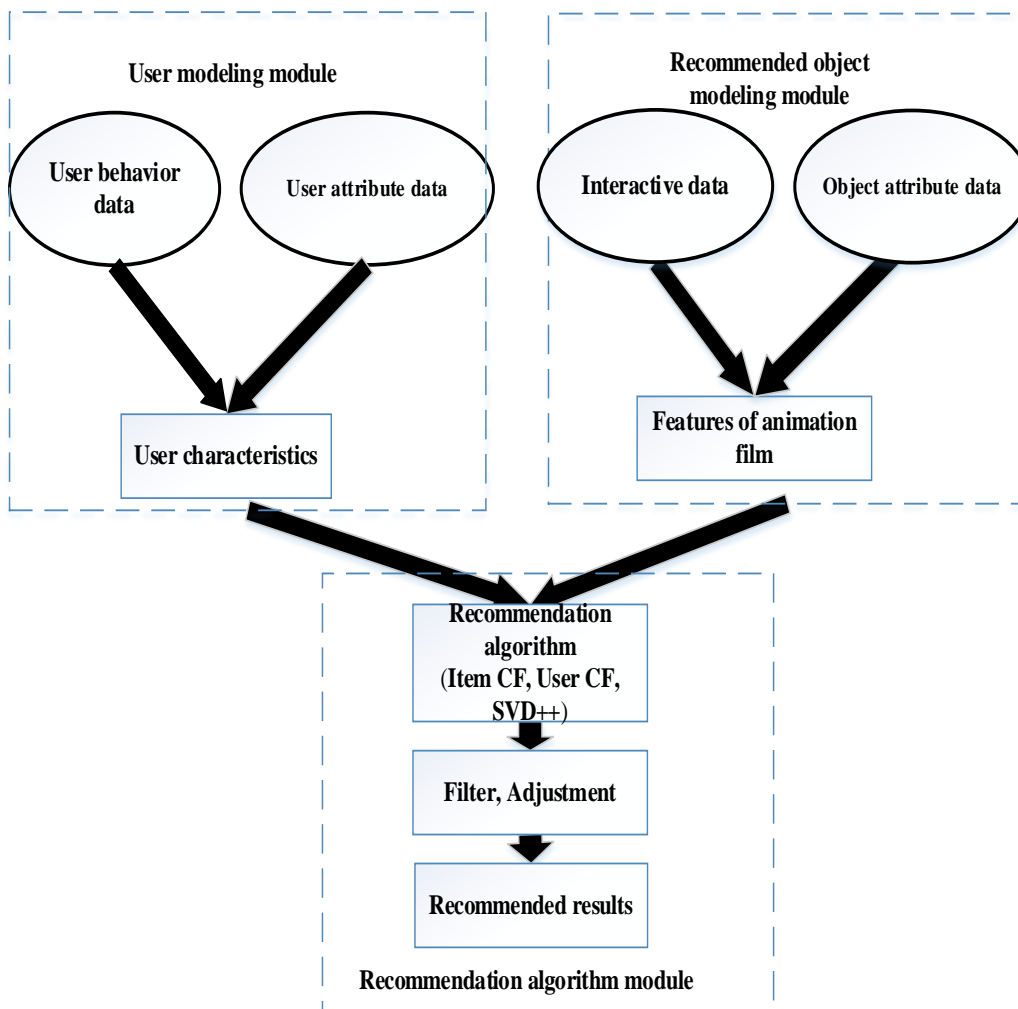


Figure 3. Architectural model of evaluation and recommendation system for computer animation design

The application of the big data model can enable people to more accurately locate the needs of current audiences. The animation design products and information that every audience has browsed on the Internet, every operation, and every action are recorded. After intelligent analysis, relevant information is pushed to consumers, which has become a universal information transmission mode in the Internet era under the environment of big data. The denser the information is, the more diversified the relevant links and contents will be, which not only greatly reduces the production time of animation design, but also effectively saves the cost and improves the efficiency of artistic creation.

4. Conclusion

In this research, the development of the field of computer animation design in the era of big data is elaborated, which covers the technology change of animation design, dimension change of animation design, timeliness of animation design and accuracy of audience. Combined with the appropriate big data analysis and processing model, computer animation evaluation and recommendation system framework model, and so on, the huge benefits brought by the application of big data technology to the entire animation design industry is comprehensively measured. It can be observed that big data has imperceptibly entered into every link in the field of computer animation design. The development mode of “big data + computer animation design” has brought bright prospects for animation design. At the present stage, the technological innovation is faster and

faster. In the future, the boundary of animation product design not only exists in the two-dimensional and three-dimensional interface, but also extends from the audio-visual sense to the senses of touch, taste, and smell, which is bound to bring more real animation experience to the audience. Following the development pace of big data, computer animation design and creation will certainly be diversified, with greater development space and richer creation methods and contents.

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