Creative and Experimental Design of Artwork Based on Artificial Neural Network Algorithm and Internet of Things

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Abstract. Art creativity and experimental design are fields full of creativity and exploration, and traditional design methods are often limited by the personal abilities and experiences of designers. Therefore, introducing artificial intelligence (AI) algorithms can help designers better explore creativity and improve design efficiency. This article investigates the application of artificial neural networks (ANN) and the Internet of Things (IoT) in computer-aided artwork creativity and experimental design. By analyzing and learning a large amount of artwork data, the creative patterns and features of artwork are extracted, providing creative suggestions and optimization solutions for artists. The results indicate that the art creation computer-aided design (CAD) system constructed in this article has strong interactive capabilities and a good user experience. Meanwhile, ANN has significant advantages in image processing time compared to Support Vector Machine (SVM). This system can be applied to creative design, experimental creation, and image processing of artworks, providing more efficient and intelligent auxiliary tools for artists and designers.

Keywords: Artificial Neural Network; Internet of Things; Art Creation; Computer-Aided Design
DOI: https://doi.org/10.14733/cadaps.2024.S13.92-104

1 INTRODUCTION

In contemporary society, with the continuous progress and innovation of sci & tech, people's lifestyles and ways of thinking are undergoing unprecedented changes. In this process, ANN algorithm and IoT have become two important fields leading the development of technology. Their rapid development and application are changing people's understanding and exploration of the world. Based on the progress of computer technology, the CAD field is also constantly advancing and innovating. CAD software has been widely applied in various industries and fields, such as architecture, machinery, electronics, etc. The security issues of IoT devices are also increasingly prominent, such as network attacks, data leaks, etc. These security issues not only harm users' privacy and interests, but also pose a threat to the stability and security of the entire IoT system. Therefore, how to effectively detect and prevent network security attacks in the Internet of Things has become an urgent problem to be solved. Abdullahi et al. [1] utilized artificial intelligence methods to detect the principles, methods, and experimental results of IoT network security attacks. The Internet of Things refers to a network that enables remote information transmission and intelligent management of items through the Internet, and is an extension and extension of the Internet. To verify the effectiveness of this method, we conducted a series of experiments. We used real IoT devices and datasets, and divided the datasets into training and testing sets. Various artificial intelligence algorithms were used for training and testing, including support vector machines (SVM), random forests, and deep learning. The experimental results show that this method can effectively detect IoT network security attacks, with an accuracy rate of over 90%. In order to discover abnormal behavior and network attacks. Moreover, CAD is gradually developing towards intelligence, automation, and personalization. In this context, applying ANN algorithm and IoT to artwork creative design can provide artists and designers with more efficient, accurate, and innovative design tools and methods. Microelectronic circuit design is an important component of modern electronic engineering. With the continuous progress of technology (CAD) tools in microelectronic circuit design is becoming increasingly widespread. Abugharbieh and Marar [2] explored the integration in microelectronic circuit design courses. By using high-precision design and simulation tools, design errors. Through parallel design and simulation, the research and development cycle can be shortened, and the time to market of products can be accelerated. By using advanced computer-aided design tools, students can master the latest design techniques and methods, thereby enhancing their innovation ability. In the course of microelectronic circuit design, it is very important to demonstrate the application of computer-aided design tools through practical application examples. For example, a simple digital signal processor (DSP) can be designed using integrated circuit design software, and then its functionality and performance can be simulated and verified using circuit simulation software.

Creative design of works of art is a field that highly depends on the creator's personality and aesthetic ability. However, the traditional creative design process of artworks is often limited by the knowledge and experience of the creators themselves, and it is difficult to achieve breakthroughs and innovations. IoT devices are collecting and generating a large amount of data at an unprecedented speed. These data contain rich information and value, but how to extract valuable information from them and make accurate predictions is an important challenge in IoT applications. Alsharif et al. [3] introduced machine learning algorithms for intelligent data analysis used in IoT environments and their applications in various practical application scenarios. The machine learning algorithm for intelligent data analysis is a technology that discovers patterns and patterns in historical data through learning, thereby predicting and analyzing future data. In the Internet of Things environment, machine learning algorithms can be used to analyze device operation data, predict device status and behavior, and optimize device operation efficiency. Moreover, due to the complexity and uniqueness of works of art, it is also difficult to evaluate and optimize works of art. Therefore, how to use CAD to assist the creative design of works of art and improve its innovation and attraction is an important issue in the current CAD field. In the manufacturing industry, smart helmets can monitor employees' safety status in real-time, improve production efficiency, and reduce accident rates. At the same time, by collecting employee behavior data, it provides a basis for enterprises to optimize production processes. In the field of transportation, intelligent helmets can detect the physiological conditions of drivers, such as fatigue and lack of concentration, and issue timely warnings to reduce the risk of traffic accidents. In the field of environmental protection, smart helmets can be used to detect environmental issues such as air quality and noise pollution, providing data support for government departments and enterprises, and assisting in environmental decision-making. In practical applications, Campero et al. [4] found that selecting appropriate sensors and AI algorithms is crucial. Firstly, appropriate sensor types and quantities should be selected based on actual needs. Secondly, by utilizing technologies such as deep learning to efficiently process data, accurate analysis results can be obtained. In addition, it is necessary to continuously optimize algorithms in practice to improve data processing efficiency and accuracy. The combination of ANN algorithm and IoT provides a new idea to solve this problem. ANN algorithm is a computational model that simulates the connection mode of human brain neurons. In the field of creative design of works of art, ANN algorithm can be used to learn and analyze a large quantity of works of art data, extract the creative rules and characteristics of works of art, and provide creative suggestions and optimization schemes for artists. ANN algorithm can extract the creation rules and characteristics of artworks by analyzing and learning a large quantity of artworks data, and provide creative suggestions and optimization schemes for artists. Combining ANN algorithm with IoT can give full play to their respective advantages and realize more efficient computer-aided creative design of artworks.

Chen et al. [5] used computer-aided design and metal 3D printing technology to prepare porous dental implants between connective tissues. Firstly, use computer-aided design software for model design and conduct simulation analysis to determine the optimal design scheme. Then, metal 3D printing technology is used to convert the model into a physical object, while post-processing the printed sample to obtain the final connective tissue porous dental implant. During the experiment, the prepared samples were tested, including porosity, mechanical properties, and other aspects. The experimental results indicate that computer-aided design and metal 3D printing technology can successfully prepare porous dental implants between connective tissues, with high porosity and excellent mechanical properties. Compared with traditional preparation methods, this technology has higher production efficiency and better processing accuracy. In addition, through the analysis of experimental data, it was found that this technology is highly feasible and can meet clinical needs. In this article, IoT is used to collect a large quantity of artworks data, including images, materials, dimensions and other information of artworks, as well as the environment and personal characteristics of artists during the creation process, to extract the creation rules and characteristics of artworks, and to use ANN algorithm to learn and predict. The three-dimensional reconstruction technology of mechanical parts based on two-dimensional images is particularly important. Huo and Yu [6] introduced the principle, implementation method, and application value of this technology. Through 3D reconstruction technology, designers can directly generate 3D models from 2D images, reducing the complex process from design to manufacturing and also reducing costs. Meanwhile, due to the ability to conduct simulation testing in a computer environment, the quality and performance of the product can also be improved. This technology allows designers to identify problems and make improvements early in product development, thereby reducing the time and cost of later testing and modification. Technology of mechanical parts based on 2D images can effectively extract feature information of parts from 2D images and reconstruct a complete and accurate 3D model of parts. Meanwhile, this method has high accuracy and efficiency, which can improve the efficiency of design, manufacturing, and testing in practical applications. Combining the model prediction results with real-time monitoring data, the process of art creation is optimized, including material selection, color matching, shape design and so on. According to the test results and assessment opinions, the model and optimization scheme are fed back and adjusted to continuously improve the efficiency and accuracy of computer-aided creative design of works of art. Hussain et al. [7] Traditional CNN models may not be entirely suitable for processing image data of solar cells. Transfer learning is a technique that applies knowledge learned from one task to another. We can use CNN models trained on a large-scale dataset (such as those trained on ImageNet) as pre trained models and apply them to the image classification task of solar cells. This can greatly reduce training time and improve the performance of the model. When training the model, we also need to consider some optimization strategies, such as selecting gradient descent algorithms, adjusting learning rates, early stopping, etc., to prevent overfitting and improve the model's generalization ability. Through the Internet of Things technology, we can collect real-time data on the working status of solar cells and conduct real-time monitoring and warning through trained models. Once abnormalities or signs of malfunction are found, maintenance personnel can be notified in a timely manner to intervene, in order to reduce downtime and reduce maintenance costs. Use regularization techniques such as L1 and L2 regularization to prevent overfitting of the model and improve its generalization performance. Consider using ensemble learning methods such as random forest and gradient enhancement to integrate multiple neural network models together to improve the classification performance of the model. Utilizing IoT technology to achieve real-time monitoring and feedback of artworks, obtaining richer datasets for more accurate modeling of creative designs of artworks. Combining interdisciplinary knowledge such as art, computer science, and psychology to better understand the creative design process of artworks and develop more innovative computer-aided creative design models. Through the above measures, we can further optimize the model structure and method parameters, improve the classification performance and application range of the model. At the same time, applying artificial neural network algorithms and the Internet of Things to artwork creative design can open up a new computer-aided creative design mode for artwork. Provide artists and designers with broader creative space and stronger creative tools. and the innovation and attraction of works of art can be improved. The research will provide artists with more efficient and convenient creative tools and methods, and promote the development and innovation in the art field. Due to the continuous progress of technology, ANN algorithm and IoT will play an increasingly important role in the creative design of works of art, providing artists and designers with more efficient, accurate and innovative design tools and methods. Aiming at the problem of artistic creativity and experimental design, this article has made the following innovations:

(a) This article applies the ANN algorithm and IoT to the field of artwork creative design, achieving a new mode of computer-aided artwork creative design.

(b) The study achieved the optimization design and experimental production of artworks through data collection, neural network model design, model training, and optimization steps.

(c) This model adopts a deep learning framework to construct the model, and uses appropriate optimization algorithms to train and adjust the model, improving the learning ability and prediction accuracy of the model.

(d) The research combines real-time monitoring data with model prediction results, achieving optimization of the art creation process and experimental production, and improving the innovation and attractiveness of the art.

The research aims to construct a computer-aided artwork creative design system based on ANN algorithm and IoT. This article first reviews and analyzes the application of ANN and IoT in artwork creative design, in order to understand the current development status and trends in related research fields; Then, a detailed introduction is given to the construction method and implementation process of the system, including data collection, neural network model design, model training and optimization, and functional implementation; Finally, the effectiveness and superiority of the system were verified through experiments, and the results were discussed and analyzed.

2 LITERATURE REVIEW

Data security and privacy protection have become urgent issues to be addressed. The decentralized, tamper proof, and transparent characteristics of blockchain technology provide new ideas for solving these problems. Kumar and Tripathi [8] proposed a framework based on deep blockchain, aiming to improve the data security and privacy protection level of industrial IoT systems. The Industrial Internet of Things connects physical devices through the Internet to achieve data collection, transmission, processing, and application. The increase in data value, data security and privacy protection face serious challenges. Traditional security technologies are no longer able to meet the needs of the industrial Internet of Things. Establish a distributed and decentralized security logging system using blockchain technology. In this system, all log information is encrypted and stored on the blockchain, ensuring the immutability and security of data. Then, we can use machine learning technology to intelligently analyze this log information, discover abnormal behavior, and issue warnings. Liow et al. [9] explore how to use machine learning technology to bring art works closer to design laboratories, thereby providing artists and designers with more creative possibilities and innovative space. Machine learning is an artificial intelligence technology that analyzes a large amount of data, automatically identifies patterns and patterns of data, and uses these patterns and patterns to predict and analyze new data. And reinforcement learning. Supervised learning refers to training based on known input and output data, adjusting model parameters to enable the model to predict the correct output results based on the input data. In the field of contemporary art, the combination of creativity and technicality in teaching has become the mainstream. This teaching method emphasizes that in artistic creation, not only should the creative thinking of the creator be unleashed, but also advanced technological means should be combined to achieve a perfect combination of art and technology. The widespread application of CAD software in contemporary art and design provides more possibilities for artists and designers. For example, through CAD software, designers can more accurately draw design drawings for model production and rendering. At the same time, the continuous updates and improvements of CAD software also allow designers to more freely unleash their creativity. Liu and Yang [10] explore a creative centered with the aim of providing reference for cultivating more innovative and practical design talents. Encourage students to learn across disciplines and integrate knowledge from different fields into design. For example, art students can delve into knowledge in fields such as engineering, physics, psychology, and cultivate the ability to think from multiple perspectives. Organize group discussions, collaborative learning, and other activities to enhance students' creative thinking abilities through mutual communication and learning. At the same time, team teaching can also cultivate students' communication and collaboration abilities, preparing them for future career development. Provide personalized guidance tailored to the different characteristics and needs of students. Teachers can develop personalized learning and career plans for students based on their interests, strengths, and industry trends.

Pelliccia et al. [11] has found that 3D factory simulation software can visually display factory layout, equipment, and process flow, making it easier for designers and relevant personnel to understand and evaluate design solutions. By simulating the process flow, designers can identify potential problems and bottlenecks before actual construction, thereby reducing the cost of modification and rework. By optimizing design and process flow, 3D factory simulation software can improve production efficiency and reduce operating costs, designing, and optimizing industrial premises, as well as achieving real-time interaction and collaboration between designers, producers, and managers in the product development process. This design method helps to improve the work efficiency of designers, reduce production costs, shorten product development cycles, it is possible to avoid costly rework and delays in the later manufacturing process, thereby reducing production costs. Designers consider more details and factors in their design, thereby improving product quality and market competitiveness. Through real-time interaction and collaboration, designers can quickly complete design proposals and collaborate with other department personnel on product development, thereby shortening the product development cycle. Pradhan and Dhupal [12] proposed a method for integrating simulation, modeling, and CAD to improve the design level and optimization efficiency of hot abrasive jet machining devices. Among them, the key technologies involved include the preparation and characteristic research of hot abrasives, simulation and modeling of jet machining processes, and structural design and optimization of devices. At present, there are some products for hot abrasive jet machining devices on the market, but overall, these products still have certain limitations in terms of performance, reliability, and adaptability. which leads to the curse of dimensionality in the data. How to effectively select features related to the target task has become an important issue in high-dimensional data processing. Filtering methods may remove important features, leading to a decrease in model performance. Although the wrapped method can find the optimal feature set, its computational complexity is relatively high. Although embedded methods can improve the performance of the model, they require additional training data and model parameter adjustments. Rj and Wei [13] using dimensionality reduction technology to project data into a low dimensional space, data complexity can be significantly reduced and data processing efficiency can be improved. High dimensional data is often difficult to intuitively understand and analyze. Dimension reduction technology can convert high-dimensional data into low-dimensional data, making data analysis more intuitive and simpler. By performing feature selection in low dimensional space, important features and relationships in the data can be better revealed, thereby improving the accuracy of feature selection. Interactive design allows designers to adjust and optimize design solutions in real-time, making the design process more flexible and efficient. This can remove irrelevant features while preserving important ones. In addition, the algorithm can also utilize interactive methods to optimize the feature selection process and improve the performance of the model.

High wrapping dough forming machine is an important food processing equipment that can quickly and efficiently shape dough into the desired product shape. In order to improve the performance and production efficiency of the equipment, Salahuddin et al. [14] used three-dimensional computer-aided design (CAD). Conceptual design of a high degree of envelopment dough forming machine using CAD software. The goal of the design is to achieve efficient and rapid dough formation, while ensuring that the formed dough has a high degree of inclusion. In order to facilitate operation and maintenance, we have designed the equipment as a modular structure, which is divided into a feeding module, a forming module, and an output module. Drawing inspiration from the forming principle of mechanical presses, we designed the forming module as a pressure roller with a mold, which rotates to press the dough into shape. In today's fiercely competitive market environment, excellent product design has become a key factor in driving enterprise development and improving consumer experience. Computer aided design (CAD), as the core of modern manufacturing technology, plays a crucial role in the design and production of high-quality products. Saleh et al. [15]. Innovative design concepts can make products stand out in the market and meet consumers' needs for freshness and personalization. Design that meets user needs focuses on the user experience and functional implementation of the product, in order to meet consumers' expectations for practicality and comfort. The aesthetic value of appearance design enhances the viewing value and brand image of the product, while durability and safety considerations ensure the long-term use value of the product. With the rapid development of technology, artificial intelligence (AI) and 6G Internet of Things communication technology have become hot topics in today's society. The goal of 6G is not only to provide faster data speed and lower latency, but also to build a comprehensive, intelligent, cloud based, and seamless Internet of Things, so that everything can be connected. At the same time, interactive installation art is constantly exploring new ways of expression and interactive forms. Wang and Cai [16] explored how to apply artificial intelligence to 6G IoT communication in interactive installation art to achieve a more efficient and intelligent interactive experience. By utilizing AI's deep learning technology and sensor data, installation art can achieve perception and interaction of audience behavior, thereby creating a more immersive artistic experience. For example, by analyzing the audience's movements, expressions, and sounds, artistic installations can generate corresponding feedback and achieve deep interaction between humans and machines.

Through extensive research and practice, computer-aided creative design of artworks has achieved certain results. CAD based on ANN algorithm enhances the innovation and attractiveness of artworks. By analyzing and learning from a large amount of artwork data, computers can extract the features and patterns of artwork, providing artists with more accurate design suggestions. However, computer-aided creative design of artworks also has certain shortcomings. The research in this article has made improvements in model generalization ability, real-time monitoring and optimization design, experimental design and assessment, and interdisciplinary cooperation, improving the efficiency and accuracy of computer-aided creative design of artworks.

3 COMPUTER ASSISTED ARTWORK CREATIVITY AND EXPERIMENTAL DESIGN OPTIMIZATION

Through IoT, a large amount of artwork data can be collected. These data not only include information such as images, materials, and sizes of artworks, but also include data on the environment and personal characteristics of artists during the creative process. After data collection, data preprocessing is required. This includes steps such as data cleaning, standardization, and normalization to ensure the accuracy and consistency of the data, providing high-quality datasets for subsequent model training. Then, the model is trained using the training dataset, and the weights and biases of the model are continuously adjusted through backpropagation algorithms to minimize prediction errors. The study applies IoT to real-time monitoring of the condition and environmental factors of artworks, and combines monitoring data with model prediction results to achieve optimization of the art creation process and experimental production. The convolution and pooling process of the ANN model in the computer-aided artwork creative design system is shown in Figure 1.

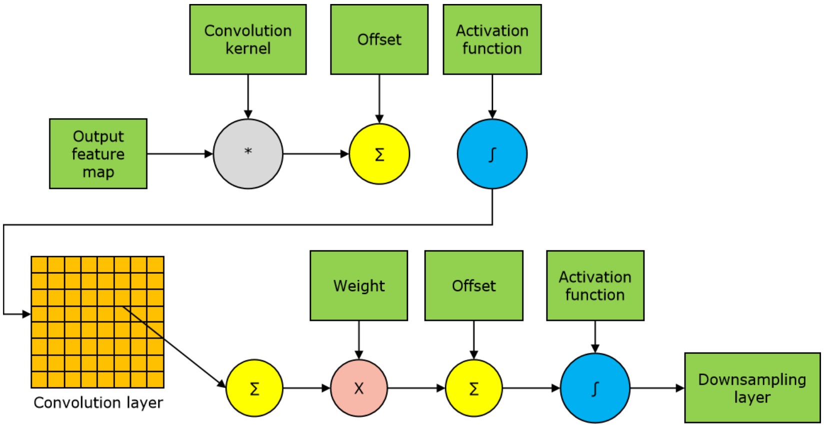

Figure 1: Convolution and pooling process.

$$F(i,j) = W_a(i,j) \times A(i,j) + W_b(i,j) \times B(i,j) \tag{1}$$

$W_a(i,j), W_b(i,j)$ is the weight coefficient of image A, B, and the weight coefficient is adjustable.

Using the hard threshold method to process the high-frequency coefficient $c_{j,l}$:

$$c'_{j,l}(x,y) = \begin{cases} c_{j,l}(x,y) & if \left|c_{j,l}(x,y)\right| \geq T_{j,l} \\ 0 & otherwise \end{cases} \tag{2}$$

Where $T_{j,l}$ is the threshold used by the coefficients in the frequency band of scale j and direction l.

According to the definition formula of image contrast, the directional contrast in wavelet domain is defined as:

$$R_j^i = \frac{D_j^i}{C_j} \quad i = 1,2,3 \tag{3}$$

For the high-frequency image, calculate the directional contrast of each frequency and direction according to the above formula. Based on the directional contrast, the wavelet coefficients of the fused image are determined.

$$D_{j,G}^i = \begin{cases} D_{j,I}^i & R_{j,I}^i \geq R_{j,I'}^i \\ D_{j,I'}^i & R_{j,I}^i \leq R_{j,I'}^i \end{cases} \quad i = 1,2,3 \tag{4}$$

By combining the model prediction results with real-time monitoring data, the process of art creation can be optimized. For example, when the monitoring data shows that the artist's creative style has changed, the model can adjust the prediction results in time to adapt to the new creative style. In addition, the model can be updated and optimized online by using real-time monitoring data. For example, when new artwork data appears, it can be incorporated into the training data set in time and the model can be retrained to ensure the accuracy and timeliness of the model. which defines a matrix of weighting coefficients. Convolution of this matrix with the image function can effectively reduce the noise in the image. In convolution operation, it is needed to copy the smoothing function periodically along the edge of the image to ensure that the whole image can be smoothed. In addition, in order to keep the image size unchanged, it is needed to carry out proper normalization in the convolution process. In order to suppress noise, the smoothing function can be convolved with the image function:

$$G(x,y,\sigma)=\frac{1}{2\pi\sigma^2}\exp\left(\frac{x^2+y^2}{2\sigma^2}\right) \tag{5}$$

$$\left|V^*\left(p^{'}\right)\right|\left(1-g^*(p)\right)< \sum_{p\in U(p)}\left(1-g^*(p)\right) \tag{6}$$

$$\Phi(p)=\begin{cases}1, & p\in M\\ 0, & p\notin M\end{cases} \tag{7}$$

When counting histograms, statistics are performed by assigning thresholds to gray-scale pixels.

$$p(\alpha_i)=\begin{cases}\frac{p}{h} & h_i>p\\ \frac{h_i}{h} & h_i<p\end{cases} \tag{8}$$

The quality and clarity of the image can be improved. Moreover, smoothing operations can also reduce the details in the image, making it smoother and softer. It should be noted that smoothing operations may lead to issues such as loss of image details and edge blur, so it is needed to choose appropriate smoothing functions and operation parameters based on the actual situation.

Distribute IoT nodes in a hierarchical structure, such as organizing them into a tree or mesh structure. This distribution method is suitable for situations that require hierarchical management and control, such as the need for hierarchical monitoring and management of artworks. The distribution of IoT nodes is shown in Figure 2.

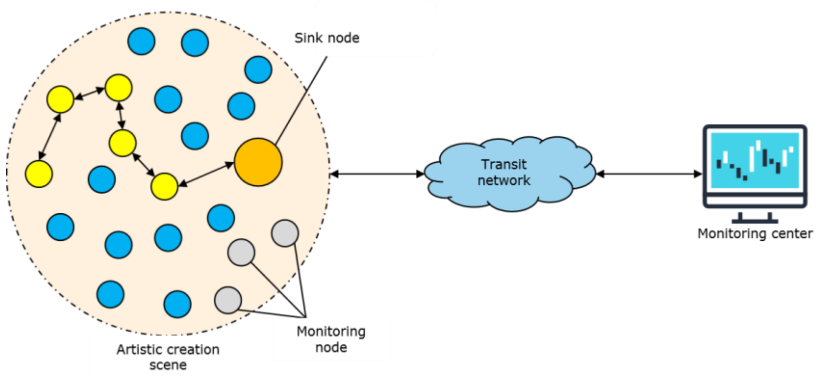

Figure 2: Distribution of IoT nodes.

$$X(k)=\sum_{n=0}^{N-1}x(n)W_N^{kn} \tag{9}$$

$$X^{'}(k)=\sum_{n=0}^{N/2-1}x(n)W_N^{kn}+W_N^{kn/2}\sum_{n=0}^{N-1}x\left(n+\frac{N}{2}\right)W_N^{kn} \tag{10}$$

4 RESULT ANALYSIS AND DISCUSSION

Firstly, a large quantity of art creation image data sets are collected, which can include various types of artworks. Moreover, it also collects data about art creation characteristics, which can include color, shape, texture and so on. The collected data are preprocessed, including noise removal, image enhancement, normalization and so on, so as to facilitate the subsequent model training and testing. The trained model is used to test the test set and evaluate the performance and accuracy of the model. Moreover, different models are compared and analyzed to choose the best model. This article designs an interactive scoring method for art creation CAD system, and evaluates the interactive performance and user experience of the constructed system through user feedback. Through comparative experiments, the advantages of the artistic image processing method proposed in this article in processing time are verified. Compared with SVM, it has obvious advantages and improves the processing efficiency and performance. The original IoT positioning algorithm is simulated on MATLAB software, and the calculated coordinates and the actual error value are calculated according to the actual position of IoT nodes, and the positioning error of the original IoT positioning algorithm is shown in Figure 3.

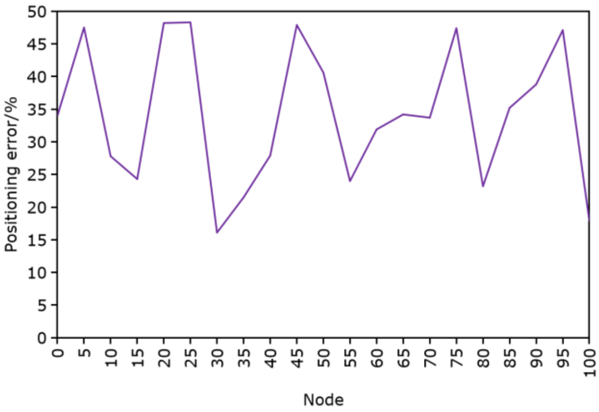

Figure 3: Error of original IoT positioning algorithm.

In IoT system, the signal propagation may be interfered by the surrounding environment and other signals, resulting in signal attenuation, multipath propagation and other problems. These interference factors may lead to a large error between the coordinates calculated by the positioning algorithm and the actual position. The signal sent by IoT nodes may gradually attenuate with the increase of distance. In addition, the signal may be affected by reflection, refraction and other factors in the propagation process. In the complex IoT environment, the signal may reach the receiver through multiple paths, which makes the receiver receive the superposition signal of multiple paths instead of a single path signal. The multipath effect may lead to the deviation of the coordinates calculated by the positioning algorithm, thus resulting in a large error.

In this article, the original IoT localization algorithm has been optimized, and the optimized algorithm is run in MATLAB software environment, and the results are analyzed. The operation result of the optimized IoT positioning algorithm is shown in Figure 4.

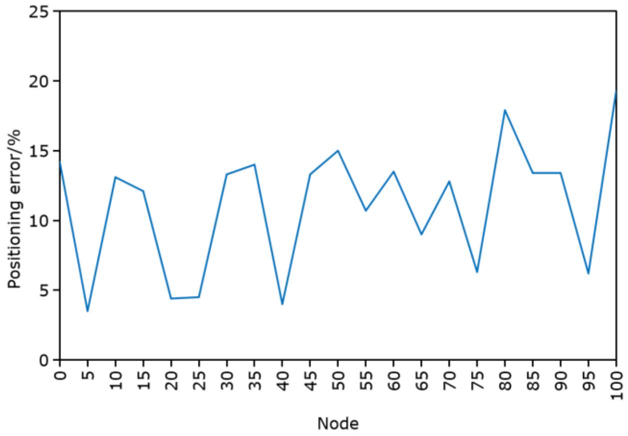

Figure 4: Error of improved IoT positioning algorithm.

In the original algorithm, factors such as signal propagation interference, signal attenuation and multipath effect may lead to large errors. By adopting advanced signal processing technology, such as filter and spread spectrum communication, the influence of these factors can be reduced, thus reducing the error value. By fusing the data of multiple sensors or positioning systems, the reliability and accuracy of the data can be increased. By improving and optimizing the original IoT positioning algorithm, and adopting advanced signal processing technology, auxiliary positioning technology and data fusion technology, the error value of the simulation results of the improved IoT positioning algorithm on MATLAB software is reduced by about 10%. This result shows that the improvement measures of the algorithm are effective, and the positioning accuracy is improved to some extent.

Figure 5 shows the precision of different algorithms for art creation feature recognition. The improved algorithm has higher recognition precision in art creation feature recognition, and the error is reduced by more than 20% compared with the traditional algorithm.

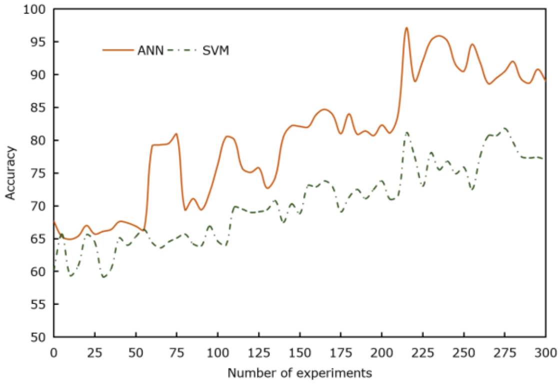

Figure 5: Precision of art creation feature recognition.

The improved algorithm may adopt ANN technology, which can automatically learn feature representation from a large quantity of data, so as to better capture the edge contour and other features of art creation images. In contrast, the traditional algorithm may need to manually design the feature detection method, which is prone to omission or false extraction.

The CAD system of art creation has strong interactive ability and good user experience. Compared with other systems, the interactive score of this system is higher (Figure 6), which shows that users have given higher assessment to the interactive performance and user experience of the system.

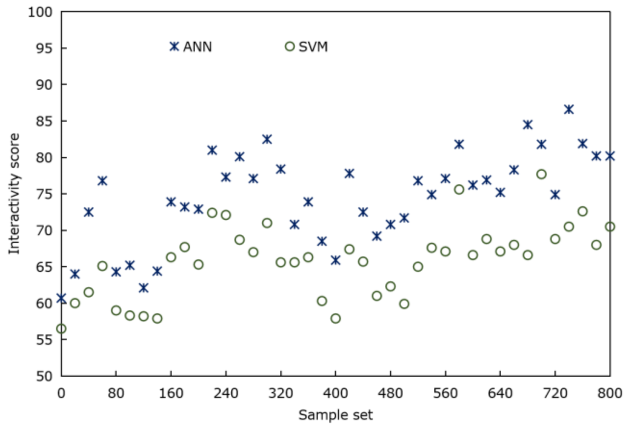

Figure 6: System interactivity score.

The system may have powerful interactive functions, such as real-time feedback and natural language processing. The system adopts efficient algorithm and computing power, which makes it possible to respond quickly and give results when dealing with art creation tasks. This efficient computing power can improve the work efficiency of users, and then improve the user experience. Compared with other systems, the interactive score of this system is higher, which shows that users give higher assessment to the interactive performance and user experience of the system.

Figure 7 shows the time comparison of different image processing methods in enhanced image processing. The time comparison of different image processing methods shows that SVM algorithm needs more time and computing resources to process images. In contrast, the ANN algorithm is optimized for the characteristics of artistic images, reducing unnecessary processing steps and calculation.

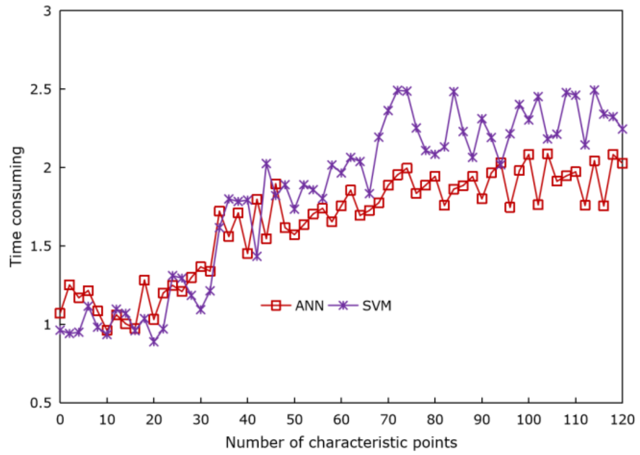

Figure 7: Image processing time of different algorithms.

SVM: The more pixels of feature information, the longer it takes. This may be because conventional methods usually require more calculations and steps to process images. ANN: Although the time required increases with the increase of pixel quantity of feature information, it still has obvious advantages compared with SVM. This may be because the method proposed in this article optimizes the characteristics of artistic images and reduces unnecessary processing steps and calculation. In addition, more efficient algorithms and calculation methods may be adopted to improve the processing speed.

According to the interactive assessment results of art creation CAD system, the art creation CAD system constructed in this article has strong interactive ability and good user experience. This is due to user-friendly interface design, powerful interactive function, efficient algorithm and computing power, and good scalability and flexibility. Compared with other systems, the interactive score of this system is higher, which shows that users give higher assessment to the interactive performance and user experience of the system. In the aspect of image processing time, ANN algorithm is optimized according to the characteristics of artistic images, which reduces unnecessary processing steps and calculation, and improves the processing speed. Through the optimization of ANN technology and interactive ability, the performance and user experience of art creation CAD system can be further improved. The system can be applied to the creative design, experimental creation and image processing of artworks, providing more efficient and intelligent auxiliary tools for artists and designers.

5 CONCLUSION

Creative design of works of art is a field that highly depends on the creator's personality and aesthetic ability. However, the traditional creative design process of artworks is often limited by the knowledge and experience of the creators themselves, and it is difficult to achieve breakthroughs and innovations. This article studies the use of ANN and IoT in computer-aided creative and experimental design of artworks. By applying ANN algorithm and IoT to creative design of artworks, a new mode of computer-aided creative design of artworks can be realized, and the creativity and attraction of artworks can be improved. The interactive performance and user experience of the constructed system are evaluated by user feedback, which proves that the system in this article has strong interactive ability and good user experience. In the aspect of image processing time, ANN algorithm is optimized according to the characteristics of artistic images, which reduces unnecessary processing steps and calculation, and improves the processing speed.

The research work shows that ANN can provide strong support for computer-aided artistic creativity and experimental design, and the performance and user experience of art creation CAD system can be further improved through the optimization of deep learning technology and interactive ability. In the future research, we can combine more knowledge of art field, AI technology with art theory and practice, and provide more intelligent auxiliary tools for artists and designers. Through further research and practice, it is expected to bring more abundant and effective technical support to the field of computer-aided art design.

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