Design and Implementation of Art Design System Based on Artificial Intelligence Processing Technology

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Abstract: In the process of art design, it is difficult to transform music into image or image into music. However, the intervention of artificial intelligence makes this transformation very easy to achieve. Based on the above background, this paper designs and implements an art design system based on artificial intelligence processing technology. Artificial intelligence technology is helpful to the creation of art design. Firstly, this paper summarizes, summarizes and analyzes the corresponding relationship between art design and system design; secondly, it analyzes the feasibility of applying multi information fusion technology to art design of artificial intelligence processing technology; finally, it uses artificial intelligence technology to accurately depict the art design model of data layer, feature layer, decision layer and multi information fusion, and constructs the art design model based on artificial intelligence processing technology. The model includes data layer, feature layer and decision layer. Among them, RBF neural network, which can deal with nonlinear problems, has the ability of self-learning and fault tolerance, and can quickly make fault classification, is used to build the art design system model of the data layer. At the same time, the integration design test of data layer, feature layer and decision layer is carried out for the art design system model based on artificial intelligence. The experiment verifies the accuracy and timeliness of the art design system model.

1. Introduction

Art design includes urban planning, design aesthetics, environmental ecology and human behavior. Taking ecological design as an example, ecological design widely uses indoor and outdoor environment, and uses art design to meet people's functional use and visual beauty needs [1]. Through the development of artificial intelligence processing technology in computer, the application of graphics and artificial intelligence processing technology in art design can improve the artificial intelligence and real-time processing ability of art design. The research of artificial design system based on machining technology has broad application prospects [2].

Artificial intelligence art design system is an important part of the new cultural industry, which is a typical example of the combination of art and technology. This is a new field developed by traditional visual art and video art. Artificial intelligence art design system is not only a new art form, but also a basic technology including all aspects of the new cultural industry. It has gradually affected many aspects of people's material and cultural life, and is an important new field in the cultural industry. Rand. Direction of development [3-4]. The biggest characteristic of AI art design system is the interaction with the audience [5]. These interactive features with artificial intelligence change the passive disadvantages of the original media communication mode, fully mobilize the enthusiasm of the participants and greatly increase the interest of the audience, which is the source power of the development of artificial intelligence art design system [6].

Firstly, this paper summarizes, summarizes and analyzes the corresponding relationship between art design and system design; secondly, it analyzes the feasibility of applying multi information fusion technology to art design of artificial intelligence processing technology; finally, it uses

artificial intelligence technology to accurately depict the art design model of data layer, feature layer, decision layer and multi information fusion, and constructs the art design model based on artificial intelligence processing technology.

2. Method

Artificial intelligence is to imitate the working mechanism of human brain according to the prior knowledge of experts on the basis of independent data model and limited by detection equipment, which can improve the accuracy and intelligence of art design. Among them, neural network learning, support vector machine and evidence theory are all important knowledge points applied in this chapter, which are the main methods of intelligent art design.

2.1 Basic Theory and Method of RBF Neural Network

RBF neural network is a regression algorithm of supervised learning method in artificial intelligence. Its nonlinear ability is very suitable for the data layer of multi information technology. RBF neural network simulates the characteristics of human neural system. It uses neurons as the basic unit of information processing in neural network [7]. It has a lot of information processing capabilities and corresponding characteristics, such as the easy to make neurons, the intrinsic excitation and inhibition state of neurons, the delay and fatigue of neuron synapses, the easy to learn habits, the easy conversion of neuron pulse and potential, etc, These are the advantages of neurons in the process of information processing[8]. A large number of processing units are connected with each other, and the artificial neural network has the basic characteristics of abstract thinking, simulated thinking, simplified thinking and so on. It also has strong self-organization, self adaptation, input and output, parallel processing, easy learning and training functions. Neural BP network is a kind of classic multilayer feedforward neural network. This is the use of an error back propagation algorithm [9]. The stimulation function of BP neural network is usually s function (signal function). The structure of BP network includes input layer, hidden layer and output layer. RBF neural network (radial neural network) is a kind of forward network, its excitation function is usually Gaussian function, and its performance is good. Simple training, the best approximation, in overcoming the smallest problem to play an outstanding performance. It has been proved that RBF network has global approximation, compact topology, fast convergence speed and improved BP function, and can approximate any continuous function with any precision. Due to the lack of network, the structure parameters can realize individual learning. Nowadays, RBF neural network has been widely used in the fields of artificial intelligence processing technology, pattern recognition and nonlinear control [10]. In this paper, RBF network will be used to solve the data layer diagnosis of gasoline art design and art design.

Different from BP, RBF neural network is a forward neural network. It consists of three networks, including input layer, hidden layer and output layer. The input sample data is transmitted to the hidden layer through nonlinear mapping, and finally to the output layer through linear mapping. In the hidden layer of RBF neural network, Gaussian function is used to locally excite the input samples to realize the high-precision training of any continuous function.

2.2 Basic Theory and Method of SVM

Support vector machine (SVM) is a classification algorithm for teachers and learners of artificial intelligence. There are specific teachers who can classify and learn data according to their learning methods. That decision state is to solve the largest peripheral hyperplane of the learning sample. SVM adopts the decision-making principle of the optimal classification surface to minimize the sample error points and further reduce the threshold value of model prediction error, so SVM shows good performance in dealing with non-linear, small sample and high-dimensional data information. Compared with neural network, SVM can overcome the shortcomings of low generalization ability and easy to fall into the optimal solution by self-learning. So it becomes a research hotspot in machine learning.

SVM is based on statistical theory, and the core idea is to construct the optimal classification

hyperplane. Because the artistic signs (phenomena) of art design are often non-linear, SVM can exchange through kernel function, map the sample data information to high-dimensional space, and construct the optimal classification hyperplane to complete the operation. The idea of dimension reduction is very important. It can solve the problem of falling into local optimal solution like neural network learning. The structure of SVM discriminant function network is similar to that of neural network.

The training sample set is defined as:

$$\{(x_1, y_1), (x_2, y_2), ..., (x_n, y_n)\}, x \in R^D, y \in \{-1,1\} \tag{1}$$

Where D is the number of sample features, n is the size of sample space, and Y is the sample category (only two types).

3. Experiment

Step 1: For the feasibility analysis of art design based on multi information fusion, the purpose and requirements of multi information fusion technology and art design are the same. Art design also forecasts, analyzes and judges art design according to the data source. The processing process is also data processing (collection, processing), analysis and search for the reasons of art design, clear the reasons of art design and accurately locate the specific parts where the design occurs. All kinds of reasons for the emergence of art are artistic reasons. All kinds of artistic reasons correspond to the characteristic data or source data of multi information fusion. They are the specific activity characteristics of each unit of art design reflected by various sensors. The screening and integration results of information sources by using the data layer and characteristic layer of multi information fusion technology are similar to the data processing methods of art sources.

Step 2: Reflect the operation state of art design through various information. According to the data abstraction level, the multi information fusion art design model constructed in this paper can be divided into three levels: data layer, feature layer and decision layer. The model can deal with non-linear problems, has self-learning ability and fault tolerance ability, and can quickly make the art classification neural network to build the fusion diagnosis model of data layer; and uses the multi art classification algorithm of support vector machine suitable for small sample decision-making, Building the fusion diagnosis model of feature layer, using the decision layer fusion diagnosis model which has more advantages in expressing uncertainty, integrating the information source results of data layer and feature layer fusion to further improve the accuracy of art design.

Step 3: According to the sorting and analysis of art design principles, there are differences in the information source data of art design in various working environments and different working states. The signal data information of art design under different working conditions is collected. The RBF neural network nonlinear mapping artificial intelligence regression algorithm is used to build the art design model of art design data layer to reflect art classification quickly and efficiently. The data layer data of multi information fusion is the related parameters of the sensor, which has the characteristics of complete preservation of the original data and large amount of information. Due to the good fault tolerance and redundancy ability of RBF neural network data, it provides a good fusion processing ability for the data layer.

4. Discuss

4.1 Analysis of Artificial Intelligence for Art Design

Artificial intelligence plays an important role in the production of works. Through artificial intelligence technology, artists' internal thinking can be fully reflected. For example, painting created by deep learning algorithm, in which music is made by using artificial intelligence, poetry image is drawn by using artificial intelligence, etc., is mainly based on human brain by using artificial intelligence technology. Combination of creativity and artificial intelligence technology. In recent years, the application of artificial intelligence in art design statistics is shown in Figure 1.

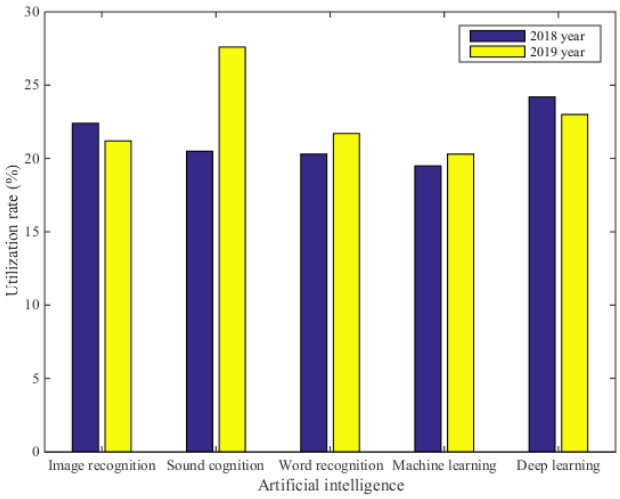

Figure 1. Utilization of artificial intelligence in art design

Artificial intelligence technology has a good influence on art design, not only in art design, but also in art education. Through artificial intelligence technology, we can effectively improve students' art knowledge, help students to accumulate more practical experience in a short time, and lay a foundation for future art design.

4.2 System Test and Result Analysis

In order to test the application performance of the system designed in this paper in the realization of artificial intelligence processing technology and art design, simulation experiments are carried out. The comparison between the art design system of AI processing technology and the traditional art design system is shown in Table 1.

Table 1. Comparison of art design system of artificial intelligence processing technology with traditional art design system

Compare content	Artificial Intelligence Art Design System	Traditional art design system
Degree of intelligence	High	Low
Accuracy	High	Medium
Real-time	High	Low
False alarm rate	Low	High
System cost	Low	Higher
Degree of manual intervention	Low	Higher

Characteristic level and decision-making level. Among them, it can deal with non-linear problems, have self-learning ability and fault tolerance ability, and can quickly make art classification neural network to build a fusion art design system of data layer; it uses support vector machine algorithm which is suitable for small sample decision-making and has strong generalization ability to build a fusion art design system of feature layer; Using the evidence theory, which has more advantages in expressing the uncertainty, to construct the fusion art design system of the decision-making level, using the fusion results of the data layer and the feature layer as the evidence, further improving the accuracy of the art design system.

The art design system of artificial intelligence processing technology involves hardware resources and software technology, working principle of key research, and some key technologies of software development. This paper studies the visual programming model based on nodes, including the research background, the definition of basic concepts, the abstraction of application logic and the significance of research. Based on artificial intelligence processing technology, the art design system is designed and implemented, including the definition of basic data types, the execution mechanism of nodes and scenes, and the efficiency analysis of the model. This paper

introduces the implementation details of each subsystem of AI art design system, including the design of interactive creation environment, the design of visual interactive subsystem, the plug-in architecture of the system and the design details of each functional plug-in.

Conclusion

In this paper, the feasibility of the integration of multi information fusion technology and art design system. Research and compare the scene of neural network and support vector machine, compare BP and RBF, SVM and SVM + PCA and other technologies. Select the most suitable technology for each level of multi information fusion model, and lay a good foundation for the art design system of artificial intelligence processing technology. The algorithm space complexity of data layer fusion design based on neural network and feature layer fusion art design based on SVM is high. We hope to reduce the algorithm space and time complexity by improving the algorithm. How to apply the intelligent algorithm to the art design system is the future research direction.

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