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Application of Generative Artificial Intelligence in Film Image Production

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Abstract. Generative Artificial Intelligence (AIGC) is a key subset of artificial intelligence that exhibits extraordinary data generation and creation capabilities in multiple fields, such as images, audio, and text. This article aims to explore the application of AIGC in the field of film production, with a particular emphasis on the role of Deep Convolutional Generative Adversarial Networks (DCGANs), and introduces an intuitive teaching method. By implementing DCGAN technology, this study achieved various functions, including generating virtual characters, scenes, style conversion, dynamic image restoration, and enhancement, thereby enhancing the film production process. The visual teaching system promotes rapid mastery of these cutting-edge technologies through intuitive interfaces and interactive operations. Our research shows that DCGAN exhibits extraordinary accuracy and efficiency in producing movie-quality images. In addition, user feedback confirms the excellence and superiority of our visual learning platform. This survey highlights the enormous potential of AIGC in film visual production while also promoting the dissemination and enhancement of related technologies through visual-based learning. This groundbreaking integration of technology and education will cultivate a new generation of innovative filmmakers.

Keywords: Generative AI Film Image Production; Computer-Aided Design; Visual Teaching
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1 INTRODUCTION

The advancement of artificial intelligence has pushed AIGC to the forefront of technological innovation. AIGC is a branch of artificial intelligence that excels in data creation and generation in various fields, including vision, sound, and text. Today, with the gradual development of the domestic animated film industry, more and more people are fond of animated films. In this context, research on the visual symbols of animated movie posters and audience cognition is beneficial for the development of the film industry, as well as for the development of the domestic animation industry. Plays a significant role in the commercial value of the film industry. Therefore, Bender [1] studied the

influence of audience cognition on the visual symbols of animated movie posters and the application of visual symbols in animated movie posters. So as to better promote the good development of the film industry and bring more economic value. Firstly, analyze the development and aesthetic development of animated movie posters both domestically and internationally, as well as the factors that influence the design of animated movie posters. Secondly, analyze from the perspective of cognitive psychology. The application of semiotics in animated movie posters, combined with cognitive psychology, elaborates on the role played in movie poster design. Finally, explore the future development direction of animated movie posters, explore the cognitive psychology and cultural heritage behind movie posters, and express deeper poster connotations. The combination of it and film production not only expands the creative path but also greatly improves the workflow of producers. Brako and Mensah [2] introduced the design of animated movie posters and the visual symbols in the posters. They analyzed the impact of text, graphics, and colours on the audience in the posters, as well as their understanding and development of animated movie posters. By using a large number of case comparisons, data research, and investigation analysis, each poster will be disassembled and analyzed one by one to identify popular animated movies, and the poster design will be analyzed, sorted out and logically arranged. Identify the differences between Chinese animated movie posters and foreign animated movie posters, and analyze the design of some animated movie posters that do not conform to the audience's aesthetic and cognitive needs. Propose to explore the innovative points and practical application value of these posters, and ultimately provide a strong basis for one's own creation. By studying from the perspectives of cognitive psychology and conformity studies, we can combine the visual symbols of animated movie posters with audience cognition. Only by combining the two can the meaning of movie posters be fully realized. Without an audience, the meaning of movie posters is lost. Use movie posters to realize the value of movies, and ultimately design animated movie posters that are widely recognized and loved by the public.

The visual presentation of movie posters is divided into linguistic information and visual information. Firstly, there is the language message, and its font selection is improved on traditional Chinese calligraphy. Choose different fonts for different types of information on the same poster, but the font for the movie name always remains consistent. In terms of text design, emphasis is placed on the design of the movie title, and the text is designed based on the movie content, with language messages complementing each other in content. In terms of text layout, the movie title is always the visual focus, and the font size is positively correlated with the importance of information. The text information layout of the entire poster is consistent in density. Next is image information. There are various types of image elements in posters, but character elements are the most important, and landscape architectural elements serve as narrative backgrounds. The extension image layer of movie posters is mainly composed of line and surface structures, frequently using cool and warm colour schemes to express strong emotions, and the composition is based on character image elements. The connotation image layer of movie posters often uses artificial symbolic narratives, combined with visual rhetoric of description and borrowing, to convey positive values [3]. Caramiaux and Fdili [4] have enriched the case and sample of visual communication research on movie posters. It provides guidance and inspiration for research on movie posters and visual communication in terms of research ideas and perspectives. In research related to visual communication, advertisements, images, magazine covers, etc. are often used as research samples, and the number of movie posters used as research samples is relatively small. It enriches the research sample of visual communication and reduces the limitations of a single research sample. The research perspective on movie posters mostly focuses on disciplines such as art and linguistics, lacking academic research in the field of communication studies. Therefore, shifting the research perspective on movie posters to visual communication can increase the research on movie posters from the perspective of communication disciplines, and inspire interdisciplinary and interdisciplinary research on movie posters. In the context of visual culture, movies and television, as traditional visual expression methods, are constantly developing in the dissemination of urban culture. At the same time, micro videos and micro movies have become part of the visual cultural context due to their originality, low entry barriers, fragmented dissemination, and postmodern content. Carpio and Birt [5] explored new entry

points for the construction and dissemination of urban culture through new media. The research on how to use new media, especially "micro" media, to enhance the dissemination and identification of urban culture is still in a relatively weak state.

Compared to ordinary flat posters, the visual symbols in movie posters bear a more important task of communication. Secondly, the connotation is more accurate. This is the only way to achieve the promotional effect of movie posters. Huang et al. [6] analyzed the language encoding of visual symbol language in movie poster design. The design of posters cannot be separated from the appreciation of the public, and without the audience, it loses its meaning. Quickly conveying information can make the audience resonate with the movie before watching it, arouse their curiosity, and drive them to watch the movie. Applying audience cognition to animated movie posters to improve the design quality of the entire movie poster. And provide a theoretical basis for the entire animation and film industry, promote the promotion and development of animation films, and generate higher box office. It maximizes and effectively conveys the function of movie posters. Kumar and Singh [7] talked about how to make an animated movie poster design impactful and expressive from a visual communication perspective. Making an animated movie poster not only has promotional purposes but also aesthetic value. Posting posters is the most intuitive way of promotion. Therefore, studying the visual symbols of animated movie posters and audience cognition, combining the two to attract audiences to watch movies, and improving box office revenue has great practical significance. Attempt to analyze visual symbol language information and interpret the basic characteristics of symbols in conveying movie information. It selects famous animated movie poster design works both domestically and internationally to demonstrate the functional significance of visual symbol language in movie poster design. Summarize the application rules of visual symbol language, providing more theoretical references and design ideas for future movie poster design. The discipline of design psychology is also very popular, and combining audience cognition with poster design is also a rare research field in design disciplines, which can provide a foundation for subsequent theories. DCGAN is a branch of AIGC Technology, known for its outstanding ability in image synthesis and has aroused great interest among people. As an important advancement in GAN technology, DCGAN enhances image generation by integrating DCNN. This study focuses on the deployment of DCGANs in movie images, with the aim of evaluating their ability to generate highly realistic virtual character portraits, emotions, and actions, thereby promoting personalized character creation and prototype development.

In the field of audiovisual art, the construction of movie characters is crucial. Unforgettable characters may resonate with the audience and become symbols of their respective films. However, traditional character creation processes are time-consuming, costly, and limited in terms of innovation and the scope of character image. As mentioned above, the main purpose of this experiment is to evaluate whether artificial intelligence can find a pattern that can be compared to old movie corpora. This section mainly emphasizes the possibilities that artificial intelligence brings to film historians. The current stage of the experiment cannot showcase all the libraries we have created, nor can it provide detailed analysis, but these works will definitely be implemented in subsequent projects. We will briefly introduce the research on constructing class libraries around crowd images and demonstrate how the introduction of artificial intelligence differs from previous research methods. This article will also suggest new research directions, inspired by hand close-up and image retrieval of clothing. In our experiment, images containing crowds were the most abundant.

The contributions of this paper can be summarized as follows:

(1) The study analyzed the application of digital character modelling in virtual character movies based on the DCGAN framework. By analyzing the emotional and facial movements of different characters, a realistic virtual character application framework was constructed.

(2) We have introduced a rigorous process for assembling large datasets to ensure a wide range of training materials. In addition, we have developed a carefully designed model training technique. This includes the strategic selection of loss functions and the deployment of optimization algorithms to improve the training efficiency and quality of the output of the DCGAN framework.

(3) The empirical exploration conducted in this study reveals the enormous potential and emerging trends of AIGC in film image production. In addition to focusing solely on today's technological applications, this book also looks forward to the infinite opportunities of AIGC in the film industry. It provides a forward-looking perspective for filmmakers and professionals.

In order to achieve our goals, our research first elucidates the basic principles and key technologies of embedding in GAN and DCGAN. This lays a solid theoretical foundation for the application of DCGAN in image creation. Afterwards, we comprehensively introduced our method, including dataset assembly, model construction, and training, ultimately generating virtual character characters. Throughout the process, we emphasized the management of datasets, the design of model structures, and the development of training methods. This ensures the creation of virtual character characters with excellent image quality. In our practical exploration, we presented examples of virtual characters created by DCGAN, evaluating their authenticity and diversity from a visual perspective. In summary, we have summarized the main findings of this study and predicted emerging models for using AIGC to produce movie images.

2 RELATED WORK

Liu et al. [8] analyzed generative adversarial networks for image and video synthesis. From the perspective of research samples, there are relatively few articles in visual communication research that use movie posters as research samples. The research samples are mostly concentrated on advertisements, photographic works, and magazine covers. From a research perspective, when studying movie posters, research is often conducted from the perspectives of linguistics, art studies, and other disciplines. There is no relevant research literature from the perspective of visual communication. Therefore, the research perspective of this paper is novel and innovative, filling the academic gap. Lu et al. [9] regard the dissemination and expression of urban culture through microfilms as an important form of cultural production. In the current development of visual culture, the concepts of microfilms and urban culture, as well as the relationship between their inheritance and innovation, have been defined. Secondly, the expression and dissemination of urban culture through microfilms were analyzed from the perspective of spatial imagery, narrative, and conceptual perspectives, from the surface to the inside. It studied the unique selection and expression methods of urban imagery in microfilm works, as well as the floating problem of imagery signifiers caused by the shallow expression of microfilms. At the narrative level, the main focus was on studying the differences between microfilms and traditional visual expression methods. At the conceptual level, it is mainly to extract the expression of the cultural theme of the city by the network subject after extracting the specific regional culture. Finally, the paper mainly focuses on the issues of "floating signifiers", "patterning of themes", and "two-level differentiation" in the urban cultural writing of microfilms.

The movie poster uses the movie name as the brand symbol for the movie. Because it is the most important textual symbol in movie posters. When typesetting the textual information of movie posters, the first consideration is also the movie name, which is the focus of all textual information. This is the textual information that the audience pays the first and most attention to. As the visual focus of the entire movie poster, the movie title needs to carry the most information, the most eye-catching artistic design, and the most concise and lively reading experience to achieve maximum visual communication effect. In order to achieve this design goal, movie posters will use a different typesetting technique for the movie title than other textual information. It can enhance the visual impact of movie titles, and cater to the audience's visual aesthetics and information acquisition needs [10]. As a cultural and artistic form, movies also carry the function of spreading cultural awareness. It has ideological significance, which means that the semantic expression of visual language not only conveys the visual meaning of the work itself but also carries cultural significance beyond the image. After analyzing urban imagery and themes, narratives, and audio-visual expressions, cultural stories belonging to the "city" are extracted by downplaying specific concepts of city names. Park et al.'s [11] study on the deeper summary media of cities in terms of cultural construction and meaning expression is the focus of the following analysis.

In the context of visual culture, movies, and television are traditional means of visual expression. While spreading urban culture, micro videos and micro movies also become visual culture through the originality of the subject. Paulin and Ivasic [12] explored new entry points for the construction and dissemination of urban culture through new media. Specifically, there are currently two main gaps in research on the relationship between the two. On the one hand, research focuses more on the media culture and development trends of new media ontology, and there is relatively less research on new media from the perspective of cities. On the other hand, discussions on the relationship between microfilms and cities mostly focus on macro-level urban marketing, image dissemination, etc., lacking micro-level research. Research on how to use new media, especially "micro" media, to enhance the dissemination and identification of urban culture is still relatively weak. Pavan and Jayagopal [13] consider the dissemination and expression of urban culture through movies as an important form of cultural production. Firstly, in the current development of visual culture, the concepts of film and urban culture, as well as the relationship between their inheritance and innovation, have been defined. Secondly, the expression and dissemination of urban culture in films were analyzed from the perspective of spatial imagery, narrative, and conceptual perspectives, from the surface to the inside. At the level of spatial imagery, it studies the unique selection and expression methods of urban imagery in film works, as well as the floating problem of imagery signifiers caused by the shallow expression of microfilms. At the narrative level, it mainly studies the differences between movies and traditional visual expression methods.

In the context of new media technology, the originality of network entities, low entry barriers, fragmented dissemination, and postmodern content. Make it different from traditional visual expression methods for the same subject - City One. And it is precisely the existence of such differences that provides an understanding of a different perspective on cities. Through a review of current research, it can be found that there is still a gap in the research on the construction and dissemination relationship between online movies and urban culture [14]. Porkodi et al. [15] use the visual presentation of movies to collage the material and non-material images of cities in their concepts and thus form a preliminary understanding of cities. However, this is only based on the basic visual perception of urban customs and traditions. This basic technique of displaying images inevitably tends to deviate from the theme in the process of application, manifested as the floating of the signifier. In some film works, the selection of artificial intelligence imagery is not closely related to urban themes and only uses a universal story template. The theme is only constructed through the transformation of urban imagery, without delving into the urban culture and characteristics that permeate the urban geographical landscape and transforming them into the theme of short films.

In addition, compared to traditional media, the biggest advantage of relying on new media for communication lies in the immediacy of feedback and interaction. The use of deep learning techniques in videos by Saini et al. [16] also reflects the interactivity of new media creation to some extent. In addition, the dissemination of micro movies mainly relies on video websites or social media platforms in the new media environment. Below the screening window of video websites, a comment section will be set up for netizens to post comments in real time. The instant comment and forwarding functions of Weibo also meet the real-time expression of audience opinions. For example, on the website of Qiyi's City Image series microfilms, netizens can comment on various cities by clicking the "Let me say two sentences" button. Utilizing the interactivity of content comments to influence the plot creation of a series of microfilms is also another way to achieve interactivity.

3 THEORETICAL BASIS

3.1 GAN

GAN represents a groundbreaking leap in deep learning technology in recent years. In its core part, GAN operates based on an adversarial training model, which confronts the generator and discriminator to generate highly trusted data instances. The goal of the generator is to create novel data instances from arbitrary noise, while the discriminator strives to distinguish between real data and the invention of the generator. Throughout the entire training phase, both parts are engaged in

a continuous struggle to improve their respective abilities. In the end, the generator gained the ability to replicate the statistical features of real data and subsequently generated new instances that were very similar to real data.

The generator strives to mimic real data allocation to create new samples, while the discriminator takes on the responsibility of identifying differences between actual and artificial samples. GANs are known for their extraordinary generative ability, which can approximate any given true data distribution, making them highly adaptable. Compared to other models, GAN output is renowned for its enhanced realism. After countless iterations of optimization between these components, the generator became proficient in simulating the distribution of training data, effectively deceiving the discriminator into mistaking the generated data for real. Figure 1 shows the structure of GAN.

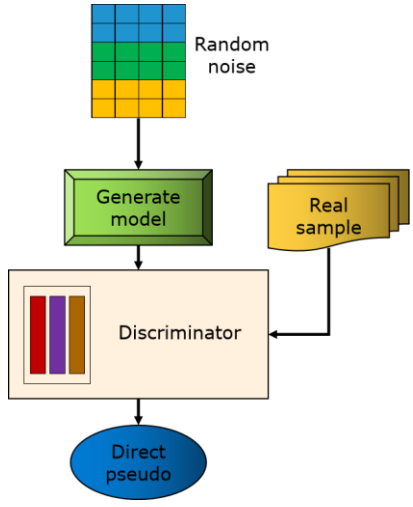

Figure 1: GAN structure.

Throughout the training period, the generator and discriminator participate in competitive, iterative, and dynamic educational programs similar to competitive sports. Reaching Nash equilibrium (a state where a discriminator can no longer distinguish between real and synthetic samples) means that all participants have achieved the best result:

$$\min_G \max_D \; D,G \; = E_{x \sim p_{data}} \; x \; \left[\; \log D \; \; x \; \right] + E_{z \sim p_g} \; z \; \left[\; \log \; 1 - D \; \; G \; \; z \; \right] \tag{1}$$

In the setting where the distribution of real samples x matches $p_{data} \; x$, the input noise distribution z corresponds to $p_g \; z$ (usually Gaussian noise). G represents the generator, while D represents the discriminator. To optimize D , maximizing $D \; x$ and minimizing $D \; D \; z$ are crucial.

Although GAN has made significant progress in generative modelling and provided valuable insights into other technologies, it is not flawless. While solving the current problem, GAN has also introduced new obstacles. When the generator and discriminator reach Nash equilibrium in competition, the generator gains the ability to generate very real samples, making it impossible for the discriminator to distinguish between artificial and real samples. This is because GAN strives to minimize the objective function rather than just seeking simple minimization solutions.

The adversarial training method of GAN endows it with an extraordinary ability to generate data, achieving significant results in multiple fields including images, audio, and text. More specifically, GAN can create high-definition and diverse image samples in the field of image generation, providing

unique tools for innovative industries such as art creation, promotional activities, and game development.

3.2 DCGAN

Although GAN has strong generative capabilities in principle, its actual implementation is often affected by instability during training, which may lead to issues such as pattern collapse. The hybrid model known as DCGAN is a fusion of GAN and DCNN, which enhances the generation ability of GAN by utilizing the inherent powerful feature extraction ability of CNN. In the DCGAN paradigm, both creators and evaluators are designed using DCNN, enabling the model to proficiently capture complex local details and a wide range of global factors in image datasets.

The virtual characters created by DCGAN showcase stunning realism and artistic expression. Directors and designers only need to rely on their own creative ideas to quickly generate characters through DCGAN technology, greatly improving creative efficiency and flexibility. By adjusting the parameters of the model and combining it with other advanced technologies, the authenticity, diversity, and controllability of generated characters can be further improved to meet the needs of different characters in film production. More importantly, this method breaks the constraints of traditional production techniques and brings broader creative space for film character creation. As far as searching for the audience is concerned, the purpose of the experiment is not to analyze the role of the audience in the narrative of a certain movie. It is not about exploring whether and how a pre-built film group shares common skills when depicting a crowd. Style, goals, etc. Introducing Al in research like ours. You can discover similarities and differences in movies without the need for hundreds of hours of watching or laborious labelling. Because in practice, only a limited number of films can be annotated. Therefore, artificial intelligence can retrieve similar images in vastly different movies. All these images reflect how the audience's attention is directed towards a specific point by the images of the crowd.

4 THE APPLICATION OF AIGC IN MOVIE VISUAL EFFECTS GENERATION

As a cutting-edge generative artificial intelligence technology, DCGAN has obvious advantages in virtual character generation, scene creation, and style transfer, which is of great significance for improving students' creative ability and technical level. In the implementation phase, apply DCGAN technology to the practical teaching of film image production. By organizing students to practice, observe and record their learning process and achievements, teaching effectiveness can be evaluated. During the teaching process, actively collect feedback from students and adjust and optimize teaching content and methods based on actual situations. The introduction of generative artificial intelligence technology, especially DCGAN, can bring new vitality to the teaching of film image production. This teaching method not only enhances students' learning interest and hands-on ability but also cultivates their innovative consciousness and teamwork spirit.

Due to its carefully crafted network architecture, DCGAN excels in producing detailed and realistic images. Figure 2 shows the CNN-based network design of the frequency discriminator.

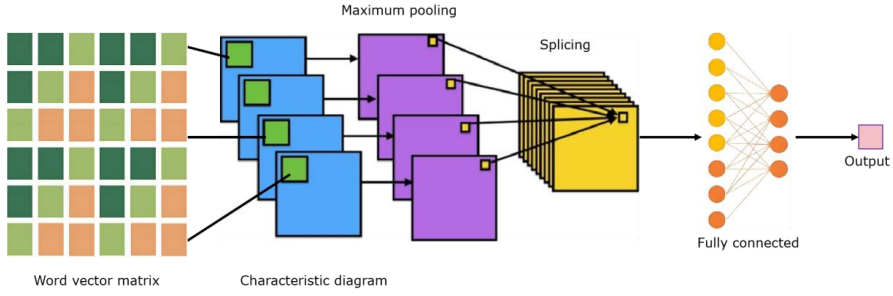

Figure 2: Frequency discriminator network.

CNN typically uses convolution kernels of different sizes to extract features, assigning several kernels to each size. After convolution, the generated feature map undergoes a process of compressing its dimensions by maximizing the time series aspect. These compressed features are then gathered and integrated into a more complex network for further examination. As described in this article, the generator's improvement relies on such network settings.

Our assumption is that the design of the discriminator network starts with a word embedding layer, followed by a convolutional layer, a fully connected layer, and finally, an output layer that uses the sigmoid function to calculate the likelihood of sample trustworthiness. The formula for the sigmoid function is as follows:

$$sigmoid\ \ z\ = \frac{1}{1+e^{-z}} \tag{2}$$

Therefore, the discriminator network architecture discussed earlier can be summarized as follows:

$$D_{\varphi}\ \ s\ = sigmoid\ \ \varphi_l^T F_{\varphi_f}\ \ s\ \ = sigmoid\ \ \varphi_l^T f \tag{3}$$

Represent the entire discriminator network as $D\cdot$, the parameters within the network as φ , the final layer parameters of the discriminator as φ_1 , and all non-final layer parameters as φ_f . The network $F\cdot$ serves as a feature extractor, as all layers before the output layer can be considered feature abstraction layers.

The results generated by the feature detection network can be symbolized as AA, and the entire process can be described as follows:

$$f = F_{\varphi_f}\ \ s \tag{4}$$

The output layer of the discriminator can receive f , which is an advanced text feature that can also serve as a reinforcement learning signal to guide the generator network.

The authenticity discriminator network evaluates images originating from the target or source domain. Specifically, the goal of an authenticity discriminator is to ensure that the generator network generates convincing images, which I^i represent the source image and $\hat{I}^i$ represents the image produced by the generator. In this case, the discriminator uses the loss function L_D^R to determine the likelihood that the image is true:

$$\begin{aligned} L_D^R\ \ I\ &= -t\cdot\log\left[D_R\ \ I\ \right] +\ \ t-1\ \cdot\log\left[1-D_R\ \ I\ \right] \\ s\cdot t\cdot\ \ \ \ t &= \begin{cases} 1 & if\ I\in\ \ I^i \\ 0 & if\ I\in\ \ \hat{I}^i \end{cases} \end{aligned} \tag{5}$$

The inclusion of this additional loss function is used to adjust the quality of the target image being generated, ensuring its compatibility with a specific network called a domain discriminator. This discriminator occupies a crucial position in the converter network. Its function is to evaluate the source image and target image and generate a scalar probability indicating the relationship between the two through the training process. This loss function helps to fine-tune the output of the generator to match the domain discriminator's evaluation of the target image quality, which is crucial for maintaining the consistency and reliability of the generated visual content.

After the above processing, the two character action sequences are converted into distance signal sequences, designated as $I_1\ t\ , I_2\ t\ \ .$ When establishing the feature space $\left[\ell_1,\cdots,\ell_k\right]$, the trajectories $P_1\ t\ , P_2\ t\ \ \ $ of these sequences within that feature space are depicted in the following manner:

$$P_1\ t\ = \left[\ell_1,\cdots,\ell_k\right]^T I_1\ t$$
$$P_2\ t\ = \left[\ell_1,\cdots,\ell_k\right]^T I_2\ t \tag{6}$$

Afterwards, the similarity between them can be expressed as follows:

$$d^2 - \min_{ab}\sum_{i=1}^{T}\left\|P_1\ t\ - P_2^{'}\ at+b\right\|^2 \tag{7}$$

Let $P_2^{'}\ at+b$ represent the dynamic normalized vector path, which adapts to time scaling and offset adjustment. Here, a,b represents the parameter that is affected by changes in velocity and phase differences between different sequences. The comprehensive generator process is shown in Figure 3.

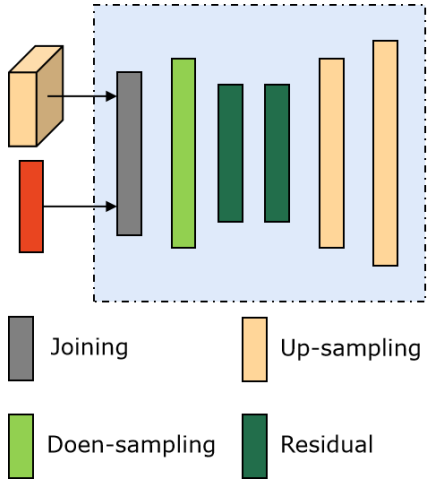

Figure 3: Schematic diagram of generator operation process.

We focus on generating virtual characters, starting with widely used triangular mesh models. When depth images and their corresponding texture images are provided, our method converts the depth images into triangular mesh representations. In order to adapt to various data structures between different objects, this article uses ellipsoidal region deformation to highlight features. By identifying the boundaries, the radius a,b,c and centre $O=\ x_0,y_0,z_0$ of a three-dimensional ellipsoid can be calculated, allowing for parameterization within this region using the following formula:

$$\begin{aligned} x &= x_0 + a\cos\theta\sin\phi \\ y &= y_0 + b\sin\theta\sin\phi \\ z &= z_0 + c\cos\phi \end{aligned} \tag{8}$$

Once the boundary is accurately delineated, the deformation coefficient ω of the specified area can be determined by comparing the results with the standard deviation of the average virtual character position. Subsequently, the new vertex position can be calculated by applying the formula provided below to each key vertex included in the specified area:

$$v^{'} = o + \gamma\omega\lambda\ r\quad v-o \tag{9}$$

In this setting, v represents the starting vertex position, and $v^{'}$ represents the position after deformation occurs. γ represents the radius of the region, while γ is used as an adjustable scaling factor determined by user input.

When creating virtual characters for movies, DCGAN has demonstrated that training on datasets rich in different facial features can generate faces with different features, skin tones, and expressions. By combining specific conditional data, such as action units or time series, DCGAN can generate virtual character images that display specific expressions or movements. By utilizing the generation capability of DCGAN, we can achieve seamless integration and transition between different character styles, resulting in innovative and imaginative character characterization.

5 EXPERIMENTAL RESULTS AND ANALYSIS

5.1 Generating Results

This study first presented a set of movie images generated by the DCGAN model (as shown in Figure 4). This selection includes different character faces, expressions, and actions, as well as a range of scene styles. The evaluation of these results intuitively reveals a significant degree of realism and artistic talent, confirming the potential of DCGAN in the field of film image generation.

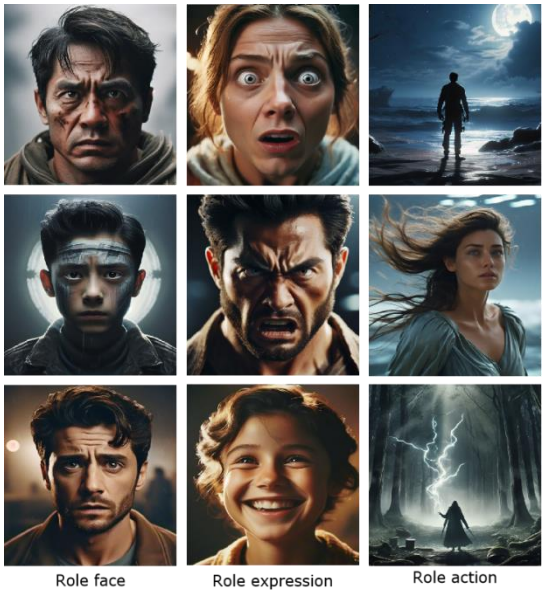

Figure 4: Generation Example.

5.2 Numerical Analysis and Comparison

In order to objectively evaluate the performance of DCGAN, this study conducted quantitative evaluation and comparison. In the experimental stage, we conducted in-depth research on the time required to create movie images on different numbers of images and nodes (Figure 5). The research results indicate that increasing the number of nodes will prolong the image generation time when processing a small number of images. However, as the number of images increases, the advantage of using multiple nodes becomes apparent, leading to a significant improvement in generation speed. This insight provides crucial guidance for determining the most suitable number of nodes in practical scenarios. This study provides a more in-depth evaluation of the accuracy of different algorithms (as shown in Figure 6). Compared with the standard GAN method, the DCGAN model proposed in this study achieved a significant improvement in modelling accuracy, registering a significant improvement of 25.46%.

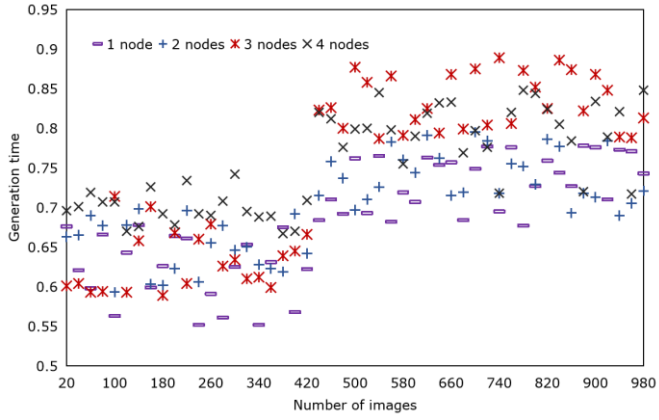

Figure 5: Image generation takes time.

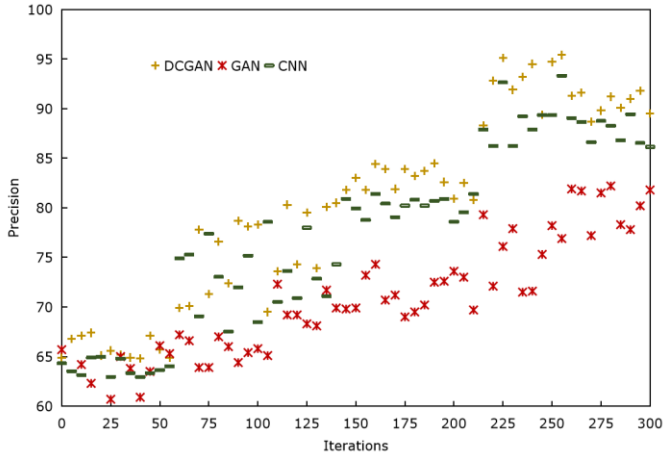

Figure 6: Precision results of various algorithms.

5.3 Feedback

By developing a customized visual education platform specifically designed for film image creation, we enable learners to deeply participate in the production of film images using the DCGAN model, and then evaluate the platform's interactive capabilities (see Figure 7). The results show that compared to other platforms, our platform stands out due to its excellent interactivity and unparalleled user experience. Feedback from users indicates that the platform helps to gain a deeper understanding of the role of AIGC in film production, thereby improving educational outcomes and practical skills.

5.4 The Impact of DCGAN on Improving Visual Teaching

So far, many methods have been derived for non-generative data augmentation, but due to the fact that non-generative data augmentation methods are all based on transformations between the original images (direct or indirect transformations), their performance improvement on classification models is still very limited.

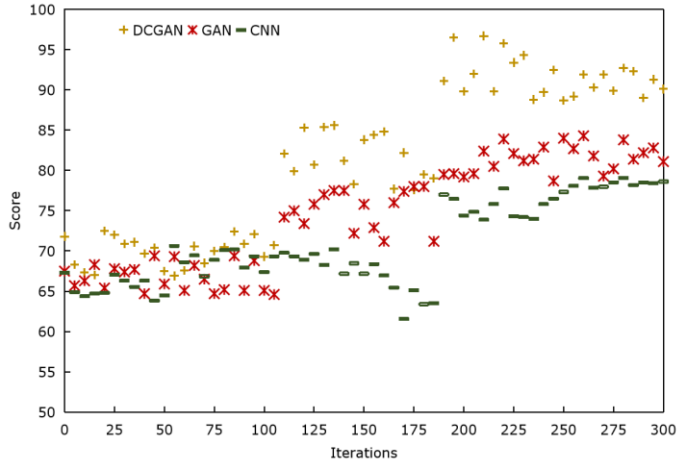

Figure 7: System interaction performance indicators.

This method is equivalent to adding a regularization term to the network. Although it is simple and convenient, it is still a combination of non-generative data augmentation methods. Compared to non-generative data augmentation methods, it can provide more feature information for neural networks in pattern classification. An excellent generative adversarial network model can generate images that are similar and clear to the original data samples. However, generative adversarial networks also suffer from unstable training, prone to pattern collapse, and insufficient diversity of generated data samples. This model learns from the high-level features of existing datasets to generate images that are similar to the features of the original dataset. Later, a GridMask data augmentation method based on a simple and effective information dropout strategy emerged. Essentially, there have been no substantial changes made to the dataset, resulting in poor improvement in segmentation performance. With the emergence of the generative model GAN. By building a visual education platform specifically designed for film production, users can actively participate in the learning process, adjust model configurations in real time, and observe real-time changes in results. User feedback and dialogue further demonstrate the advantages of DCGAN in improving system engagement and user satisfaction. In visual film production education, rapid design iterations and improvements help learners master key skills faster and enhance their practical abilities. This intuitive and interactive learning approach greatly stimulates learners' enthusiasm for learning and deepens their understanding of the principles and applications of AIGC technology. At the same time, the modelling accuracy of the model also ensures the quality of the generated images, meeting the strict requirements for visual effects in film production. By finely controlling the number of nodes, the DCGAN model has achieved a significant improvement in image generation speed, which is crucial for the field of film production.

6 CONCLUSIONS

Through in-depth analysis of empirical research, we have found that DCGAN exhibits outstanding abilities in creating realistic and vivid virtual character roles and environmental visual effects. Through quantitative comparison with other technologies, the advantages of DCGAN in fast processing and image generation are undoubtedly highlighted. In addition, the positive feedback from users also confirms the practicality and interactivity of a visual learning platform tailored for film production. These achievements not only bring stunning visual enjoyment to the audience but also inject a continuous stream of innovation into the film production industry. Especially when processing a large number of visual images, its efficient generation speed and excellent image clarity are impressive. Fundamentally speaking, the integration of AIGC and film visual effects not only provides

unprecedented convenience and innovative space for film creators. At the same time, its application in visual education has significantly improved the results of academic research and the quality of teaching. This platform not only provides learners with rich visual education resources but also greatly enhances their participation and learning effectiveness through real-time modification and feedback mechanisms.

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