

THE METHOD OF EXTRACTING REGIONAL CHARACTERISTICS OF MOUNTAIN NATIONAL PARK BASED ON ARTIFICIAL INTELLIGENCE

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Abstract: Based on the existing regional characteristics of Mountain National Park, the spatial form of influencing thermal environment effect of mountain mountain park is analyzed and evaluated systematically based on the comprehensive measured data and satellite remote sensing data, and using various models to analyze and evaluate the spatial shape of mountain mountain park thermal environment effect, In order to find the key factors that constitute the influence of the spatial form of mountain mountain park on the thermal environment, based on this, the paper constructs the optimal control strategy of thermal environment of the mountain mountain park space form, improves the quality of human settlements environment, and provides decision support for scientific and reasonable Mountain Park planning and landscape planning.

Keywords: Artificial Intelligence; Mountain Terrain; Mountain Park; Regional Characteristics; Feature Extraction;

0 Introduction

With the expansion of the scale of Mountain Park, the population of Mountain Park rises sharply, and the original natural land of mountain park is constantly eroded by artificial construction land. Under the influence of internal and external factors, the heat island effect of mountain park is more and more significant, and various ecological and environmental problems brought by the heat island effect of mountain park gradually affect the healthy development of mountain park^[1]. Chongqing is a typical high-density Mountain Park in the inland. Due to the characteristics of location and topography, it is particularly hot and humid in summer. It has been known as "stove" since ancient times. In recent years, with the rapid progress of Mountain Park, a large number of natural mountain patches have been eroded by high-density construction land, high temperature records in summer have been constantly refreshed, energy consumption has intensified, and the quality of human settlements has declined^[2]. Therefore, it is of great application value and theoretical significance to study and find the relationship between the spatial form of mountain park and the thermal environment of Mountain Park, and to guide the construction of Mountain Park, alleviate the heat island effect of Mountain Park, especially how to develop the optimal control strategy of thermal environment suitable for mountain park itself based on mountain park^[3]. At present, China is at a critical turning point in the development of mountain park. Some coastal mountain parks have completed the initial stage of mountain park development, and began to transfer from extensive incremental development to fine stock renewal. In the stock renewal period of mountain parks, more attention is paid to the coordination between the spatial form of mountain parks and the material resources and environment^[4]. And the

improvement of comprehensive environmental quality of mountain park. This theory enriches and develops the connotation of ecological civilization and puts forward new requirements for the construction of ecological mountain parks in China.

1 Regional feature extraction of Mountain National Park

1. The influence characteristics of landscape factors of land type National Park

China is a country with a vast territory, a long history and multi-ethnic groups. Its culture is broad and profound, gorgeous and colorful, and has a profound cultural heritage. Due to the different geographical location, natural conditions and ways of production and life, different regions have their own unique culture, especially in some remote areas, which is difficult to be known by the public^[5]. At the same time, under the background of economic globalization and cultural integration, a large number of foreign cultures are impacting the traditional Chinese regional culture with their novel contents and fresh experiences. Take landscape design as an example, more and more designers pursue "internationalization" of landscape, blindly pursue "fashion", and regional landscape tends to be similar and has few characteristics. Mountain park is a distinctive type of park in China^[6]. The terrain in China is high in the West and low in the East. Hills, mountains and plateaus account for about 67% of the total land area. The number of mountain towns is half of the total number of towns in China. The ecological diversity of mountain cities is more complex, and the regionality is more obvious than other parks. However, due to the large-scale urban construction and some builders' lack of clear understanding of the overall construction of mountain parks, the landscape pattern of the city has been broken to a certain extent, the outline of mountain landscape has been destroyed, and the mountain environment in some cities has been damaged to varying degrees, This phenomenon is more common in urban centers. With the emphasis and in-depth study of urban cultural form, the understanding of regionality and regional culture is gradually deepened, and the concept of traditional regional culture is put forward correspondingly^[7]. Regionalism refers to the nature and characteristics associated with or related to a region. Or it refers to the comprehensive characteristics of a region's natural landscape and historical context, including its climate conditions, topography, hydrogeology, animal and plant resources, historical and cultural resources, and people's various activities and behaviors.

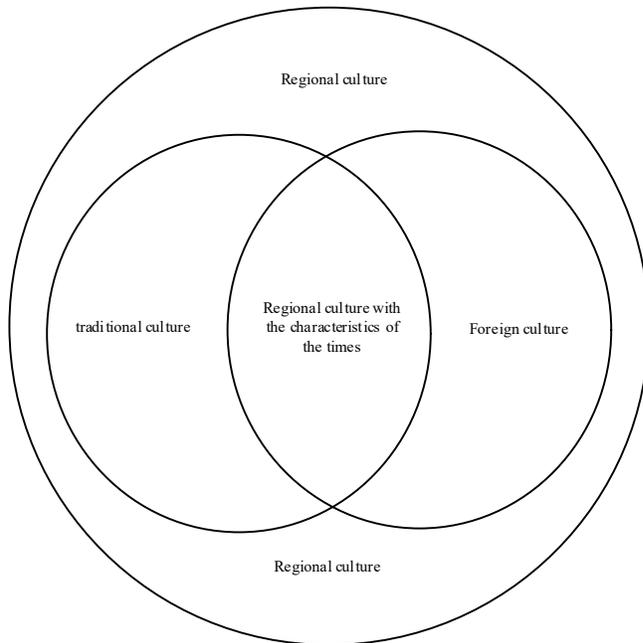


Fig. 1 Schematic diagram of regional characteristics influence category

In this context, it is of great significance to put forward the research of mountain park planning and design from the perspective of regional culture. It is a difficult problem that how to make the modern landscape and the characteristic cultural landscape complement each other and make the traditional regional culture and its environmental space develop more closely while reasonably retaining the characteristic features of the mountain landscape^[8]. Only by fully excavating the local cultural connotation and studying the local natural features, can we reasonably combine the two and achieve the purpose of supporting the design with culture. Only on the basis of rich design connotation, can we create a mountain park with regional cultural characteristics^[9]. Regional culture includes material culture and non-material culture, which reflects the local economic level, cultural accomplishment, artistic level, lifestyle, religious belief and other aspects of social life. Every region on the earth has its own unique culture, which is not only reflected in natural scenery such as hills, rivers and grasslands, but also in clothing, language, life and architecture. China's vast territory, blue sea and blue sky of the South China Sea scenery and endless desert scenery, these different natural and geographical environment, regional culture is also different^[10]. Based on the data collection and understanding of regional culture, the author thinks that when it comes to the planning and design of mountain park under the background of regional culture, we should first control the three levels of regional culture, and select the appropriate level to apply to the design, which is also the first step of applying regional culture. Based on a certain understanding of the three, the planning and design of the park can make people have a deep sense of identity for the local cultural landscape.

Table 1 Description of regional culture forms

Major categories	Middle class	Form of existence
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Human environment	historical	natural resources traditional culture	Soil, rock, mineral, etc Ancient prose, poetry and calligraphy
Economic environment	social	thought Industry Agriculture	Religion, dialect, character, belief Production of Arts and crafts, advertising, industry Technology, crops, farming tools
Physical geographical environment		landforms Biology	Local hydrological and climatic conditions, topography and geomorphology Animal and plant resources

According to the characteristics of natural changes of mountains, the characteristics of different positions of mountains are often called mountain positions. Different mountains have different spatial attributes and different design methods^[11]. The mountain sites are divided into seven types: peak, ridge, hillside, cliff, valley, foothill and basin. Slope represents the steepness of the surface, which can be expressed in two ways: one is the angle, the other is the percentage of vertical height and horizontal distance. Slope not only affects human activities, but also affects the flow of rainwater and the difficulty of site construction^[12]. The more the slope shakes, the more difficult it is to build, and the tourists' activities will also be affected. Slope also has a great impact on plant growth. The soil on steep slope is poor and not suitable for plant growth.

Table 2 Different types of slope

slope	Slope type	Existence type
0-5°	gentle slope	Large area activity site
5 °-15 °	Medium gentle slope	Moderate area of activity site
15 °-25 °	steep slope	Small scale activity site
25 °-45 °	Steep slope	Small scale site
45 °-90 °	steep cliff	Extreme sports ground

1.2 Algorithm of environmental impact characteristics of mountain slope aspect

The combination of natural environment, human environment and social environment together constitutes the traditional regional cultural pattern of multi symbiosis in mountainous areas. This is also the cultural source of architectural characteristics in mountainous areas mountain landform, which has created the natural mountainous nature of the architectural settlement, and produced flexible and random architectural style^[13]. The multi-ethnic distribution constitutes the multi-form of architectural culture. Even in the same mountain, there are different nationalities and architectural forms due to the latitude changes; Multi religious beliefs have constructed the multi values of architectural culture.

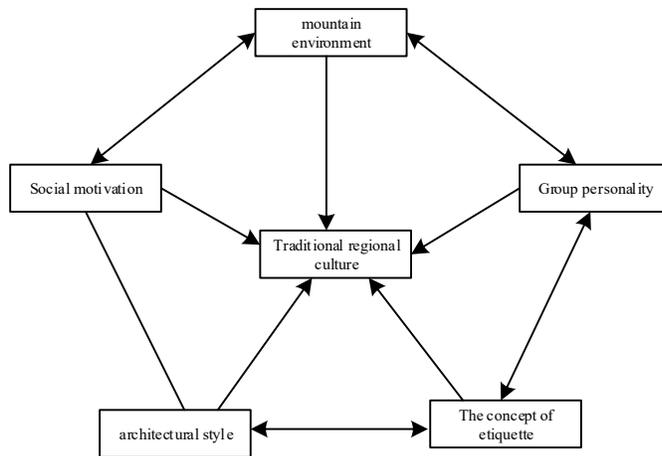


Fig. 2 The endogenous relationship of regional culture in Mountainous Areas

Aspect refers to the direction of the hillside, which has a great impact on the mountain environment and ecology. The main reason is that the change of aspect will cause the change of natural factors, such as light, temperature, wind direction, soil and so on. In this way, the landscape design needs to consider the design according to the different aspect, and some projects are greatly affected by natural factors, In particular, the effects of aspect should be considered. Mountain park space is defined and enclosed by buildings, structures, roads, parks, greening, water bodies, mountain park sketches and other elements within the scope of mountain park^[14]. The spatial form of Mountain Park refers to the form and state of the internal space of Mountain Park, as well as the internal mechanism of its formation and evolution. The spatial form of mountain park is the spatial form and distribution of the elements of mountain park. It is a spatial result of the comprehensive effect of natural, social and economic factors on mountain park^[15]. As a part of the morphology of Mountain Park, the spatial morphology of Mountain Park originated from the study of biological morphology in ancient Greece. After the development of biology, history, archaeology and other fields, it was not until the early 19th century that morphology was introduced to the study of the morphology of mountain park. From this point of view, the research on the spatial form of mountain park mainly focuses on the narrow category of mountain park form, that is, the specific physical spatial form of Mountain Park entity. By summarizing the texture of traditional mountain parks in the European continent, a parameterized prototype of Mountain Park morphology is constructed. After years of development, the parameterized Mountain Park spatial form model has been further developed. Fractal, spread index and form index are the most commonly used methods to characterize the spatial form of mountain park^[16]. In the study of the relationship between the spatial form of mountain park and the change of thermal environment, the form index is the most effective method to measure the spatial form of mountain park. Currently, the commonly used form index mainly includes the density of Mountain Park (population density), compactness, complexity (landscape pattern form index), accessibility, residential area form (plot ratio, building density) and green space (green space ratio, green space ratio) Shannon diversity index).

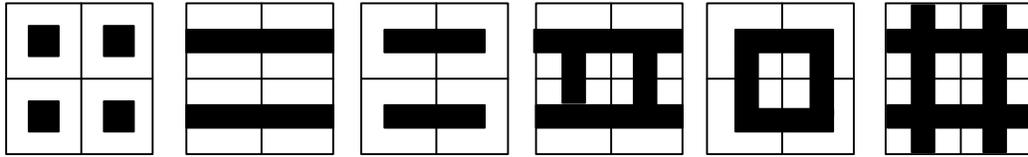


Fig. 3 Prototype of Mountain Park texture

In order to cope with the challenge of global warming caused by mountain park, scholars at home and abroad, on the basis of the preliminary phenomenon revealed, further on the basis of the general model, according to the characteristics of the spatial form of Mountain Park, began to use different mountain park meteorological models to analyze and evaluate the design, land use, ecological environment of mountain park. It is expected to improve the local climate conditions to improve the quality of human settlements and alleviate the heat island effect of mountain parks^[17]. However, it can not be ignored that mountain park, as a concentration of material and energy, few studies consider the material and energy balance of mountain park from the overall level of the region, and more consider the local building layout, lighting and ventilation from the perspective of design, which leads to the separation between the overall and local building environment research of mountain park. The corresponding thermal environment improvement measures are less effective^[18]. In fact, this is not only due to the dislocation between the meteorological environment research and the planning and design needs of mountain parks, but also because the planners pay more attention to the physical space planning, take meeting people's basic needs as the primary goal, and rarely consider the impact of human activities and built environment on the natural ecology^[19]. This requires scholars to fit the actual needs of planning in the research level, support the construction technology system of ecological mountain park, and also requires design practitioners to change the design concept and pay more attention to the ecological and environmental benefits of material space^[20-21]. Physical space form planning is not only the main content and final performance of mountain park planning and design, but also the main means that the planning designer can control and implement, It can greatly reduce the impact of mountain park construction on the natural environment and effectively improve the quality of human settlements.

Table 3 Common mountain meteorological research models

Model name	Model scale	Simulation application content
SOLWEIG	u- α	The impact of urban planning
SLUCM(WRF)	α - β	Large scale simulation of urban wind thermal environment
MITRAS	u	Wind environment simulation
ENVI-met	u- α	Influence of architectural form on local microclimate
TUF-3D	u	Thermal environment simulation of green space
** Where u is the micro scale (1-100m), α is the local scale (1-2km), and β is the mesoscale (> 2km)		

The concept of energy balance comes from the first law of thermodynamics, that is, energy can neither be created nor destroyed, but can only be transformed from one form of energy to

another. This means that in the complex system of Mountain Park, the energy input to the mountain park system is always equal to the sum of the energy output from the mountain park system and the energy stored in the mountain park system, and its surface energy balance (SEB) relationship can be expressed as.

$$Q^{\dot{a}} + Q_F = Q_H + Q_E + \Delta Q_A + \Delta Q_s \quad (1)$$

Where Q^* is the total net solar radiation, Q_F is the anthropogenic heat flux, Q_H is the Rayleigh (sensible) heat flux, Q_E is the latent heat flux, Q_a is the horizontal net heat convection, and Q_S is the net storage heat flux. The amount of radiation from the sun is the main component of the heat source of mountain parks

$$Q^{\dot{a}} = (K_{dir} + K_{dif})(1 - \alpha) + L \downarrow - L \uparrow \quad (2)$$

Where, Q^* is the net solar radiation, K_{dir} is the direct short wave radiation, k_{dif} is the diffuse short wave radiation, and a is the reflection of Mountain Park surface, $L \downarrow$ is the long wave radiation that the surface of a mountain park receives from the sky, $L \uparrow$ is long wave radiation from the surface of a mountain park. In Cartesian coordinate system, the linear equation with slope m and intercept C is as follows:

$$y = mx + Q^{\dot{a}}c \quad (3)$$

Its homogeneous form is as follows:

$$Ay + Bx + 1 = 0 \quad (4)$$

Where: $A = -1/c$, $B = m/c$. It can be seen that a line can be defined by parameter pairs (a, b) , and a line in parameter space (a, b) can be defined in the same coordinate (x, y) . The expression can be regarded as a line with fixed coordinate points (x, y) or fixed parameters (a, b) , which reflects the corresponding relationship between points and lines. If the point set of collinear is $\{(x_i, y_i)\}$ and the corresponding line parameter is (a, b) , then:

$$Ay_i + Bx_i + 1 = 0 \quad (5)$$

Any point (x_i, y_i) in a point set (x_i, y_i) , whose gradient direction is γ_i . Fuzzy mapping of arbitrary points (x_i, y_i) according to location and gradient (ρ, θ) Spatial fuzzy set A_i . The domain of AI is (ρ, θ) , Nuclear elements are γ_i, ρ_i . Set the pre extracted linear characteristic parameters ρ, θ The allowable error range is $\rho_{error}, \theta_{error}$, discrete interval is $\Delta\rho, \Delta\theta$, Then:

$$\begin{cases} \theta_{ij} = \gamma_i - \theta_{emc} + (j-1)\Delta\theta; j = 1, 2, \dots, k_\theta \\ \rho_{ij} = \rho_i - \rho_{emur} + (l-1)\Delta\rho; l = 1, 2, \dots, k_\rho \end{cases} \quad (6)$$

Among them:

$$\left\{ \begin{array}{l} \rho_{ij} = x_i \cos \theta_{ij} + y_i \sin \theta_{ij}; j = 1, 2, \dots, k_\theta \\ k_\theta = \frac{2\theta_{\text{cmut}}}{\Delta\theta} + 1 \\ k_\rho = \frac{2\rho_{\text{entwe}}}{\Delta\rho} + 1 \end{array} \right. \quad (7)$$

In addition to the land itself, the natural scenery and historical traditions of the mountains are also of great value. City highly artificial environment, fast-paced life, it is easy to let people accumulate pressure. Providing scenic mountain parks in the suburbs of cities can meet people's psychological needs, enhance people's happiness and release pressure. In such a mountain park, compared with the construction of artificial facilities, the natural landscape, forest and spring, bird song and flower fragrance have more important significance. At the same time, the contrast between the eternal mountains and the constantly demolished and renovated cities can give people a sense of security and belonging. This is what the so-called "seeing mountains, seeing water, remembering nostalgia" means. Mountain, can become a solid backing, encourage people to struggle and forge ahead.

1.3 Implementation of feature extraction for National Park

Mountain city park, as a representation of mountain regional culture, its multi scene and multi-level spatial framework system often brings people special visual experience and psychological feeling. Its unique terraced platform elements, climbing one by one, and reflecting with the natural environment, create a garden like experience of real mountains and water. According to the modern design theory, parks can be divided into municipal park, Memorial Park, traffic Park, commercial park, leisure park, building Park and so on. Combined with the field investigation, the paper also makes a further summary of the spatial law of the mountain city park, and understands the mountain park as a city park with continuous spatial form, which is composed of platform space with base height difference greater than 15m, at least three elevation levels, and is connected by obvious terraces. The mountain city park discussed in this paper is based on the three-dimensional skeleton system, and within the intersection range of the above six types of park function classification.

Table 4 Differences between mountain city park and plain city park

type	Mountain city square	Plain city square
space structure	The shape of mountain is three-dimensional and changeable, so the mountain square built on the natural landscape must be different.	The spatial structure of the plain square built on the plane shows the extension in the horizontal direction.
Axis path	It makes people appreciate the appearance of the square and experience the natural characteristics of the city at the same time.	It is conducive to the formation of a clear axis relationship

Spatial hierarchy	It provides the possibility for all kinds of view lines, such as looking up, looking down and looking into the distance	The spatial level is realized by artificial landscape such as plants and landscape structures
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In the construction of Mountain Park, it is particularly important to inherit and reflect the regional characteristics. Since ancient times, mountains have distinctive regional characteristics. With people's worship and praise of mountains, they also show rich and strong regional color in humanistic characteristics; Mountain park is not only a window to show the regional characteristics of the city, but also an important occasion for people to relax and cultivate their sentiment. Only the mountain park with rich natural and regional characteristics can complete the mission of curing fatigue, and only the mountain park inheriting the regional cultural tradition can move the users and really play the role of edifying sentiment. There are many factors need to be considered in the functional layout of mountain park. On the one hand, like city park, park positioning should be carried out first, and then functional zoning should be carried out after the nature of the park is clear. The types of activity sites need to be set in the park should be listed, and they should be classified according to their activity nature, and arranged in different functional zoning. This design logic is mainly based on human beings and arranges the related activities in one area. For example, the recreation area and fitness area can be arranged together in the sports area of the park, while some static activities such as fishing are not suitable. On the other hand, the biggest design difficulty of mountain park is the adaptability to the terrain, which has a greater impact on its functional zoning and site layout. The mountainous terrain is rich and changeable, the slope is large, the proportion of flat land is small, and the distribution is scattered. Activity sites are generally arranged on flat terrain, which leads to the scattered arrangement of mountain park sites and lack of contact. The changeable terrain leads to the flexible function layout of mountain park. Based on the conventional design ideas, the original functions should be split and reorganized to find out the layout principles that adapt to the terrain. Mountain is a unique type formed by natural factors, and its spatial form is rich. The same mountain can be divided into peak, valley, piedmont and other mountain forms. From the table, we can see that different locations have different spatial attributes, which give people different feelings of space.

Table 5 The spatial attributes of mountain area

spatial property	position
Open type	ridge
Semi open	Cliff
Semi open	hillside
Semi open	hillside
Semi open	mountain path
closed	Basin accommodation

In the planning and design of Mountain Park, the road layout is greatly restricted by the terrain, which is also an obvious feature of mountain park. The road layout is often planned on the basis of the original mountain terrain according to the situation, and the road forms are also diversified.

Mountain terrain is complex, the vertical height difference between various scenic spots is large, and the horizontal distance is short. Therefore, the road system should consider not only the traffic on the plane layout, but also the vertical traffic, which is a major feature of mountain park. The traffic form of Mountain Park adapts measures to local conditions, adopts three-dimensional traffic connection, and generally solves its terrain problems by setting ramps and steps. Some parks set up some cable cars to connect in the place with higher vertical height, but the cost of this method is higher, so it is not commonly used in general mountain parks, but it has high operation efficiency and good viewing effect.

2 Analysis of experimental results

On the basis of fully retaining the original conditions, the landscape structure of "two axes, seven areas and multiple points" is constructed. Combined with the original terrain conditions of the site, according to the changes of terrain, a main landscape axis and a secondary landscape axis are planned in the design. The main axis is the landscape axis formed by the main entrance Park and the viewing platform of the commanding height of the mountain top through the Shuixi Park, and the secondary axis is composed of the Cultural Park and the commanding height of the mountain top. For the consideration of the design stage, the park is divided into seven main functional areas, as well as a number of landscape nodes scattered in the functional areas, which together constitute the planning layout of this scheme. This design takes a mountain regional culture as the theme, and strives to integrate the culture into the landscape through the design, so as to create a mountain park with unique regional characteristics. At the same time, create a diversified space to enrich the experience of the public. Therefore, the concept of "return" is put forward in the design, so that tourists can return to traditional culture, return to natural ecology, and finally return to their own heart. Based on the in-depth understanding of the current situation of the site, the study of regional culture and the analysis of the surrounding environment, the park is divided into leisure sports area, Mountain Recreation Area, waterfront leisure area, folk ecological tourist area, forest ecological convalescent area and folk experience activity area.

Table 6 Planning Layout Characteristics of the scheme

partition	features	Activity content
Waterfront activity area	The surrounding area is surrounded by mountains, mainly with semi open space	Featured footpath and waterfront platform
Leisure sports area	Shaping the space corresponding to the city needs the residents' recreation needs	Daily activities of residents: communication, square dance, fitness, sports
Recreation Area	Close to the main entrance	Folk square and characteristic architecture
Mountain Recreation Area	The characteristic landscape is composed of the surrounding mountains	Cycling, mountaintop architecture, ancient tree garden

Forest ecological experience area The planting density is high and the space under the forest is used reasonably Forest characteristic building building, service building

The service facilities in the design site mainly include entertainment facilities, catering, cultural and artistic display, sales, management buildings, public toilets, etc. The sports area, farming area and convalescent area are equipped with corresponding management rooms, and the peak buildings are equipped with catering and selling functions. There are three parking lots at the entrance, and the service radius of public toilets is 20 meters. The design of small items, facilities and sign system in the park landscape seeks to fully extract the local cultural characteristics and express the cultural features from the aspects of color, material, form and spatial combination.

Table 7 Evaluation index of economic characteristics

Serial number	Land name	Planning area (m ²)	Proportion (%)
1	park	1547600	100
2	Water body	88400	5.71
3	land	1459200	94.329
4	Garden Road and site	185247.72	11.97
5	Building service facilities	50451.76	3.26
6	greenland	1153643.52	79.06

Through the statistical analysis of the construction volume in the grid, it is found that compared with the construction intensity index such as building density and building height, the floor area ratio can more directly show the distribution of construction intensity in the study area. The content plot ratio of the study area is generally more than 5, and the plot ratio of some grids is more than 20. Due to the newly developed commercial sub center Tianjie, the plot ratio of a few grids has also reached more than 10. The plot ratio is basically below 5, and the overall development intensity is low. The far and LST were exported to spss24 for correlation analysis. It was found that there was a significant positive correlation between far and LST (0.417^{**} , $P = 0.000 < 0.01$), that is, in the overall trend, the higher the far, the higher the construction intensity. High far also means more human heat release and stronger degree of environmental transformation, resulting in higher LST value.

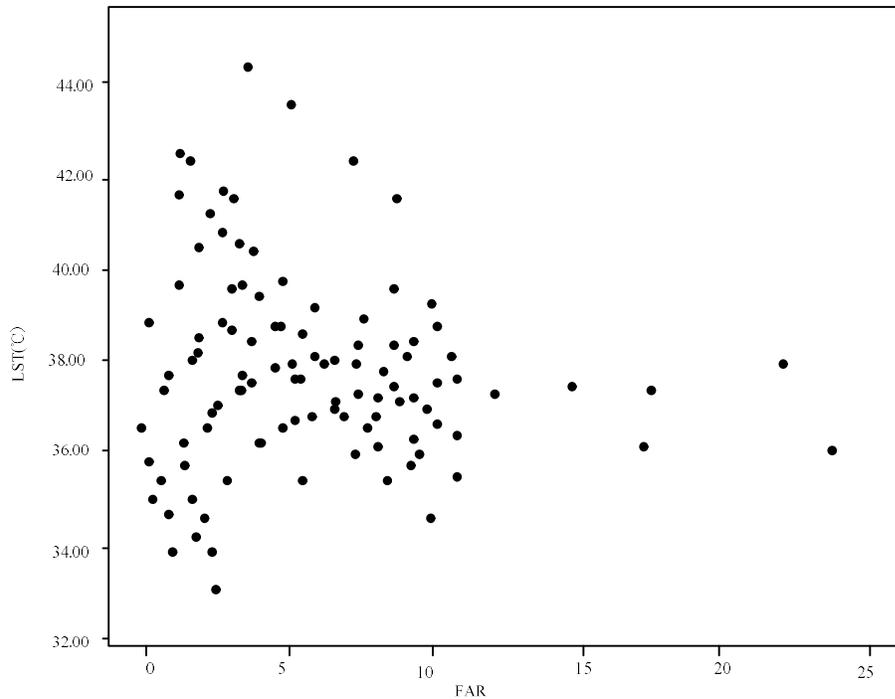


Figure 4 Extraction results of spatial feature distribution of Mountain Park

Further analysis of the relationship between far and LST shows that there is no stable fitting function relationship between the two. From the scatter diagram of the relationship, in low-intensity development areas, the difference between urban spatial morphology has a significant impact on the thermal environment, while in high-intensity development areas, the urban spatial morphology tends to be the same, and the difference between the thermal environment is weak. From this point of view, in high-density urban areas, high-intensity development does not necessarily mean bad thermal environment. On the contrary, through reasonable planning and design, we can optimize and control the quality of thermal environment to a certain extent and improve the comfort of human settlements. City Park reflects the cultural connotation and spiritual temperament of a city, and excellent city park needs to respond to the spatial structure of the city and region, reflecting its unique place. Different geographical environment breeds different regional culture. In the mountainous environment, in order to truly become a platform to show the regional culture, urban parks must continue the three-dimensional and multi-dimensional spatial characteristics of the mountainous environment in the spatial structure. Therefore, this chapter starts from the continuation of the spatial pattern of the mountainous Park, strengthening the relationship between the original natural background, strengthening the relationship between the natural environment and the natural environment In order to protect the context and texture of the traditional mountain city, this paper puts forward the technical strategy of constructing the mountain city park, and ensures that the mountain city park has significant regional characteristics from the material form. Secondly, it is to refine the connotation of regional culture, and choose the appropriate means of expression to present the essence of the hidden regional culture, so as to strengthen the regional characteristics of mountain city park from the connotation. Finally, the

paper puts forward the design strategy of strengthening the formation of the climax of context, systematically grading the mountain city parks, and using the urban public transport system to connect all levels of city parks, forming a point-to-face mountain city park system, so as to expand its influence as the carrier of traditional regional culture.

3 Conclusions

With the continuous development of society, people's life is constantly rich and colorful. Some foreign cultures attract more and more people with their novel forms and rich activities. In this era of economic and cultural globalization and integration, some excellent traditional culture and regional culture of our country are gradually ignored by people. Mountain Park as a special type of landform, the change of terrain and space is more complex, but it has a unique landscape effect. In the large-scale development of Mountain Park, some mountain park forests have also been affected to a certain extent. How to reasonably protect and design the mountain landscape of mountain park is a problem faced by contemporary landscape designers. Through the research background of mountain park planning and regional cultural landscape, domestic and foreign related theoretical research and case analysis, this paper further summarizes the basic methods of mountain park planning and design and the application principles, expression carriers and expression methods of regional culture in mountain park landscape design, and strives to summarize the key points of regional cultural mountain park landscape planning, Finally, through the practice of a park planning and design project, the theory is applied to the specific design, aiming to create a mountainous landscape with local characteristics and cultural connotation.

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