

Evaluation on the Development Path of New Media Art Communication Based on Artificial Intelligence Technology

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Abstract: With the improvement of people's living standards, their consumption capacity is also increasing. In this context, more and more people choose to buy art as their spiritual and material sustenance. At the same time, people have more diversified pursuit of art. The new media has fast transmission, large information capacity and other characteristics, and can effectively meet the needs of the audience for information and products. However, in the current network environment, due to the lack of professionals or technical means, it is unable to achieve the "voice of emotion", which makes some works with high artistic quality lose their market competitiveness. AI (Artificial Intelligence) can better present works of art to the public, help consumers understand the story behind the works, stimulate audience interest and generate emotional resonance by analyzing and processing a large amount of data and then applying it to the field of art creation. This paper constructed a model based on emotion change by generating emotion vectors, which is convenient to depict the psychological state and aesthetic taste of artists and audience groups from different angles. Using the information gain theory, it calculates and designs a feedback mechanism for the relationship between individuals and groups, and calculates the emotional intensity value at different stages, providing users with more personalized services. This paper set up a comparative experiment between the traditional art communication method and the new media art communication path under AI technology. The results showed that the new media art communication under AI technology is more efficient, the audience is wider and more satisfied, and integrating AI into the creation of art works can improve the clarity of images by about 7.73%. AI has a significant role in promoting the development path of new media art communication.

1. Introduction

New media art has a strong inclusiveness and openness. It can integrate and combine different types of elements to create more abundant and diverse works of art. At the same time, it can also make innovative exploration of traditional culture.

Many scholars have studied the communication process of new media art. Sun H analyzed the

development trend of visual communication design under the background of new media, and proposed a design scheme from the innovation of design concept, design language and visual thinking, providing valuable reference for designers to better grasp the current trends [1]. Wang Z understood the impact of new media art in commercial public space from two aspects: experience design and its impact on people's lifestyle, discussed the positive role of its integration with traditional culture from the perspective of "new media", and promoted the public's further understanding of new media communication forms and related technology applications [2]. Li L Y compared the forms of art communication between the East and the West in the 17th and 18th centuries, and believed that the traditional culture of Western painting, sculpture and architecture was fundamentally different from that of the East, which provided a reference for the creation and communication of modern art [3]. Bilova N studied the nature and performance of the synergy potential of art communication in music and dance education, revealed the impact of the teaching process on the cultivation of students' emotional attitude, and put forward beneficial enlightenment for the practical teaching of art education [4]. Gong Y analyzed the impact of new media art on visual communication and its characteristics, and discussed how new media art plays an active role in modern design from the perspective of "media culture", providing reference for further improving and developing the new media art communication system [5]. New media art communication provides more information channels and enriches the audience.

As a research hotspot, AI has been studied by many scholars. Zhou S analyzed the new media art content production and dissemination methods using AI as a carrier, built a virtual environment to meet the needs of users for content creation and dissemination, and realized the perfect form of unity of inheritance of tradition and bold innovation [6]. Ying Z used the artificial fish algorithm in AI technology to design interactive media, forming a new interactive art communication system, which improves the communication effect and speed, improved the robustness of the control effect, and strengthened the stability of the system [7-9]. New media art communication has brought great convenience to people, but at the same time, due to the lack of effective management and feedback mechanisms, this new communication medium has been disturbed by some negative information. AI can improve the user experience by intelligently identifying user behavior and automatically learning content, so AI has great significance for new media art communication.

2. Application of AI in New Media Art Communication

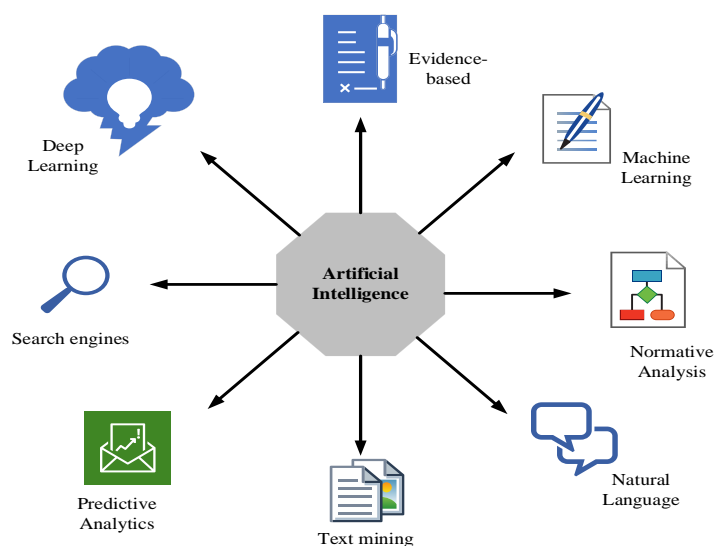


Figure 1: Application of the AI

(1) Application of AI Technology

With the progress of technology and economic development, intelligent technology has become one of the essential key tools in all walks of life today. AI is an emerging concept resulting from the combination of modern information technology and social science, which combines people and machines in a perfect way. It has strong intelligence, flexibility, and adaptability, and can respond quickly to changes in the environment. All walks of life have begun to try to complete various complex and onerous tasks through this technology, such as autonomous vehicles, palmprint recognition, expert systems, etc. The application fields of AI technology are shown in Figure 1.

(2) Characteristics of new media art communication

The development of new media technology has injected fresh blood into traditional culture. The use of modern media for artistic creation can enrich and improve the transmission and protection of national cultural heritage, improve the quality of artistic works. Art communication is a key way to achieve information transmission and emotional expression. In the Internet era, the release of representative works in the form of words and pictures through the Internet can greatly promote the aesthetic level and spiritual needs of the public, and play a positive role in promoting traditional national culture. The characteristics of new media art communication are shown in Figure 2.

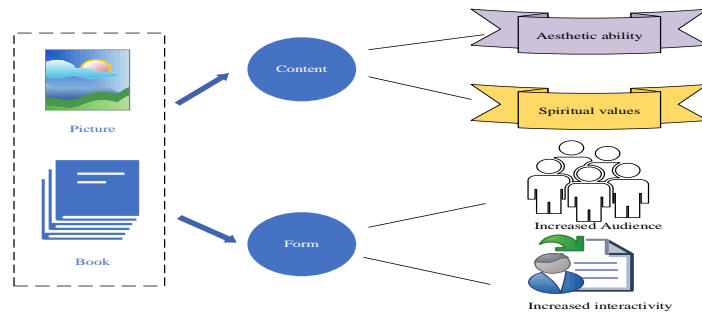


Figure 2: Characteristics of new media art communication

(3) New media art communication path under artificial intelligence technology

AI is the fourth wave of industrial change after computers, the Internet and mobile communications. It not only provides people with more intelligent and convenient services, but also greatly promotes the human society to move towards intelligent direction. The application of AI in the media industry plays a positive role in building a harmonious media relationship, stimulating creative enthusiasm, and expanding the audience and other aspects. In addition, it can realize the communication of information and emotion, make the works of art more vigorous and infectious, enhance the sense of visual experience, promote the collision of ideas, improve the effect of art communication, and quickly integrate intelligence and manpower, which plays a crucial role in improving the level and quality of the whole cultural communication cause. The specific communication path is shown in Figure 3.

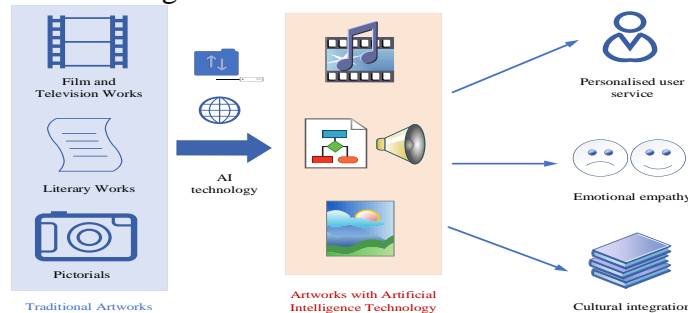


Figure 3: New media art communication paths with artificial intelligence technology

3. Development Path Model of New Media Art Communication under Artificial Intelligence Technology

(1) The generation of emotional vector of art communication

Emotion is a complex emotional state generated psychologically in the process of people's experience of objective things and life. Analyzing the causes and influencing factors of emotion in art communication from a psychological perspective can help people better understand the relationship between works of art and audiences [10].

The input layer is defined as:

$$A = (a_1, a_2, \dots, a_i)^T \quad (1)$$

The network output is:

$$B = (b_1, b_2, \dots, b_j)^T \quad (2)$$

The emotion sample data is normalized to:

$$a_i = \frac{2(a(j) - a_{\min})}{a_{\max} - a_{\min}} - 1 \quad (3)$$

The correlation between PAD emotional dimension and different personality traits is as follows:

$$Q = \begin{bmatrix} E_m \\ Y_n \\ C_d \\ S_t \\ D_e \end{bmatrix} \times \begin{bmatrix} P \\ A \\ D \end{bmatrix} \quad (4)$$

In the formula, E_m is external tendency factor, Y_n is pleasant factor, C_d is responsible factor, S_t shows anxiety, and D_e shows creativity and wisdom.

These data are normalized to obtain the response vector after personality correction:

$$\overline{e_Q} = \overline{e} + \overline{e_Q}^* \quad (5)$$

Among them, $\overline{e_Q}^*$ is the character correction vector and \overline{e} is the response vector generated by the intelligent system.

The influence of mood on emotion is corrected through linear superposition relationship:

$$\overline{e_{QM}} = \lambda M_t + \overline{e_Q} \quad (6)$$

λ is the influence coefficient, whose expression is:

$$\lambda = \cos(\overline{e_Q}, M_t) \quad (7)$$

In the formula, $\overline{e_{QM}}$ is the vector of personality and mood after correction,

When $t=0$, the mood state update process is:

$$M_t = M_0 \quad (8)$$

When $t > 0$, there are:

$$M_t = \frac{\alpha}{e^{\|M_t\|}} \overline{e_Q} + (1-\alpha)M_t \quad (9)$$

α indicates the influence of $\overline{e_Q}$ on M_t . The greater the range of M_t , the greater the range of α , that is, the calmer the mood, the greater the influence of external stimuli, and the better the communication effect.

(2) Information gain

Information gain is a new information processing method. By calculating the feedback amount and information entropy in the process of art communication, an optimal transmission path can be determined to improve the transmission effect of images, videos and other media [11].

If there are u categories in the sample, then there are:

$$K = \{k_1, k_2, \dots, k_u\} \quad (10)$$

Assuming that v is the number of category k_u in the sample set V , the total information entropy of the sample set is:

$$X(v_1, v_2, \dots, v_u) = -\sum_{m=1}^n Z_m \log_2(Z_m) \quad (11)$$

In the formula, Z is a prior probability.

If the sample contains r features, and one feature R has i different values, then there are:

$$R = \{a_1, a_2, \dots, a_r\} \quad (12)$$

$$V = \{v_1, v_2, \dots, v_r\} \quad (13)$$

The sample set is divided according to attribute R , including:

$$X(R) = \sum_{i=1}^r \frac{v_{1i} + v_{2i} + \dots + v_{ui}}{V} X(v_{1i}, v_{2i}, \dots, v_{ui}) \quad (14)$$

$$X(v_{1i}, v_{2i}, \dots, v_{ui}) = -\sum_{m=1}^n Z_{mi} \log_2(Z_{mi}) \quad (15)$$

$$Z_{mi} = \frac{v_{mi}}{V} \quad (16)$$

At this time, the information gain is:

$$G(R) = X(v_1, v_2, \dots, v_u) - X(R) \quad (17)$$

(3) Emotional intensity calculation

Emotional intensity measurement is one of the important contents of psychometrics. It can effectively evaluate a person's emotional state, and analyze whether their feelings have reached a

satisfactory level by observing people's performance and reaction in the process of empathy.

According to the norm of the emotion vector, the emotion intensity corresponding to the modified emotion vector can be obtained:

$$T = \frac{\|e_{QM}\|}{3} = \frac{\sqrt{P^2 + A^2 + D^2}}{3} \quad (18)$$

When $e_{QM} > 0$, there are:

$$T = 0 \quad (19)$$

When $e_{QM} \leq 0$, there are:

$$T = \frac{\|e_{QM}\| \cos(e_v, e_{QM})}{\|e_v\|} \quad (20)$$

According to the change of emotional intensity at each stage, people's emotional response changes caused by art communication have been obtained, and finally emotional resonance has been achieved.

4. Contrast Experiment of New Media Art Communication Path Based on AI Technology

(1) Experimental methods

A questionnaire survey was conducted among 30 people randomly selected from a certain area to analyze people's cognition of traditional communication path and new media art communication path under AI technology. The survey results are shown in Table 1.

Table 1: Breakdown of respondents' age and preferences

Age	Number of people	Attitude preference
Under 25 years old	16	New Media Art
25-50 years old	9	Neutral attitude
Over 50 years old	5	Traditional Arts

As shown in Table 1, the number of respondents under the age of 25 is the largest, accounting for half of the total number of respondents, and they are more optimistic and willing to try the new media art under AI; people aged between 25 and 50 hold a neutral attitude. Some young people have low income and living standards due to low education and poor economic conditions, and lack confidence in the development of AI and new media art; the middle-aged people with certain cultural knowledge and higher education belong to the middle income group and above. They have a strong sense of enterprise, responsibility and learning ability, so they are easy to accept new things such as AI and new media; only 5 of the respondents are over 50 years old, accounting for 16.7% of the total number. Most of them have not received relevant education, and they would show a certain degree of maladjustment when accepting new things, such as introversion and impatience, which also shows that these people have poor psychological endurance. Therefore, for users over 50 years old, traditional art communication forms are a better choice.

(2) Data analysis

After screening, 20 valid questionnaires were obtained. These 20 questionnaires were divided into 4 groups, with 5 people in each group, and were named Group A, Group B, Group C, and Group D respectively. Group A and Group B adopted the original communication mode. The

proportion of men and women in the group was equal, but the average age was high. Group A and Group B were set as the control group. Group C and Group D adopted the new media art communication form supported by AI technology. The members of this group were the same age, but there were more male members. Groups C and D were set as the experimental group. A comparative experiment was set up from three aspects of communication efficiency, communication quality and satisfaction, and the experimental data was recorded and analyzed.

1) Communication efficiency

The statistics software is used to analyze and record how many people can be transmitted to each minute by the two modes of transmission. The results are shown in Figure 4.

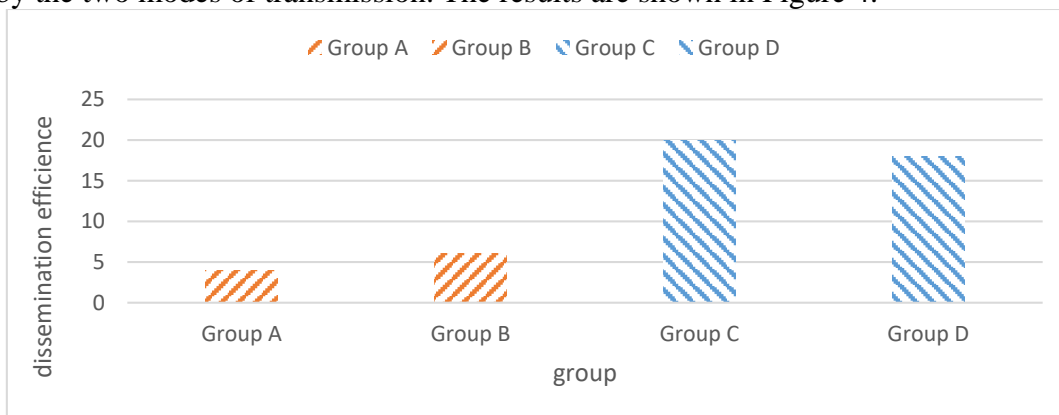


Figure 4: Comparison of dissemination efficiency

As shown in the figure, it is obvious that the number of people in the experimental group is more than that in the control group every minute. Group C has the fastest speed of transmission, which can be delivered to 20 people every minute, and Group D can be delivered to 18 people every minute. After calculation, the experimental group can deliver an art work to 19 audiences every minute on average, which shows that the communication system supported by human AI technology has stronger ability to identify and screen target users; on the contrary, when observing the control group, it can be seen that Group A only transmits to 4 people every minute, while Group B transmits to 6 people. On average, the control group can transmit to 5 people every minute, less than half of the experimental group. It shows that older audiences tend to have some hesitation and hesitation when receiving information. It can be seen that AI technology has certain advantages in improving people's speed of understanding and obtaining product information.

2) Quality of communication

The user scores the chromaticity and clarity of the received works of art, and sets a score of 1-10 points to compare the communication quality of the two communication methods. The results are shown in Figure 5.

As shown in the figure, it can be seen that in terms of clarity, there is little difference in the scores of the four groups, both of which are above 8 points. After calculation, the average score of the experimental group is about 9.75 points, and the average score of the control group is about 9.05 points. With the support of AI image recognition and classification technology, the clarity of art works has increased by about 7.73%; in terms of color freshness, the experimental group scored more than 8 points, while only Group B in the control group scored 8 points, indicating that the color performance of the experimental group is more prominent, and AI has greater advantages in visual effect processing.



Figure 5: Comparison of communication quality

3) Satisfaction

The four groups were asked to rate the satisfaction of the art communication process of this experiment, and the score was set at 1-10 points, as shown in Figure 6.

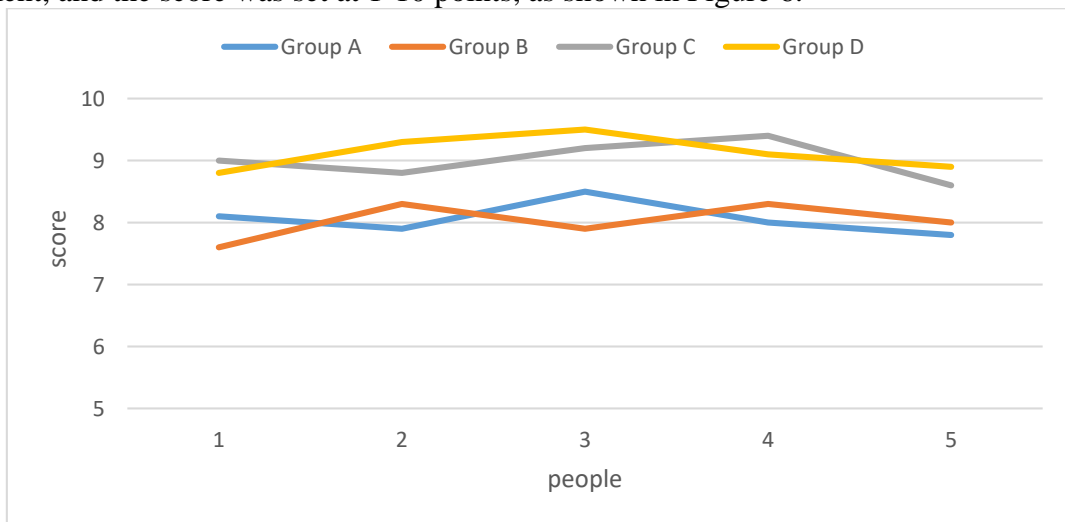


Figure 6: Comparison of satisfaction results

As shown in Figure 6, it can be clearly seen that the scores of Group A and Group B are distributed at about 8 points, while the scores of Group C and Group D are distributed at about 9 points. After calculation, the average score of the control group is about 8.04 points, and the average score of the experimental group is about 9.06 points. The trend of these four curves is relatively gentle and stable, indicating that the four groups have reached a consensus. Therefore, the experimental group is more satisfied overall.

The above three groups of data are comprehensively weighted to explore the impact of AI on new media art communication. The overall comparison results are shown in Figure 7.

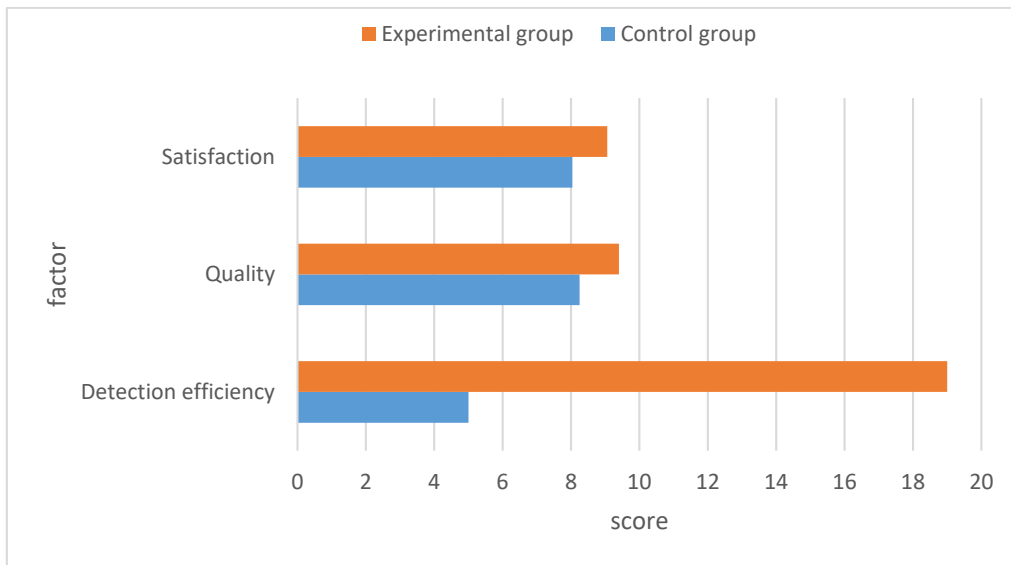


Figure 7: Overall comparison results

It can be seen from the figure that the performance of the experimental group is better than that of the control group in three aspects of communication efficiency, quality and satisfaction, among which the difference in communication efficiency is the largest, indicating that AI can improve people's effective communication of information and better achieve emotional feedback, intelligent interaction, personalized recommendation and other functions. After calculation, the average score of the experimental group is about 7.1 points, and that of group B is about 12.49 points. Therefore, AI can bring more convenience and improvement to people, and art communication under AI technology is more efficient and accurate.

5. Conclusions

The main carriers of artistic creation and dissemination are traditional media such as television and radio. New media forms developed under the network environment include We Media, micro video websites, etc. This is a key channel for personalized service and communication to the audience through information sharing, interactive communication and other ways based on Internet technology. The application of AI transforms it into a new human-computer interaction mode, which makes it more convenient for users to obtain the required content and improve their work efficiency, and meet the needs of different groups. This paper focused on the research of AI based new media art communication path, analyzed the current art and culture communication and development status and existing problems, and put forward corresponding countermeasures and suggestions, verified the role of AI technology in improving the efficiency of art communication through experiments, and affirmed the possibility of AI application in the art field in the future.

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