Remittances Review
May, 2023
Volume: 8, No: 3, pp. 95-111
ISSN: 2059-6588 (Print) | ISSN 2059-6596 (Online)

Received: 11 November 2022 Accepted: 25 March 2023
DOI: https://doi.org/10.33182/rr.v8i3.7

Research on the use of visual aesthetics based on the maximum information entropy model in the design of urban green spaces: the example of the design of the green space in Xibei Road, Wuxi

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Abstract

The purpose of exploring the use of artistic texture design techniques in urban green space design is to make the urban green space landscape design more artistic and satisfy the citizens' happiness. This paper takes the maximum information entropy model as the entry point and elaborates the principle of maximum information entropy, showing that information entropy is a measure of information as a way to solve for the probability distribution of unknown information. The form of maximum entropy distribution for discrete random variables and continuous random variables is then given, and the Lagrange multiplier is used to solve the maximum information entropy with extreme value constraints, and the performance evaluation is carried out for the maximum information entropy model. Finally, the maximum information entropy model is used to analyze the use of artistic myriad design techniques in urban green space design, taking the green space design of Wuxi Xibei road junction as an example, and analyzing the greening indexes and layout forms from this road junction. From the greening indexes, the greening coverage rate, tree coverage rate and green space rate account for 66.69%, 34.71% and 22.37% respectively. From the layout form, 82.26% of them choose to carry out the overall planning layout of green space in the form of center. The use of artistic texture design techniques for urban green space design should be based on the abstract expression of urban cultural symbols, so as to enhance the artistic quality of urban green space design.

Keywords: *Maximum information entropy; Lagrangian multiplier; artistic muscularization; urban green space design*

Introduction

Urban greening consists of many types of green spaces, and large park green spaces play an important role in improving the urban ecological environment and meeting the different needs of citizens for outdoor activities (Wei, 2017; Yuan, 2015). Some perceptive urban planners have perceived the leading role of park green space in urban construction, and forms such as green space first and scenery for the city have been paid more and more attention and started to be put into action (Wu, Ye, Du, & Luo, 2017; Zhang, Murray, & Turner Ii, 2017).

In the practice of urban green space construction, the practice of using parks as the geographic core of the city began to appear in the planning, and generally parks are combined with urban

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administrative centers as a way to enhance the practical functions of urban green space (Gu, Tao, & Dai, 2017; Liu, Chen, & Dong, 2017). Moreover, the use of artistic myriad design techniques for various types of urban green space design is also increasingly recognized by the public, not only to carry urban cultural symbols, but also to use cultural symbols for the abstract expression of artistic myriad, and then to build a green space landscape design more in line with urban culture (Hao, 2017; M, 2017; Q, 2018).

Excellent urban green space design can improve people's livelihood, enhance people's quality of life, and drive urban development. The literature (Stessens, Canters, Huysmans, & Khan, 2020) argued that urban green space is the main source of urban residents' contact with nature, and high-quality green space is considered an important factor for good quality of urban life, and a GIS model is used to infer the naturalness, quietness and spaciousness that residents feel in urban green space for better urban green space design. The literature (Stigsdotter & Sidenius, 2020) proposed a landscape architecture model for the design of healthy urban green spaces and concluded that the model is a design approach that can achieve health and also shows that urban green spaces have an important role in improving the health challenges brought about by urbanization. Based on a spatial design network analysis model, the literature (Ma, 2020) analyzed that urban green spaces provide environmental and social benefits to humans, but there is still the problem of uneven distribution of urban green spaces and the resulting problem of sustainable urban development. The literature (Wang T 2018) focuses on clarifying the design scope, solving boundary problems through different types of land, and strengthening public participation to provide effective references for other public green space designs. In addition, the literature (Ko & Son, 2018) argues that urban green spaces have special value, analyzes the cultural services they bring to residents by investigating the urban green space where citizens often move and the main activities, and argues that urban green spaces provide diverse cultural values for citizens' daily life. The literature (R. Wang, Zhao, Meitner, Hu, & Xu, 2019) illustrates that urban green space design is closely related to people's aesthetics and explores the influence of aesthetic preferences and perceptual restorability of images produced by montage techniques on urban green space design. The literature (Belmeziti, Cherqui, & Kaufmann, 2018) proposes a new typology of urban green space that increases the multifunctionality of urban green space, and this new typology suggests that the connection of green space components to urban green services allows planners and managers to cover the desired services by selecting the best combination of green space components. In order to explore the use of the maximum information entropy model of artistic myriad design techniques in urban green space design, this paper has been studied and analyzed in three parts. In the first part, the algorithm of the maximum information entropy model is explained, and the principle of maximum information entropy is explained. The distribution of probability is solved for the unknown information based on the known information, so as to obtain objective and realistic results. The maximum entropy form of discrete random variables and continuous random variables is then explained, and the general form of the entropy function is solved by attaching constraints to the entropy function using the Lagrange multiplier method, which obeys the maximum entropy distribution. A general application process description and performance evaluation analysis of the maximum information entropy model are also presented. The second part introduces the use of artistic muscularization design in urban green space, including artistic muscularization analysis and artistic muscularization design characteristics, and elaborates the key concerns of urban green space design in Wuxi Xibei Road Crossing. In the third part, the maximum information entropy model is used to quantitatively analyze the use of artistic texture design in urban green space, and the two indicators of greening index and layout form are explored to verify the influence of artistic texture design on urban green space design.

Maximum information entropy model

Entropy is originally a concept in physics to reflect the degree of chaos in a system. It was later used in mathematics to describe an amount of information, i.e., information entropy, where the greater the amount of information, the greater the entropy. If one wants to determine an unknown in a distribution of random events, but does not have enough information to determine this distribution, the prediction at this point should satisfy all known restrictions and not make any subjective assumptions about the unknown. In that case, the probability distribution is the most uniform, and the risk of prediction is the smallest, so the information entropy of the probability distribution obtained by prediction is the maximum. The maximum information entropy principle is to select the model with the greatest information entropy among the cases that satisfy all known constraints. The model based on maximum information entropy for classification is shown in Figure 1.

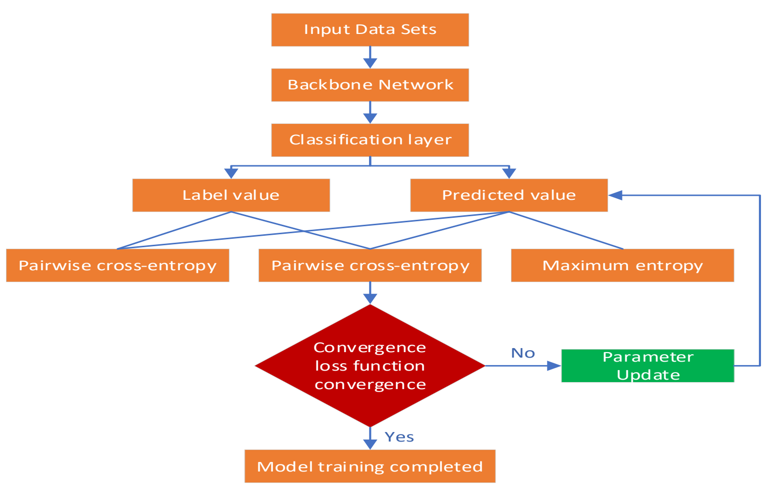

Figure 1: Maximum information entropy classification model

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Maximum information entropy

Maximum information entropy principle

If a random probability variable $\boldsymbol{X}$ takes the value X={x_1,x_2,...,x_n} and its probability distribution is P(X=x_i)=pi(i=1,2,...,n), then the information entropy of the random probability variable X is defined as:

$$H(X) = -\sum_{x} p(x)\log p(x) \quad (1)$$

Here log can be a natural number logarithm or a logarithm with a base of 2. The equation holds for any base greater than 1, since different bases are nothing but different units of information (X. Wang, Yan, & Ma, 2020). For a continuous probability distribution, the definition of information entropy can be written as:

$$H(X) = -\int p(x)\log p(x)dx \quad (2)$$

The maximum information entropy is the maximum value of H(X) given that all constraints are satisfied. This type of problem is actually an extreme value problem with constraints in calculus, which can usually be solved by introducing parameter λ using the Lagrange multiplier method. The maximum entropy principle was first proposed by Jaynes, and its core idea is that among all feasible solutions, the one with the highest entropy should be chosen. From the physical point of view, the entropy in an isolated system never decreases, i.e., it has a tendency to increase all the time, so the maximum entropy method is "natural" to solve the problem. From the information theory point of view, entropy is a measure of information, and as information increases, entropy decreases. Therefore, under the premise of fully containing the known information, the unknown information is not speculated, at this time the least unknown information, and the maximum entropy, so that the probability distribution obtained is objective and real, unbiased.

Maximum entropy distribution form of discrete random variables

Since the solution of the maximum entropy distribution under a given constraint is the solution of the optimal probability distribution, we thus transform it into the problem of solving the conditional extrema, and in some occasions we often use the Lagrange multiplier method. The Lagrange multiplier method is a classical mathematical method for solving conditional extrema, and in general, the Lagrange multiplier method is formulated as follows:

Solve the *n* elementary function f(x_1,x_2,...,x_n) in *m* with (m<n) constraints:

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$$\begin{cases} \mu_1(x_1, x_2, ..., x_n) = 0 \\ \mu_2(x_1, x_2, ..., x_n) = 0 \\ \vdots \\ \mu_m(x_1, x_2, ..., x_n) = 0 \end{cases} \quad (3)$$

The conditional extrema under the condition. Let the constants $\lambda_1,\lambda_2,...,\lambda_m$ independent of the variables be multiplied by each constraint function μ_i (x_1,x_2,...,x_n)=0(i=1,2,...,m) in turn and summed with the objective function to obtain the following Lagrangian function:

$$L(x,\lambda) = f(x) + \sum_{i=1}^{m} \lambda_i \mu_i(x) \quad (4)$$

where x=[x_1,x_2,...,x_n]^T is the independent variable and λ=[λ_1,λ_2,...,λ_m]^T is the Lagrangian multiplier.

Then the necessary condition for L(x,λ) to have extreme values without constraints is:

$$\begin{cases} \frac{\partial L}{\partial x_1} = \frac{\partial f}{\partial x_1} + \lambda_1 \frac{\partial \mu_1}{\partial x_1} + ... + \lambda_m \frac{\partial \mu_m}{\partial x_1} = 0 \\ \frac{\partial L}{\partial x_2} = \frac{\partial f}{\partial x_2} + \lambda_1 \frac{\partial \mu_1}{\partial x_2} + ... + \lambda_m \frac{\partial \mu_m}{\partial x_2} = 0 \\ \vdots \\ \frac{\partial L}{\partial x_n} = \frac{\partial f}{\partial x_n} + \lambda_1 \frac{\partial \mu_1}{\partial x_n} + ... + \lambda_m \frac{\partial \mu_m}{\partial x_n} = 0 \end{cases} \quad (5)$$

The above equation is solved for $m+n$ value of $x_1,x_2,...,x_n,\lambda_1,\lambda_2,...,\lambda_m$ where is the possible extreme value point, called the stationary point.

Random variables are classified into two types: discrete random variables and continuous random variables. When a random variable may take on a finite number of values or may be listed infinitely many, it is called a discrete random variable. In the following, we derive the general form of the maximum entropy distribution obeyed by discrete random variables based on the maximum entropy principle, using the Lagrange multiplier method.

Let the discrete random variable η take only a finite number of values $x_1,x_2,...,x_n$, and the corresponding probability is denoted $p_1,p_2,...,p_n$, which is subject to a set of constraints from prior knowledge, set to k, and expressed by the following equation:

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$$\sum_{n} x_i p(x_i) = < f_k > \qquad (6)$$

The above equation is expressed as a set of functions with mean <f_k> of the random variable x_i. They are a priori constraints that we derive from prior measurements or other knowledge, and an additional constraint is the normalization condition that the total probability is 1:

$$\sum_{i=1}^{n} p(x_i) = 1 \qquad (7)$$

The maximum entropy distribution takes the form: $I_p = -\sum p(x_i)\, ln\, p\,(x_i)$. Considering the Lagrange multiplier method, we can derive:

$$p(x) = e^{-\sum_{i=1}^{k} \lambda_i x_i} / Z(\lambda_1, \lambda_2, ..., \lambda_k) \qquad (8)$$

Among them,

$$\begin{cases} Z(\lambda_1, \lambda_2, ..., \lambda_k) = \sum_{n} e^{-\sum_{i=1}^{k} \lambda_i x_i} \\ \frac{\partial \ln z}{\partial \lambda_k} = -< f_k > \end{cases} \qquad (9)$$

If only two constraints are considered, then to maximize the information entropy I_p, consider the following function:

$$L = -\sum_{n} p(x_i) \ln(p(x_i)) - \lambda_0 (\sum_{n} p(x_i) - 1) - \lambda_1 (\sum_{n} x_i p(x_i) - < f >) \qquad (10)$$

Solve for the partial derivative:

$$p(x) = Ce^{-\lambda_i x} \qquad (11)$$

Among them $C = e^{-(\lambda_i + 1)}$.

From this we determine the form of the maximum entropy distribution of discrete random variables with two parameters when only two constraints are considered with λ_0, λ_1.

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Maximum entropy distribution form for continuous random variables

A continuous random variable is a random variable that takes any point in an interval on the number axis if all the values of the random variable cannot be enumerated one by one, such as lifetime, measurement error, etc. For the solution of the maximum entropy distribution form of continuous random variables we also use the Lagrange multiplier method.

Let the continuous random variable η be defined on the interval *Y*, the density function of η be f(x), and f(x) satisfy the following constraints:

$$\begin{cases} \int f(x)dx = 1 \\ \int_Y g_i(x) f(x)dx = \langle f_k \rangle, (k = 1, 2, \ldots, m) \end{cases} \quad (12)$$

The maximum entropy function is of the form:

$$I_p = -\int_Y f(x) \ln f(x) dx \quad (13)$$

Consider the Lagrangian function, then:

$$L = -\int_Y f(x) \ln f(x) dx + \lambda_0 (\int_Y f(x)dx - 1) + \sum_{i=1}^{m} \lambda_i [\int_Y g_i(x) f(x)dx - \langle f_i \rangle] \quad (14)$$

Solve by taking the partial derivative of L with respect to f and making the partial derivative 0:

$$f(x) = e^{\lambda_0 + \sum_{i=1}^{m} \lambda_i g_i(x)} \quad (15)$$

As soon as the value of the unknown parameter λ_0,λi is determined, the *f*(x) expression is uniquely determined. One of the main advantages of using the maximum entropy approach to modeling is that it can portray a variety of different features in the same framework and does not require the assumption of feature independence, but the disadvantage is that the computational space-time complexity is large and resource intensive.

The maximum entropy statistical model is obtained as the model with the highest information entropy among all models that satisfy the constraints. The probabilistic model corresponding to the time when the information entropy obtains the maximum value has an absolute predominance of the probability of occurrence. This can be proved theoretically. Using the maximum entropy it is possible to accurately model the subtle dependencies between variables, and the model is able to subtly associate these features with the probabilistic evaluation model. The features thus selected

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are not possible with traditional predictive modeling techniques and are highly portable. Maximum entropy recognizes existing facts and has no independence assumptions for the selected features.

Evaluation index and application process of maximum information entropy model

Evaluation index of maximum information entropy model

The horizontal coordinate of the ROC curve is referred to as the false positive rate, which is the probability of predicting the correct counterexample in the total counterexample, and the vertical coordinate is the true positive rate, which is the probability of predicting the correct positive sample in the total positive sample, thus forming a graph that can be used to assess the probability. The ROC curve is shown in Figure 2.

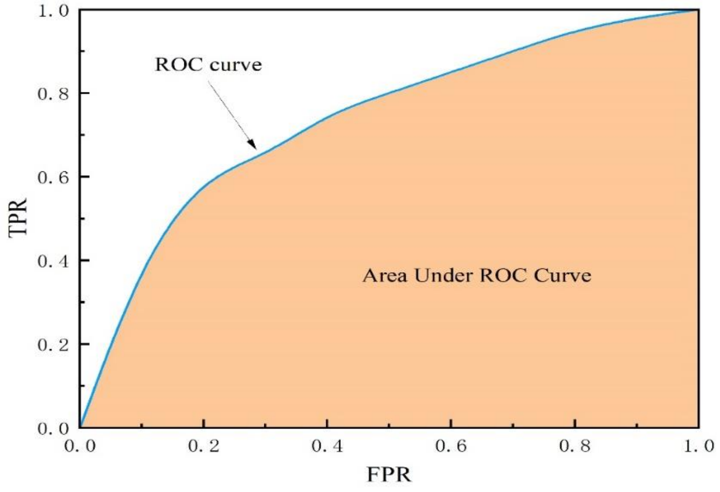

Figure 2: ROC curve

The value of the area under the ROC curve, AUC, is generally used to reflect the accuracy of the system under test. The AUC value is not influenced by the threshold value and is recognized as a more desirable evaluation index.

Just looking at the curve does not accurately assess the effectiveness of the classifier, so the AUC value is used to indicate the probability of each classifier's prediction of a positive case versus the correct prediction of a negative case (the random distribution is a probability of 0.5).

Based on the specific relationship between AUC value and model accuracy: AUC value < 0.6, model accuracy is poor, AUC value between 0.6 and 0.7, model accuracy is average, AUC value between 0.7 and 0.8, model accuracy is more accurate, AUC value between 0.8 and 0.9, model accuracy is very accurate, AUC value > 0.9, model accuracy is extremely accurate The AUC value ranges from 0 to 1. The closer the value is to 1, the more accurate the model is and the more accurate the prediction result is.

The application process of maximum information entropy model

A maximum entropy model is constructed where each species or classification model is determined by a set of data, which is a set of grid cells in the data set, and a set of sample locations where the data is observed.

The model represents the fitness of each grid cell as a function of that grid cell. A high value of this function on a particular grid cell indicates that the predicted grid cell has the right conditions for that data.

The computational model is a probability distribution over all grid cells, and the chosen distribution is the one with maximum entropy under certain constraints: its expectation for each feature must be the same as the mean value over the sample locations.

The maximum entropy model analysis process is:

Step 1: Specify the known values and constraints of the study object.

Step 2: Perform the input of known variable values and constraints in the input layer of MaxEnt model software.

Step 3: Perform data resampling in the MaxEnt model to analyze the information of the data.

Step 4: The variable data of the constraints are converted to MaxEnt model format and imported into the known research object numerical data set and constraint variable data set respectively for modeling.

80% of the known research object data are generally classified as training data for modeling and 20% of the known research object data are classified as test data for testing the model.

The analysis process generally uses the cut-point method to clarify the contribution of each constraint and to determine the model accuracy.

Performance evaluation analysis of maximum information entropy model

In this section, the performance of the maximum information entropy model proposed in this paper is compared and evaluated with the SVM algorithm and RF algorithm using the data set in the UCI database.

The data in the UCI database are validated by using the ten-fold cross-validation method, and the dataset is experimented in the ratio of 1:9, and the average value of ten experiments is taken as the evaluation criterion. The ten-fold cross-validation results of the three algorithms are shown in Figure 3.

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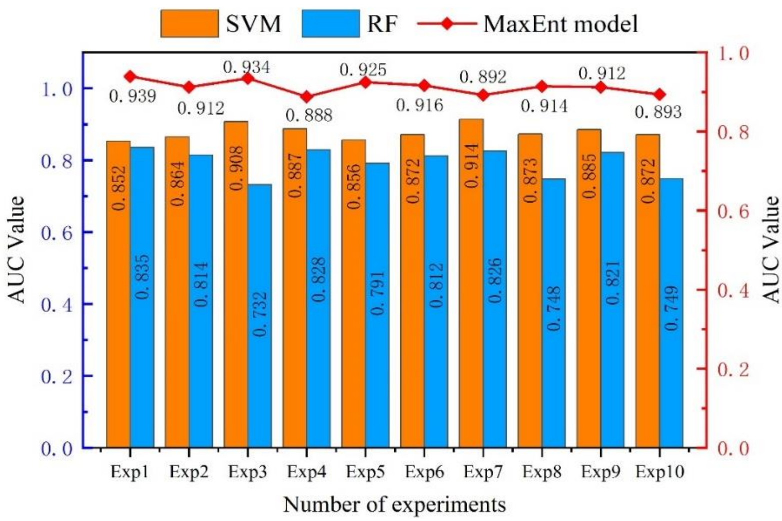

Figure 3: Ten-fold cross-validation results for the MaxEnt model

The AUC values of the maximum information entropy models proposed in this paper all remain between 0.888 and 0.939.

The average AUC value of the proposed maximum information entropy model is 0.913, the average AUC value of the SVM algorithm is 0.878, and the average AUC value of the RF algorithm is 0.796.

The AUC value of the proposed maximum information entropy model tends to 1, which indicates that the stability of the proposed maximum information entropy model is good, and all the indicators meet the expected model The maximum information entropy model proposed in this paper has good stability, and all the indicators meet the expected performance requirements of the model, and can achieve the purpose of classification and regression for data.

Study of artistic texture design techniques in urban green space design

With the continuous development of visual aesthetic art, both mainstream art and art styles of ethnic minorities have a continuous and important influence on landscape design.

The design styles and visual styles of different art schools have influenced to a certain extent the emotional perception, design thinking, design concepts and creative techniques of the landscape, greatly enriching the sources of inspiration for innovative landscape concepts and bringing about the renewal of landscape design.

This chapter focuses on the analysis of the design concept of Wuxi Xibei Dao Kou green space by artistic myriad design techniques, which provides the basis for the data analysis later.

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Artistic texture design techniques

Artistic muscularization analysis

Originally, texture is a visual aesthetic concept, referring to the texture structure of the surface of an object, expressing people's cognitive feelings about the surface texture characteristics of the design object. Artistic texture is a texture structure with artistic beauty, which is subordinate to artistic creation.

Art texture is divided into two categories, one is simulating nature and the other is element superimposition.

Art texture that simulates nature can simulate natural landforms such as mountains, rivers, gullies, sand dunes, terraces, etc., biological forms such as branches, leaves, flowers, roots, cells, etc., and image objects such as pixels, light edges, circuits, crystals, etc. are all natural textures. The artistic texture of elemental overlay is formed by single overlay and repeated variations of line shapes such as straight lines, curves, folds, triangles, quadrilaterals, polygons, and circles. No matter which texture serves for landscape design, it should reflect the site characteristics and cultural connotation of urban green space.

Artistic muscularity design features

Artistic musculature design needs to follow the rules of formal beauty: symmetry, balance, scale, rhythm and rhyme, diversity and unity.

The pursuit of artistic texture in landscape design is not just a consideration for the city, but for better spatial layout, better integration into the site, and a greater integrated effect. Although artistic texture plays an important role, for cities, villages and living environments, landscape sites are only one part of the whole system. Leaving aside the sensual and artistic part, the rational and scientific content is the focus of artistic texture-based landscape design. Artistic myriad design features are shown in Table 1.

Table 1: Artistic musculature design features

Features	Explanation
Serviceability	To enable human beings to acquire various more valuable and quality forms of existence, making life simpler, more comfortable, more natural and more efficient.
Scientific	A rigorous scientific spirit, using scientific experiments and data considerations to improve the design of artistic texture.
Reasonableness	Rational planning of artistic design can effectively enhance the artistic texture of the design product.
Collaborative	Artistic design is not the work of one or two disciplines, but requires the support of various other theories and techniques.

Urban green space design

Urban green space design needs to make full use of visual aesthetics, using artistic texture design techniques to make the green space carry more urban residents' expectations and meet the residents' sense of well-being as much as possible, so that the urban green space design can reach the hearts of people and gain public recognition. This section explores the prospect of using artistic texture design techniques in Wuxi Xibei Road Crossing to explore how to make better use of artistic texture design techniques to improve the landscape design of the place.

Located at the intersection of Fengxiang Road, Hulong Expressway and Huyi Expressway, Wuxi Xibei Road Crossing Greenbelt is the most important north interchange traffic node in Wuxi, covering an area of about 372,000 square meters. The green belt around the site is mainly residential land, supplemented by a protective green belt, including some commercial and industrial land. The current natural conditions of the site are good, with flat terrain, mixed vegetation and a small amount of water system. In order to enhance the attractiveness of Wuxi Xibei Road Crossing, the use of artistic texture design techniques for green space landscape design is the way to go. In the artistic texture of the green landscape design should focus on the content shown in Table 2.

Table 2: Elements of artistic textural landscape design

Contents	Explanation
Expressing design philosophy and fostering spirit	Translating artistic ideas into the language of landscape design, expressing the design concept of the landscape environment through its narrative, abstraction and symbolism.
Organise the space according to a logical sequence	Artistic texture landscape design uses the developmental logic of artistic texture to organise the spatial sequence of the landscape.
Dimensional modelling to enrich the vertical content	Tapping into the characteristics of the site itself, the artistic texture is combined with the land form to form a sculptural topography with streamlined artistic lines, ensuring the integrity of the site landscape and the unity of the design language.
Design language and graphic composition	The use of artistic texture landscape design, so that the design language of artistic texture and cultural emotions from the local to the whole through the landscape.

Analysis of the use of artistic texture design techniques in urban green space design

Based on the previous research on the use of artistic myriad design techniques in Wuxi Xibei Road Crossing, this chapter analyzes the specific use of artistic myriad design techniques.

The green space design of Wuxi Xibei Road Crossing is used as an example to verify the influence of the maximum information entropy model on the design of urban green space, to promote a more attractive urban green space, and to make it more satisfying to the public's sense of well-being.

Greening index analysis of urban green space design

In the design of urban green space by using artistic texture design, the focus is on the green space environment, and the indexes to measure its artistic texture design are the quantity of greenery, i.e. green space coverage, green space rate, tree coverage, etc.

For the actual situation of Wuxi Xibei Road Crossing, the precious cultural relics jade flying phoenix in Wuxi Hongshan site is used as the inspiration source of artistic myriad design, and Art Mountain, Valley of Vitality and Sharing Ring are selected as the evaluation targets respectively, and the data are classified and analyzed by using the maximum information entropy model, and the greening indexes are analyzed as shown in Figure 4.

From the perspective of green coverage, the design of Wuxi Xibei Road junction is designed by using artistic texture design techniques.

The Art Mountain abstracts the design language of curves from Yu Fei Feng and uses simple elements to express a land landscape with artistic texture, and its green coverage is 61.41%.

The Valley of Vitality makes use of green grass to create a rich visual perspective and line of sight transformation, creating a spatial environment with both usage function and visual aesthetics, and its green coverage rate is 66.26%. The Shared Ring uses artistic texture to create space, highlighting Wuxi's urban symbols and forming a unique cultural symbol of Wuxi. The Shared Ring is a bridge between the city and the green space, with a green coverage of 72.42%, and together with the Art Hill and the Valley of Vitality, it strengthens the artistic quality of the entire Xibei Road Crossing.

In terms of tree coverage, the percentages of Art Hill, Valley of Vitality and Sharing Ring are 50.33%, 28.41% and 25.38% respectively. It indicates that under the artistic muscular design approach, more open space is chosen on Art Hill, with tall trees to create overall harmony, and more shaded open space for leisure and recreation to meet the public's spiritual relaxation feeling.

In terms of green space rate, the percentages of Art Hill, Valley of Vitality and Shared Ring, which are designed by using artistic texture to extract inspiration from Yu Fei Feng's cultural relics, are 17.11%, 21.25% and 28.78% respectively.

The relatively high percentage of green space in the Sharing Ring is due to the fact that it is a bridge between the green space and the city, and more green can bring psychological comfort to the citizens and help them relax their tired bodies and fully experience the sense of happiness and satisfaction brought by the green environment.

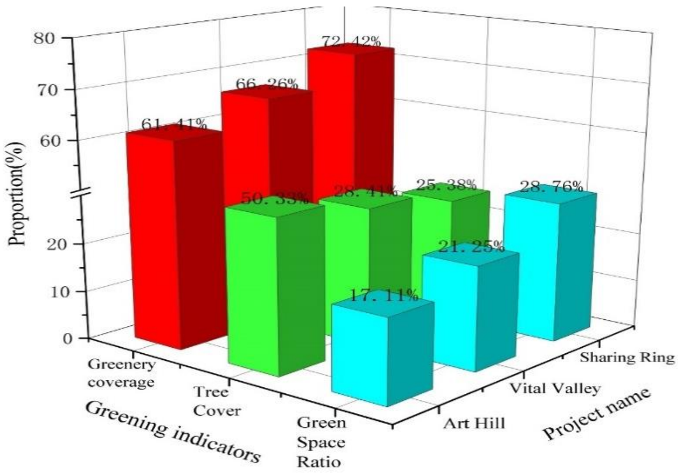

Figure 4: Greening Indicator Analysis

Analysis of the layout form of urban green space design

From the perspective of regional block relationship, the green space of the city and the physical space of the city have a symbiotic relationship. The green space not only limits the disorderly spread of the city, but also guarantees the creation of excellent urban environment and landscape imagery, while the physical space of the city enhances the cultural, landscape and ecological nature of the green space. The use of artistic myriad design techniques for landscape design of urban green space mainly divides the layout form of green space into six layout forms, such as center, surround, mosaic, traverse, scatter, and mixed. In this section, the maximum information entropy model is used to investigate and analyze the data of the artistic texture design technique applied to the green landscape design of Wuxi Xibei Road junction to understand the layout form of the green landscape of Wuxi Xibei Road junction under the artistic texture design technique. The specific analysis results are shown in Figure 5.

In the re-creation of the green space landscape design of Wuxi Xibei Road Crossing using the artistic muscular design approach, in terms of the overall layout form of Wuxi Xibei Road Crossing, 82.26% tend to adopt the central layout form to carry out, so that the urban physical space can be developed around the green space green center, connecting the urban functional groups through the green corridor, thus promoting the control of the development scale of the urban area. In addition, the public's opinions on the three types of green space landscape layout forms based on Yu Fei Feng's heritage design, namely Art Hill, Valley of Vitality and Shared Circle, vary.

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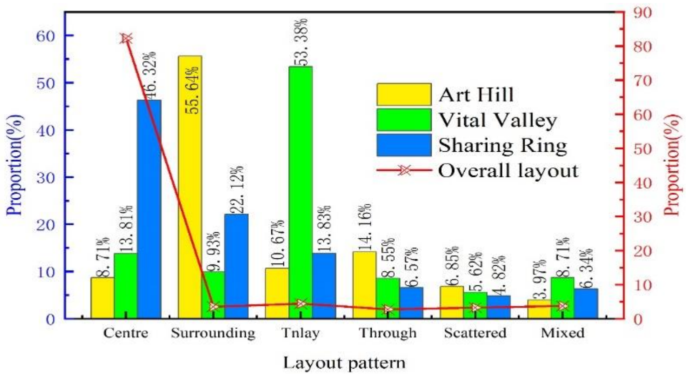

Figure 5: Analysis of green landscape layout patterns

For the Art Hill, 55.64% of the public preferred the wrap-around layout form, which allows the Art Hill to be expressed in simple elements through artistic texture design, unifying the parcels separated by the viaduct. For the Valley of Vitality, the use of the mosaic layout form for landscape planning was approved by 53.38% of the citizens. The use of the mosaic layout form creates a sports, entertainment and leisure space connected by a winding garden path at the Wuxi Xibei Road junction, forming a complex and varied visual aesthetic. For the shared ring view, using the layout form of the center for planning is the will of 46.32% of the public, with an elliptical composition to echo the feather element of the heritage jade flying phoenix, thus creating a central venue at the Wuxi Xibei Road junction, as a way to form a more suitable urban greenway for the public to travel.

Conclusion

In order to investigate the use of artistic myriad design techniques in urban green space design under visual aesthetics, this paper analyzes the greening indexes and layout patterns of green space landscape design using artistic myriad design techniques by using the classification analysis function of the maximum information entropy model, taking the green space design of Wuxi Xibei Road Crossing as an example, and draws the following conclusions from the data:

(1) From the greening index, the green space is designed with artistic muscular design approach, in which the greening coverage, tree coverage and green space rate are 66.69%, 34.71% and 22.37% respectively in the Art Hill, the Valley of Vitality and the Sharing Ring which are designed with the inspiration of Hongshan Yu Fei Feng.

(2) From the viewpoint of layout form, using the artistic myriad design techniques to analyze the public opinion on the design of green space in Wuxi Xibei Road Crossing, 82.26% of the public choose to plan the overall layout form of the green space with the central layout form, and the design of the other three landscapes with the layout forms of surround, mosaic and center are most

in line with expectations, accounting for 55.64%, 53.38% and 46.32% respectively.

As a result, simple elements and streamlined design techniques are used in the design of urban green spaces to form abstract art forms and landscapes. The design incorporates artistic texture techniques throughout the design process to form a holistic, open artistic expression and emotional rendering. The design not only pursues a challenge to the inherent order, but also makes new design attempts to different styles and spatial types in urban green space design.

Funding

1.This research was supported by Philosophy and Social Science Research General Project of Jiangsu Universities in 2021 (2021sja1007).

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