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Research on Art of Artificial Intelligence from the Perspective of Symbolic Aesthetics

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***Abstract*—In recent years, art works created with participation of artificial intelligence have been continuously emerging, and the creation methods are mostly regular calculation and reasoning based on the deep learning technology. According to the symbol aesthetics theory, although art works created by artificial intelligence have artistic illusion, their creation is based on the feature extraction of art works by big data, without emotional input, let alone organic life form. Therefore, it cannot be called art yet. Artificial intelligence has strong advantages in learning ability and abstract thinking ability, which will strongly supplement the creation practice of artists based on traditional experience. In the future art creation, where the integration of artificial intelligence and natural intelligence will become a normal development, artificial intelligence will become an important factor to stimulate the birth of new art forms.**

Keywords—symbolic aesthetics; artificial intelligence; the artistic creation

I. INTRODUCTION

In recent years, with the rapid development of artificial intelligence technology, its participation in the creation of art works has been emerging. Examples are not limited to the published poetry of Microsoft Xiaoice, music pieces of DeepBach, and the ordinary photographs that can also have the stylistic characteristics of works by Vincent van Gogh and other masters. In 2017, researchers at Rutgers University and other institutions proposed CAN: Creative Adversarial Networks, which can not only imitate different painting styles such as Renaissance, Baroque and impressionism, but also directly create paintings comparable to those of masters. The extraordinary performance of artificial intelligence in the art field unique to human beings has caused many artists to worry and panic about artificial intelligence. Whether the art works created by artificial intelligence can be called art and how to view the involvement of artificial intelligence in the field of art has become an important topic of people's attention. Based on Susanne K. Langer's symbolic aesthetics, this paper attempts to analyze the above problems.

II. THE ARTISTIC CREATION OF ARTIFICIAL INTELLIGENCE

A. Art Creation Mechanism of Artificial Intelligence

The creation process of human artists mainly consists of "three important stages of artistic experience, artistic conception and artistic expression" [1], while artificial intelligence presents a completely different way of creation from human artists. At present, the artistic creation of artificial intelligence is mostly regular calculation and reasoning based on deep learning technology. The so called "deep learning", is "to learn a lot of unlabeled data and extract the characteristics of data in the hidden layer" [2]. In the process of painting creation and music composition, the artificial intelligence based on deep learning usually builds an artificial neural network composed of input layer, hidden layer and output layer according to the object attributes. The number of hidden neural layers is determined according to the analysis content. It transmits images and music data that meet the data type requirements of neural network model from the input layer and deconstructs the art works created by human artists in the hidden layer. For example, it decomposes a painting into formal features such as stroke, color, line and texture, and strengthens or weakens a feature after decomposition. Finally, it superimposes different formal features extracted by different neural networks at different layers to obtain results in the output layer, so as to complete the creation of artificial intelligence works.

B. Technical Analysis of Art Creation Cases of Artificial Intelligence

The online website of Google's Deep Dream, the most widely used artificial intelligence program, was originally designed for visualization of convolutional neural networks, which help scientists and engineers see how the networks present images when they process specific images. In the Deep Dream system, the researchers built an artificial neural network consisting of 10-30 layers, presented the neural network with millions of training images, and gradually adjusted the parameters of the neural network until the desired classification results could be obtained [3]. Each training image is fed from the input layer, processed by the hidden layer, and the final result is presented in the output layer. In order to visualize the processing of the hidden layer, the researchers used the gradient ascending algorithm to

enlarge the specific form of the image, and set different iteration rounds to enhance it, so that the final image presented this enlarged form characteristics.

The CAN (Creative Adversarial Networks) is mainly composed of generator and discriminator [4]. The researchers trained the discriminator with different tagged works of art, enabling the discriminator to learn the art styles of various paintings. In the learning process of the discriminator, artificial neural network automatically extracts image features. Usually, the nerve in the superficial layer extracts the edge, direction, stroke and other information of the image, the middle layer analyzes the general outline or components of the image, and finally the high layer combines the previously extracted information into complete semantic content, such as identifying the whole building or tree. The art image generation of the generator under the supervision of discriminator is also generating innovative work with different styles from the paintings it has learned, based on calculation of formal features.

In 2016, the Magenta project of Google published "Performance RNN" based on the LSTM recursive neural network for music composing [5]. The idea was to decompose a piece of music into several unit durations and analyze the characteristics of pitch, rhythm, strength, note density and pitch frequency at different moments. The researchers trained the neural network with MIDI format music data played 1,400 times by performers to extract the pitch, rhythm and other features of music from the music, and used the recursive neural network model to predict the music characteristics of music in different time series. The result is a complete piece of music that is automatically generated after repeated many times over multiple unit durations. With rhythm, pitch and other changes, the automatically generated music also sounds emotional ups and downs.

III. Artistic Creation in Symbolic aesthetics

Symbolic aesthetics is an art philosophy theory founded by aesthetician Susanne K. Langer on the basis of inheriting and developing Cassirer's semiotics. Artistic illusion is the foundation and starting point of Langer's aesthetic theory. Langer believes that works of art can create an unreal image or space that does not exist in real life. This unreal object can be perceived by the visual and auditory senses, unreal though, it can incur psychological feelings. Langer calls this unreal thing "illusion." Langer believes that every successful work of art has its own illusion, which has never been seen before, although it is expressed with the help of the brush, canvas, music, loudness and so on, which is why Langer calls art "creation".

At the same time, Langer points out that artistic illusion is different from physical virtual image. A virtual image in a mirror may not arouse people’s interest, but why do people prefer to appreciate the dancing image? It is because this image works for men as an image steeped with emotion [6] Emotion is an important part of Langer's aesthetic theory. Langer takes whether the works contain human emotion as the criterion to judge whether they are art or not and her illusion is an expressive form of emotion. Art, as a creation, is an artistic illusion that contains the emotions recognized by the artist. Its fundamental task is to express emotions, which is essentially different from physical virtual images. Emotion gives life and vitality to art. Inspired by natural or social things, artists have a passion for creation. In the process of conceiving, they constantly integrate emotions, inject their own aesthetic taste, value judgment and other ideological contents into the things in front of them, and shape an artistic image, that is, an artistic illusion, in the emotional interaction with the world.

Moreover, Langer believes that every successful work of art ultimately points to life forms. Art becomes the projection of emotion and life in different time and space; at the same time, the works of art, like living organisms, is a complete organic unity, containing organic life forms. "If its components were simply to be separated, it would no longer be what it was — the whole image would disappear" [6]. Each part of a work of art organically forms an organism full of life meaning, while look at each part of the work of art, one cannot get the implication of emotion and life contained in the work of art. At the same time, if an artist wants to modify a part of a work of art, he or she should consider the changes of the work of art in all directions, because as an isomorphic form of life, the work will also be affected like a domino.

IV. Reexamination of Art of Artificial Intelligence

A. Art of Artificial Intelligence in Symbolic Aesthetics

According to the brush strokes, colors, lines and other formal characteristics of the painting, as well as music's voice pitch and rhythm and other dynamic characteristics, works of art generated by artificial intelligence create an unreal space in the real space that has never existed before, and arouse the real psychological feelings of the audience. CAN, which has passed the Turing test, creates innovative paintings or uses intense colors. Or it uses irregular lines to present different figures and scenes in the picture, which seem to express feelings of sadness, anger and expectation. Moreover, CAN's works have a higher score of innovation than those of human artists. Deep Bach's work is considered by many listeners to be the work of music master Bach. Therefore, according to Langer's theory of "artistic illusion", artificial intelligence works can create an illusory thing based on time flow and space perception, which has "artistic illusion".

Although there is artistic illusion in the artistic works of artificial intelligence, its creation method is based on the feature extraction of art works trained by big data, and it simply imitates art works in form without emotional input in the creation process. At present, the visible works of artificial intelligence are mostly modernist paintings, especially abstract paintings. However, in abstract paintings, the "emotion" and "inner life" that artists usually inject into their works are relatively vague, which makes it difficult for the audience to directly read the artist's emotion. The formal features of abstract painting are extremely distinct, such as

cubism, such as Mondrian's works that feature breaking the focus perspective, cubism in which straight lines and curves intersect, and taking geometry as the basic element. The emotional ambiguity of abstract works makes artificial intelligence works escape from the essence of "expressing emotion" in art to some extent. After learning the style of art works, artificial intelligence works have acquired the "similarity" of expression form, producing similar "artistic illusion", instead of being an indication of emotion and inner life.

Due to the creation method of formal feature inference based on algorithm of artificial intelligence, the generation of its works becomes the stacking and splicing of the form features. Human artists, on the other hand, think about the meaning of life when creating, and will carry out artistic conception on the layout and composition of works. In the current common photo applications featuring style transfer, the ordinary photo can have the style of Van Gogh, Picasso and other masters, but this is only the transfer of formal features. CAN's works are also intelligent permutation and combination of art elements according to the algorithm. The combination and splicing of art elements based on characteristics of artificial intelligence is difficult to be considered as a complete and organic whole. Therefore, artificial intelligence works are only imitation of natural life forms, with only empty art forms, but not "organic life forms".

B. Integrated Development of Artificial Intelligence and Natural Intelligence

Although it is impossible to classify artificial intelligence works as art at present, the strong performance of artificial intelligence in the field of art has provided infinite space for artistic creation. The creation of artists is based on the traditional experience of perceptual art creation practice. Yet deep learning can automatically extract the features of artistic works and present the previous perceptual and abstract features of works of art in a quantified and specific form. Its logical way of reasoning based on algorithm can effectively supplement the thinking mode of human artists. At the same time, artificial intelligence based on big data training can traverse all human art works, effectively supplementing artists' creation experience, and stimulating artists to generate new artistic creativity. In addition, human artists have incomparable advantages in perceptual experience and imagination. In future artistic creation, artists with emotions can make use of rational artificial intelligence, integrate the artificial intelligence and natural intelligence, and create more and better artistic works.

According to Habermas, "The development of technology is compatible with the interpretive scheme. It seems that human beings have reflected the basic components of the functional range of purposeful rational activity originally possessed by the human organism on the level of technical means one by one, and liberated themselves from these corresponding functions" [7]. He went on to suggest that machines could gradually strengthen or replace the moving organs of the hands and feet, the sensory organs of the eyes and ears, and the brain. From the frescoes in caves of Lascaus, to the application of scenography in painting, to the emergence of photography, film, and virtual reality art, the connotation of art activities has been enriched and improved with the development of times and technology. In the process of the development and extension of art activities, the emergence of technology constantly strengthens and replaces human organs and functions. However, technology does not completely replace human art creation, but the art form and art content of art creation are made more colorful by using different technical means. With the help of technology, human beings get rid of repetitive and boring manual labor and invest their energy and time into more creative and intelligent space. Therefore, faced with the involvement of artificial intelligence in the field of art creation, human should think about how to make good use of this "considerate" technical tool to create more and better art works. In future artistic creation, the cooperation between human beings and artificial intelligence will become a normal state. Artificial intelligence will become a powerful tool for artistic creation and an important factor to stimulate the birth of new artistic forms.

V. CONCLUSION

The rapid development of artificial intelligence technology not only changes people's way of life, but also has a huge impact on the field of artistic creation. Although works of artificial intelligence cannot be called art according to the semiotic aesthetic theory, AI painting and AI composing have become common phenomena in the field of creation. Artificial intelligence works of art have also begun to occupy a place in the art market, playing an important role in promoting the prosperity of the art market. Artificial intelligence technology complements the artist's perceptual creation method based on traditional experience, enriches the existing art creation method, and expands the art creation theory. In the future, with the extensive application of 5G communication technology, artificial intelligence technology will usher in a broader prospect in the field of art. In the face of the strength of artificial intelligence technology, artists should constantly improve their artistic innovation ability and use artificial intelligence technology to better create "symbolic forms of human emotions".

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