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Research Article

The Construction of Data Intelligent Search Model and Music Database Management and Control System Based on Machine Learning

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At present, machine learning can bring new research ideas to researchers on existing problems in some fields and lower the application threshold in this field, such as data mining and database fields. It has become the most cutting-edge research direction of artificial intelligence. For one, this article delves into a data mining model based on machine learning. Data intelligence combines the way of thinking that mimics the human brain with data mining theory, which has a great effect on data enhancement, and applies the theory of data intelligence search model to practical problems. The concept of the number of intelligent objects with the same data is proposed, and the intelligent search model of continuous data in this field is established to provide help to solve the intelligent search problem under the background of big data. This paper also studies the music database management and control system. Nowadays, there are many kinds and numbers of music resources, which has caused confusion in management. In addition, the existing database system is difficult to expand and reuse. In response to the above situation, this paper designs a standard-based universal custom music database system. Based on the comprehensive research and analysis of system requirements and functions, it completes the formulation of the music data element, public data element standard, and the development and realization of the universal music database management and control system. Finally, passed a complete functional test and interface test. Based on the research of machine learning, this paper examines the data intelligent mining model and the music database management and control system, respectively, creates an intelligent management and control system and a search model, and lays the foundation for the development of intelligence.

1. Introduction

Many machine learning problems are black box problems, and it is impossible to observe the optimal solution of the problem. Only a possible global optimal solution can be explored through data mining iteration, and only local optimal solutions are usually obtained [1]. When it comes to learning modeling problems, machine learning is far from smart enough. A good machine learning model requires multiple steps, including developing functions, selecting models, and setting parameters [2]. Professionals must learn and practice many algorithms in order to be confident enough to design in the simulation process [3]. Therefore, this article derives a data intelligent search model based on machine learning for research. Data mining theory can intelligently subdivide complex problems into different search levels [4]. As a tool to solve complex problems, data intelligent computing is applied in various fields, such as data mining, fuzzy information processing, data intelligent search model, and cloud computing [5]. The complex problems that data mining solves are mainly reflected in the two main calculation problems between different data search spaces and data mining: constructing a data intelligence space and calculating the size of the data search space [6]. The former focuses on information-based data, while the latter focuses on computational data and synthesis. Therefore, decomposing a complex problem into many more detailed simple subproblems is an important problem in the field of intelligent computing [7].

This article also conducts an in-depth study on the music database management and control system [8]. The rapid development of music makes the digitalization of music promote the innovation and sustainability of traditional music to a large extent, but it also leads to a sharp increase in the number of music resources and the number of music sources. Significant increase and uneven quality make the management of digital music sources a top priority [9, 10]. At present, the most effective resource and data management tool is the music database system, which fully guarantees the storage and management of massive data, has strong data reorganization capabilities, and can fully describe the internal relationships between data [11]. These advantages of database management and control systems continue to increase in number and scale and attract more and more researchers [12–15]. However, most modern music database management and control systems have poor scalability and reusability and cannot be widely used in the music field. This has affected the effective development and utilization of more music resources and the development of music digital construction to a certain extent [16]. Therefore, the design and implementation of a highly scalable and universal music database management and control system based on a single storage standard is of great significance for the storage, protection, management, and sharing of music resources [17–19].

2. Related Work

The literature introduces a new field of automatic structure search using machine learning. The automatic structure search is essentially composed of three parts: search space, search strategy, and evaluation strategy [20]. The literature puts forward the idea of a data-driven intelligent search model. First, the intelligent search model of discrete domain data is examined in four types of wrong decisions. Then, according to the intelligent search calculation idea, the concept of equal number of data objects is redefined, and the number of data mining objects is redescribed [21]. To a certain extent, the data mining cost model is extended from a discrete domain to a continuous domain [22]. An intelligent search model is created on the domain data of the universe, and an effective algorithm for solving the optimal threshold of intelligent search for continuous domain data is given. The literature shows that the main work of this article is to investigate the search and decision-making problems based on intelligent data [23]. First, briefly explain the current status of data computing knowledge research; secondly, select examples and create intelligent and efficient search algorithms based on data computing theory and data search space; then, use the idea of data intelligent computing to propose the number of data search objects, and then, construct a continuous discourse data intelligent search model [24]. The literature shows the key technology of music database system design and technical realization and analyzes the needs of music database system [25]. The literature introduces the creation of a universal music database system based on unified storage standards and high scalability, which requires mature technology as support [26]. The system combines the attributes of music resources and selects intelligent data search as the framework to formulate unified metadata standards for music resources to ensure the standardization of resource management and the diversity of the system [27].

3. Machine Learning and Data Intelligent Search Model

3.1. Machine Learning

3.1. Machine Learning. Machine learning means that the computer does not refer to specific codes and data to perform all actions. It allows the executor to enter a specific project to learn, but according to the initial set of basic codes, the executor continues to improve the processing power, so that the final wireless is close to reality. Organizations can use machine learning to improve job predictions and reduce worker workloads. When we examine machine learning problems, we basically start with three areas of performance improvement: feature design, parameter optimization, and model selection. With the improvement of the computing power of key chips and the emergence of big data, the application of machine learning is becoming more and more extensive. Machine learning techniques have become part of our daily lives.

Since the invention of computers, we have wondered if they can be learned. With the improvement of the computing power of key chips and the emergence of big data, the application of machine learning has become more and more extensive. Machine learning technology has become a part of our daily lives. However, many machine learning problems themselves are black box problems, and the best solution to the problem cannot be observed. By learning data, it can be repeated step by step to check the possible global optimal solutions, usually only local optimal solutions [28].

When we examine machine learning problems, we basically start from three aspects of performance improvement: feature design, parameter optimization, and model selection. The research of automatic parameter search gradually shifts to the other two aspects: automatic model selection and automatic development function. Other Bayesian optimization algorithm models (such as SMAC) are also used to automate the machine learning process, mainly to solve large-scale parameter configuration problems.

3.2. Construction of Data Intelligent Search Model

3.2.1. Problem Modeling

(1) Definition of Graph. The expression of the graph is similar to the expression of TensorFlow in graph operations. However, the difference is that our directed acyclic graph is constantly changing due to genetic algorithms. Regardless of the original data or the data output of the machine learning model, the number of data elements remains the same, so only the data function number has changed. Based on

the principle of functional fusion, we use functional data fusion, namely,

$$z_{k1} = f_{mn}(U(z_{n1}, z_{n2}, \cdots, z_{\mathrm{ni}})). \tag{1}$$

The output is the data stream z_{k1} to the node v_{k} after calculation by the machine learning model, z_{kni} represents all z parameters of the same type.

(2) Definition of Layer. First, find the node with no edge pointing to itself, put it into the sequence, and mark the depth as 0, then delete the node and its output point to other nodes, then find the node with no edge pointing to itself, and arrange it in order. The mark depth is increased by one, and the loop until there are no nodes. At this time, all nodes are sorted in depth based on topological logic.

Each node is defined as the depth of a node in the graph according to the sequence of topological logic. A group of nodes with the same depth d is considered to be the same level L_{d} of the graph:

$$L_d = \{v_k \mid d_k = d, \forall v_k \in V\}. \tag{2}$$

Due to the definition of topological sorting, the characteristic of the layered structure is that the nodes of the same layer are not connected. In addition, the search in the directed acyclic graph should be simplified and should provide stable results.

(3) Definition of Layer Block. Based on the requirements of genetic algorithm, we define the adjacency matrix of the nodes in the directed acyclic graph as A, the size of the matrix is $K \times K$, and the definition of the median value of the matrix is shown in formula (3):

$$A_{\mathrm{ij}} = \left\{ \begin{matrix} 1 & e_{\mathrm{ij}} & \in E \\ 0 & e_{\mathrm{ij}} & \notin E \end{matrix} \right\}. \tag{3}$$

Among them, 1 means that node v_i points to node v_j, and 0 means that the node is not connected.

Due to the previously defined characteristics of topological logical ordering, all zero matrices can appear on the diagonal of the matrix. The elements in the matrix are defined as

$$A_{\mathrm{ij}}^{(d)} = 0, \forall V_i, V_j \in L_d, \tag{4}$$

where d represents the number of layers, and each $A^{(\mathrm{d})}$ in the neighborhood matrix corresponds to the relationship between nodes at the same layer, so this is a zero-valued matrix.

The color corresponds to the probability of connecting points between different layers. The darker the color, the greater the possibility. Assuming that the nodes of the i-th layer and the j-th layer are v_i and v_j, respectively, the connection probability of the points between the layers is defined here:

$$p\left(e_{\mathrm{ij}} \mid v_i \in L_d, v_j \in L_{d'}\right) = p_0 \exp\left(Y\left(d_i - d_j + 1\right)\right). \tag{5}$$

When the layer structure changes, it needs to be changed in the unit of layer unit, that is, the $A^{(d)}$, $A^{(d,d^{'})}$, and $A^{(d^{'},d)}$ areas are modified at the same time.

(4) Search Algorithm. Our goal in looking for machine learning model architecture is to find an integrated solution that can better solve machine learning problems. X and Y represent the attributes of data or labels. We define the optimization goal as follows:

$$G^*, \Theta^* = \arg\ \min_{G,\oplus} f(G, \Theta, X, Y) + \alpha c(G). \tag{6}$$

Based on this setting, the algorithm selects a graph with a simpler structure as the output within the same performance model.

(5) Search Space. Search the structure of a neural network. Assuming that the given search space is F and the input data is X, the goal of the algorithm is to find the most suitable $f*$. The parameters of the training network can be a function of the data with the smallest loss of $\theta f. X$ so that the goal can be defined as

$$f^* = \underset{\mathrm{f} \in \mathrm{F}}{\arg\min}\ \min_{\theta_t} C\left(f\left(X; \theta_f\right)\right). \tag{7}$$

Since the neural network itself can be mapped into a graph structure, Bayesian optimization is also based on the graph structure to define the search space.

(6) Gaussian Process. From the introduction of Bayesian optimization in related articles, it can be seen that Bayesian optimization can observe and match the optimal value when the data obeys a certain distribution. As a probabilistic prior model, Gaussian process is a more flexible nonparametric model, which is widely used.

Based on this, the kernel function is defined as

$$k(f_a, f_b) = e^{-\rho^2(d(f_s, f_b))}. \tag{8}$$

Use the Bourgain theorem to embed the original metric space into the new space to construct a new space, the purpose is to ensure the effectiveness of the kernel.

Based on the search space and the structure of the graph, the distance between the two neural networks is mapped to the distance between the two graphs which can be expressed as

$$d(f_a, f_b) = D_1(L_a, L_b) + \lambda D_s(S_a, S_b). \tag{9}$$

The mapping distance of the layer is the shortest operand required to map the network f_a to f_b without considering the jump.

We assume that the distance between the two networks L_a and L_b can be obtained by minimizing using the following formula:

Where $L_a \longrightarrow L_b$ is the injection layer function. If the layers in f_a and f_b are based on topological sorting, then the layer satisfies the condition shown in equation (10), and $\omega(1)$ represents the width of the layer:

$$d_1(1_a, l_b) = \frac{|\omega(1_a) - \omega(1_b)|}{\max[\omega(1_a), \omega(1_b)]}. \tag{10}$$

The layer width is defined as the tensor size of the layer output. If it is a convolution kernel or other multidimensional output, the width is the number of channels, and the width of the fully connected layer or other one-dimensional output is the size of the output.

In order to calculate $D_s(\bullet, \bullet)$, we assume that $S_a < S_b$, the hopping distance of the two networks can be defined as

$$D_s(S_a, S_b) = \min \sum_{i=1}^{|S_s|} d_s\left(s_a^{(i)}, \varphi_s\left(s_a^{(i)}\right)\right) + |S_b| - |S_a|. \tag{11}$$

$S_a \longrightarrow S_b$ is an injective function, $S_b - S_a$ measures all mismatched cross-connections. The calculation method is that if there is a cross-connection in the network but no f_a, then f_a passes the connection once. The transition can be adjusted, the distance is increased by one, and the non-matching length can be calculated by adjusting any incompatible transition joints. The corresponding transition distance $d_s(\bullet, \bullet)$ can be defined as

$$d_s(s_a, s_b) = \frac{|u(s_a) - u(s_b)| + |\delta(s_a) - \delta(s_b)|}{\max[u(s_a), u(s_b)] + \max[\delta(s_a), \delta(s_b)]}. \tag{12}$$

Among them, $u(s)$ is the number of levels at which the jump starts after topological logic sorting, and $\delta(s)$ is the number of levels from the beginning to the end of the jump.

(7) Collection Function. The collection function in this article is the upper confidence bound algorithm (UCB) as a function that needs to be optimized:

$$\alpha(f) = \mu\left(y_f\right) - \beta\sigma\left(y_f\right), \tag{13}$$

where β is the equalization coefficient, and $\mu(y_f)$ and $\sigma(y_f)$ are the mean and variance of Gaussian approximations, respectively. When optimizing, expect to get a new structure.

3.2.2. Algorithm Structure

(1) The Case Where the Number of Granulation Layers $i = 1$. Firstly, N objects are grouped once, grouped by 1 k objects, and all objects are randomly divided into multiple groups. That is, the original factor space is randomly divided to ensure that the divided subspaces do not intersect, and the mathematical expectation $E_1(Y_1)Y_1$ can be obtained as

$$E_1(Y_1) = \frac{1}{k_1} \times q^{k_1} + \left(1 + \frac{1}{k_1}\right) \times \left(1 - q^{k_1}\right) = \frac{1}{k_1} + \left(1 - q^{k_1}\right). \tag{14}$$

Then, the expected number of inspections required by N individuals is

$$N \times E_1(Y_1) = N \times \left\{\frac{1}{k_1} \times q^{k_1} + \left(1 + \frac{1}{k_1}\right) \times \left(1 - q^{k_1}\right)\right\}. \tag{15}$$

After determining the probability p, you only need to select k_1 to save the number of songs.

For example, if $p = 0.001$, $q = 1 - p = 0.999$. It can be seen from equation (14) that the minimum value of $E_1(Y_1)$ is equal to $k_1 = 32$, that is, 32 people are the optimal group. If $N = 10000$, the number of detections is expected:

$$\mathrm{N} \times E_1(Y_1) = \left\{10000 \times \frac{1}{32} \times q^{32} + \left(1 + \frac{1}{32}\right) \times \left(1 - q^{32}\right)\right\}. \tag{16}$$

(2) The Case Where the Number of Granulation Layers $i = 2$. Group a certain group in the first layer into granular groupings, the group number $S_2 = 2.3 \cdots k_1$. It can be concluded that the number of granulation layers is $i = 2$, and the number of tests for each person is Y_2. From the distribution of the above random variables, it can be concluded that when the granulation reaches the second layer, an expected number is the number of tests for each object. $E_2(Y_2)$ for

$$\begin{aligned} E_2(Y_2) = {} & \frac{1}{k_1} \times q^{k_1} + \left(\frac{1}{k_1} + \frac{1}{k_2}\right) \times \left(1 - q^{k_1}\right) \times q^{k_2} \\ & + \left(1 + \frac{1}{k_1} + \frac{1}{k_2}\right) \times \left(1 - q^{k_1}\right) \times \left(1 - q^{k_2}\right). \end{aligned} \tag{17}$$

If the number of granulation layers is increased to 2, the number of inspections per object will be reduced even more.

If $k_1 = 32$, according to formula (16), when $E_2(Y_2)$ takes its minimum value, then $k_2 = 16$, it is estimated that the total number of inspections of the object during the second grouping is

$$\begin{aligned} \mathrm{N} \times E_2(Y_2) = N \times {} & \left\{\frac{1}{k_1} \times q^{k_1} + \frac{1}{k_1} + \frac{1}{k_2} \times \left(1 - q^{k_1}\right) \times q^{k_2}\right. \\ & \left. + \left(1 + \frac{1}{k_1} + \frac{1}{k_2}\right) \times \left(1 - q^{k_1}\right) \times \left(1 - q^{k_2}\right)\right\}. \end{aligned} \tag{18}$$

$N \times E_2(Y2) \approx 338$ times can be used to detect all 10,000 objects.

(3) The Case Where the Number of Granulation Layers Is i. According to the random variable distribution of each granulation layer, the sum of the probability distribution of each layer is equal to 1, so as to test the correctness of the probability distribution.

For granulation to layer 1,

$$q^{k_1} + 1 - q^{k_1} = 1. \tag{19}$$

For granulation to 2 layers for grouping,

$$\begin{aligned} &q^{k_1} + \left(1 - q^{k_1}\right) \times q^{k_2} + \left(1 - q^{k_1}\right) \times \left(1 - q^{k_2}\right) \\ &\quad = q^{k_1} + \left(1 - q^{k_1}\right) \times \left(q^{k_2} + 1 - q^{k_2}\right). \end{aligned} \tag{20}$$

For grouping granulation to layer i,

$$\begin{aligned} &q^{k_1} + \left(1 - q^{k_1}\right) \times q^{k_2} + \cdots + \left(1 - q^{k_1}\right) \times \left(1 - q^{k_2}\right) \\ &\quad \times \cdots \times \left(1 - q^{k_{i-1}}\right) \times q^{k_i} + \left(1 - q^{k_1}\right) \\ &\quad \times \left(1 - q^{k_2}\right) \times \cdots \times \left(1 - q_i^{k_i}\right). \end{aligned} \tag{21}$$

The probability distribution idea under multigranularity conditions can be used to construct a probability distribution model to solve such problems.

Suppose that in the partial probability space on the nonempty finite set, the solution of multilevel and multigranularity (i layer) granularity grouping is satisfied. The expected particle size is determined as follows:

$$E_i(X, S_i) = \frac{1}{k_1} + \sum_{i=2}^{L} \left[\frac{1}{k_i} \times \prod_{j=1}^{i-1} \left(1 - q^{k_j}\right)\right] + \prod_{i=1}^{L} \left(1 - q^{k_i}\right). \tag{22}$$

Use the least number of inspections (the least expected number of inspections) to build a hierarchical granularity model.

According to the expected difference between the first layer and the second layer of continuous granulation, i.e., the difference between $E_1(Y_1)$ and $E_2(Y_2)$, compare the advantages and disadvantages of the first layer and the continuous granulation. If ee $- 1 < q < 1$, Equation (14) is subtracted from equation (17) to get

$$E_1(Y_1) - E_2(Y_2) = \frac{1}{k_1} + \left(1 - q^{k_1}\right) - \left\{\frac{1}{k_1} + \left(1 - q^{k_1}\right) \times \left(\frac{1}{k_2} + 1 - q^{k_2}\right)\right\}. \tag{23}$$

Evidence shows that if $k_1 < 1$, further granulation in the second layer can reduce the number of controls. Try to prove that continuous granulation and grouping can reduce the expectation of the number of inspections until the expectation is minimized when $k_i = 1$, just prove that it is a decreasing function $E_{\mathrm{i}}(Y_{\mathrm{i}})$. By proving that the first layer continues to split into the second layer, the number of inspections can be reduced; only the expectations $E_{i-1}(Y_{i-1})$ and $E_i(Y_i)$ need to be compared. Use formula (23) to get

$$E_{i-1}(Y_{i-1}) - E_i(Y_i) = \frac{1}{k_1} + \sum_{l=2}^{i-1} \left[\frac{1}{k_l} \times \prod_{j=1}^{l-1} \left(1 - q^{k_j}\right)\right] + \prod_{l=1}^{i-1} \left(1 - q^{k_l}\right). \tag{24}$$

Due to

$$E_{i-1}\left(Y|_{i-1}\right) - E_i(Y_i) > 0. \tag{25}$$

Any further granulation and delamination can reduce the number of inspections. In theory, the verification efficiency is further improved from the first layer to the i-th layer (the number of objects in each group of the last layer is 1).

3.2.3. Simulation Analysis. In order to test the feasibility of the three-branch decision algorithm proposed above for solving the optimal threshold for the continuous universe, the approximate function $f(p)$ with different numbers of isogranular objects is used to test the lemma and design Dolby's experiments, according to different comparison results to analyze and to determine the characteristics of the experimental object. This experiment uses an artificial data set to model four isogranular objects. The data set of each isogranular object counting function is 500,000, respectively: (a) isogranular object counting function–$f_1(p) = 100 + (p - 0.5)\ 2$; (b) the function of the number of isogranular objects $f_2(p) = 100 - (p - 0.5)^2$.

The data set of each isogranular object number function is 500,000. They are as follows: (a) isogranular object number function is $f_3(p) = 100 + \log_{0.5}{}^{p}$; (b) isogranular object number function $f_2(p) = 100 + e^p$.

4. Music Database Management and Control System Construction and Application Analysis

4.1. Demand Analysis. The music database system is designed to digitize and store a large number of traditional music resources, while standardizing, encapsulating and managing them, and providing users with comprehensive search functions to create a highly scalable general database on this basis. Therefore, the design of the system must meet the following goals: to provide system users with convenient multidimensional resource search and to establish links between content and resource attributes between different resources, so that users can quickly obtain the best results based on the unified description and packaging of resources. The detailed information of the resource is presented to the user at a glance in a unified way.

The basic needs of ordinary users are twofold: complex resource search and the use of music resources in the system. The specific requirements are as follows: perform advanced multikeyword matching search according to the search conditions of the custom matching field to obtain more accurate matching results;

Search for a category in different categories in a specific database; ordinary users should be allowed to use the results of resource searches, such as viewing detailed information about resources and viewing related resources, attachments, image files, or attached audio files.

4.2. Overall System Design. The hierarchical framework of the system is shown in Figure 1:

Presentation layer: responsible for receiving customized request data and presenting dynamic web page content to users. This layer is mainly used to display visualized data, so that users can intuitively accept and observe the situation of nail data.

Business logic layer: Located between the presentation layer and the data persistence layer, it is responsible for receiving the request data sent by the presentation layer in the system. The main function of this layer is to process the logic of the business and process the data that needs to be processed in the business according to specific logic. Arrange.

Data persistence layer: responsible for the data read and write processing required by the business logic layer to access the database. This layer realizes the interaction with the database and the guarantee of data source stability.

Data layer: located at the bottom of the system hierarchy, the data layer is responsible for processing data in the system, including database operations and creating the Lucene indexes. This layer is mainly used for operations such as SQL query update and deletion.

Combined with the overall demand analysis of the system, the functional module framework of this system is shown in Figure 2:

According to the structure diagram of the functional modules, the system is divided into two subsystems, namely, the portal subsystem and the internal control subsystem. Resource management and on behalf of other components of the system, functional applications provide basic guarantees.

The functional module division of the portal subsystem is shown in Figure 3:

According to the needs of users, the complex search module contains four submodules, namely, the global resource search module, the extended resource search module, the resource list category query module, and the detailed information viewer.

4.3. System Function Design

4.3.1. Music Data Element Public Data Element Standard Design. The definition of music resource metadata is the core of the entire system. It summarizes the meaning of music data, enabling users to manage, search, and retrieve music data; at the same time, it helps users understand music data and judge whether music data meets their needs; it also shows the relationship between music data; the most important thing is to provide consistent data description, making it easier to share and exchange music data. The music data public data standard is based on the Dublin standard. According to the specific attributes of the music resource, the music data public data item is defined into two parts. There are two common global

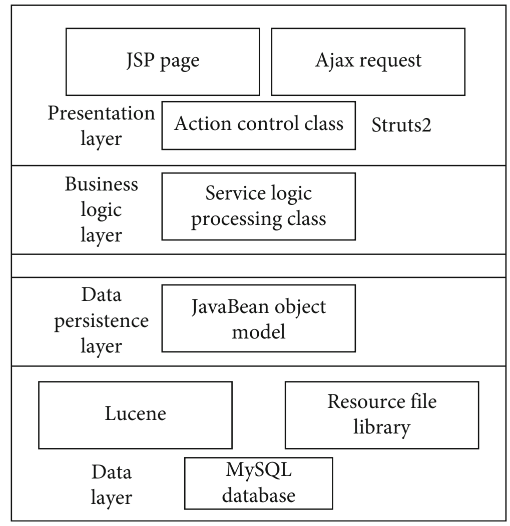

Figure 1: System layered framework diagram.

search methods, one of which is the sequential scan method. Sequential scanning of unstructured data is very slow, so the system uses different methods to extract and reorganize information from unstructured data and create indexes. The system-wide search engine installs the Lucene index and then pulls the index file from the index, which greatly improves the search performance.

This module is mainly composed of two parts: category management and field configuration. Category management and field configuration can only choose one of the two categories that contain subcategories. The category management module is composed of database management and database subcategory management. The resource input control module is a part of the internal control subsystem and the core basic module of the entire music database system. It is responsible for inputting information and managing all music resources. Resource records are composed of two parts: metadata records and corresponding attachment downloads. The metadata recording design is based on the above-mentioned music metadata public data standard. The system has developed two metadata entry methods, single import and batch import. Administrators can create new records and enter corresponding resources according to the type of resource input information.

4.3.2. Database Design. In order to meet the needs of the system for resource metadata storage and comprehensive search and management, the system has developed a corresponding database table for data information and storage resource metadata information required for system search and management.

The database category table t_class is shown in Table 1:

The table t_class is a database category table that records the categories of music resources, from the highest category to the lowest subcategory information. It is the backbone of system applications and provides a solid foundation for classifying and managing music resources.

The similar word information table t_similarwords is shown in Table 2:

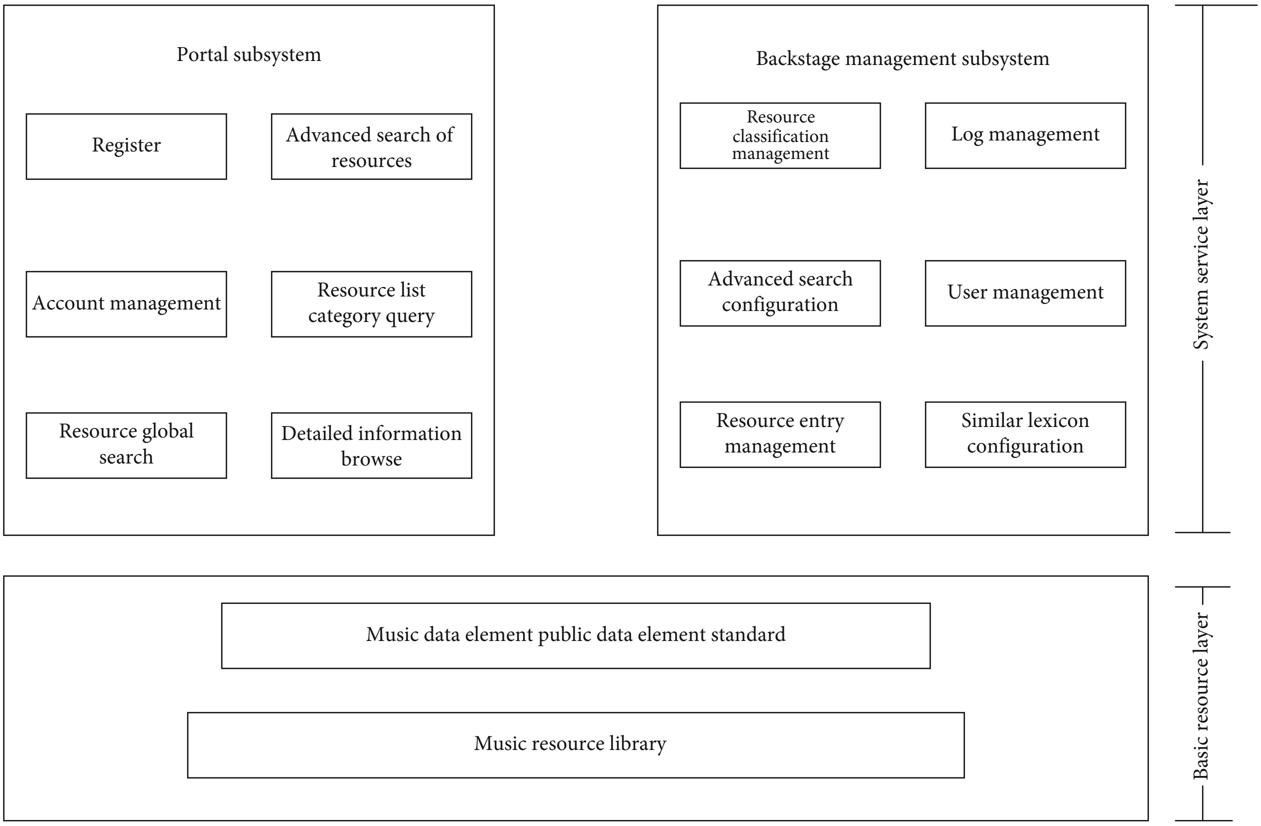

Figure 2: System function frame diagram.

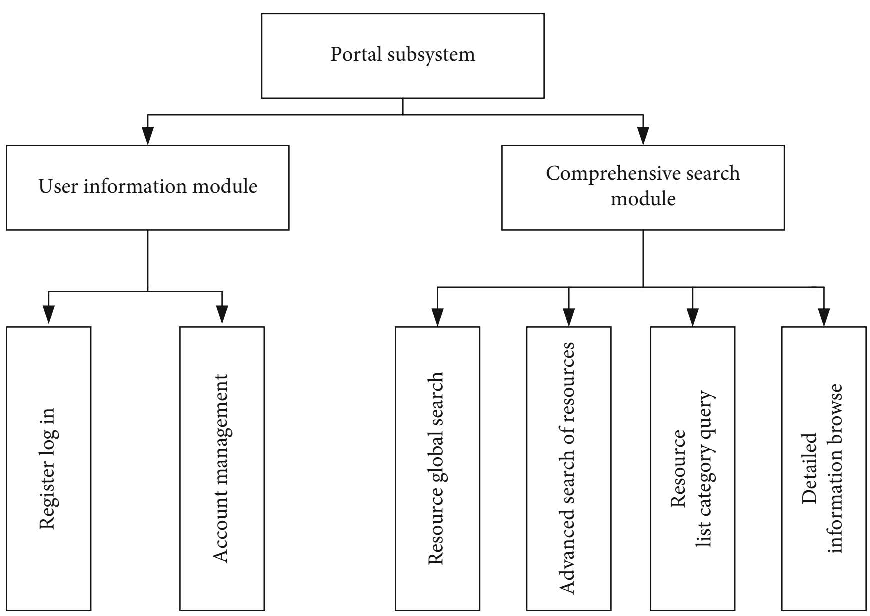

Figure 3: Function module diagram of portal subsystem.

The table t_similarwords is a similar word information table, which records the database of similar words in the system and provides basic information for maintaining the index of similar Chinese words. The table sets a UUID for each similar word, and the same UUID is the similarity of the corresponding match.

The field description collection table t_field_collection is shown in Table 3:

The table t_field_collection is a field description collection table, which stores all the custom information about the search field. It is used in conjunction with t_field_define to set the search conditions of each category in the single

Table 1: Database category table t_class.

Field name	Field type	Allow to be empty	Default value	Chinese name	Remarks
CLASS_ID	bigint(20)	No	—	Category id	Primary key, self-growth
CLASS_NAME	varchar(255)	Yes	—	Category name	—
CLASS_DESC	varchar(255)	Yes	—	Category description	—
PATH	varchar(255)	Yes	—	Level	—
CLASS_CODE	varchar(20)	Yes	—	Resource function code	—
ORDER_CODE	varchar(20)	Yes	—	Sort code	—
USESTATE	Int(1)	Yes	—	Is it currently in use	0 no, 1 yes

Table 2: Similar word information table t_similarwords.

Field name	Field type	Allow to be empty	Default value	Chinese name	Remarks
ID	bigint(20)	No	—	—	Primary key, self-growth
CLASSID	bigint(20)	Yes	—	Owning database ID	—
WORDS	varchar(500)	Yes	—	Name	—
UUID	varchar(50)	Yes	—	Unique identifier	—

Table 3: Field description collection table t_field_collection.

Field name	Field type	Allow to be empty	Default value	Chinese name	Remarks
ID	bigint(20)	No	—	—	Primary key, self-growth
FIELD_DESC	varchar(50)	Yes	—	Field description, Chinese name	—
DEFINITION	varchar(50)	Yes	—	Definition	—
KEY_NUM	varchar(20)	Yes	—	Identifier	—
CBJEC_NAME	varchar(200)	Yes	—	Object word	—
SPECIAI WORD	varchar(200)	Yes	—	Feature words	—
EXPRESSWORD	varchar(200)	Yes	—	Express word	—
EXPRESSFORMAT	varchar(200)	Yes	—	Representation format	—
AREA	varchar(200)	Yes	-	Range	-
REMARKS	varchar(200)	Yes	—	Remarks	—
IF_TIME	varchar(200)	Yes	—	Is it time	0 no, 1 yes
IF_SHOW	varchar(200)	Yes	—	Whether to show	0 no, 1 yes
STATE	varchar(200)	Yes	1	(Status)	0 disable, 1 enable

category query, and the field configuration of the classification management in the background management system and field management function.

The category and search field mapping table t_field_define is shown in Table 4:

The table t_field_define is the mapping between categories and search fields. It records the available search fields corresponding to categories without subcategories. It is mainly used for custom search conditions for each category in a single category query and for configuring fields to manage the background classification.

The resource metadata information table t_item is shown in Table 5:

The table t_item is a resource metadata information table, which forms the basis of all system functions and stores the metadata information of all music resources in accordance with established metadata standards. The CLASS_ID field associates the foreign key with the t_class database category table of the primary key CLASS_ID (Table 6).

The system test shows that the system can adapt to the corresponding requirements under high concurrent access and reading, and the performance in all aspects meets the design indicators of the system.

4.4. System Application Realization. The resource global search module contains two main functions: Lucene index creation and global search. The creation of Lucene index is the core of global search. When the user performs a global search on the source data, the Lucene index is actually set during the search process, so the global search not only implements a powerful fuzzy search function but also greatly improves the indexing speed. The global search function is the main function of the system, allowing users to quickly and easily obtain all comparable search results.

Table 4: Type and search field mapping table t_field_define.

Field name	Field type	Allow to be empty	Default value	Chinese name	Remarks
CLASS_ID	bigint (20)	No	—	Category id	Primary key
TYPECLASS	bigint (20)	Yes	—	Owning database ID	—
FIELD_ID	bigint (20)	No	—	ID of field_ collection such as title, instrument name, etc.	—
FIELD_NAME	varchar (20)	No	-	Field name (F1, F2), etc.	Primary key
FIELD_DESC	varchar (50)	Yes	—	Field description	
ORDER_ CODE	int(4)	Yes	—	Sort code	—
QUERY_ STATUS	int(4)	Yes	0	Default query status	0 default no query 1 default query

Table 5: Resource metadata information table t_item.

Field name	Field type	Allow to be empty	Default value	Chinese name	Remarks
I_ID	bigint(20)	No	—	—	Primary key, self-growth
ITEM_ID	varchar(50)	Yes	—	Entry number	—
ARRANGER	varchar(50)	Yes	—	Data organizer	—
CLASS_ID	bigint(20)	Yes	—	Category ID	—
CLASS_NAME	varchar(50)	Yes	—	Category name	—
F1	text	Yes	—	Field 1	—
F2	text	Yes	—	Field 2	—
F3	text	Yes	—	Field 3	—
F4	text	Yes	—	Field 4	—
....	....	....	—	....	—
F30	text	Yes	—	Field 30	—
ADD_TIME	datetime	Yes	—	Add time	—
UPDATE_TIME	datetime	Yes	—	Update time	—
APPROVED	int(11)	Yes	—	Review status	0. To be reviewed 1. Approved

Table 6: System test cases.

Performance description	Ensure high-speed and stable operation of system products	
Use case purpose	Verify that system speed, pressure, etc. meet requirements	
Prerequisites	Using the loadrunner tool	
Input/output	Estimated output/corresponding	Actual output
100 users registered information at the same time in the registration interface.	It took <4 seconds to register successfully.	It took 3.6 seconds to add.
100 users performing simultaneous search operations	In <5 seconds	Operation took 3 seconds

The resource classification management module is the main basic module of the entire music database system. The realization of this module is explained in detail by creating a music database. In order to create a database for different types of music, the administrator first creates a new database in this module and then classifies the database according to database resources. Create categories for databases of different categories, check whether they contain subcategories, if enabled, create a subcategory for the current category, and finally configure the corresponding fields for the subcategory, save it to complete the creation of the new database.

When creating a new entry, first determine the smallest subcategory corresponding to the music resource entry. Fill in the metadata items according to the recording information, if saving fails, fill in again. If the save is successful, create a new record and directly enter the record details page according to the Struts configuration to display the information of the new record. The import function mainly includes the following steps: import the entry table, import the attachment table, import the attachment, and rebuild the index. The reconstruction index matches the Lucene index function defined in the global search module above.

5. Conclusion

This paper firstly proposes an efficient search algorithm based on machine learning intelligence and the theory of data search space, and then based on the idea of data computing, the data mining model is extended to the continuous universe for discussion and research. According to the idea of data computing, the data mining model of continuous universe is studied. Afterwards, it studies the intelligent data search idea based on four wrong decisions, the discrete global data intelligent search model; and according to the idea of data calculation, divides an equivalent probability approximate data block according to the probability intelligence and provides the same data search object. Using the concept of the number of data search objects, redescribe the number of objects in the boundary area and extend the intelligent search model from the discrete domain to the continuous domain, so as to establish the continuous domain data intelligent search model. Based on this model, the idea of global optimization based on the search model is proposed, continuous analysis of the domain data; finally, an effective algorithm for solving the optimal threshold of the intelligent search model of the universe continuous data is given. Based on the research on the music database management and control system, this paper describes and encapsulates all music resources in a unified manner. According to the actual needs of music database, a general and customizable music database management and control system based on data mining is developed and implemented.

Data Availability

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Conflicts of Interest

It is declared by the authors that this article is free of conflict of interest.

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