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Research on the Cultural Factors of Insufficient Expression of Emotion in the Application of AIGC Technology in Film Production

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Abstract:

This study discusses the application of AIGC technology in film production and its shortcomings in emotional expression. AIGC technology provides efficient, low-cost solutions in multiple aspects of film production, such as script writing, special effects production and image generation. However, AIGC technology still presents challenges in emotional expression and accurate communication of cultural context. This paper analyzes the application status of AIGC technology in movies and points out its limitations in character expression, tone of character lines, and background construction. It is found that the emotional expression of characters generated by AIGC often lacks delicacy and cannot perfectly present complex emotional changes, especially for the emotional expression in a specific cultural background. To this end, the article suggests that the AIGC technology should play a greater role in film production by enriching the emotional and cultural data of the AIGC model and strengthening the deep understanding of text and images.

Keywords: AIGC Technology; Film Production; Emotion Expression

1. Introduction

Before the age of AI, most machines were only responsible for analytical and repetitive tasks, and creative tasks had to be produced by humans. However, with the advancement of science and technology, machines have been able to produce creative and meaningful content, known as "generative artificial intelligence", that is, to generate novel content on their own, rather than simply analyzing existing data. In recent years, artificial intelligent-generated content (AIGC) has attracted widespread attention in society, has gone beyond the field of computer science and technology, and has integrated into the production and life of all walks of life, from art to industry, and has completely changed all aspects of our lives. This technology has the potential to universalize the use of AI, augment human capabilities, and change the way we work and live. AIGC technology, full name of Artificial Intelligence Generated Content, refers to a variety of text, image, audio, video and other multimedia content generated by artificial intelligence technology, essentially through the combination of machine learning and natural language processing technology, Collect, integrate and analyze massive data, and then let computers imitate human creativity and judgment to automatically generate content that meets human needs, realizing the transition from perception and understanding of the world to generation and creation of the world. The origins of AIGC technology can be traced back to the 1950s, when computer scientists had begun to experiment with computer-generated language models, and by the last decade, AIGC technology represented by ChatGPT had developed rapidly. ChatGPT, a language model that understands and responds to human language input, and Midjourney, an AI painting tool model that generates high-quality images from text instructions, are prime examples of AIGC products that are also used more frequently.

AIGC technology continues to develop and improve, more and more types, and more and more widely used in the film and television industry. On March 6, 2024, "Our T2 Remake" was released in Los Angeles, the film is a remake of the classic science fiction film "Terminator 2" directed by Nem Perez. It took 50 AI artists three months to complete the creation, which is also an epoch-making mark in the field of AIGC and film. This film is also the world's first full-length film made entirely by AI, which has trans-era significance. Another film, The Universe at a Moment, will be released in North America on March 25, 2022, and the use of AIGC technology in the film allows the characters to shuttle through the parallel universe to

integrate more elements and visual effects, which is also one of the iconic clips of the film. At the same time, the film won a number of awards at the 95th Academy Awards in 2023, which is also one of the signs of AIGC technology's gradual penetration into the film industry.

The film industry is one of the direct means to convey the basic values of society. In the current state of continuous integration of artificial intelligence into the social development, AIGC technology has better emotional expression in the production of films, which can not only make the film better reflect some social phenomena, stimulate the deeper thinking of social groups, but also carry out creative expansion on the basis of human creation. Make its artistic effect and the deep meaning conveyed behind the film more colorful, expand the commercial space of the film and make the film more significant in The Times and social significance.

2. Literature Review

Nowadays, the construction of neural networks is constantly iterated and upgraded, computer technology is developing rapidly, and digital visualization has become the main expression mode in the Internet era. As a narrative visualization product, movies are increasingly closely related to AIGC technology in the production process. AIGC technology can now be used in all stages of film production, mainly for text and image processing and production, the ability to leverage ChatGPT, Midjourney, Stable Diffusion, Runaway, Maya, Houdini, Stable Technical tools such as Audio can generate film script writing, special effects production, character image or fragment background and other virtual image generation and post-editing according to the instructions, reducing the cost of film production and making the production process more efficient [1,2]. However, in the future for a long time, AIGC cannot replace human beings to completely produce movies, because its expression and output of emotions have not reached the height of human beings [3].

AIGC technology has brought a lot of convenience and new vitality to film production with its low-cost and efficient way of producing content. Among the many tools contained in AIGC technology, the text processing tool represented by ChatGPT can produce scripts according to the requirements of film production. However, since ChatGPT only collates, learns and re-creates text data, it cannot express most of the emotions and the interpretation of social thoughts and cultural products well. Humans still need to add some details or incorporate some elements to explain the profound meaning or core idea of the script. However, the use of ChatGPT for text secondary production can bring new vitality to film story creation, break the conventional reality setting, broaden creative ideas, and produce content more efficiently [4]. In the process of combining AIGC technology with film production, for humans, the core is a complete and meaningful narrative, and AIGC technology is mainly responsible for generating various multimedia elements and then combining them manually, which is a narrative visualization method based on the current development of AIGC technology that can maximize the value of both parties. In addition to the output of text, image generation is also a very widely used part of AIGC technology in film production, which occupies a very important position in film production and publicity, such as the generation of virtual characters, scenes, and virtual effects and the production of propaganda posters. However, such image plug-in tools as DCGAN and Midjourney not only add virtual images with richer visual effects to the movie, broaden the path of visual innovation, shorten and simplify the production time and process of virtual images, but also save the human and material costs required for the production of virtual images. In addition, as the most intuitive way of publicity, movie posters are also an important part of AIGC technology's participation in film production. The background environment of the characters in the movie is also an indirect way to convey emotional information to the audience, such as the generation of virtual characters, the production of scenes, virtual effects, and propaganda posters. The use of image plug-in tools such as DCGAN and Midjourney in the production can add virtual pictures with richer visual effects to the movie. It broadens the path of visual innovation and enables background images to convey more information [5].

Text and image production are the most common and widely used production methods of AIGC technology in film production. In addition, AIGC technology can also digitally present high-tech virtual items required in films. In the science fiction film Avatar · The Way of Water, AIGC technology was used to design related science fiction props. After analyzing and learning a large amount of data, AR and VR technology was used to digitize the shooting props, which enriched the visual art effect of the film and was also a catalyst for breaking traditional thinking in the design of film props [6]. The film industry has not injected more new elements. The use of AIGC technology not only enriches the thinking and way of film props design but also makes the finished products have more scientific basis support and improves the accuracy and practicability while considering the artistry of props. When AIGC technology continues to provide convenience for human beings, human beings are also passively improving their own capabilities. At this stage, AIGC technology still requires human input requirements to generate

content, the design of virtual props and the construction of some scene models in movies. AIGC tools cannot independently produce according to movie scripts or theme information, which encourages film practitioners to have greater professional knowledge reserves and higher application flexibility. At the same time, it indirectly enhances the individuation of the design and better matches the needs of the market or the movie theme idea or emotional expression [7].

Although the application of AIGC technology in film production has brought revolutionary changes to the film industry, artificial intelligence technology can help human beings to make up for some regrets that human beings cannot improve, such as AI face changing, dubbing, images are converted to video. These technologies reduce the barriers of interpersonal communication and greatly promote the development of man-machine mutual assistance model in the film industry. However, the output content of AIGC technology still has limitations in emotional expression [8]. According to the study, when AIGC expresses its emotions according to the users' needs, the depth of its emotional interaction with the users is positively correlated with the users' sense of awe and identification with AIGC [9]. Therefore, when some language models produce texts, they lack emotional expression with human characteristics, resulting in the output content not being able to establish a deep connection with the audience. For example, when generating shooting scripts, it is difficult for AIGC technology to clearly distinguish the ways in which characters in different cultural backgrounds express their emotions, resulting in the lack of emotional support in the generated content, or the emotional expression is not in line with the social background, which weakens the connection between the ideas conveyed by the film and the audience, making the film lose part of its meaning [10,11].

The information mentioned above is helpful in understanding how AIGC technology produces content for emotional expression during film production, however, there are still some research gaps in this area. While there is much literature on the breadth and depth of AIGC applications in the film industry, there is little research on how improving AIGC techniques can improve emotional expression when producing content in film production. Film is essentially to convey information and emotions to the audience. In-depth study of AIGC technology emotional expression can make the film production process more efficient and enable the film industry to better balance commercial and cultural values, so that the film has more depth and thoughtful significance. Through the exploration of these research gaps, we can further promote the application of AIGC technology in the film industry and bring more innovations and breakthroughs to the film industry.

3. Methodology

In the study of AIGC technology in the film production of insufficient expression of emotion and the cultural factors behind the research, mainly divided into data collection and screening, facial expression coding system and data analysis and other key links. In the whole study, representative action movies and science fiction movies using AIGC technology were selected as screening criteria, and a total of about 10 movie samples with different cultural backgrounds were collected. Then, representative characters are selected in the film to collect and analyze data from three dimensions: facial expression, the content and tone of the character's lines, and the construction of the background picture when the characters appear and compare the influence of cultural factors on emotional expression in the output content of AIGC technology. In the research process, the cultural background data of the sample films were collected first, and then representative character fragments were selected for facial expression analysis using the facial expression system. At the same time, the details and background of the lines in the segment were selected and analyzed by integrating the cultural background. These measures effectively enhance the credibility and validity of the research and provide strong academic support for the further application and development of AIGC technology in the field of film production.

4. Result

4.1 Influence of Character Expression on Emotion Expression

In most narrative films, emotional expression is shown through characters, and for characters, the expression of characters is the easiest place for the audience to visually receive the emotional expression of characters. AIGC has reached a certain height in the shape of the characters in the film scene production, but the expression of the emotion of the movie characters needs to be improved. According to the Coding analysis of Facial Action Coding System (FACS) on character expressions in movies, AIGC technology shapes most characters' expressions to achieve emotional transformation through changes in eyebrow, eye shape and mouth shape. There are few types of emotions that can be transformed, and the emotional expression is relatively strong. Usually expressed in anger, sorrow and joy. In the process of expression conversion or character expression display, the character expression produced by AIGC is not flexible enough, and the eye is not fast enough to track other pheromones, and the flexibility

is also insufficient. As a result, the character expression is slow, and the performance tension cannot reach the height of the real character, and the audience cannot have a high sense of substitution. On the other hand, there is a lack of movement and coordination of facial muscles. When facial muscles such as character expression or speech need to change, some muscles do not change, forming a difference with the real face, making it easier for the audience to distinguish the difference between real people and virtual characters produced by AIGC technology. In 52:45-52:47 of the film "Our T2 Remake", the characters change the direction of their faces when they speak, but their eyes remain still and the focus is less intense than in reality, resulting in an increased sense of AI. In addition to the problem of eye focus, the character's forehead muscle direction when the expression changes are also not very common sense, resulting in an increased sense of virtual synthesis of the character, and the audience cannot immerse in the film content.

4.2 Influence of Character Line Writing and Tone on Emotional Expression

In general, the changes in facial expression and the voice of the character are synchronized. Through the analysis of the colloquialization degree of lines and the logical chain, the lines produced by AIGC technology are relatively easy to understand on the whole, but the logical chain is not sufficiently echoed, there are few lines with deep meaning, and there is still a lot of room for development of the pushing intensity of the development of the story plot of the film. At present, in most of the character pictures synthesized by AIGC technology, the changes in the mouth parts of the scenes in which the characters speak are the most obvious. Therefore, in the film, the logic of the character lines can make the story narrative more complete, and even promote the development of the story plot, when necessary, which is an important tool to describe the character's personality and emotional expression [12]. In the movie, the character lines with strong emotions can make the audience more immersed in the movie, and the contradictions in the verbal communication between the protagonist and other characters can arouse the audience's interest in the subsequent development of the story.

4.3 Influence of Film Background Construction on Characters' Emotional Expression

As a very important part of the film, the scene structure can show the tone of the film, the mood of the characters, and even the cultural background of the story. Because of the huge database, the pheromones contained in the pictures generated by AIGC technology are more comprehensive and richer in color. The pictures can be generated at a speed that cannot be reached by humans, which greatly facilitates the film production process, but the cultural information elements covered in the generated pictures are not rich enough. For example, in All the Universe, which won the Oscar for best film in 2023, the background of the fragments in which the heroine Evelyn travels through various parallel universes uses AIGC technology to generate background pictures and special effects production. In the fragment, the color of the generated pictures is generally dark, which can make the audience focus on the characters and at the same time suggest the nervous emotions of the characters in the shuttle, indirectly conveying the emotions of the characters to the audience. At the same time, most of the background pictures or videos generated have the characteristics of Chinese cultural elements, which echo the identity of the main characters in the film, but most of the backgrounds are in overseas Chinese areas, and few are in Chinese areas, which is also because the AIGC image generation model has relatively insufficient exposure to cultural types in the training. Some pictures with similar words but requiring different instructions have little difference in style and visual effects, resulting in the audience accepting similar visual elements of information for a long time, which is easy to aesthetic fatigue.

5. Discussion

According to the above research results, from the perspective of character expression, one of the reasons why AIGC technology cannot perfectly combine character expression with character emotion is that the data collected by AIGC technology or analyzed according to the data of the facial system are mostly the changes in the Angle of human facial features, and the emotions of characters can be accurately judged by the changes in degrees. However, the change of Angle does not cover the events that affect the emotion or other external conditions of the character's own personality, just like the slightly raised corners of the mouth of a calm athlete after winning a game and the slightly raised corners of the mouth due to the disdain of the opponent in a competitive occasion, the Angle of the mouth rise is the same, but they are two completely different emotions. At present, AIGC technology is unable to incorporate these factors into the data analysis to generate dynamic changes in characters' expressions. On the other hand, most AIGC technologies can only collect and skillfully use the generated virtual characters' inherent human emotions, such as happiness, sadness, sadness, and joy. Some delicate emotions generated by family, friendship, love, or social relations cannot be well digested by AI, resulting in a slight deviation between the characters' ex-

pressions and inner emotions. The audience will not fully accept the emotional output of the characters when watching the film. The wrong emotional output of characters is highly likely to have a negative impact on the expression of the core ideas of the film, and the audience will have a deviation in the reception of information and not understand clearly the information or social phenomenon that the film mainly wants to convey. In this way, the film will lose a large part of the meaning of shooting. In order to make the change of characters' facial expression more closely related to their emotional expression, AIGC technology needs to update a large amount of social emotion social customs and cultural data information and simulate human emotion output and expression change according to some conventional social rules, so as to more accurately judge human emotions for different events. Improve the matching degree of character expression and emotional change.

From the perspective of character lines in the film, the text model of AIGC technology can only understand the text itself or extend to the meaning of slang. For some simple words, the deep meaning is extended due to different contexts, and it cannot be well used. Therefore, the text output such as lines generated by AIGC technology is generally relatively easy to understand. It forms a slight sense of separation from the complex picture in the film, affecting the audience's feeling of the audio-visual experience or the understanding of the theme of the film. The reason for this phenomenon is that when human beings train artificial intelligence, they pay more attention to training it to be responsible for simple and repetitive work, such as the collection and collation of text data, but do not pay attention to improving its understanding and creativity of deep text. If AIGC technology itself is not creative, both advantages and disadvantages exist for human beings. As for the advantages, AIGC technology by enhancing human ability, can improve the efficiency of human creation, and does not need to spend time on repetitive work, at the same time with the increasing popularity of artificial intelligence, people at all levels and fields can participate in technical creation, saving the time to complete non-creative tasks. Focus more on higher-order cognitive and creative tasks. In order to improve the ability of AIGC technology in text creation, famous or accomplished literary works can be input in a targeted way based on the cultural background of the film. AIGC technology model can express creativity through the learning and understanding of literary works, and at the same time provide a larger inspiration base for human creative ideas. For example, the background of the film is the American youth group, when training the AIGC text model, it can input more literary works such as "The Great Gatsby", "Catcher in the Rye" and "The Hunger Games", so that the model can understand the deep meaning behind the daily communication or written language of the American society and specific languages, so as to improve the training text model's understanding and application of language art. But AIGC technology is also a double-edged sword for human development. With the improvement and development of AIGC technology, the existing society of human beings is likely to be reshaped, and human beings will also be replaced by AI. However, on the contrary, AIGC technology and human beings are not always on the opposite side in social development. In order to achieve sustainable development, the two need to maintain a symbiotic relationship and use human-machine interaction to achieve win-win cooperation.

For film background generation, the background picture or video generated by AIGC technology is relatively mature and can accurately feedback the visual finished product according to the description of the command, but the matching degree between the picture generated by AIGC technology and the film story is not enough. A large part of the reason is that the R&D team members of AIGC technology do not cover the diversity of cultural backgrounds and may even only come from the cultural background of one country or one region. As a result, the integration of AIGC technology into cultural diversity is ignored in the process of R&D and training of AIGC technology, which can only be produced according to the template of a single cultural background. As a result, the pictures or videos generated by AIGC in some unfamiliar cultural fields are monotonous, and the visual stimulation effect is not good for the audience so the audience will pay attention to the loopholes in the background and ignore the performance of the characters or the plot development. Another reason is that AIGC technology is not sensitive to different cultures. Cultural differences and cultural sensitivity are also a very important parts of film production. Different regions have different cultures and establish social rules. Before film production, fully understand the place where the story takes place and its cultural background to avoid cultural misunderstanding and avoid unnecessary negative cultural collision outside the art field. In order to increase the cultural sensitivity and diversity of the content generated by AIGC technology, the model of AIGC technology should absorb the culture of all places as much as possible, not just the common country or the common region of a country. To this end, a team can be set up to train AIGC technical models and recruit literary, artistic, and computer technical talents from different cultural backgrounds, which can not only better collect data from different cultures, but also improve the human concentration of AIGC technical models.

6. Conclusion

With the development and application of AIGC technology, the application of AIGC technology in the film industry is getting deeper and deeper. This paper studies the cultural factors of insufficient emotional expression in the application of AIGC technology in film production, to improve the efficiency of film production and promote the sustainable development of human-machine interaction in the film industry. The research results can be divided into three parts according to the character expression, character lines and background structure. First, when the character expression is changed, the lack of flexibility of the expression leads to the increase of the character AI sense, and the audience is easy to play. Second, the lines produced by AIGC technology are easy to understand, but the logic before and after is not close enough, there are few lines with deep meaning, and there is a lack of representative lines that depict the character and emotional output. Third, the pheromones contained in the pictures generated by AIGC technology are relatively comprehensive, but the cultural types contacted by AIGC technology are relatively insufficient, and the cultural information elements in the generated pictures are not rich enough. The styles and visual effects of the pictures generated by similar but different production requirements are not very different, which makes it easy to make people aesthetic fatigue.

Cultural background is one of the factors influencing the insufficient expression of emotion in film production by the AIGC technical model. From the perspective of character expression, relevant AIGC technical models mostly judge characters' emotions by changing the Angle of five facial features, and the models are not able to output many kinds of emotions skillfully, and do not consider the influence of other indirect factors such as social relations on characters' emotions, resulting in slight deviation in matching expressions and emotions. To improve the matching degree, AIGC technology needs to receive a large amount of social emotion customs and cultural information and enhance the judgment ability of human emotions in different events. From the analysis of character lines, most of the text models of AIGC technology can only understand the text itself or slang and lack the ability to express the deep meaning with simple words, which affects the audience's understanding of the audiovisual experience of the film and the main ideas expressed. For this situation, AIGC technical models can be trained with many excellent literary works to improve their creativity and diction. In terms of background construction, the current output of AIGC technology is relatively mature, but for film production, the application ability of AIGC technology to the social culture of various regions is insufficient, resulting in insufficient matching degree between the finished product and the story, which can only be produced according to a single template. Based on this situation, the AIGC technical model needs to learn a large amount of data information of different regional characteristics of culture, train the ability to cover cultural diversity and sensitivity, and gradually improve the ability to produce the corresponding cultural background map according to the film story region.

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