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Retraction

Retracted: Landscape Design of Rural Characteristic Towns Based on Big Data Technology

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This article has been retracted by Hindawi following an investigation undertaken by the publisher [1]. This investigation has uncovered evidence of one or more of the following indicators of systematic manipulation of the publication process:

(1) Discrepancies in scope
(2) Discrepancies in the description of the research reported
(3) Discrepancies between the availability of data and the research described
(4) Inappropriate citations
(5) Incoherent, meaningless and/or irrelevant content included in the article
(6) Peer-review manipulation

The presence of these indicators undermines our confidence in the integrity of the article's content and we cannot, therefore, vouch for its reliability. Please note that this notice is intended solely to alert readers that the content of this article is unreliable. We have not investigated whether authors were aware of or involved in the systematic manipulation of the publication process.

Wiley and Hindawi regrets 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 own 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. Zhang and Y. Sui, "Landscape Design of Rural Characteristic Towns Based on Big Data Technology," *Mathematical Problems in Engineering*, vol. 2022, Article ID 7356508, 13 pages, 2022.

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Research Article

Landscape Design of Rural Characteristic Towns Based on Big Data Technology

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This study explores an effective method for constructing a landscape model of characteristic rural towns. In this study, the landscape pattern index of characteristic rural towns is obtained by calculating the total area, patch density, patch shape index, and average patch fractal dimension of the landscape area of characteristic rural towns. At the same time, this study calculates the minimum function of the three-dimensional rural characteristic town landscape cloud fusion transformation. At the same time, this study uses this function to calculate the 3D translation transformation, the rotation matrix of the 3D model, and the scaling factor transformation of the 3D model to construct the 3D model of the rural characteristic town landscape area. The simulation results show that the above method can reduce the error, reduce the registration time, improve the convergence, and reduce redundancy. This method can enhance the overall effect of constructing a three-dimensional model of a rural characteristic town landscape area.

1. Introduction

Under the background of Chinese urbanization development and transformation and new-type urbanization becoming a new bright spot for China's future growth, the solid industrial relevance and driving force of tourism make tourism urbanization a hot spot of widespread concern in the industry and an essential factor in new-type urbanization. In recent years, tourism characteristic towns have become typical representatives of characteristic towns and have become an important way of China's new urbanization. The booming of rural tourism in China in recent years has triggered massive industry changes and profound consumption transformation and dealt a feasible breakthrough direct forrural vitalization. Under the background that rural tourism is increasingly dominated by local tourism consumption, the economic ecology of characteristic towns formed by relying on the unique local natural and human resources has opened up a new path for the transformation and development of the domestic tourism industry. In recent years, the landscape design of characteristic rural towns has gradually become a unique ecotourism resource, and its development and utilization have been paid more and more attention by people. When people plan and design the landscape area of characteristic rural towns, due to the influence of urbanization and ecological environment changes, the construction of the rural characteristic town landscape model has high model construction redundancy, the complexity of model construction increases, and the design effect is better. It is necessary to explore an effective method for constructing the landscape model of characteristic rural towns, which can improve the registration time of model construction, the convergence, and the efficiency of model construction. It has important practical significance in practical application [1].

The influence of tourism characteristic towns is embodied in the process of tourism urbanization. The researchers believe that tourism is an important industry to promote the development of the national economy, and tourism characteristic towns have become one of the

important ways to promote the economic development of traditional small towns. With the rapid development of rural tourism and the continuous increase in small-town construction, rural tourism's role in promoting the construction of small towns will become increasingly apparent, and the leading role of tourism-featured towns will be more significant. Some scholars have proposed that the development of tourism can increase the employment rate in urban areas and promote the improvement of local employment status, industrial structure, and infrastructure, thereby improving the quality of life of urban residents and enhancing their sense of belonging and happiness [2]. Researchers agree that tourism urbanization profoundly impacts urban and rural development, population and social structure, land use, and landscape environment. The urbanization of tourism has accelerated the development of cities, making the scale of cities continue to expand and making significant changes in the ideological concepts and attitudes of rural residents, such as life attitudes, educational concepts, and business concepts. Many rural residents show the characteristics of urban residents. Some rural residents have experienced the social role transition from farmers to operators and then to modern entrepreneurs. Many urbanized areas have improved infrastructure and the environment. These changes have triggered changes in education, transportation, and infrastructure in cities and towns. Tourism urbanization has changed the industrial structure of cities and the direction of urban and rural development, resulting in the continuous expansion of tourism land, the rapid expansion of nonagricultural populations, and the large number of women employed with far-reaching influence.

The researchers found that while tourism characteristic towns positively impacted local construction, they also brought many challenges. In addition to the urban waste disposal due to the short-term population surge brought about by tourism, in the process of tourism urbanization, with the influx of nonlocal population, the phenomenon of residents' laziness and population hollowing appear, and tourism characteristic towns exist. With solid population mobility and chaotic population management, resulting in contradictions in land use and even the problem of land occupation and waste to a certain extent, tourist towns also pose challenges to the ecological environment. Tourism urbanization has brought about the emergence of social class differentiation and isolation. In tourism, urbanization, rising prices, increasing social problems, floating population, and seasonal employment have difficulties in social management. Basile's research has found a strong correlation between the unscientific disposal of municipal solid waste, the decline in surface water quality, and the increase in the incidence of downstream waterborne diseases during the tourist season. Some scholars take Zhouzhuang, a historical water town, as a case point, revealing that tourism development will not only bring economic and environmental changes to the destination but also lead to the fragmentation of social relations and the loss of sense of place in the destination [3]. The researchers believe that the development of tourism characteristic towns must first take into account resources and location, look for distinct cultural themes, create core attractions from both tangible and intangible levels, use the core business format of commercial street + accommodation to connect and enrich build the texture of the characteristic tourism town, and use the business management + operation method to continuously optimize and design the business model of the characteristic tourism town. In this study, a method for constructing a 3D model of a rural characteristic town landscape based on cloud point fusion is proposed and verified by simulation tests. This method can reduce registration time, reduce errors, and improve convergence.

2. Urgent Problems to Be Solved in the Planning and Development of Characteristic Towns

2.1. Embody the Characteristics. A characteristic town refers to a comprehensive development project with a clear industrial orientation, cultural connotation, tourism characteristics, and community functions that rely on a characteristic industry and distinguishing environmental factors (Figure 1). Since the introduction of relevant incentive policies, the construction of characteristic towns in various places has entered the fast lane. However, some places have become government departments' "performance projects," and the planning and construction of characteristic towns have turned into road building and tree planting, and extensive planning of cultural and tourism towns; some town planning and construction emphasize "form" over "soul." The construction of the spatial form of the town is too rigid, the local culture is not explored, and the basic rules for developing characteristic towns are not combined [4]. There is a lack of scientific planning for the consumption formats, cultural projects, and characteristic content of characteristic towns, which is difficult to stimulate the local economy.

2.2. Clarify the Planning Direction. Cultural and tourism characteristic towns are the product of the development of local social and economic development to a particular stage, the accumulation of local history and culture to a certain extent, and the development of characteristic local industries to a certain extent, combined with the unique local cultural and geographical environment. Under the boom in the construction of characteristic towns, many enterprises blindly follow the trend to seize resources and obtain policy support [5]. The construction of some cultural and tourism characteristic towns is "out of shape," and it is easy to make wrong judgments on critical links such as decision-making and investment, eagerness for quick success, lack of scientific decision-making and good planning, and lack of overall long-term planning so that resources are wasted in many places. Based on planning first, combined with local reality, the planning, construction, and development direction of characteristic towns are clarified.

2.3. Pay Attention to Cultural Connotation. In constructing the characteristic town landscape, it is necessary to consider how to protect and inherit the local culture. For example, there are ancestral clan halls in many rural areas in Guangdong, which are iconic buildings in characteristic

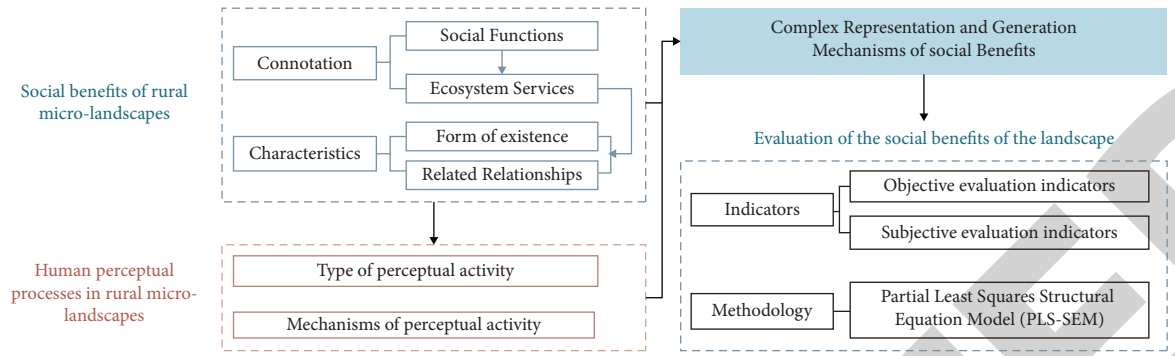

Figure 1: Connotation of characteristic towns.

towns, and many ancestral halls are damaged due to disrepair. In constructing the characteristic town landscape, effective measures should be taken to repair it and prevent it from being damaged. The design and construction projects should also be combined with the local conditions and architectural styles in the specific implementation. The design content should be integrated into the local culture, reflect the local characteristics, and create a foundation for the inheritance of culture. If the characteristic town is in the Chaoshan area, Chaoshan cultural elements are injected; if it is in the minority area, it must combine the minority culture to create the characteristic landscape of the minority culture.

2.4. Incorporating Local Customs. In the planning and construction of the "culture + agriculture" characteristic town, the local villagers' customs, lifestyles, and regional economic conditions should also be investigated to ensure the rationality and operability of the landscape plan. For example, in the construction of areas that focus on planting, it is necessary to combine the economic development methods of local villagers to avoid the adverse impact of planning and construction on their lives and production. When building a "cultural + agricultural" characteristic town, local specialties and relevant elements of leading industries can be extracted and applied to the architectural firm. Scenes familiar to the villagers are also used to set up the characteristic town landscape, which can ensure its cultural identity. This is also a meaningful way to promote the inheritance of culture.

2.5. Focus on Holistic Planning. The planning and construction of "cultural + agricultural" characteristic towns should be comprehensively analyzed to ensure the coordination and unity of human, natural, and artificial landscapes. Planning and Design: before planning, it is necessary to dig deep into the local history and refine the symbols that reflect the regional culture. For example, you can select topics from historical events, famous sentences, etc., and integrate them into the planning and design. In terms of performance, based on determining the topic selection, it is necessary to adopt an appropriate form of expression, reflect the connotation of the region's specific culture, and find an entry point in the planning and design. Regarding material technology, it is necessary to select raw materials that reflect regional characteristics and the region's unique natural or humanistic characteristics. Regarding craftsmanship, the core part of traditional craftsmanship is inherited from innovation.

3. Influencing Factors of Landscape Design of Characteristic Towns

"Although a building is substantial, what it can suggest or reveal includes the whole of life. Because it not only reflects the technical and scientific level of an era, the spirit of that era, and the aesthetic concepts at that time but also faithfully records the way of life and values of the people at that time." Chinese buildings are people-oriented, the embodiment of human civilization, as are the environmental landscapes. Through the architectural forms and landscape features presented by these, you can appreciate the unique local customs of various places. Since the development of the times, the humanistic concern in the creative activities of the Chinese nation is more reflected in the humanized design [6]. The so-called humanized design is to take people as the main body of the design and comprehensively consider the needs of all aspects of people, and its core is still people-oriented. In the environmental landscape design of characteristic towns, the human factors can be grasped from the following aspects: to meet the crowd's needs. First, it is necessary to understand the positioning of characteristic towns, whether industrial parks or tourist attractions. According to different types of towns, the town landscape is rationally planned to meet the needs of the main event groups for venue functions. For example, in the landscape planning of the community, more fitness places and resting places should be set up; more public service and tourist-oriented facilities should be set up in tourist attractions.

Demonstrate Humanistic Care. The first is the selection of materials. In slippery places, nonslip floor coverings should be selected; shading facilities should be appropriately set in areas with solid solar radiation; lighting equipment should be added in dark places. Secondly, we must pay attention to scale control and barrier-free design and reasonably design the length and height of steps, the height of handrails, and the planning of barrier-free passages, to

provide travel guarantees for the elderly and children, and the disabled.

Show the Humanistic Spirit. In the design of landscape modeling and landscape sketches, the local special cultural symbols are integrated, and they are used as elements in the landscape design of the town, which can show the unique humanistic outlook. For example, the Tea Horse Department in Ya'an, located in Changchun Village, Xindian Town, Mingshan County, Ya'an City, Sichuan Province, is an old site on the Ancient Tea Horse Road, and there is still a Yamen Institution that managed tea and horse trading in ancient times (Figure 2). While protecting this ancient site, the local people also built landscape sketches reflecting the ancient tea-horse road culture (Figure 3). These sketches reproduce the scene of caravan people carrying horses and camels in those days, highlighting the characteristics of caravan culture and showing the spirit of caravan merchants who are not afraid of hard work and hardships.

"Harmony between man and nature" advocates that people must follow nature's laws and coexist with nature. In the design, it is recommended to get inspiration from nature and carry out creation activities according to the principles of nature. This philosophical viewpoint is applied to all aspects of ancient creation activities, such as furniture architecture and garden landscapes, and still has an essential reference for today's design concepts. Landscape design techniques derived from this philosophical viewpoint are as follows.

3.1. Taking Advantage of the Situation. Borrowing scenery according to the situation is to use the original landscape features and cleverly borrow angles to enrich the sense of hierarchy of the landscape. The technique of borrowing scenery can be applied in two aspects, and one is the natural landscape. The land of China is vast and rich in terrain [7]. According to the local topography, different architectural structures and spatial layouts have been formed. In constructing characteristic towns, using topographical features to construct new buildings can maintain the overall landscape effect of the settlement to the greatest extent. In landscape planning, reasonable use of close-up and distant views can extend the landscape space and better integrate the scenery into nature.

3.2. Localized Design. Localized design is a creative activity that combines national characteristics with regional characteristics based on the national culture and current needs. Mr. Wu Liangpu once said, "To create a beautiful environment, we must achieve two kinds of integration. One is to integrate with nature, and the other is to integrate with history and culture, that is, to integrate with 'cultural context,' to inherit and develop historical heritage." After several years of inheritance and evolution, each ethnic group has formed its unique regional customs. Regional cultural characteristics need to be presented through traditional cultural symbols. An in-depth study of regional culture, extraction of traditional cultural symbols with the most local characteristics, and proper application of urban cultural landscape design can give the design a sense of cultural identity.

Figure 2: Ya'an Tea-Horse Division.

Figure 3: Sketch Sculpture of Ancient Tea Horse Road.

3.3. Sustainable Design. With the shortage of resources and the gradual awakening of national consciousness, sustainable landscape design has become the focus of current designers. Sustainable landscape design emphasizes meeting people's needs and creating a comfortable and green landscape environment to ensure environmentally sustainable development. Adapting measures to local conditions is one of the fundamental principles of sustainable development. Building a small-town landscape following local conditions will not destroy the ecological balance and achieve ecological and green town landscape design.

4. Construction Principle of the 3D Model of Rural Characteristic Town Landscape Area

The construction principle of the three-dimensional model of the landscape area of the characteristic rural town is to calculate the spatial orientation coordinate system of the rural characteristic town landscape through the imaging principle of the visual camera and use the visual difference ranging method to obtain the image points of the rural

characteristic town landscape image corresponding to the three-dimensional coordinate system. After transforming the world coordinate system and the coordinate equipment system, the actual rural characteristic town landscape area model is constructed.

Suppose $Q_\varepsilon - Y_\varepsilon A_\varepsilon C_\varepsilon$ represents the three-dimensional coordinates of each pixel in the visual camera. C_ε corresponds to the corresponding depth orientation along the optical axis. A_ε represents the corresponding height orientation along the optical axis. The Y_ε table corresponds to the width orientation along the optical axis. $Q_J - \mathrm{YA}$ represents the landscape spatial coordinate system of characteristic rural towns. $Q_\kappa - \mathrm{VX}$ represents the device configuration coordinate system. H_ω represents the landscape image of the characteristic rural town in the camera, and the depth coordinate system of the point is calculated by the visual difference between the projection points H_1, H_2 of the landscape image plane through the H_ω point. The visual difference calculation formula is as follows:

$$\begin{cases} C_\varepsilon = \dfrac{xk}{1000q}, \\ q_\omega = \chi_1 - \chi_2. \end{cases} \tag{1}$$

In the formula, C_ε represents the depth coordinate of H_ω in the camera coordinate system. x represents the baseline spacing. k is the focal length of the camera. qω represents the visual difference corresponding to the depth coordinate system of the H_ω point. χ_1 represents the abscissa of the landscape image coordinate system corresponding to the projection point H_1. χ_2 represents the abscissa of the landscape image coordinate system corresponding to the projection point H_2.

The rural characteristic town landscape image is saved by the device coordinate system of the unit pixel selected in the image device. It is on the same plane as the rural characteristic town landscape image coordinate system and the same azimuth coordinate axis, and the origin position is changed. The point conversion relationship ofthe rural characteristic town landscape image coordinates is expressed as follows:

$$\begin{bmatrix} i \\ j \\ 1 \end{bmatrix} = \begin{bmatrix} \vartheta_i & 0 & -v_0\vartheta_i \\ 0 & \vartheta_j & -v_0\vartheta_j \\ 0 & 0 & 1 \end{bmatrix} \cdot \begin{bmatrix} \nu \\ v \\ 1 \end{bmatrix} = N_2 \begin{bmatrix} \nu \\ v \\ 1 \end{bmatrix}. \tag{2}$$

In the formula, N_2 represents the coordinate transformation matrix of the landscape image of characteristic rural towns. (ν, v) means that the projection point of H_ω is the abscissa and ordinate on the device coordinate system. (ν_o, v_o) represents the abscissa and ordinate of the origin coordinate system of the rural characteristic town landscape image on the device coordinate system. i represents the width, azimuth, and unit pixel size of the landscape image of rural characteristic towns. j represents the height and orientation unit pixel size of the landscape image of rural characteristic towns. Using the principle of linear camera pinhole imaging, the pixel coordinates of the camera width and height orientation of point H_ω are expressed as follows:

$$\begin{cases} Y_\varepsilon = C_\omega \dfrac{i_1}{k}, \\ A_\varepsilon = C_\omega \dfrac{j_1}{k}. \end{cases} \tag{3}$$

In the formula, (i_1, j_2) represents the coordinates of the landscape image of the rural characteristic town at the camera projection point. If $Q_\omega - Y_\omega A_\omega C_\omega$ is the world coordinate system placed on the ground, C_ω represents the depth orientation corresponding to the rural characteristic town landscape. A_ω means that the landscape of rural characteristic towns corresponds to the front-facing vertically upwards. Y_ω represents the horizontal orientation along the landscape of rural characteristic towns. The formula for converting camera coordinates to the landscape of rural characteristic towns is as follows:

$$\begin{bmatrix} Y_{\bar{\omega}} \\ A_{\bar{\omega}} \\ C_{\bar{\omega}} \\ 1 \end{bmatrix} = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & \cos(\alpha) & -\sin(\alpha) & 0 \\ 0 & \sin(\alpha) & \cos(\alpha) & 0 \\ 0 & z & 0 & 1 \end{bmatrix} \cdot \begin{bmatrix} Y_\varepsilon \\ A_\varepsilon \\ C_\varepsilon \\ 1 \end{bmatrix} = \begin{bmatrix} Y_\varepsilon \\ A_\varepsilon \\ C_\varepsilon \\ 1 \end{bmatrix}. \tag{4}$$

According to formula (4), after the transformation of the world coordinate system and the equipment coordinate system, the actual rural characteristic town landscape model formula is constructed as follows:

$$\mathrm{T} = \begin{bmatrix} Y_{\bar{\omega}} \\ A_{\bar{\omega}} \\ C_{\bar{\omega}} \\ 1 \end{bmatrix} = N \begin{bmatrix} i_1 \\ j_2 \\ 1 \end{bmatrix}. \tag{5}$$

In summary, the construction principle of the three-dimensional model of the landscape area of the characteristic rural town has been completed, and the construction of the three-dimensional model of the rural characteristic town landscape area has been realized according to this principle.

5. The Construction Method of the Three-Dimensional Model of the Landscape Area of the Characteristic Rural Town

5.1. Obtaining the Landscape Pattern Index of Characteristic Towns in Rural Areas. The process of the landscape pattern index of characteristic rural towns is to obtain the landscape pattern index of characteristic rural towns by calculating the total area, patch density, patch shape index, and average patch fractal dimension of the landscape area of characteristic rural towns.

5.1.1. The Total Area of Landscape Area of Characteristic Rural Towns. It is assumed that the selected wetlands have n total of landscape area types. A type of rural characteristic

town landscape area is selected, which is represented by ι, the number of patches is represented by m, and b_{il} is an area in the number of patches. The calculation formula of the total area of the rural characteristic town landscape area is as follows:

$$B_{\mathrm{DA}} = \sum_{l=1}^{m} b_{il}\left(\frac{1}{10000}\right). \tag{6}$$

5.1.2. Patch Density in Landscape Area of Characteristic Rural Towns. The patch density in the landscape area of the characteristic rural town can reflect the fragmentation of the landscape area and the spatial heterogeneity of the rural characteristic town landscape. The larger the landscape patch density value in characteristic rural towns, the greater the fragmentation and heterogeneity of the landscape area. The formula for calculating the landscape patch density in characteristic rural towns is as follows:

$$S_{\mathrm{EF}} = \frac{m_{\iota}}{\left(B \times 10^{6}\right)}. \tag{7}$$

5.1.3. Patch Shape Index in Landscape Area of Characteristic Rural Towns. The shape of landscape patches of rural characteristic towns is used to show the patch specifications of landscape elements and the contours' complexity. The patch shape index is to select a particular type of patch in the rural characteristic town landscape and calculate its area. At the same time, a square of the same area is used as a reference, and the deviation degree of the two is used to determine the size and complexity of the landscape patch shape. The more complex the patch shape, the higher the shape index value. The landscape patch shape index of characteristic rural towns is as follows:

$$L_{\mathrm{XZC}} = \frac{c_{\iota}}{2\sqrt{\pi B_{\iota}}}. \tag{8}$$

5.1.4. The Average Patch Fractal Dimension of the Rural Characteristic Town Landscape. Let P_{fd} represent the average patch fractal dimension of the rural characteristic town landscape, and the value is $1 \le P_{fd} \le 2$. When $P_{fd} \le 1$, the shape of the rural characteristic town landscape patch is clearer; when $P_{fd} \le 2$, the more complex the rural characteristic town landscape patch shape. Let R_{il} denote the area of all patches in the landscape of rural characteristic towns, and the formula for calculating the average patch fractal dimension of the landscape of rural characteristic towns is as follows:

$$P_{fd} = \frac{\sum_{l=1}^{m}\left(2 \ln R_{il}/\ln b_{il}\right)}{m_{\iota}}. \tag{9}$$

5.1.5. Obtaining the Landscape Pattern Index of Characteristic Rural Towns. By calculating the total area of landscape types of characteristic rural towns, the density of landscape patches of characteristic rural towns, the patch shape index of characteristic rural towns, and the average patch dimension of characteristic rural towns, the landscape pattern index of characteristic rural towns the formula is as follows:

$$H = \ln m + \sum_{l=1}^{m} P_{fd}, L_{\mathrm{XZC}}. \tag{10}$$

5.2. Construction Method of the 3D Model of Rural Characteristic Town Landscape Area. Based on the acquisition as mentioned above of the landscape pattern index of characteristic rural towns, a method for constructing a three-dimensional model of rural characteristic town landscape area based on point cloud transformation is proposed. This function calculates the 3D translation transformation amount, the rotation matrix of the 3D model, and the scaling factor of the 3D model, converts and constructs the 3D model of the landscape area of the characteristic rural town, and completes the construction of the 3D model of the landscape area of the rural characteristic town. Assuming that δ_1 represents the overall pattern point cloud model, and δ_2 represents the partial pattern point cloud model, the same points are $\delta_{\varphi 1}$ and $\delta_{\varphi 2}$, the minimum function calculation formula of the three-dimensional rural characteristic town landscape cloud fusion transformation is as follows:

$$S\left(\delta_{\varphi 1}, \delta_{\varphi 2}\right) = \left\|\delta_{\varphi 1} - \left(\sigma \cdot \delta_{\varphi 2} \cdot \eta + T + H\right)\right\|. \tag{11}$$

In the formula, σ represents the three-dimensional scaling factor. η represents the rotation matrix of the 3D model. T represents the three-dimensional translation transformation. According to formula (11), the specific steps for transforming the three-dimensional model of the rural characteristic town landscape area using the required function are as follows.

5.2.1. 3D Translation Transformation. Suppose G represents the geometric center point of the 3D rural characteristic town landscape point cloud model. R_{τ} represents the τ coordinate point in the 3D rural characteristic town landscape point cloud model. O represents the number of 3D landscape point clouds of characteristic rural towns, and the calculation formula of the set center point of $\delta_{\varphi 1}$ and $\delta_{\varphi 2}$ is as follows:

$$G = \sum_{\tau=1}^{O} \frac{R_{\tau}}{O}. \tag{12}$$

According to formula (12), let the geometric center points of $\delta_{\varphi 1}$ and $\delta_{\varphi 2}$ be G_1 and G_2, respectively, and the coordinate normalization method is used to translate the geometric center point to the position of the origin G. The

calculation formula of the set translation transformation is as follows:

$$T = (G_1 - G_2) + (G - G_1). \tag{13}$$

5.2.2. Rotation Matrix of the 3D Model. When $\delta_{\varphi 1}$ and $\delta_{\varphi 2}$ are processed by coordinate normalization, the simplified formula for formula (1) is as follows:

$$S(\delta_{\varphi 1}, \delta_{\varphi 2}) = \left\| \delta_{\varphi 1} - \delta_{\varphi 2} \cdot T \right\|. \tag{14}$$

If it is ensured that the landscape point cloud model of characteristic rural towns remains unchanged during conversion, the OPP algorithm is used to limit the rotation matrix. When $\det(T) = 1$, the calculation formula of the optimal rotation matrix is as follows:

$$J = I \cdot U^{\nu}. \tag{15}$$

5.2.3. Scaling Factors for 3D Models. Let $l\mu(\cdot)$ represent the traces of the matrix, and the calculation formula of the scaling factor is as follows:

$$\eta = \frac{l\mu\left(\delta_{\varphi 1}^{\nu} \cdot \delta_{\varphi 2} \cdot T\right)}{l\mu\left(\delta_{\varphi 1}^{\nu} \cdot \delta_{\varphi 2}\right)}. \tag{16}$$

After transforming the translation transformation value, rotation matrix value, and scaling factor, the expression of the point cloud in G_2 transformed to the G_1 coordinate system is as follows:

$$G_2'' = \eta \cdot G_2 \cdot J + T. \tag{17}$$

When the overall pattern points cloud and the partial pattern point cloud are integrated, namely $G_1 \cup G_2$, the construction of the three-dimensional model of the rural characteristic town landscape area is realized.

6. Landscape Planning and Design Methods for Tourism-Oriented Characteristic Towns

6.1. General Layout. In this design, the landscape planning is carried out for the characteristic tourist towns in the north, and the overall planning and design are carried out under the condition that the natural landscape, industrial park landscape, living area landscape, and infrastructure construction meet people's daily needs and highlight the tourism function. It includes commercial streets, theme plazas, residential areas, industrial parks, and usual scenic spots. To this end, the characteristic town should have three primary functions: (1) the essential functions of tourist attractions in the general sense; (2) meet the basic requirements of people's life and travel; and (3) satisfy the essential elements of residents' work and entrepreneurship. To become a thriving tourist town, it is indispensable to have distinct commercial complexes and characteristic industrial parks that can drive the town's rapid economic development and build a characteristic town with an intense cultural atmosphere, complete functions, and a healthy economic model.

6.2. Design Method

6.2.1. Traffic Route. In the design and planning of the characteristic tourist town in the north, combined with the research on the road traffic design strategy in this study, the topography, surrounding, and internal environment of the town itself are investigated and analyzed, and the roads and traffic routes are redivided to meet the flow of people. The traffic flow is large, but the number of short-term stagnations is small compared with the interior. Wider roads (6–9 meters) should be designed and planned to avoid traffic jams, and secondary arterial roads (2–4 meters) should be designed. To avoid exceptional circumstances, the surrounding greenery is designed to be simple and yet connotative as adjustment and improvement to satisfy the visual experience of tourists and improve the level of the ecological environment. The planning and design of the roads in the park should ensure convenience and efficiency and integrate the roads with the surrounding environment and the characteristics of the town to enhance the interest and comfort of the roads. According to the specific conditions of the town, a parking lot area with an appropriate scale will be constructed to meet people's parking needs. The most crucial point is that the road should make the flow of people and vehicles "live," and loops should be designed to avoid problems such as congestion and fire protection to the greatest extent. The above are the main roads in the town, and the roads should be designed with broader pavement and distinct areas, or the garden area should choose a narrower road, and the overall road system of the town should complement each other without disrupting the pattern so that the space is diversified and the traffic system route is fast.

6.2.2. Scenic Spots. This section accounts for the most significant proportion of the characteristic tourist towns in the north. The local intangible cultural heritage museum in the characteristic town and the tourist area composed of the surrounding park landscape is taken as an example. The historical development process as the background, the history, status quo, and complementary products of characteristic industries and enterprises are displayed as the core content, and the follow-up promotion and publicity are developed with interactive links such as sales. Negotiations, office, and other functions are carried out after the visit. The surrounding parks integrate culture into life and have better contact with local cultural characteristics. They are the best places for people to relax and travel and are an essential part of characteristic towns suitable for travel and vacation.

The Industrial Culture Museum can also be designed as a local modern history museum. Through the transparency and interaction of the industry, visitors have the opportunity to have close contact with the product production process and craftsmanship of the industry to promote better the subsequent development of the industry and economic growth. The design of the surrounding area of the Industrial Culture Museum and the park environment should also be different from other areas. The combination of the two

should not be incompatible with the general town design. An ecological landscape system that is unified with the town style should be built in the area. The type and scale of the building are equipped with the corresponding greening and water system. The elements should be designed and planned according to the corresponding theme: rockery, landscape pavilions, sketches, water features, flowers, etc. The spatial structure can be upgraded in terms of water bodies. For example, waterwheels and artificial springs add some interactive items in different seasons to add to the area's characteristics. Figure 4 shows the landscape design near Baotu Spring in Jinan. In the large-scale waterscape, the flexibility of water is fully used to create a spatial level of opening and closing so that it can form a dynamic and static combination with other elements. In summer, you can rest by the river to achieve the effect of adjusting your mood and promoting the experience. In winter, designing an ice-skating rink can improve local economic benefits and be the best place to play.

6.2.3. Living Park Segment. The area of this planned plot is divided into two parts, one is the original residential area, and the area is the residential house of the locals in the town. Town hotels, country-style restaurants, etc., can relieve the economic pressure in the initial stage of the town and increase the vitality of the characteristic town, making the town more distinctive. On the other hand, it is to build commercial and residential houses on the original basis, build communities, and provide housing for the foreign population, which can be sold to long-term residents or rented to tourist tenants.

6.2.4. Commercial Area Segment. This section mainly comprises cultural and commercial streets and industrial parks, ensuring that residents and tourists are one of the economic sources of the characteristic town. The business park connects the residential area with "zero distance" to experience the convenience of being located in the "city center."

6.2.5. Industrial Park Sector. The industrial park sector must satisfy three elements. 1. In production, to meet production needs, the design plan should be based on human text to provide a better working environment. 2. In transportation, the plate area should meet the transportation needs and be planned on the periphery of the town to facilitate a better transportation environment. 3. Tourists can visit the tourism environment with local characteristicsand the industrial park. The vitality of local culture is shown. Introducing industrial culture into characteristic towns can add a new color to tourism.

6.2.6. Greenland Landscape

(1) Green Space in the Tourist Area. Greenland landscapes in tourist areas refer to natural landscapes such as woodlands and grasslands within the environment of characteristic

Figure 4: Baotu Spring.

towns, which account for the most significant proportion of characteristic tourist towns and have the most local characteristics. How systematically, rationally, and scientifically plan this part of the area is a characteristic of the focus of the town's natural landscape. Therefore, it is necessary to plan the design of the green space in the site first and artificially plant the areas that need to be repaired to ensure sustainability and integration. Second, the plant resources around the characteristic town are rationally planned and utilized to improve the town's economic income or viewing ability.

(2) Green Space in the Living Area. The greening of the community's public areas, the greening of the adjacent roads, and the greening of the areas connected to other areas belong to the green space landscape of the living area. To ensure the balance of the ecological environment, the green space in the living area is planned to meet the aesthetics of the residents and facilitate the residents' travel. When constructing a new road, on the premise of ensuring the smoothness of the road, the area with existing trees on both sides is preferentially selected, and the trees that hinder the project are transplanted, which can not only preserve the integrity of the town but also reduce the expenditure. In the area connecting with tourist areas and business parks, the construction of a green space landscape should reflect local cultural characteristics and increase the viewing value of green areas.

(3) Green Space in an Industrial Park. There are many industrial parks, and green areas are planned according to the local conditions. Different types of green space planning have differences and similarities. Most of the green landscapes in industrial parks are scattered, and this ecological landscape structure composed of small areas frequently appears in landscape planning and design. The shape, color, size, location, etc., of these small areas, should be reasonably planned, and the planning structure most suitable for the green space of the industrial park should be made. The area of the characteristic town itself is contacted, the scope of green space is adjusted, and the stable development of the industrial park and the ecological environment is ensured [8]. The landscape of farmland is divided into two types:

natural and nonnatural. The landscape of natural farmland is a farmland landscape that is produced independently without any human factors involved. The landscape of the nonnatural farmland park includes two kinds of subjective factors and nonsubjective factors. The subjective factor refers to the relevant design of the designated area before the landscape construction, and the actual construction is carried out. Nonsubjective factors mean that human factors only affect the selection of farmland areas, and the rest of the factors are naturally generated. Through data review and on-the-spot investigation, it is concluded that most of the landscapes of farmland parks are the planning methods of nonnatural farmland parks that can most stimulate the development of economic income. The above two forms of expression can also be combined with the local and regional culture based on the original landscape, without affecting the original custom and culture, to create the characteristic farmland landscape that the area should have.

Aquaculture parks are mainly oriented to production parks in rivers, ponds, and sea areas. They have inherent advantages. Through Internet +, with the continuous expansion of their scale, they have gradually become industrial park landscapes with unique characteristics and an essential part of the town [9]. The aquaculture landscape is also transformed from the traditional free-range method to the large-scale, ecological, and intensive method according to the connotation concept of the characteristic town. That is to say, we are gradually guiding and promoting the scale and diversification of aquaculture and strengthening water management. At the same time, it can have a particular viewing ability. The achievements have replaced the original aquaculture industry model using scientific and technological breeding technology. First of all, we can promote the multidimensional breeding model, add the traditional aquaculture production model to the economic and ecological breeding model, and establish a breeding method that can increase the income of the town, enhance the cultural characteristics, and scientifically utilize resources, such as artificial breeding of hairy crabs (Figure 5). Another example is the combination of lotus root and soft-shelled turtle, which can improve water quality while increasing the ornamental value (Figure 6).

Figure 5: Hairy crab breeding base.

Figure 6: Coculture of lotus root and soft-shelled turtle.

6.2.7. Water Landscape

(1) River. Plane. The rivers within the scope of the characteristic tourist town in the north should consider factors such as water storage capacity, turbulence and gentleness, and water quality. According to statistics, most of the rivers in the northern characteristic towns are relatively gentle, and there is rarely a situation where the water element is turbulent. The water volume is too much [10]. Because when planning and designing at the plane level, priority is given to conforming to the original flow direction and route, modifying some areas, and expanding according to the actual situation to ensure smooth water flow, ecological stability, and visual aesthetics.

Section. Section means that the bottom of the river will change with the change in the water level under the influence of geology, and there is a flexible contact space between the hard part along the river and the river. During planning and design, the water level is investigated and summarized, and the hydrophilic platform and coastal area are designed according to the actual situation. No matter how the water level changes, the use function and aesthetics of the water level are guaranteed as much as possible. At the cross section, an artificial ladder is set up, and aquatic plants are planted simultaneously to prevent tourists from feeling bored when viewing the waterscape, which can not only enrich the configuration of the coastal landscape but also prolong the service life of both sides of the river.

Revetment. In the river landscape planning and design, the revetment, the area with the highest utilization rate, is the primary design object [11]. The revetment is divided into two types: natural and artificial, and the natural revetment is divided into two types. One is to reinforce the revetment only by the adsorption of the plant to the soil, making the revetment more natural. The other is moderate human intervention. In addition to the functions of plants, the revetment is further strengthened using the existing local natural resources.

Figure 7: Landscape image of the original rural characteristic town.

River Derivative Zone. The ecological reserve area, the planning, and design of this area are significant to the ecological environment of the town. The town's local species configuration and ecological structure are analyzed and summarized, artificial components are minimized, wild and cluttered plants in the derivative belt of the river are adequately removed, and finally, a leisure space for tourists to watch is further established.

(2) Pond. In characteristic towns, in addition to ponds that can generate economic effects, there may also be natural ponds of different scales and shapes, all of which significantly contribute to the ecosystem. These ponds change the climate on a small scale and serve multiple functions. Restoration management of natural ponds should reduce manual intervention and leave room for free development. For the construction of artificial ponds, trees with high survivability can be planted appropriately to protect the existing vegetation growth space, to promote the pond to play its function better, and then enrich the plant types to make it more ornamental and regular.

(3) Sea Area. To develop tourism in the sea area, first of all, the proper restoration and protection of this area should be carried out, the garbage should be removed, and the waters should be kept clear [12]. The infrastructure is perfect, the beach is organized, and the influence of the sea area is improved. The overall planning needs to be unified if there is a sea aquaculture industry. The route planning problem of a chain of production, transportation, and sales will not be affected. The development of the tertiary industry will not only improve the local economy. The income can also be used to develop tourism through unique local products.

(4) Nullah. At present, open channels are usually divided into two types: complex state and peaceful state. Soft open channels are widely used in water-rich areas. The distribution of rivers in the north is relatively sparse, and the precipitation is not high, so the characteristic towns in the north are more suitable for complex open channels, which can reduce water loss and increase the degree of sealing [13]. Regular maintenance is enough to enhance the open channel's size further and gradually develop it into an open channel ecological area. This can enhance the local ecological environment and ornamental.

7. Simulation and Analysis

A landscape image of the typical rural town is selected from the rural characteristic town landscape, the primary frequency is 4.2 GHz, the memory for a 4 GB computer, a comparative experiment between the literature method and the construction method of the 3D model of rural characteristic town landscape based on point cloud fusion and transformation was completed, and the C++ language was used as the simulation platform in the VS2018 environment. According to Figure 7, a landscape image of a rural characteristic town is selected in the experiment. The literature method and the construction method of the three-dimensional model of the rural characteristic town landscape based on point cloud fusion transformation are used to construct the three-dimensional image of the rural characteristic town landscape, as shown in Figures 8 and 9.

Figure 7 is a landscape image of a typical rural town. The image is used to compare the deep learning algorithm method and the point cloud fusion and transformation-based method for constructing a three-dimensional model of the rural characteristic town landscape to construct the three-dimensional image effect of the rural characteristic town landscape. Figure 8 is a three-dimensional map of the rural characteristic town landscape constructed using the deep learning algorithm [14]. It can be seen from the figure that the gray distribution of the image is uneven, the overall pattern of the rural characteristic town landscape is poorly integrated with the image points of the image, and the error is relatively high. Figure 9 is a three-dimensional map of rural characteristic town landscape constructed by constructing a three-dimensional model based on point cloud

Figure 8: Deep learning algorithm method to construct a three-dimensional map of rural characteristic town landscape.

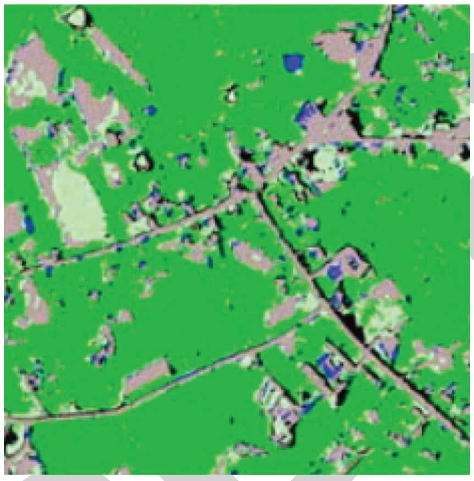

Figure 9: Method of point cloud fusion to construct a three-dimensional map of rural characteristic town landscape.

fusion transformation. It can be seen from the figure that the gray distribution of the image is relatively uniform, and the overall pattern of the rural characteristic town landscape is similar to that of the rural characteristic town landscape. The fusion degree of each pixel point of the image is good, and the error is small, indicating that the construction method of a 3D model of rural characteristic town landscape based on point cloud fusion transformation is better than the deep learning algorithm method to construct the 3D image of rural characteristic town landscape.

To further test the effectiveness of the proposed method, the registration results of different point cloud data calculated by the proposed method and the deep learning algorithm method [15–19] are used for simulation. The registration time of the three-dimensional landscape model construction method and the convergence of the registration results are compared in Table 1. Let SDJ denote point cloud data. PZT stands for registration time. PZSL represents the convergence of registration results. WF stands for deep learning algorithm method. SF represents the construction method of a 3D model of rural characteristic town landscape area based on point cloud fusion transformation.

Table 1: Registration time and convergence of the two methods on point cloud data.

SDJ	PZT		PZSL	
	WF	SF	WF	SF
4094	3.70526	1.17895	0.01214	0.01202
16829	26.66737	7.70526	0.01193	0.01179
39639	64.94632	19.73684	0.01226	0.01181

It can be seen from Table 1 that when the cloud point data continue to improve, the registration time of the deep learning algorithm method and the proposed method is constantly rising, and the time used by the deep learning algorithm method is higher than that of the proposed method, which proves the registration time of the proposed method [20–25]. The proposed method is more efficient methods than deep learning algorithms. When the cloud point data registration results of the deep learning algorithm method [26–29] and the proposed method are obtained, and the cloud point data are continuously improved, the convergence of the proposed method's cloud point data registration results is lower than that of the deep learning algorithm method. It is proved that the convergence of the proposed method is better than that of the deep learning algorithm method. It also shows that the proposed method can reduce the redundancy of the construction data of the three-dimensional model of the rural characteristic town landscape, reduce the complexity of the three-dimensional model construction method, and improve the characteristic rural town and landscape 3D model building speed. A method for constructing a three-dimensional model of rural characteristic town landscape based on point cloud fusion transformation is proposed. The experimental comparison with the deep learning algorithm method proves that this method can improve the degree of fusion and reduce the error. At the same time, the algorithm can improve the registration time and convergence and the construction speed of the 3D model of rural characteristic town landscapes.

8. Conclusion

With the rapid development of modern science and technology, due to the influence of urbanization and ecological environment changes, a method for constructing a three-dimensional model of rural characteristic town landscape based on point cloud fusion and transformation is proposed. The minimum function of fusion transformation is used to calculate the 3D translation transformation amount, the rotation matrix, and the 3D model's scaling factor of the 3D

model. The 3D model of the rural characteristic town landscape area is converted and constructed. The 3D model of the rural characteristic town landscape area is completed. It is proved by simulation that the proposed method can enhance the degree of fusion, reduce the error, and improve the construction rate of the 3D model of the rural characteristic town landscape.

Data Availability

The dataset can be accessed upon request to the corresponding author.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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