Design of environment art design element mining system based on deep learning

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Combined with the development requirements of current environmental art mining system, the design method of environmental art design element mining system based on deep learning is optimized, and the hardware configuration of environmental art design element mining system is introduced. Combined with the principle of deep learning, the system software operation algorithm and function are improved, so as to improve the effect of environmental art design element mining, Ensure the operation effect of the system to the greatest extent. Finally, the experiment proves that the environment art design element mining system based on deep learning has high effectiveness in the practical application process, which can better guide the design of environment art and fully meet the research requirements.

Keywords: deep learning; environmental art; element mining;
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INTRODUCTION

The reason why environmental art design has become the focus of human living environment is that the public lacks the necessary respect for the ecological environment. At present, the society generally pursues luxury, novelty and fashion, blindly consumes and designs, shortens the life cycle of products, and there is a large amount of construction waste and synthetic materials used in modern decoration design[1]. The ecological concept in environmental art design is a new discipline which is born under the background of disharmony between such social development mode, human life style and environment. It has three related functions: first, enriching the theme of the environment and highlighting the characteristics of the environment; second, improving the material, spiritual and social quality of the environment; third, enhancing the identifiability of the environment[2]. The relationship between environmental art design and ecological concept is dialectical and developmental. People's environmental design concept has a decisive impact on the characteristics of environmental design, and excellent environmental art design can guide people's environmental design concept to change, improve people's aesthetic level, and then achieve the purpose of edifying sentiment, beautifying life, improving people's awareness of environmental protection and sustainable development[3]. Environmental art element mining is a process of extracting hidden, unknown and potentially useful information and knowledge from a large number of incomplete, fuzzy and random data. Effective use of these data implied, valuable knowledge, resulting in the embarrassing situation of data explosion and knowledge poverty[4]. The use of a variety of environmental art mining system tools is a powerful means for people to get rid of this embarrassing situation, because environmental art mining system tools can help people intelligently and automatically discover the potential knowledge left in the massive data for analysis and decision-making.

DESIGN OF ENVIRONMENT ART DESIGN ELEMENT MINING SYSTEM

Hardware Design of Environment Art Design Element Mining System

The purpose of environmental art mining is to discover knowledge in the huge database and preprocess the data: the amount of data in the database is extremely large and complex. Therefore,

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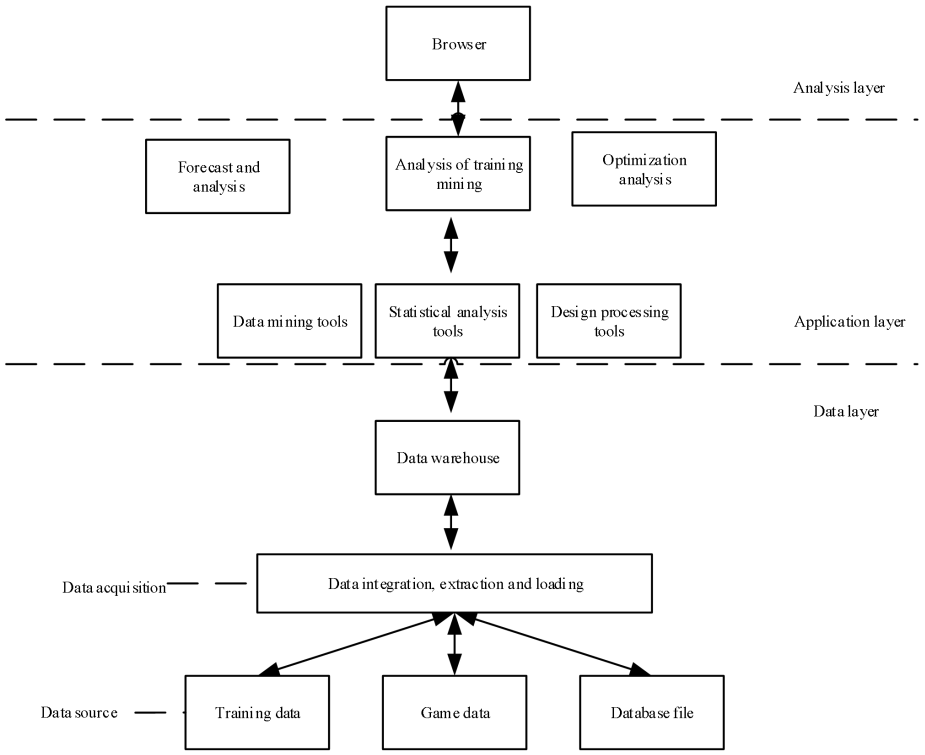
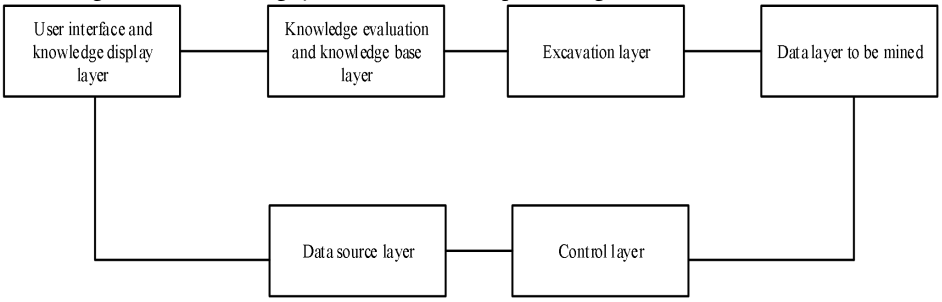
in order to improve the efficiency of mining and achieve the purpose of mining, it is necessary to preprocess the data, which mainly includes data collation, integration, screening, conversion and so on. In the aspect of data arrangement, it mainly includes deleting redundant data, merging data items, checking and correcting data information, etc[5]. After that, it is necessary to integrate and filter the data from different sources, and filter the data to select the data types that meet the search requirements. In general, the mode evaluation is based on a certain value standard and the corresponding reference materials to analyze the rationality of the results. Generally speaking, the process needs to interact with the environmental art mining module to refer to the corresponding reference materials Interest degree, the search results are directly located on the points of interest, using the three-tier structure of B / S mode, the background database storage and mining data as a reference, the deep learning data engine SDE as a connector[6]. In this application server, it configures with the corresponding data, and stores the client, file and description file of environmental art mining on the server, so that multiple clients can visit the environmental art page at the same time, and stimulate to download the client related to environmental art mining. The functional framework of the system is mainly composed of the following three parts, as shown in Figure 1.

Fig. 1
Overall structure framework of the system



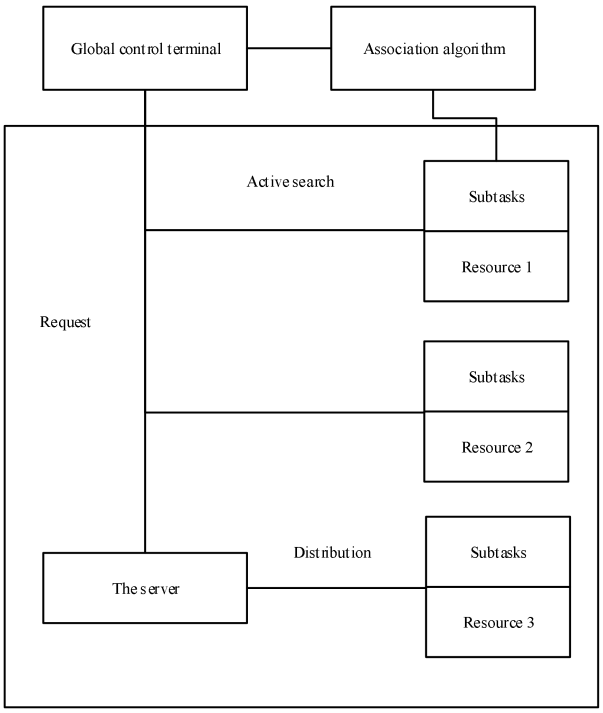
It can be seen from the figure that: environment art design element label and human-computer interaction module based on deep learning are the core modules of the whole system. Arc SDE is used to complete the information extraction of environment art mining, and the components in the module are used to mine the results of the original environment art, in which the application layer environment art server is responsible for receiving the information from coaches, training centers and Sports Bureau decision-makers[7]. The request from the browser is sent back to the browser according to the data obtained by the database server, so as to realize the design of the system framework. Single database / data warehouse environment art mining system is a mature environment art mining application system. Many environment art mining applications are based on this structure[8]. Through the analysis of the current major environmental art mining systems, we can find that the centralized data mining architecture is as follows:

Fig. 2
Architecture of centralized data mining



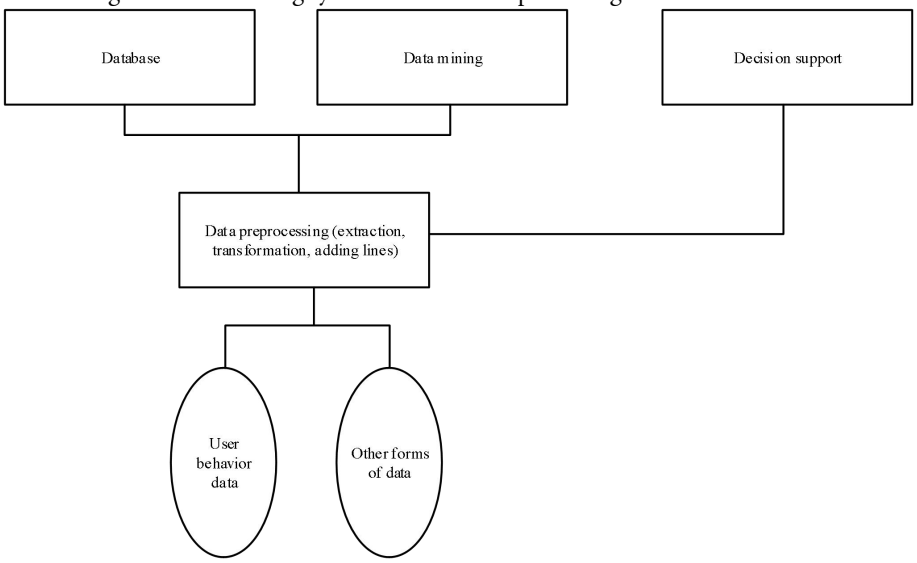
The task is divided into several sub tasks and processed separately. The task allocation of data resources is relatively transparent. During the period of environmental art mining, its resources will change greatly[9]. Therefore, we need to use the global control end to ensure the safety of data use, such as data resource redoing, partial resource revocation, etc. Therefore, it is necessary to further optimize the structure of environment art element mining processor, as shown in the following figure:

Fig. 3
Processor structure optimization of environment art element mining



The research of environmental art mining service mode needs to obtain data resources first, based on the resources, implement environmental art mining service, and finally release resources for other users' reference[10]. The characteristic of environmental art mining system in the analysis of user behavior is that it takes the acquisition of user's relevant data as the primary purpose, through the processing of the data, it can be transformed into a form suitable for the database to organize and store. This step is to preprocess the data and remove the noise and redundancy of the original data[11]. In the aspect of data preprocessing, there are three steps, namely: data extraction, data conversion and data loading, to further optimize the structural model of the data mining system, as shown in the figure 4.

Fig. 4
Structure model of data mining system



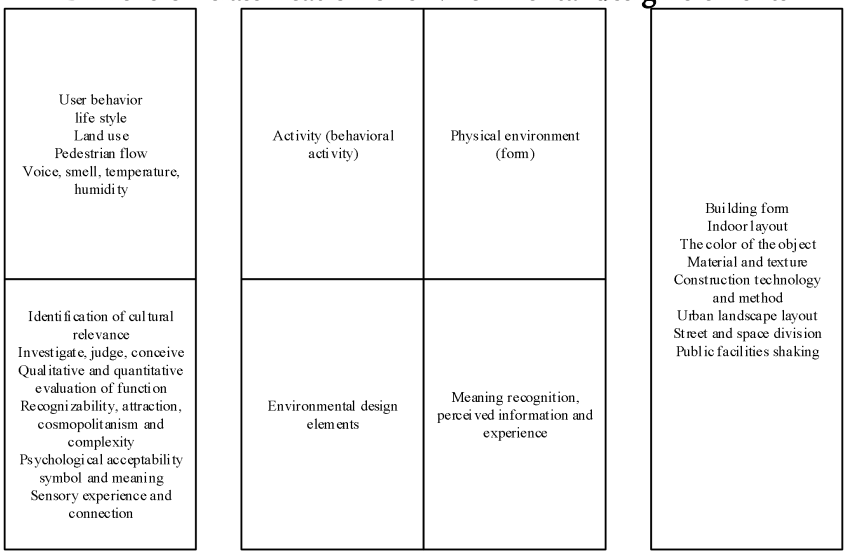
As shown in the figure, the structure model of data mining system can be divided into seven main points: data clustering, association, classification, regression, prediction, sequence analysis and deviation analysis[12]. Through these seven points to complete the data mining work, so as to achieve the purpose of mining useful knowledge, in order to provide theoretical support for decision-makers, and finally to provide reference for decision-making.

Function Optimization of Mining System Software

Data mining is essentially a process of knowledge mining. This algorithm mainly uses the method of data statistics and analysis to effectively search the valuable and meaningful information in the database. However, due to the large size of the database and the complex amount of data in it, it is undoubtedly difficult to carry out mining with the traditional search mode. Therefore, compared with the traditional search method, the data mining system has a different form of realization, that is, the data mining model. The characteristic of data mining model is that it can build specific data mining model according to different search requirements. Have flexibility and adjustment namely sex. Generally speaking, a data mining model that is more suitable for solving customer problems can be created according to the specific needs of customers, and the model itself can be combined with the actual work. The research on the mining and visualization of environmental art design elements is a systematic project, involving data integration, algorithm development, application improvement and model integration. It needs the integration of interdisciplinary and multi-technical means, and the organic combination of theoretical research and engineering construction. Therefore, it needs a unified planning and gradual implementation[13]. According to the task flow, the theoretical framework of environmental art design element mining and its visualization research can be roughly divided into four levels: data source, data warehouse, algorithm layer and expression layer. Among them, the data source and data warehouse layer are the bottom and foundation of environment art mining, and the data is integrated into standardized, standardized or structured intermediate products through specific patterns. Several mature data set patterns are described, including Federation pattern, middleware pattern and data warehouse pattern[14]. Then, according to the multi-source and heterogeneous characteristics of environmental art design elements, through the analysis of several integration modes of multi-source environmental art design elements, the basic characteristics and similarities and differences of multi-source environmental art design elements integration approaches are summarized. On this basis, the integration of data integration for data warehouse is discussed, and the overall framework of data integration for data warehouse is proposed[15]. Finally, the multidimensional data model of environmental art design element warehouse and the construction method of environmental art design element cube are studied, and an OLAP analysis application based on environmental art design element cube is given. These methods are classified from three dimensions: method attribute, design process and design object. From the method attribute dimension, the design method is divided into qualitative method, quantitative method and mixed method; from the design process dimension, based on the "double drill" model, the design process is divided into four stages, namely exploration, definition, development and delivery. From the design object dimension, the environmental design element dimension classification model is proposed, as shown in the figure 5.

Fig. 5

Dimension classification of environmental design elements



This model divides the elements of a place into three parts: the physical environment, which corresponds to the form, including the shape generating technology of buildings and public facilities, the use of materials, furnishings, the use of colors, the division of urban streets, and the spatial layout; activities, that is, the behaviors, activities, and lifestyles of people or users in the environment, plus the activities in the environment[16]. Three elements, such as temperature, humidity, smell, sound, traffic flow, also belong to the category of activity objects. At the meaning level, the local cultural beliefs are considered in the early stage of the design, and the new scheme is finally conceived by investigating the design objects, collecting information and judging the research results; at the late stage of the design, the design scheme is reflected, and its functionality, usability, perception in the process of use, association with the environment and experience are evaluated[17]. The environmental art mining system is divided into two stages, the environmental art mining task determination stage and the environmental art mining task execution stage. First of all, according to the defined problem to clear the environmental art mining task, such as classification analysis, deep learning discovery, clustering analysis or sequential pattern discovery; after the environmental art mining task is determined, we can decide which algorithm to use for data analysis to get the results of environmental art mining[18]. Data preparation can be divided into three steps: data selection, data preprocessing and data transformation. The mining layout function is further described as follows:

Table 1
Function description of data mining information layout

function	explain
Data selection	The process of determining target data for data mining tasks from raw data.
Data preprocessing	It includes data type conversion, filtering noise, deducing missing data, eliminating duplicate records and so on, which provides clean and effective data for data mining algorithm.
Data transformation	In order to reduce the number of features or variables to be considered in data mining, it is necessary to find the really useful features from the initial features.

Environmental art mining is a special type of mining. The data to be mined is no longer obtained from the specific database, but from the environmental art web page. With the development of computer and Internet technology, the main way for people to obtain information is from the Internet. This method is simple and fast, but at the same time, due to the rapidity of the network, the growth rate of data information is very fast, and it is very difficult to dig out the relevant information. At present, the characteristics of environmental art mining elements can be divided into three categories, as shown in the following table 2.

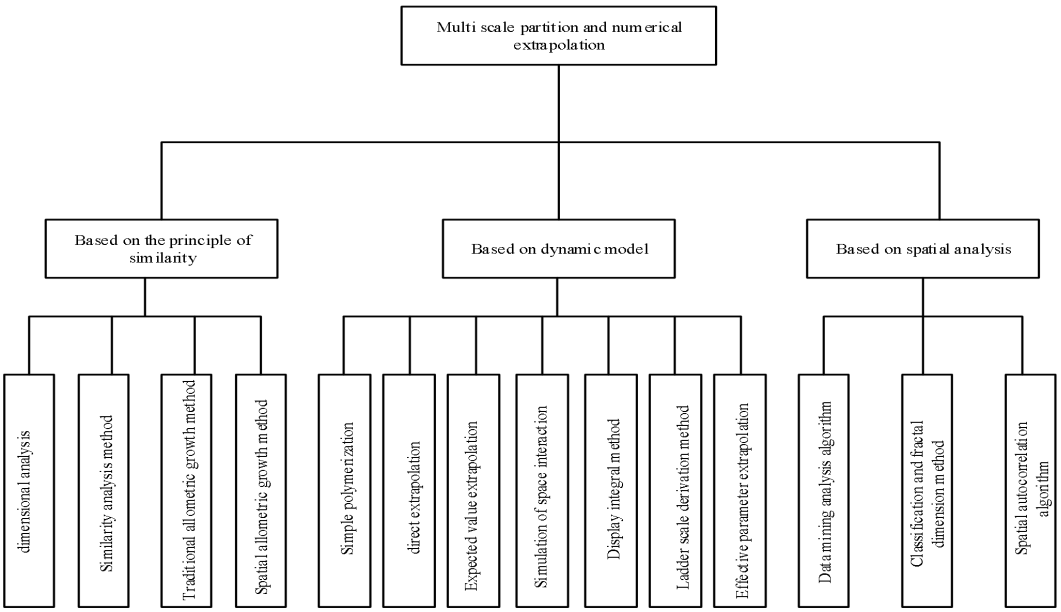
Table 2
Feature classification of environmental art mining elements

type	data	Data characteristics	Form of expression	method	application
environmental art Content mining	Text document	Unstructured; semi-structured	disorder /Ordered word	Machine learning;	Classification; search for

			set term phrase relation curve	statistics; deep learning and deformation	extraction rules; search for text patterns
environmental art Structure mining	Link structure	Link structure	Topology diagram	Mining algorithm	Classification; clustering
environmental art Log mining	environmental art Server log, proxy log, buffer log	Access data (this data)	- Statistical analysis; deep learning; clustering		Personalized site; site structure management

Furthermore, the principle of inclusion degree and constraint to algorithm are introduced to calculate the classification level of multi-scale environmental art mining. One or more attribute eigenvalues in the environmental art mining level are discretized, and the preference order relationship of environmental art mining is recorded[19]. A four level multi-scale information data set is constructed, and the data set is trained to obtain the classification mining model. To further understand the data information mining value, linear programming is carried out for discrete distribution and unsmooth information value, and scale up conversion and scale down conversion are carried out. The specific conversion steps are shown in the following figure:

Fig. 6
Multi environment art element feature mining method



Combined with the numerical processing principle of multi-element characteristics of environmental art, the mining process of multi-scale environmental art is further optimized, which can be divided into the following steps

Step 1: the data to be mined are characterized by multiple environment art elements, and the multi-scale feature data set is established according to the value of each scale hierarchical relationship.

Step 2: reasonably select the basic criteria and scales, and standardize and compare the special data after mining.

Step 3: divide any scale, use the mining features to calculate, and use the scale conversion system to deduce the mining results or knowledge from the basic criteria scale to the target scale repeatedly.

The design of the processing flow, basically is to take the XML file as the processing object, complete the data download, integration, reduction and other work, and finally concentrate the effective information in the database, to make a good foundation for data mining. The main work flow is roughly as follows: first, read the internal information of the XML file, fully analyze the address text downloaded in advance, and finally generate the address text containing useful information In this process, data cleaning, data integration, data transformation and data specification are mainly used. Among them, the data cleaning is to clear the duplicate values and noise data in the data. The purpose of data cleaning is to complete the unified standardization of the data and delete the abnormal, wrong and duplicate data. After the completion of data cleaning, all the data are grouped together and stored in a unified way, which can also be regarded as the establishment of the database Data storage warehouse, when the data is completely stored in the database, it will be transformed through a special way, from data to a more suitable data

format for mining system. The data obtained through various forms are expressed by relevant technologies through conventions. In our data mining, the flow of data volume is very large, which causes a lot of work pressure for data mining. After reduction, the data is much simpler than the original data volume on the basis of maintaining the original integrity, so it can be greatly compressed Mining time, improve mining efficiency.

Realization of Mining Environmental Art Design Elements

According to the similarity of feature values in the mining data, a simulation model is constructed to realize the visualization goal of environmental art mining. Because the traditional environmental art mining algorithm is often limited to the three-dimensional simulation module numerical information dimension, it is difficult to ensure the accuracy and effectiveness of environmental art mining[20-21]. Therefore, according to the similarity characteristics of the data itself, hierarchical measurement is carried out on different scale data layers. Mining the contribution value of the known data samples, considering the common characteristics of the known data samples to be mined and the distribution characteristics of the scale convenient grid boundary information, the absolute environment art mining steps are standardized, so as to better measure the known sample data characteristic information, and standardize the contribution degree and characteristic value of the mining data sample information, so as to improve the overall data characteristics and distribution Taking the trend as the starting point, considering the changes of the samples to be mined, the data to be mined and the feature data nearby, the paper defines and standardizes the method of environmental art mining environmental art element feature. Let f(y)=Y, where y is the known sample in the data to be mined. Through the function f mapping, the candidate sample set o of the sample x to be mined is obtained. If the value range of function f (y) can be represented by a triple (L， T， W), and in the triple, $L=(l_1,\ l_2,\ l_3,...,\ l_n)$, N scale feature layers of environmental art mining can be normalized according to certain data feature mining conditions. $T=(T_1,\ T_2,\ T_3,...,\ T_n)$ represents the subset of known samples contained in the nth scale layer, $W=(w_1,\ w_2,\ w_3,...,\ w_n)$ represents the contribution of the subset of known samples contained in the nth scale layer to the mining dataset. Under the scale layer of each feature data to be mined, the influence degree value of the known subset of data samples to be mined is normalized, and a candidate sample value of sample x to be mined is obtained, which can be recorded as:

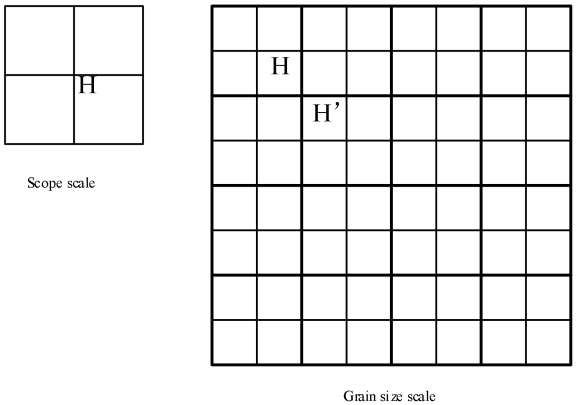
$$\varpi=\sum\sum\lim_{y\to\infty}Y-\frac{f(y)}{3(\widehat{L+T+W})} \quad (1)$$

Environmental art mining processing method specification. Set $g(x)=X$, and the number of samples to be mined in the data feature mining layer is x. mine and evaluate the information feature n of environmental art mining candidate samples. The evaluation algorithm is as follows:

$$\zeta=\sum\sum\lim_{x\to\infty}X-\frac{2g(x)}{3(n-\varpi)}-1 \quad (2)$$

Based on multi-scale data feature mining and classification, the original data feature set is piled up and published, and then the multi-scale data set is constructed according to the data feature inclusion degree theory and hierarchical classification principle, and the range scale H of the original data is refined to obtain the granularity scale H '. The details are shown in the figure.

Fig. 7
Feature data division of environmental design elements



Based on the above algorithm, the multi-scale data features are divided. In the process of division, the point set of multi-scale mining needs to be standardized by combining the data preference sequence feature structure

1) If h and H 'are adjacent scales and 0 < H < H', then h is the parent scale of H '.

2) If h and H 'are adjacent scales and H = H:, then h is the sublayer scale of H'.

3) If h and H 'are not adjacent scales, and H > H' > 1, then h is the ancestral scale of H.

4) If h and H 'are not adjacent scales and H = H' > 1, then h is the descendant scale of H '.

Multi scale information data set refers to the set of data points with preference order relation using multi environment art element features.

According to the above steps to further optimize the multi environment art element feature algorithm, combined with the multi environment art element feature principle to mine the similar data feature classification points, complete the definition of scale region common feature concept, and design the multi-scale data set model, based on the probability calculation density prediction principle to treat the mining data discrete processing, so as to improve the efficiency Improve the multi-scale algorithm, standardize the degree of multi-scale feature mining of divisible data, classify the data of multi environment art element features according to the lower time complexity change law, and establish the corresponding multi-scale data set. Use the quasi scale standard method obtained in the previous paper to select the feature data information entropy in the feature data layer as the evaluation method, In order to better expand the mining of multi-scale environmental art. The actual monitoring value of the distance d between the known sample and the sample to be mined is used to calculate the contribution degree of the known sample feature information. In the calculation process, the closer the data sample is, the greater the contribution degree is, otherwise, the smaller the contribution rate is. If the contribution degree of data sample is p, the accuracy of environmental art mining will be further improved. When there is a slight data gap in the feature process of environmental art elements, the scale data needs to be further weighted by inverse distance, which is recorded as n. multiple known scale data sample values are used for linear algebraic combination, so as to calculate and provide the feature values to be predicted

$$A_{ij} = v\sum \frac{n * p - \zeta}{\lim\limits_{0\to\infty} 2\mathrm{k}(H - d_{ij})} \quad (3)$$

If v represents the distance between the sample to be mined and the known information sample, and k is any positive real number, the general value is k=1 or k=2. For a single local feature of each target scale level, multiple data samples to be mined will be generated. For a single sample to be mined, it needs to be evaluated carefully. If m represents the missing samples with known local classification level. Further, the feature sample set E which is consistent with the classification of the samples to be mined and the rest of the sample set B which is excluded from the local environment art element features except the known data are selected for calculation. The specific algorithm is as follows.

$$B = Ek - A_{ij}\mathrm{m} \quad (4)$$

In essence, the support vector of multi-scale environmental art mining is the reference value of boundary classification samples. In the process of environmental art mining, it is necessary to select similar information data for multi-scale mining. According to the generalized classification scale type of environmental art mining, combined with the basic information attribute x and the maximum feature attribute y of the known information sample, the L scale partition values of the data to be mined are determined, and the known information sample set S covered by a single scale is obtained. The candidate information sample N of the information sample to be mined is obtained under a single scale, and it is obtained according to the multi-scale environmental art mining method. The final characteristic value of the sample information to be mined, in which the mining reference mechanism is expressed as follows:

$$k_{\mathrm{ij}} = \frac{1}{2N}\prod\prod \frac{E(A_{ij} - L)}{\sum s(B - d_{ij})(\mathrm{x} - \mathrm{y})} \quad (5)$$

Using the opposite distance E of the theoretical basis for weighting, the analysis mode of the analysis weight is obtained, where p is 1. Considering the variation of the distribution details of samples in the process of small-scale environmental art element characteristics, as well as the details between the adjacent data nodes of the samples, the smooth distribution of data samples is analyzed

$$z = \frac{R(x - y)}{\sum\sum Q(k_{ij}^{-1} - 1)} \quad (6)$$

According to statistical analysis theory, feature attributes are classified into definition, ordering, ratio and quantitative information models. Among them, the definition class information index is called information, the ordering class information is called ordinal information, and the interval information and ratio information in the quantitative and proportional index information data are one-to-one corresponding to different information types to obtain the characteristic values of each environmental art element. Combining with the deep learning principle, we can get the following results.

$$U = \arg\max z\sum\sum \lim_{x\to\infty} S(y - x) \quad (7)$$

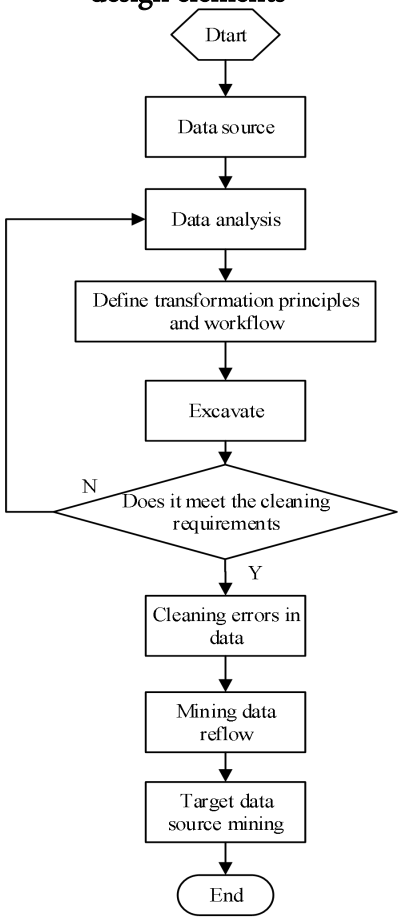
Furthermore, the scale of mining information is divided. Combined with the concept of preprocessing and hierarchical method of environmental art mining, the features of multiple environmental art elements of ordered data and numerical information data are discretized without monitoring. On the basis of equal distance, equal frequency and equal probability density, the clustering discrete partition processing is carried out, and the information distribution characteristics are mined according to the probability density processing method. By analyzing the data characteristics of the data itself,

the more efficient discretization is achieved, and the unsupervised discrete function evaluation algorithm is obtained, as follows:

$$scre(T) = U\sum_{i=1}^{k} g(x) + \lim_{x\to\infty} f(y) \quad (8)$$

In the above algorithm, the larger the calculation value is $g(x)$, the higher the score of mining curve function is $f(y)$, and vice versa U. Not all of the collected environmental art data are useful, but also contain redundant data which are independent of mining rules. The existence of these data will increase the burden of later environmental art mining, so it needs to clean and filter in advance to realize the processing steps of element mining. The specific process is shown in the figure below.

Fig. 8
Optimization of mining steps of environmental art design elements



The process of data mining is generally divided into data analysis, that is to detect whether there are errors, inconsistencies, incompleteness, repetition and other phenomena in the collected data, and find out the quality problems in order to carry out post-processing. Define transformation principles and workflow. According to the quality problems obtained from the above data analysis, the data cleaning conversion principle and workflow are formulated to provide a solution for the formal cleaning. verification. Input the sample data to verify the data cleaning conversion principle and workflow, and adjust it until the sample data cleaning meets the requirements, and get the best cleaning scheme. Implement the cleaning conversion principle and workflow, clean the quality problems in the data, and get the target data.

ANALYSIS OF EXPERIMENTAL RESULTS

ASP is chosen as the experimental platform. Net environment art data development platform, environment art standard website, XHTML language, netframework memory, ASP. Net application, B, jscriptnet data runtime. VisualC++6。 0 as an experimental research and development tool, and the patterns of data features are grouped into a set. Mining algorithm is applied to the field of security defense, so as to mine the abnormal behavior of users, so as to ensure information security.

Table 3
Simulation Environment

Name	Simulation parameters
operating system	Windows7
Memory	16GB*8
Machine configuration	CPU2.20GHz
Experimental tools	SQL2007 数据库，VBScript
development environment	Jbuilder，Xmlwriterv2。11
development language	Java，XML，XSL

The collected sample data mainly includes the following contents, as shown in the table below.

Table 4
Mining data sample content

field	describe	field	describe
customer	IP	Number of bytes accepted	The number of bytes received by the server
Customer name	The user name of the client	-	Time taken to complete browsing
server name	-	Protocol version	Protocol version for transmission
The server	IP	-	Server operating system
Server port	-	Proxy data	-
method	User's request method	Cookie	Cookie
URL	Environmental characteristic resources	reference	-
URL	query	Data status	return

Due to the characteristic elements in the collected records, in order to make the experiment comparable, a comparative detection experiment is carried out based on the above experimental environment and experimental parameters. Through the display of the mining effect of the interference degree on the wave frequency in the process of environmental art mining, the detection values are recorded and plotted. The specific experimental detection results are shown in the following figure:

Fig. 9
Test results of traditional methods

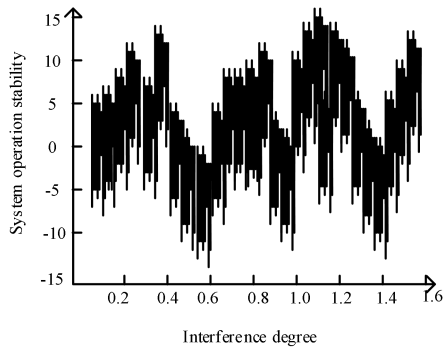
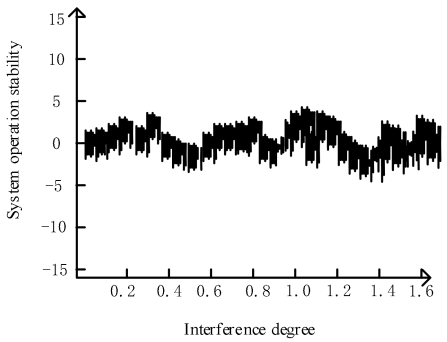


Fig.10
Test results of this method



It is not difficult to observe the above detection results. Under the same interference degree, the fluctuation value change of traditional environmental art mining method is far beyond the standard range, which proves that the accuracy of traditional environmental art mining method is relatively poor. In contrast, the detection results of the mining method in this paper show that the fluctuation value of the network traffic environment art mining simulation detection results based on the optimized ant colony algorithm is always in the standard fluctuation range, which proves that the network traffic environment art mining simulation based on the optimized ant colony algorithm has higher accuracy and fully meets the research requirements.

CONCLUSION

To sum up, in the process of the continuous development of the Internet, the amount of information is increasing. It is of great practical significance to use data mining technology to mine environmental design elements from massive data. However, due to the limited ability of environmental design elements processing and analysis, it provides a new idea for data mining technology. Based on this, this paper puts forward the design method of environment art design element mining system based on deep learning. Starting from data mining, it uses the corresponding distributed data mining system of deep learning, expounds the hierarchical structure of the system, and puts forward the system test method. The system test results show that the use of distributed data mining system can effectively mine massive data and improve the accuracy of environment design element mining So as to reduce the mining cost.

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