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Retraction

Retracted: Three-Dimensional Landscape Rendering and Landscape Spatial Distribution of Traditional Villages Based on Big Data Information System

Mobile Information Systems

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This article has been retracted by Hindawi, as publisher, following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of systematic manipulation of the publication and peer-review process. We cannot, therefore, vouch for the reliability or integrity of this article.

Please note that this notice is intended solely to alert readers that the peer-review process of this article has been compromised.

Wiley and Hindawi regret that the usual quality checks did not identify these issues before publication and have since put additional measures in place to safeguard research integrity.

We wish to credit our Research Integrity and Research Publishing teams and anonymous and named external researchers and research integrity experts for contributing to this investigation.

The corresponding author, as the representative of all authors, has been given the opportunity to register their agreement or disagreement to this retraction. We have kept a record of any response received.

References

[1] J. Li and P. Wei, "Three-Dimensional Landscape Rendering and Landscape Spatial Distribution of Traditional Villages Based on Big Data Information System," *Mobile Information Systems*, vol. 2022, Article ID 4945918, 13 pages, 2022.

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Research Article

Three-Dimensional Landscape Rendering and Landscape Spatial Distribution of Traditional Villages Based on Big Data Information System

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Traditional villages refer to the villages that formed earlier, are rich in traditional resources, and have various values and must be protected. This paper aims to study how to draw three-dimensional landscapes of traditional villages based on the big data information system. This paper puts forward the problem of 3D landscape rendering, which is based on big data and modeling, and then elaborates around the concept of data mining and related algorithms and designs and systematically tests 3D landscape rendering. The experimental results show that when the number of rendered patches is less than 120193 between 120193 and 242029, the system can run smoothly. It can achieve acceptable and relatively smooth operation; when it exceeds 242029, the system is obviously stuck. The design scheme of the three-dimensional landscape geographic information system of the traditional villages is reasonable and feasible, the operation is stable, and the expected research goals are achieved.

1. Introduction

After entering the 21st century, social development is more rapid. With the development of society and the innovation of information technology, information systems are rapidly expanding in all walks of life. The efficiency of an industry largely depends on the degree of informatization in the industry. However, with the rapid spread and development of computer systems, the amount of information collected, analyzed, and accumulated by these systems has also increased, and the speed of data volume has also increased. Speed up, so that people now use "massive and explosive growth" to describe the rapid growth of data volume in the era of big data. With the implementation of the "digital city" strategy, the three-dimensional landscape has transitioned from the research stage of theoretical models to the development and application stage of software products. Geographic information system technology has also developed rapidly and has been successfully applied to many fields of social and economic construction. With the improvement of urbanization in China, an ever increasing number of towns are declining. China has progressively entered the data age, and data blast has turned into a significant component in the current social advancement process. With the continuous development of big data technology, information technology is rapidly infiltrating every corner of business development at an unimaginable speed. Information system not only exists as a tool for business development but also has become an important guarantee for company development and a majestic height of business development [1].

China's traditional villages have precipitated the profound farming history and cultural essence of the Chinese nation. They are not only precious cultural heritage, but also important material heritage. The report of the 19th National Congress of the Communist Party of China put forward the strategy of rural revitalization. The local culture with unique regional characteristics and national style inherited from traditional villages is one of the main starting points for the implementation of the rural revitalization strategy.

Extremely important resource and potential power. The "root" of traditional Chinese culture lies in the countryside, and traditional villages are the living carriers of Chinese civilization, embodying the nostalgia of Chinese children. Folk wisdom in construction and utilization is a precious legacy left by history to people. Traditional villages are an important symbol of the historical and cultural achievements of a country and a nation. Safeguarding conventional towns is not just significant for concentrating on the advancement of nearby societies, yet in addition assumes an extraordinary part in safeguarding social variety, which is the normal social abundance of humanity. Chinese traditional villages are the carriers of Chinese traditional culture, which concentrate the spirit of the Chinese nation, have high cultural, historical, artistic, scientific, economic and social values, and protect the diversity of national culture. It is the bond that maintains the cultural identity of the Chinese and the basis for inheriting the national culture.

The innovation of this paper lies in (1) this paper combines big data with traditional villages, introduces the theory of big data and related methods of data mining in detail, and also summarizes related content such as information systems. (2) When facing the three-dimensional landscape, this paper uses modeling software such as 3DMax to draw the traditional village landscape. Through the evaluation of the experimental results, the design of the traditional three-dimensional village landscape geographic information system is reasonable, and the test proves that the system is user-friendly and runs smoothly.

2. Related Work

With the consistent turn of events and improvement of computer network technology, enormous information innovation has slowly turned into the focal point of consideration. Kuang *L* proposed a singular tensor model to address unstructured, semi-coordinated, and coordinated data. He investigated the time intricacy, memory utilization, and guess exactness of the proposed technique. A contextual analysis shows that surmised information remade from a center set containing 18% of the components regularly ensures 93% exactness. Hypothetical examination and exploratory outcomes show that the proposed brought together tensor model and IHOSVD strategy are compelling for large information portrayal and dimensionality decrease. However, his method is more complicated [2]. Yaoxue gave an outline of enormous information points and a thorough review of how distributed computing and its connected innovations address the difficulties presented by huge information. Then, at that point, he investigated the disservice of distributed computing when enormous information meets the Internet of Things and presented two promising figuring standards, mist registering and straightforward processing, to help large information administrations for the Internet of Things. At last, he summed up a few open provokes and future headings to work with proceeded with research endeavors in this developing field of exploration. However, his content is not novel enough [3]. Xu *L* briefly introduced the basics of related research topics, reviewed the state-of-the-art methods, and proposed some preliminary ideas for future research directions. He also reviewed game-theoretic methods that have been proposed to analyze interactions between different users in data mining scenarios, each with their own evaluation of sensitive information. By distinguishing between the responsibilities of different users regarding the security of sensitive information, he hoped to provide some useful insights into the research. However, his research is too subjective [4]. Zhang Y proposed a patient-driven digital actual framework for clinical applications and administrations, called Health-CPS, in view of cloud investigation innovation and large information. His discoveries propose that this innovation can be utilized to work on the exhibition of medical care frameworks, accordingly empowering people to partake in an assortment of brilliant medical care applications and administrations. However, his energy consumption is relatively large [5]. Rathore M proposed an ongoing huge information examination design for remote detecting satellite applications. The proposed engineering comprises of three primary units, the Remote Sensing Big Data Acquisition Unit, the Data Processing Unit, and the Data Analysis Decision Unit. Furthermore, his proposed design can store approaching crude information to perform disconnected examination of hugely put away dumps when required. At last, he utilized Hadoop to lead a definite examination of the large information of land and ocean remote detecting Earth perception. Moreover, he proposed different calculations to distinguish land and ocean for each degree of RSDU, DPU, and DADU to detail the working of the design. However, its application range is limited [6]. Xing H used Random Matrix Theory to inspire data-driven tools to perceive high-dimensional complex grids. At the same time, he proposed an architecture with detailed procedures. From an algorithmic point of view, the architecture performs high-dimensional analysis and compares the results with RMT predictions for anomaly detection. It proves that the architecture is compatible with block computing using only regional small databases. In addition to this, the architecture, as a data-driven solution, is sensitive to system situational awareness and has utility for truly large-scale interconnected systems. Five case studies and their visualizations validate design architectures in various domains of the power system. However, its performance is not high [7]. Wang Y fabricated enormous information investigation models. He distinguished five major information examination capacities from 26 major information contextual investigations, proposing a few systems for the effective utilization of large information investigation in medical services settings. He had an exhaustive comprehension of the likely advantages of enormous information examination. However, he did not take into account other factors affecting the experiment [8]. Janssen M identified factors influencing BD-based decision making through case studies. The size of huge information intensifies validness, assortment, and speed, requiring social and authoritative administration components to guarantee BD quality and have the option to contextualize information. The contextual investigations show that utilizing large information is a transformative cycle wherein moderate comprehension of its true capacity and the regularization of cycles assume a pivotal part. However, his data are not rich enough [9].

3. Traditional Village Landscape and Big Data Methods

3.1. Big Data

3.1.1. Big Data and Its Value. According to the definition of Wikipedia, big data alludes to informational collections that surpass the capacity, the executives, and handling abilities of customary programming or consume additional time than satisfactory reach.

As early as 2001, the qualities of huge information were depicted as three "*V*", specifically volume, velocity, and variety [10]. Figure 1 envisions the three aspects and implications of large information.

First, volume: This is the biggest feature that distinguishes big data from traditional data, that is, the amount of data is large. This feature is inseparable from the development of technology. First of all, the data storage capacity in the past was very limited. According to the development of Moore's Law, the performance of hardware has been continuously improved and the price has gradually decreased, making large-scale data storage possible. In addition, the popularity of technologies such as social networking, e-commerce, and the Internet of Things has flooded into data [11, 12].

Second, velocity: it refers to the continuous influx of data flow at an unprecedented speed and must be processed within an acceptable time frame. This is the main challenge faced by big data. Traditional data storage and processing methods simply cannot achieve the efficiency that can be used.

Third, variety: it refers to the variety of forms of data, mainly because the sources of data are very rich. Include structured data, such as data stored in traditional relational data. More primarily unstructured data, including documents, emails, pictures, audio, video files, sensor data, and more. The storage and analysis of these data is also one of the main challenges faced by big data [13].

In addition, a fourth "*V*" can be added, which is value. Statistically speaking, the larger the data sample, the higher the accuracy of the statistical results. From a commercial point of view, big data has been widely used in user purchase behavior analysis, personalized recommendation, etc. Companies such as Amazon and YouTube have improved the accuracy of recommendation from big data analysis, reaping tangible benefits. In terms of biomedicine, the analysis of disease data can help doctors diagnose the disease earlier and more accurately. DNA itself is big data, and sequencing DNA can predict possible genetic defects and improve the quality of human life. As far as the Internet of Things, the realization of smart homes and smart cities is also inseparable from the support of big data technology. In terms of maritime shipping, big data can be used for route forecasting, ship collision avoidance, and analysis of international futures price trends for bulk cargo shipping [14].

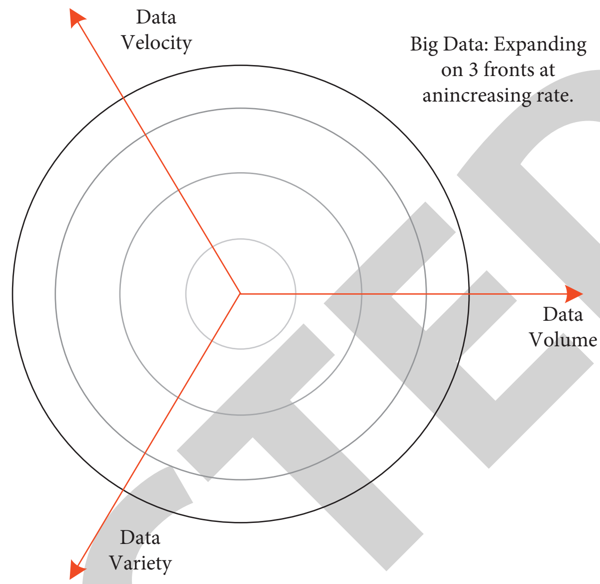


Figure 1: Three dimensions of big data.

To put it plainly, enormous information includes all parts of society, and the worth it contains has extensive importance to the public economy and individuals' lives. A big data mining engine with real-time, high availability, and effectiveness will enormously advance and work on the effectiveness of information esteem mining, accordingly advancing the improvement of all parts of society.

3.1.2. Big Data Storage. With the development of appropriated document frameworks, information can be put away as dispersed records. Distributed has the following advantages: It can accommodate large amounts of data. Its distributed file system represented by HDFS can store a large file in multiple machines, and let each machine store a part of the file to dissipate the pressure of a single machine. It supports redundant backup of data. By default, HDFS saves three copies of each data and distributes them to different machines in the cluster. In this way, even if a machine in the cluster goes down or is completely destroyed, the data will not be lost [15]. It has good scalability. When the amount of data increases gradually, the data storage capacity can be improved by adding cluster machines. There are three key components in HDFS, namely DataNode, NameNode, and Client. The NameNode is responsible for maintaining the file system's namespace, metadata, cluster configuration information, etc. DataNode is the actual storage unit of data, the DataNode sends the information of the data block to the NameNode. Client is answerable for starting perused and compose demands. The architecture of HDFS is shown in Figure 2.

Considering the organized information stockpiling strategy and the capacity to arbitrarily peruse and compose appropriated records, the data set framework in light of the dispersed document framework has additionally come out. HBase is the most representative, based on Google BigTable, based on HDFS, a distributed database specially designed for big data storage.

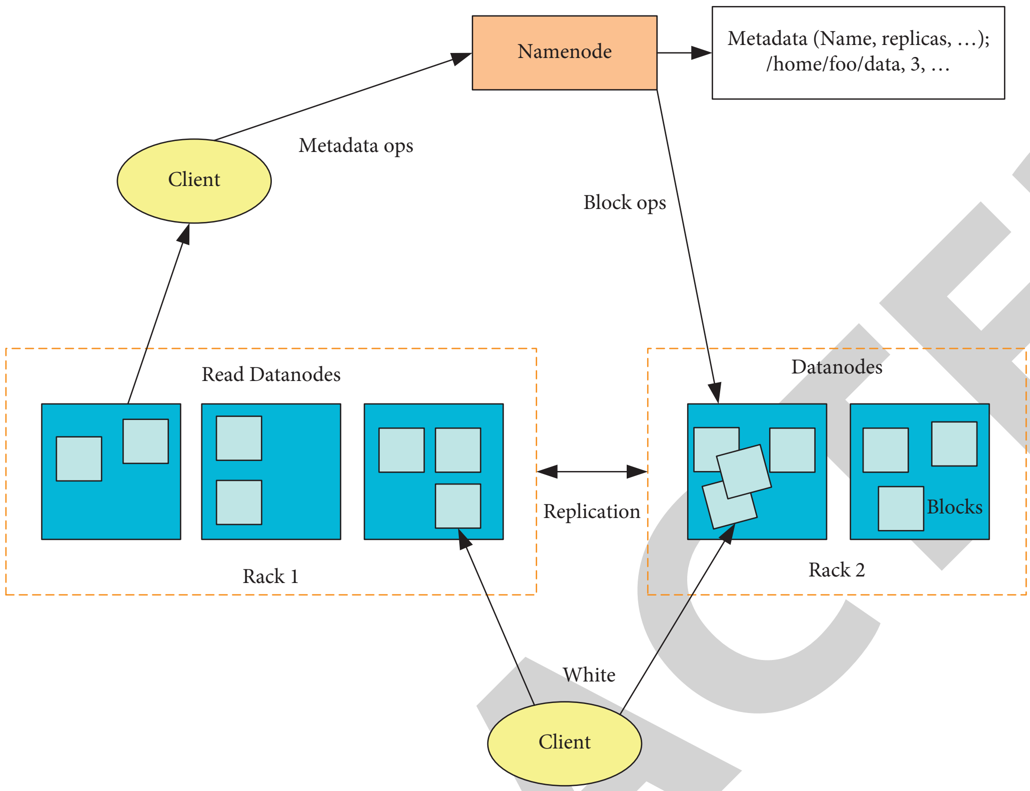


Figure 2: HDFS architecture.

3.1.3. Data Mining Definition and Process. Data mining refers to mining valuable knowledge or rules for people from a large amount of incomplete and irregular information. The object of data mining is mainly for business data in large databases. Processes such as data cleaning and integration, data conversion, data analysis, model evaluation, and knowledge representation of business data ultimately provide users with valuable information and help users make corresponding decisions on business data. The storage of data sources can be of any type: structured, unstructured, and semi-structured data. Such as ordinary text files, relational database data, data on the web, and even pictures, audio, video, and other data.

In different application scenarios and mining technologies, the data mining process will also be different. However, on the basis of summarizing predecessors, the basic process of data mining generally includes data preparation, data mining, evaluation, and presentation, etc. [16], see Figure 3.

3.2. Classification Methods in Big Data Mining. Data mining includes a variety of analysis methods to mine and analyze data sets, obtain patterns, and apply them, among which classification occupies a place, and classification methods are also well known. How to properly classify the data will directly affect the accuracy and standard efficiency of mining results. Uses of grouping incorporate a wide assortment of issue spaces like text, media, informal organizations, and natural information [17, 18]. Moreover, various issues might be experienced in a wide range of situations, arrangement is a genuinely assorted point, and the fundamental calculations are vigorously subject to the information area and issue situation. Classification algorithm is also one of the important fields of research in all walks of life.

3.2.1. BP Neural Network Algorithm. The BP neural network algorithm includes two processes: information forward propagation and error back-propagation [19]. The particular strides of the calculation are as per the following:

3.2.2. Initialize the Weights. Introduce the association weight of every hub of the neural organization to a little arbitrary number (for instance, from −1.0 to 1.0 or from −0.5 to 0.5). Every hub has a related inclination, also introduced to a little irregular number.

3.2.3. Forward Propagation Input. Training samples are fed into the info layer of the neural organization and its qualities do not change. That is, for the information hub j, its result esteem S_j is equivalent to the information esteem E_j. The organization passage and exit for every hub in the covered up and leave layers are then determined. The net information worth of any hub in the result or secret layer is processed utilizing a direct mix of its contributions, as displayed in Figure 4.

Truth be told, every hub has various data sources, and what connects it is the outlet of the node in the previous layer. There is a weight for each connection. On the off

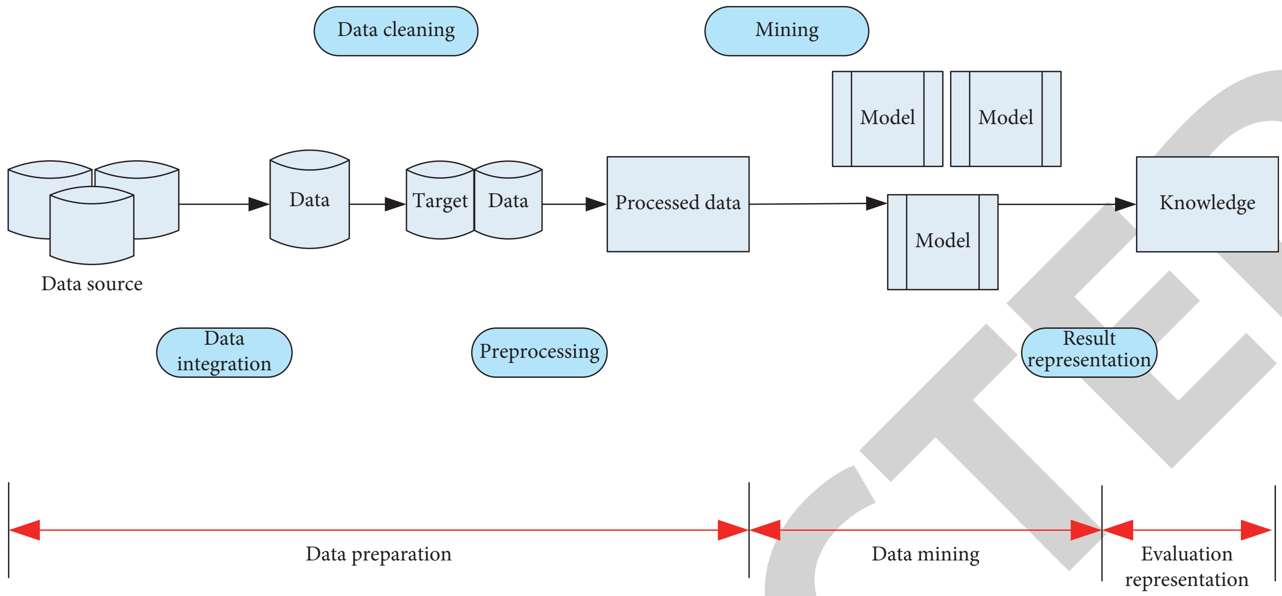


Figure 3: Data mining process.

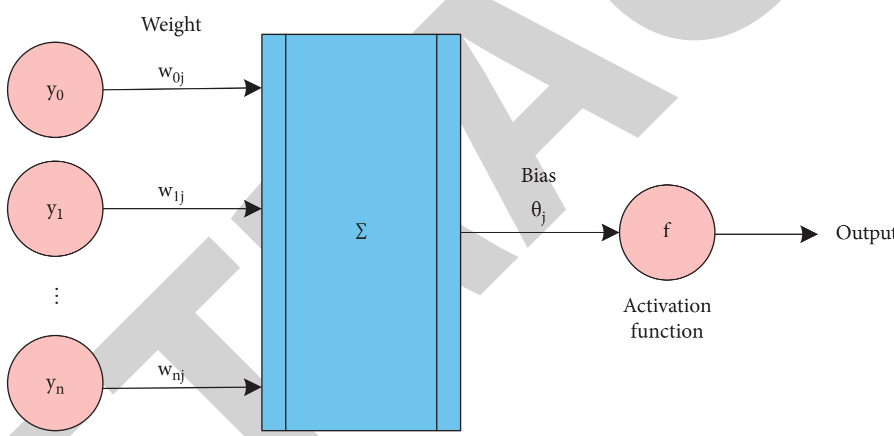


Figure 4: A certain node unit j of the output layer or hidden layer.

chance that the j hub is in the leave layer or the secret layer, the net information E_j of the j hub is

$$E_j = \sum_i w_{ij} S_i + \theta_j. \tag{1}$$

Among them, w_{ij} is the weight of the connection from the node i of the previous layer to the node j; S_i is the output of the node i of the previous layer; θ_j is the offset of the node j. This bias, also known as the threshold, can change the activity of the node.

This function expresses the activity of the neuron represented by this node in symbols, using logistic or sigmoid functions. Given the net information E_j of j, the result S_j of j is

$$S_j = \frac{1}{\left(1 + e^{-I_j}\right)}. \tag{2}$$

Since this function can map a larger input range to a smaller interval (0, 1), this function is also called a squashing function. Because the logistic function is nonlinearly differentiable, it enables the back-propagation algorithm to model nonlinearly differentiable classification problems.

3.3. Back Propagation Error. Errors propagate backwards as the burden and biases that represent the prediction errors of the network are continuously updated. For the node of output layer j, the calculation formula of error Err_j is as follows:

$$\mathrm{Err}_j = S_j\left(1 - S_j\right)\left(G_j - S_j\right), \tag{3}$$

S_j is the real result of node j and is the realized objective worth of node j for in light of a given preparation test. In fact, $S_j(1 - S_j)$ is actually the derivative of the logistic function.

Computing the error for j nodes on the hidden layer requires a weighted sum of the j-related mistakes on the following layer. The blunder of the j node is

$$\mathrm{Err}_j = S_j\left(1 - S_j\right) \sum_k \mathrm{Err}_k w_{kj}, \tag{4}$$

w_{jk} is the association weight from node k to node j in the following higher layer, and Err_k is the blunder of node k.

The propagated error is reflected by updating the weights and biases. The formula for weight update is as follows, where Δw_{ij} is the change of weight w_{ij}.

The recipe for weight update is as per the following, where Δw_{ij} is the change in weight w_{ij}.

$$\Delta w_{ij} = (1)\mathrm{Err}_j S_i, \quad w_{ij} = w_{ij} + \Delta w_{ij}. \tag{5}$$

The bias is updated by the following formula, where $\Delta\theta_j$ is the change in bias θ_j.

$$\Delta\theta_j = (1)\mathrm{Err}_j, \quad \theta_j = \theta_j + \Delta\theta_j. \tag{6}$$

In the method, biases and weights are updated by processing tuples, which is the way to update existing. But in practice, increases in biases and weights can accumulate in variables, and biases and weights can update training samples after all tuples have been processed. The method is a regularly updated method, with a period representing one iteration of the training samples [20–22]. Periodic updates are often used to mathematically extract retrospective propagation processes, while instance updates are more commonly used in practice because instance updates tend to yield more precise results.

3.3.1. Decision Tree Classification Algorithm. The crucial place of the choice tree order calculation is the means by which to track down the ideal ascribes to partition, ceaselessly structure high-immaculateness branch hubs and leaf hubs, and lastly observe a choice tree that can sensibly characterize the preparation set [2, 23].

Expecting that the preparation set S is an assortment of erratic example objects, which contains m items with various class mark property estimations, and Q_a $(a = 1, 2, \ldots, m)$ is thought to be m various classes. Let $Q_{a,S}$ be the set of objects belonging to class Q_a in data set S, $|S|$ be the quantity of information objects in data set S, and $|Q_{a,S}|$ be the quantity of information objects in $Q_{a,S}$.

The entropy computation equation of the set S is

$$\mathrm{Info}(S) = -\sum_{a=1}^{m} p_a \log_2(p_a). \tag{7}$$

Among them, $p_a = |Q_{a,S}|/|S|$.

The preparation set S is ordered by the n qualities of the trait X, and X contains n various articles $\{x_1, x_2, \ldots, x_n\}$. At the same time, S is divided into n partitions $\{S_1, S_2, \ldots, S_n\}$, what is more the data expected for grouping can be added by weighting the entropy of the n parcels:

$$\mathrm{Info}_X(S) = -\sum_{a=1}^{n} \left(\frac{|S_a|}{|S|} p_a \times \mathrm{Info}(S_a) \right). \tag{8}$$

The data gain is

$$\mathrm{Gain}(X) = \mathrm{Info}(S) - \mathrm{Info}_X(S). \tag{9}$$

3.3.2. Information Gain Calculation. In the early stages of machine learning, there was only a blank decision tree and no idea how to divide existence based on features. The currently learned decision tree model is used to classify the entire feature space. The preparation set partitioned into X class is characterized as L, represented as the case of the i-th class, $|L|$ addresses the absolute number of cases in the preparation set L, if the probability $G(A_i)$ of the unknown instance belonging to the i class is defined as

$$G(A_i) = \frac{|A_i|}{|L|}. \tag{10}$$

At this point, the partition A uncertainty measure is

$$H(L, A) = -\sum_{i=1}^{r} G(A_i) lbG(A_i). \tag{11}$$

It can be seen from the whole decision tree learning process that the uncertainty of the classification data set in the decision tree is getting smaller and smaller. If the test attribute b is used for testing, when $b = b_j$, the samples belonging to the ith class can be regarded as A_{ij}, then there are

$$G(A_i; b = b_j) = \frac{|A_{ij}|}{|L|}. \tag{12}$$

That is, $G(A_i; b = b_j)$ represents the size of the probability that it belongs to the ith class when $b = bj$. The conditional entropy of the training set for attribute L is the uncertainty degree of the decision tree for the division:

$$H(L_j) = \sum_i G(A_i|b_j) lbG(A_i|b = b_j). \tag{13}$$

The information entropy of all the $b = b_j$ branches L extended after selecting the test attribute b for the classification information is:

$$H(L, b) = \sum_j G(b = b_j) H(L_j). \tag{14}$$

The information gain $I(L; b)$ provided by attribute b for classification is

$$I(L; b) = H(L) - H(L|b). \tag{15}$$

3.3.3. Naive Leaf Bayesian Classification Method. The standard of the Naive Bayes calculation is to accept that the presence or nonattendance of a particular component is free of the presence or nonappearance of different highlights, which is class contingent autonomy. It upholds the presumption of freedom between various elements utilizing Bayes' hypothesis [24–26].

The clarification of Bayes' hypothesis is as per the following: suppose K is an information object in the preparation set and portray K with n property estimations: suppose H addresses the theory that the information object K has a place with a specific class Q. Then, at that point, $P(H|$

X) addresses the back likelihood of the H occasion under the reason X.

The Bayes rule is as per the following:

$$P(H|K) = \frac{P(K|H)P(H)}{P(K)}. \tag{16}$$

Assuming a training set $Z = \{Z_1, Z_2, \ldots, Z_n\}$ with m elements, each element in Z can be represented by a vector $X = \{x_1, x_2, \ldots, x_n\}$ of n-dimensional attributes. Assuming that $A = \{A_1, A_2, \ldots, A_n\}$ addresses n ascribes, then, at that point, K is the n proportions of the n credits on the information tuple. Assuming m sample classes $Q_1, Q_2, \ldots, Q_n$, the naive Bayes algorithm predicts an object K whose attribute class is unknown, then the attribute class of K is the class $P(Q_i|K)$ to which the posterior probability belongs, namely:

$$P(Q_i|K) = \frac{P(K|Q_i)P(Q_i)}{P(K)}, \tag{17}$$

where $P(K)$ is a proper incentive for all classes $Q_i\,(a = 1, 2, \ldots, m)$, while $P(K_i)$ is normally viewed as equivalent likelihood, in particular:

$$P(K_i) = \frac{\text{Number of samples belonging to class } K_i}{\text{The total number of training set samples } m}. \tag{18}$$

Along these lines, it is simply important to amplify $P(X|K_i)P(K_i)$ to acquire the most elevated back likelihood. Nonetheless, because of its perplexing estimation and enormous measure of computation, in light of the basic setting of class condition freedom, the accompanying equation can be utilized to communicate $P(X|K_i)$:

$$P(X|K_i) = \prod_{t=1}^{n} P(X_t|K_i) = P(x_1|K_i)P(x_2|K_i)\ldots P(x_n|K_i). \tag{19}$$

3.4. Overview of Traditional Village Landscape

3.4.1. The Concept of Traditional Village. The evaluation and identification of traditional villages includes three aspects: evaluation of traditional buildings, evaluation of the location and pattern of the village, and evaluation of the intangible cultural heritage of the village. Traditional villages are one of the carriers of Chinese regional culture. The living space for the coexistence of man and nature formed by Chinese laborers in their long-term production and life is a testimony to the long history of the Chinese nation [27–29].

3.4.2. Landscape Composition. The rural landscape in traditional villages is the product of the harmonious coexistence and long-term interaction between humans and nature. The formation of traditional village landscape is not only restricted by the natural environment but also affected by human activities. Many traditional villages in China have a strong historical atmosphere, and their village landscapes are usually integrated with the historical environment to form material and nonmaterial landscapes rich in local flavor. The material landscape includes natural landscape, settlement, and architectural landscape. Intangible landscapes mainly refer to two parts: economic and living landscapes and historical and cultural landscapes and folk custom landscapes [30–32]. All kinds of landscapes are interconnected and infiltrated with each other, forming a rich landscape composition of traditional villages. Comprehensive understanding of "traditional village landscape", its constituent elements include houses, settlements, woodlands, farmland, vegetable fields, fences, roads, rivers, ponds, lakes, canals, bamboo forests, mountain springs, ancestral halls, stone Buddhas, stone walls, wells, waterwheels, wooden bridges, wooden houses, dojos, grain drying fields, etc. Table 1 shows the element carrier of traditional village landscape.

It can be divided into basic landscape and characteristic landscape. The former is the basic landscape feature shared by traditional villages, which can be mainly distinguished from modern villages. The latter is the unique business card and characteristics of each traditional village and is the core element of the development and evolution of the village. In terms of distribution, these characteristic historical landscapes are usually distributed in the fringes of villages, or in the peripheral areas of villages, and are generally scattered [33, 34]. Figure 5 shows a conceptual map of the spatial distribution of historical characteristic landscapes in most traditional Chinese villages. It can be seen that the historical feature landscape is usually born around the base landscape.

4. Experiment and Analysis of Traditional Village 3D Landscape

4.1. Establishment of 3D Model. The 3D model of ground objects is one of the indispensable elements in 3D GIS, and it is a major element of 3D scene. 3D modeling is extremely cumbersome and complex, and it also requires a ton of labor supply and material assets. There are many popular 3D modeling tools such as 3DS Max, Softlmage, SketchUp, Maya, UG, and AutoCAD.

4.2. Construction of Traditional Village Landscape Model. The village buildings are divided according to 4 quality classification standards:

(1) Better buildings: buildings with good main structure and good quality.

(2) General building: the main structure is general, the quality is mostly intact, and some buildings are damaged.

(3) Poor building: the main structure has been damaged, and the quality is poor.

(4) Very poor building: a building with severely damaged main structure and poor maintenance.

Classification of current building quality: most buildings in the village are of poor quality and general buildings, including traditional wooden buildings in the Qing Dynasty, some buildings built after liberation, and buildings built or maintained by farmers in recent years. Poor buildings

Table 1: Carriers of elements of traditional village landscape.

material Form landscape	Natural landscape	Topography, climate, soil, hydrology, flora and fauna, and color landscape
	Settlement and architectural landscape	Dwellings, roads, wells, waterwheels, streets, houses, sculptures, calligraphy, gardens, stone bridges, wooden bridges, docks, shops, post stations, ancestral halls, temples, pavilions, theatres, archways, gate towers, academies, and dojos
Immaterial landscape	Economy and living landscape	Population, agricultural crops, daily activities in the countryside, including carrying water, chopping firewood, breeding, grazing, sowing, transplanting, picking, harvesting, resting, and trading
	Historical culture and folklore landscape	Language, clothing, religion, local worship, folk knowledge, construction skills, traditional crafts, living customs, rural governance, entertainment, and competition

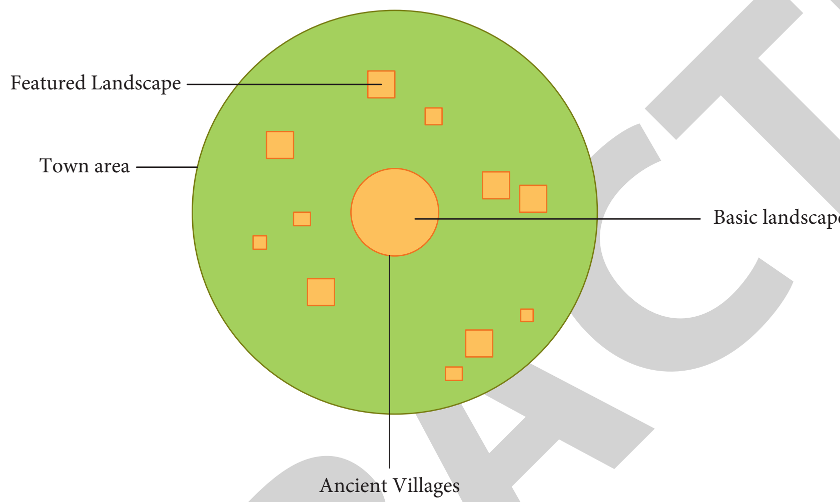


Figure 5: Schematic diagram of the basic composition and distribution of traditional village landscape space.

include rammed Earth buildings for farmers' livestock and unattended wooden buildings. Figure 6 shows the current building quality classification data:

4.2.1. Construction of Terrain and River Models. Soils and rivers form the basis of the city's three-dimensional landscape. The first step in the construction of three-dimensional landscapes in traditional villages is the construction of soil and river models.

The ground model construction method is to first use ArcGIS to create a digital elevation model, build the soil data required for the soil, and then input the DEM data into Unity3D to create a three-dimensional soil model [35, 36]. Following are the main steps to create a ground model with Unity3D using ArcGIS software, as shown in Figure 7.

(1) Export the required elevation data (contours and elevation points) from the existing terrain data and save it as a line layer and layer point format Shanghai Medicine, as shown in Figure 7(a).

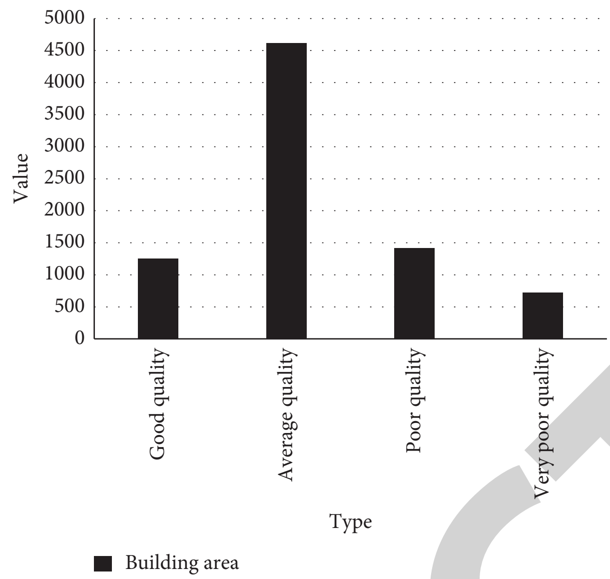
(2) Create DEM data in triangulation format based on the received contours and elevation points. Then, the raster data are generated from the triangulation, the data format is converted, and the appropriate DEM image resolution or size is defined. The generated DEM data are shown in Figure 7(b).

(3) Input the DEM data into Unity3D to create a DEM-based 3D soil model, as shown in Figure 7(c).

The construction of the river model involves two aspects: one is the construction of the river model, what's more the other is the development of the water framework model.

(1) Construction of the channel model: for the channel of a natural river, the Unity3D soil modifier is directly used for processing according to the voltage, distortion, drop and other conditions of the channel, or the channel data are added to the DEM data generation process. In this way, the ground is created according to the river channel information, and the modeling of the natural river channel is completed indirectly; for the planning of the river channel passing through the city, the 3DMax tool is used to build a model according to the data of the river direction, deformation and drop, and then the map is drawn and the ground is simulated.

(2) Build a water body model: There are two ways to create a water body model: one is to use the parametric modeling tool Unity3D water body to set relevant parameters (including water energy, ripple, reflection) according to the direction, drop and other related conditions, etc.) to complete Modeling of the river water system; First, when the dynamic effect of the water system is not high, the texture of the water body can be simulated with 3DMax [37, 38]. The method is simple, the amount of data is small, and it can meet the general conditions.



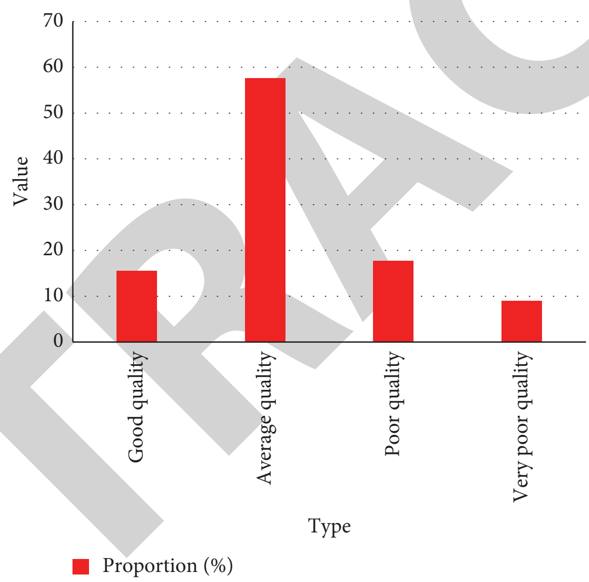
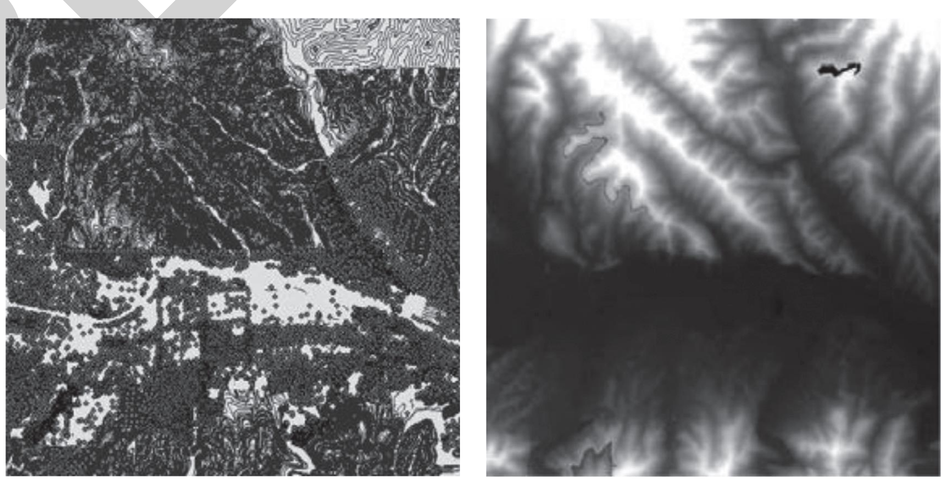
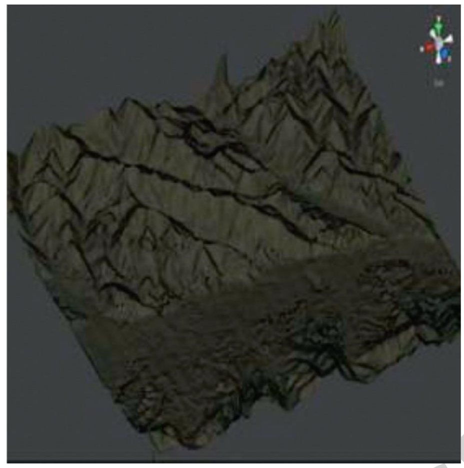


FIGURE 6: Current construction quality classification.



(a) (b)

FIGURE 7: Continued.



(c)

Figure 7: Three terrain construction process. (a) Elevation data, (b) data elevation model, (c) 3D terrain model.

In the process of building a river model, conditions such as the direction and drop of the river should be considered, and the modeling principles should be revised and adjusted to adapt to the actual ground. The influence of the river model constructed by 3DMax software on this file is shown in Figure 8:

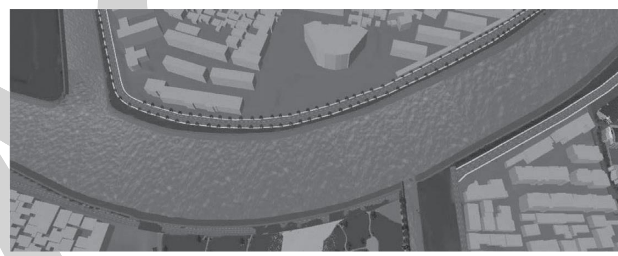


Figure 8: River model.

4.2.2. Construction of Vegetation Model. Vegetation is an important part of outdoor scenes, and good vegetation performance can improve the fidelity of 3D virtual scenes and assume an imperative part in the loyalty and imperativeness of the whole scene. The vegetation characterization and displaying apparatuses utilized are displayed in Table 2:

Table 2: Vegetation classification modeling tools.

Vegetation classification	Modeling tools
Tree-like vegetation	Untiy3D, 3DMax
Spherical vegetation	Unity3D, 3DMax
Zonal vegetation	3DMax

Figure 9 is a three-dimensional landscape of a village based on a traditional village's three-dimensional geographic information system.

Figure 9: Three-dimensional landscape of traditional village.

4.3. System Resource Test and Rendering Efficiency Analysis. The 3D digital map system mainly provides unified integrated management of city-level 3D model data and 3D information services under the network environment. The data content of the system integration includes: basic map data, including DEM, DOM, and volume data; extended map data, including administrative boundary data, place name data; planning-related data, including planned road edges and municipal control lines; 3D model data, including various models of different levels of detail; multimedia information, including pictures, audio, and video [39].

The main types of data are shown in Table 3.

Based on the visual experience during system operation, the relationship between the frames per second (FPS) transferred to Unity3D and the smooth operation of the system should be investigated and calibrated through experiments. The hierarchical relationship table is shown in Table 4:

Then, each set of test data reflecting the relationship between the number of rendered patches and rendering efficiency is obtained, and according to the classification relationship table between FPS and running stability. The acquired test information are displayed in Table 5:

5. Discussion

First of all, through the study of relevant knowledge points of literature works, this paper initially masters the relevant basic knowledge and analyzes how to study the three-dimensional landscape rendering of traditional villages. This paper elucidates the idea of enormous information and related classification methods. It focuses on the BP neural network algorithm, explores the landscape of traditional villages, and draws traditional village landscapes through modeling software such as 3DMax.

Table 3: Main data and data volume.

Data name	Data format	The amount of data	Data name	Data format	The amount of data
Aerial photograph	Tif	110 G	Volume	Shp	180 G
Satellite	Tif	5.26 G	Planning road edges	Shp	75.8 G
DEM	Img	2.04 G	Municipal control line	Shp	42 G
Place name	Shp	8.89 G	3D model	.X/.XPL/JPG/TGA	>3T

Table 4: Fluency rating relationship.

FPS	>25	>15	>10
Fluency	Very smooth	Smooth	Generally smooth
FPS	>6	<6	
Fluency	Relatively smooth	Caton	

Table 5: Test data.

The number of rendered patches (pieces)	Tris	Draw calls (times)	FPS	Fluency
28932	932.35 K	4720	27	Very smooth
120193	1.53 M	10437	9.4	Generally smooth
242029	1.83 M	16020	6.1	Relatively smooth
471028	2.72 M	27701	3.5	Caton
942930	4.33 M	46571	1.8	Caton is serious

The paper also focuses on introducing traditional village landscapes. It includes climate, geology, water environment, soil and vegetation, as well as elements such as houses, buildings, daily necessities and decorations, material cultural elements other than folk customs, and local historical and cultural elements (such as folk allusions, historical figures, totem worship, feng shui concepts, and spiritual and cultural elements).

Through the experimental analysis, this paper shows that the design scheme of the traditional village 3D landscape geographic information system is reasonable and feasible, the operation is stable, and the expected research goal is achieved. The system can provide strong technical support and guarantee for urban planning and management. The higher the number of rendered patches, the lower the system performance and the less stable the system will run.

6. Conclusion

Based on the 3D GIS construction project of traditional villages, this paper studies the rapid development of 3D GIS technology in recent years and the technical process of landscape distribution modeling and designs and implements a 3D GIS for traditional villages. This study realizes the construction of traditional landscape village based on unity3d. At first, through the research and analysis of the traditional landscape characteristics of the village, the traditional landscape characteristics are divided into soil, river, vegetation, architecture, road, and so on, and its modeling and simulation methods are studied. Then, use 3D modeling tool 3DMAX to build the model, use Photoshop software to process texture data and create simulation model, manage 3D soil model and traditional village objects through unity3d, and build 3D traditional village landscape scene and visualization. The traditional village landscape is a local landscape, not an exotic landscape, with local characteristics. It is a primitive ecology, not a modern landscape, not a pure natural or urban landscape, but a landscape with rich seasonal changes. Traditional villages are living symbols of history and culture, as well as extremely fragile cultural heritage. During rapid urbanization, they are very sensitive to external factors and changes. Therefore, it is particularly important to explore effective ways to protect and develop traditional villages. Its materials from traditional villages can be digitized to extract key cultural genes for permanent protection. On this basis, this paper evaluates the rural characteristics of conventional towns and examines the modernization of customary towns in a sequential request. The high immersion of the 3D landscape information system is an index to enhance user interest and expand the application of the system. Although this system has strong spatial analysis capabilities, there are still some defects in the image browsing effect. It should enhance the performance of particle effects and improve the system's performance. Reference [40].

Data Availability

No data were used to support this study.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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