




Computer-Aided Interaction of Visual Communication Technology and Art in New Media Scenes

Ruoyao Wang¹

¹School of Art and Design, Henan Finance University, Zhengzhou 450046, China, wangruoyao85218@163.com

Corresponding author: Ruoyao Wang, wangruoyao85218@163.com

Abstract. This paper conducts a computer-aided interaction study of visual communication technology and art in the new media scene, and describes, in turn, the role of digital technology for digital media art creation that is the main visual expression, auditory expression, and audio-visual integration, as well as the role of digital technology in promoting fields related to digital media art practice. Finally, with a focus on future development, he elaborates on the potential possibilities of digital technology in the future period and the development trend of digital technology for future digital media art practice. It proposes a new form of art that is in line with the development of the intelligent era, "intelligent visual art creation", and discusses the opportunities and challenges that intelligent visual art brings to the field of art and design. The research in this paper mainly belongs to the scope of practical research, taking the existing research results as the first point of experimental research, mainly through literature compilation, case study, and experimental analysis research methods, combined with design-related research results, to build an interdisciplinary research framework of intelligent visual art creation research based on deep learning.

Keywords: New media scene; visual communication technology; visual communication art; computer-aided interaction

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1 INTRODUCTION

Digital media art practice is a new field of artistic application research and creation, which integrates modern science and technology with traditional art fields. Due to the in-depth research and development of advanced science and technology and digital technology, the direction of digital media art practice will bring together more talents specialized in digital technology. As digital technology continues to reform and innovate, digital technology can largely help people to share some of their work and may replace human beings in some types of work [1]. The creative

process of digital media art practice can be applied to digital technology, and the development of digital technology can also serve digital media art practice more effectively. Digital technology is the basis for the development of digital media art practice. In the surging wave of technological innovation, the era of digital technology has come, and the current period is the best period of rapid development of digital technology and the most controversial. Digital technology has been developed for a short period and integrated into the new era, grafting, and serving professional fields such as intelligent interface, digital imaging, game design, business communication, etc., to carry out various cross-disciplinary innovations and thinking. The breakthroughs in multimedia technology and big data technology have also paved a good way for the development of digital technology.

The purpose of the study is to analyze the causes of digital technology, understand the formation and development of digital media art practice, grasp the basic concepts related to digital media art practice, summarize the classification of digital media art practice content, outline the general characteristics of digital media art practice, develop a discussion on the specific expressions and intuitive presentation forms of digital media art practice, and explore the relationship between digital media art practice and digital technology [2]. The aim is to explore the relationship between digital media art practice and digital technology so that in the future digital technology can play a more useful role and have a more beneficial impact on digital media art practice. The relationship between the development of digital technology and digital media art practice can be explored to explore the interplay between the two, and thus derive the many possibilities for digital technology to drive the development of digital media art practice. The new wave of artificial intelligence technology has brought about lifestyle changes, permeated every corner, and influenced artists' thinking and creation. Using data, with the help of AI-related technologies, to fully recognize and understand the characteristics of intelligent visual art created in the context of new technologies, and to study new ways of visual art expression with the assistance of AI technologies.

In the context of the rapid development of computer science and technology, we throw light on the intervention of deep learning technology in visual arts, promote cross-learning of multiple disciplines, and encourage researchers and designers to actively try various interdisciplinary fusions. Scholars are encouraged to actively try various possibilities of combining with artificial intelligence technology and possess the courage to break the inherent thinking patterns and creative paths. And give them ways and means on how to integrate interdisciplinary disciplines, so that researchers can more easily cut into other fields or allow scholars from other fields to enter the field of design and art.

2 RELATED STUDIES

Alam et al. [3] mentioned the knowledge structure system and skill structure system that digital media art professionals should have, and explored how to cultivate practical skill-based talents. Wu et al. [4] mainly discuss the research results of domestic new media art and dig out the shortcomings in the domestic new media research field. Lee et al. [5] take art museums and museums as the starting point, and list four art museums and museums respectively; Guangdong Museum of Art uses digital technology to promote public education and give back to the high viscosity audience with digital technology; Wenjuan [6] uses a digital system to upgrade the museum guide system; Henan Museum uses digital technology to break the time and space and bring the audience a different viewing experience; Jiangxi Museum uses digital technology to provide high-quality guide service and promote the integration with museums. The museums in Jiangxi use digital technology to provide high-quality guided tours, promoting integration with museums. The creation of interactive animation is a comprehensive use of various fields, requiring diversified knowledge integration and innovation. However, these theoretical masterpieces are only the results of innovative research in a single field, and although they have been used in many

ways by people in various fields in practice, few people have summarized their internal connections.

Intelligent visual art is characterized by multidisciplinary intersectionality, involving technology, art, and philosophy, which have been developing through interweaving, mutual inspiration, and influence. The scope of this paper is to analyze and interpret the creation of intelligent visual art based on deep learning in the context of the era of artificial intelligence, to find the core theoretical support around the background of art, design, philosophy, and other related disciplines, to determine the scope of this paper and thus to elaborate it, and the author will do his best to sort out these contents so that this paper has a rigorous academic foothold. Fan [7], for example, explores the relationship between visitors and spatial animation in the form of immersive exhibitions, and so on, in different forms of interactive animation creation attempts. But no matter how the forms change, the goal of using these design methods is to better communicate the message [8]. When the user has a good experience in the work, it will be easier to accept the information conveyed in the work, so that the work can achieve the purpose of efficient information output.

This paper focuses on the use of graphic design in film and television commercials in the digital age and tries its best to study the visual effect of commercials with different artistic expression methods. The correlation between film and television advertisements and graphic design comes first from the image symbols in film and television advertisements, followed by the visual-based audio-visual both. When the film and television advertisements based on graphic design are disseminated, the integration of their main visual symbols such as images, colors, and words is closely related to the development of film and television forms. With the development of Internet technology, the innovative use of graphic design in film and television advertising in the digital era is manifested not only in the audiovisual application of relevant symbols but also in the innovation of the presentation form of visual symbols and the innovation of communication characteristics. The main use and significance of visual effects in the film and television advertising industry are that: different forms of visual expression will directly affect the acceptance and memory of different viewers of the whole advertising information. With the application of special effects technology in film and television, various special effects and visual expressions are constantly appearing, which strongly promote the development of film and television advertising.

3 RESEARCH ON THE TECHNOLOGY AND ART OF VISUAL COMMUNICATION IN THE NEW MEDIA SCENE OF COMPUTER-AIDED INTERACTION

3.1 Computer-Aided Interaction Design

Computer-aided design technology is mainly divided into 2D drawing technology represented by CAD and other graphic design software, 3D production technology represented by Maya, 3DSMAX, SKETCHUP, etc., 3D printing technology represented by solid printing and experience interaction, virtual reality technology, GIS, and other new technologies, the rise, and application of these auxiliary technologies help planners [9]. The rise and application of these assistive technologies help planners to better improve their work efficiency and express their design concepts. 2D drawing technology, 3D production technology, 3D printing, and virtual reality technology are not used independently in one part of the design but are more of an interplay between technologies. These new technologies include computers, art, and design, landscape architecture, etc. The integration of multidisciplinary knowledge greatly expands and extends the scope and connotation of residential planning and design.

The accuracy of computer-aided design technology is mainly reflected in two aspects: precision management and the basis of engineering construction. From the perspective of precision management, it is the use of powerful computer computing functions to effectively solve the problems required in the planning and design process, which not only improves the work efficiency

but also ensures the accuracy of data in the drafting work. In the traditional drafting work, to ensure the accuracy of the data in the drafting work, the planner needs to operate manually with the help of measuring tools such as rulers and round gauges, which is difficult to ensure the accuracy of the data in the drawing process, and the planner takes a long time to measure manually, which greatly reduces the efficiency of the drafting work. Computer-aided design technology in the drafting work can be accurate data to the millimeter, and computer-aided design software provides more convenient and fast measurement tools so that the planner will be more time and energy to transfer to the design program, as shown in Figure 1.

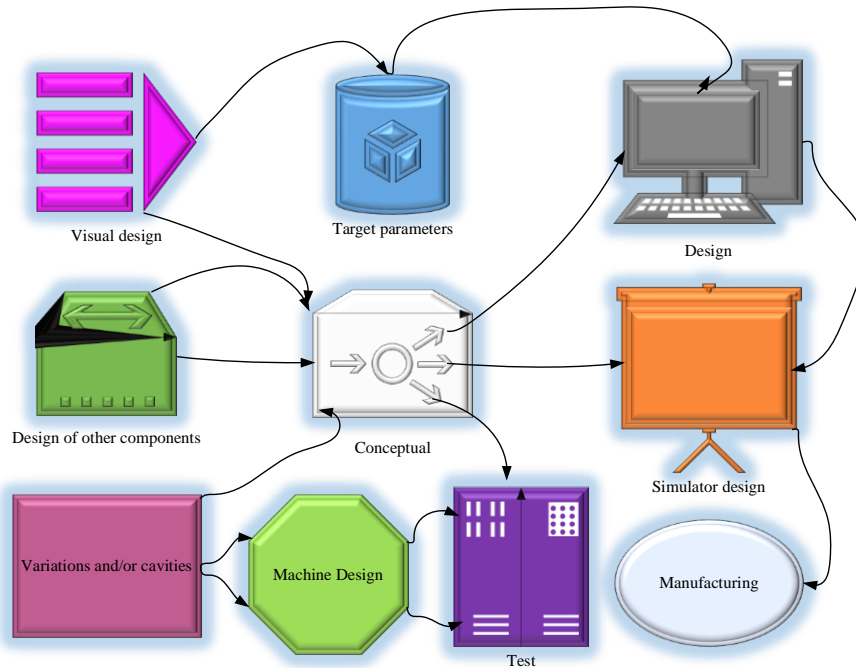


Figure 1: Computer-aided interaction design architecture.

The computer-aided design approach focuses on the use of graphic design software to create a graphic plan during the design conceptualization stage. There are many types of graphic design software, but different graphic design software has their advantages, which provides a variety of options to produce floor plans. In the conceptualization stage, the focus is on the planner's design concepts and ideas, and graphic design software can maximize the ability to help the planner transform abstract design ideas into concrete plans. The graphic design software has accurate data manipulation tools, color adjustment library, text editing, and processing functions, image processing functions, interface layout functions, digital hand-painting functions, etc. These functions make the drawing of the floor plan more convenient, especially in terms of data accuracy and color adjustment, making the floor plan more identifiable, clearer color hierarchy, and more reasonable interface layout, thus improving. The aesthetics and ornamental qualities of the floor plan can better help the audience to identify and understand the design.

3.2 Analysis of Visual Communication Technology and Art in New Media Scenes

According to the steps in the project planning, the author found in the process of conceptualizing the experimental program that with the continuous improvement of hardware conditions to assist visual art creation experiments, the visual art expression form has gradually transformed from

manual drawing to computer production. However, the current visual art creation contains infinite creative themes and expression styles, and it is not easy to inspire or extract style elements alone, thus leading to a single means of expression and lagging creation efficiency of visual art creation. Therefore, to adapt to the requirements of modern industrial production, it is necessary to find methods that can assist art creators to complete their design production more consistently and efficiently [10]. This allows art creators to focus more on artistic innovation and deeper development of creative ability, to improve the design level and design efficiency, and to present high-quality visual artworks.

Deep learning-based automatic coloring uses deep neural networks to automatically give line art images reasonable color and even light and shadow effects, without human intervention or hinting at the coloring results during the process. Specified coloring methods, on the other hand, require a human to click on a certain area of the image and fill the selected area with color and attach light and dark relationships. The coloring of line images done by this method is faster than manual coloring, and the quality of the output coloring images is more stable. At the same time, I found that there are already some programs that can automatically color or even specify the coloring of a line drawing. For example, Paints Hainer is a program that uses deep learning algorithms to achieve the automatic coloring of anime-style line drawings.

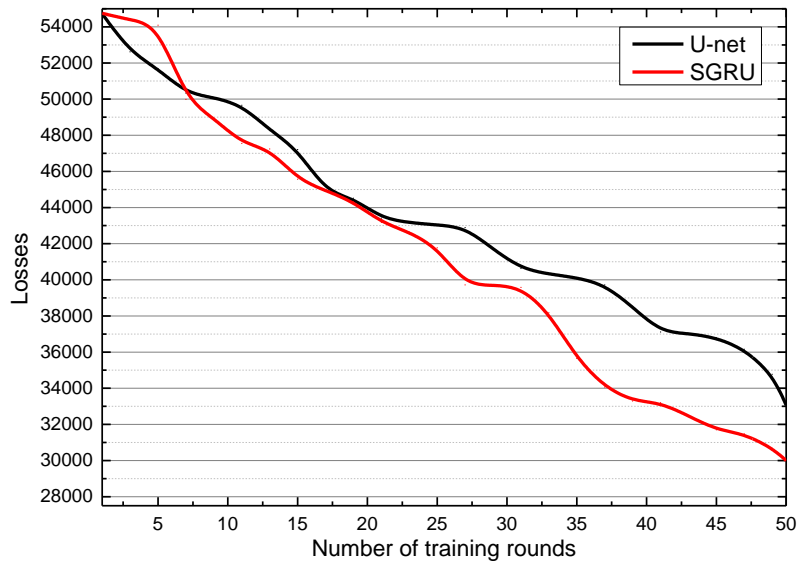


Figure 2: Pixel loss curve.

Based on the requirements of the author's art major, the visual effect of the colored image and the in-depth discussion of the feasibility contained the computer science major in the team. To verify the performance of the proposed coloring method, it is necessary to compare the coloring image output from SGRU with those from the same type of coloring program. Therefore, the dataset selected for training the SGRU network model needs to be consistent with the coloring images output by the same type of coloring program to visually compare the difference between the coloring images and the coloring images of existing programs. The team finally selected the public character illustration dataset through preliminary research and analysis of many public datasets and selected 18,560-character illustration line drawings and corresponding colored character illustrations from the dataset for training the network model. The pixel loss during the experiment is shown in Figure 2, which shows that the SGRU network model converges faster than

the U-net network model as the number of training rounds increases, and the pixel loss of the output image is relatively less.

The specific loss of the two network models, U-net and SGRU, as shown in Figure 3. As the data in the figure shows, the training loss of the two network models is relatively similar at the first training round, but when the number of training rounds reaches 50, the loss difference between the SGRU network model and the former reaches 3134.683. Thus, as the number of training rounds increases, SGRU can achieve lower image loss than U-net, and the network performance of SGRU is significantly better than U-net. The network performance of SGRU is significantly better than that of U-net.

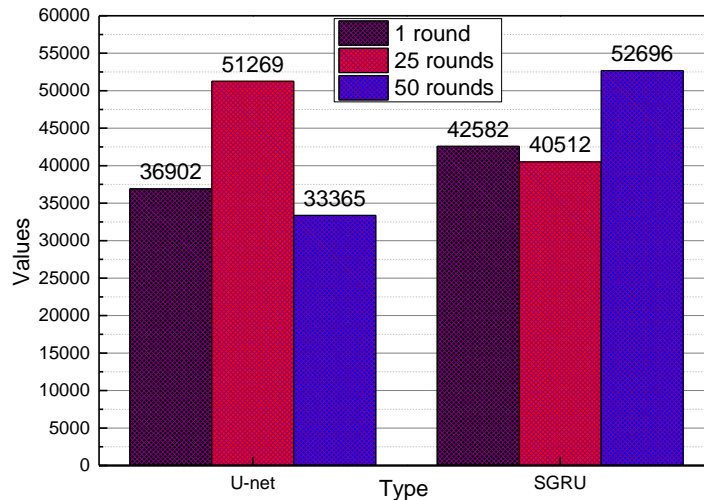


Figure 3: Comparison of training loss.

To verify the visual effect of the proposed coloring method, the author discussed with the team and proposed to conduct another. The same character illustration sketch is input into the SGRU network model and the same type of sketch coloring programs Paintschainer and Style2paints, and the images of coloring effects of the sketch and several different programs including the SGRU network model are compared. It is hoped that through compiling, comparing, and analyzing the coloring images outputted by different programs, the author can focus more on the degree of realism, image quality, and visual effect of the automatic coloring effect of different programs, and promote the results of the deep learning algorithm-based coloring method for illustration. At the same time, we hope that the process and the results of this experiment can be used as a reference for more active cooperation between art and computer disciplines in the future.

4 ANALYSIS OF RESULTS

4.1 Computer-Aided Interactive Performance Results

The floor plan is an important way to express the design plan in front of the audience after it is completed, and it is also a means to highlight the characteristics of the planner's design ideas and design concepts. The first part is to use CAD software to process the residential planning and design plan and then output it as the base picture, which is mainly in the form of wireframe sketch; the second part is to use graphic design software such as Photoshop, Illustrator, CorelDRAW, Painter to synthesize the CAD plan. The second part is to use graphic design software such as Photoshop, Illustrator, CorelDRAW, Painter to fill the CAD floor plan with buildings, roads,

vegetation, etc. using different colors in layers and synthesize the required auxiliary text, decoration, frames, etc., to get the final floor plan with color information.

Computer-aided design techniques and methods are used to draw analysis drawings. Due to the accuracy of computer-aided design techniques, the dimensions and proportions of the drawings are very precise, and the drawing process automatically generates auxiliary lines, reference diagrams, tables, and other data, and after the drawing is completed, accurate and complete chart data are automatically generated, which is convenient and fast. The use of computer-aided design techniques and methods to draw analysis drawings is the same as the graphic effects, first using CAD software to trim the plan, add the required analysis elements, and output as a plan analysis with transparent channels. Then, the picture is imported into the graphic design software, and the required analysis elements are beautified by layering, coloring, and labeling, and then the final complete analysis drawing is output. The different colors and markings can clearly understand the structural relationship and overall appearance of the whole residential area, as shown in Figure 4.

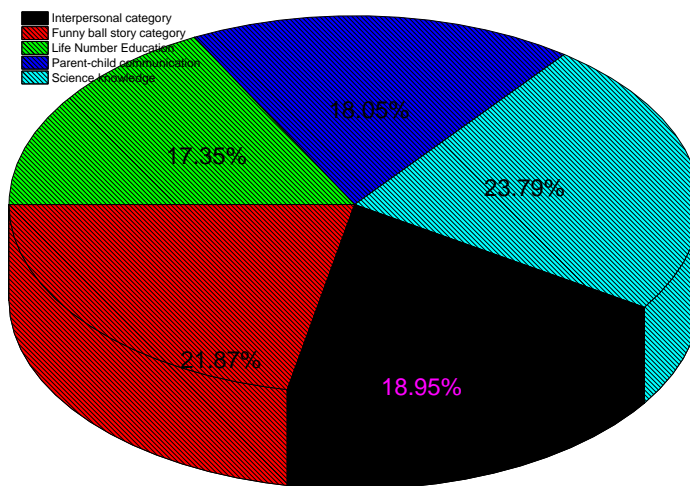


Figure 4: Digital picture book type favorites.

Learning value is the most important to readers, accounting for 21.87%; followed by an aesthetic value, accounting for 23.79%; collection value and use value account for a slightly lower proportion, 18.05%, and 17.35% respectively; the least is entertainment value, accounting for 18.05%. The three-dimensional roaming animation is to present the three-dimensional static space in a motion way, which enables the audience to observe each location of the living area from the first perspective. This way of expression not only brings the audience the maximum visual experience but also enables the planner to link the concept and intention of the residential planning and design plan with the computer-aided design technology and method, to better convey to the audience. The 3D roaming animation of the residential area is based on the 3D modeling of the residential area, setting multiple cameras in its static 3D space, and setting the cameras to make them roam along the designed route. The design of the wandering route generally takes the road system of the residential area as a reference, and then records the keyframes of the camera movement, so that the production of the residential area 3D roaming animation can be completed, as shown in Figure 5.

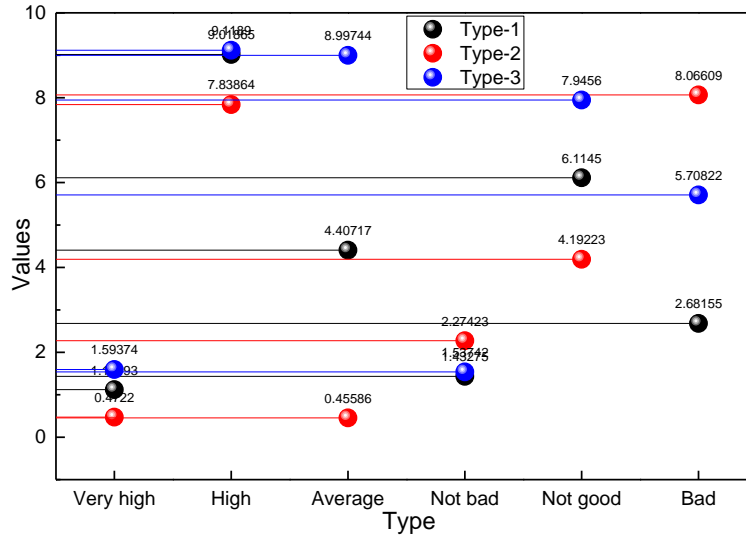


Figure 5: Digital picture book interaction design.

In addition, taking advantage of the audience's curiosity has also become a common method of film and television advertising. The sudden appearance of a peculiar and conspicuous graphic symbol in an ordinary picture can attract the viewer's attention for a short period and make them gather their eyes in a specific directional indicator, while also improving the organization and logic of the picture, thus highlighting the ultimate vision. Therefore, in the production process, you can let an object suddenly appear in the film and television advertising screen, towards a certain dynamic trajectory or other composition factors combined into a common aggregation method to trigger visual perception.

4.2 Analysis Results of Visual Communication Technology and Art in New Media Scenes

Layout design is an important part of digital picture book design, a good layout design can bring readers a better reading experience. Layout can be divided into horizontal and vertical, the author chose the horizontal version of the main full-screen layout, in the animal science interface design vertical layout. The whole layout style is harmonious and unified. Figure 6 shows the low-fidelity wireframe diagram designed by the author, from which the layout design of each level of the digital picture book is shown respectively.

Digital technology has highlighted the unparalleled potential in solving social problems. Scientists can use digital intelligence systems to predict changes in the environment in real-time. Cornell University uses digital intelligence to predict changes in animal habitats, which can be used for the targeted conservation of animals. It also shows that the proposed SGRU network model is significantly better than other coloring methods in the coloring of relatively complex human line drawings. The output image colored by the SGRU network model has a higher picture finish, better quality, and the coloring effect is closer to the level of professional art creators, as shown in Figure 7.

To further explore and enrich the auxiliary functions of artificial intelligence technology for visual art creation, the author proposes to further develop the versatility of the SGRU network model for line coloring, based on the ability of the SGRU network model to perform line coloring work stably. As a result, the author discussed with his team and finally came up with a method that allows nine different coloring schemes for the same line.

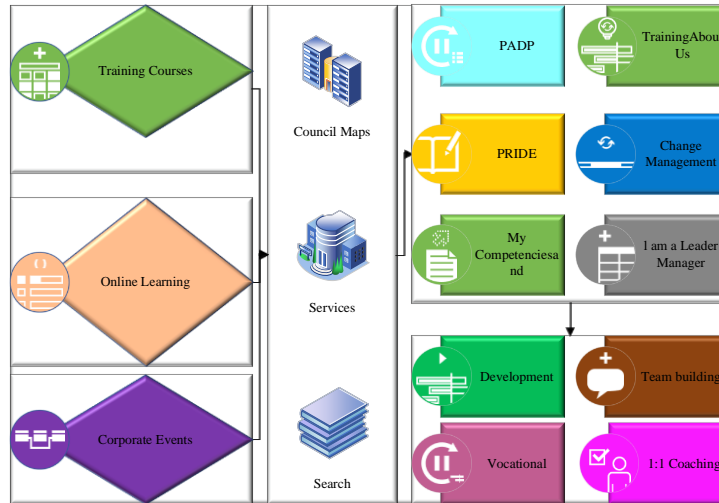


Figure 6: Wireframe diagram.

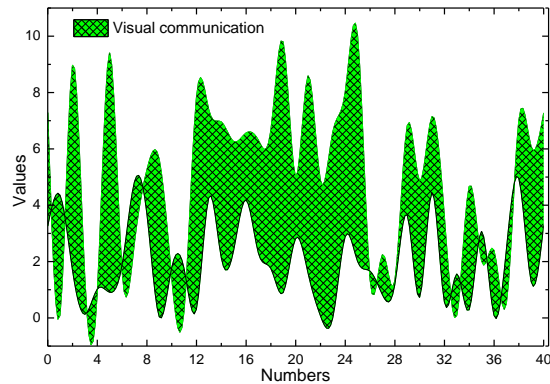


Figure 7: Visual communication results.

The method provides a quick output of nine different color schemes while maintaining the quality of the colored image, noting the effect of the environment on the color rendering of the character's eyes, hair, clothes, and so on. It is hoped that it will give the creator a reference choice in terms of overall color style in the creation of visual art, and greatly enrich the creator's inspiration in terms of color matching.

After the coloring method assists the art creator to complete the initial coloring work of the line drawing, the visual art creator then modifies, adjusts, and creatively controls the overall picture. Through such an intelligent human-computer collaboration creation mode, it can eventually achieve the purpose of greatly improving the creation efficiency, shortening the creation cycle, reducing the creation cost, and improving the creation quality. If we can further overcome the program's automatic understanding of simplified abstract forms of expression in the case of infinite creative themes and painting styles, or if it is possible for art creators to participate in and guide the program in coloring, thus realizing high-quality deep learning-assisted coloring work, then it will also play a huge role in promoting the whole field of visual art creation.

5 CONCLUSION

The effective fit between graphic design and film and television advertising through the communication channels of computer-aided technology is the focus of this paper. The current style and form of graphic design have changed the arrangement and combination of visual symbols, allowing film and TV commercials to ensure more effective aesthetic attention and influence in visual communication. When audiences view advertisements, they not only focus on the information of the product but also become a kind of enjoyment about beauty. With the help of more oriented graphics and text, visual representations are formed in the design of film and TV commercials, forming their unique advertising style. Firstly, we talk about the specific role in terms of creative methods, citing three representatives of the field of digital media creation: visual expression-based, auditory expression-based, and audio-visual fusion-based digital media art practice creation, and comparing and analyzing relevant cases. Four aspects are described: the field of digital technology, the field of artistic practice, the field of the digital industry, and the field of digital education.

Ruoyao Wang, <https://orcid.org/0000-0002-1560-9738>

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