

## “Sansheng” Landscape Design Of Pastoral Complex Based On Svm Image Analysis

Luo Yidun<sup>1</sup>, Chen Guosheng<sup>2</sup>

<sup>1</sup>School of Design, South China University of Technology, Guangzhou, Guangdong, China

<sup>2</sup>School of Economics and Management, Hunan Institute of Technology, Hengyang, Hunan, China

### Abstract

*In landscape design, the environment changes because of individual participation. This behavior that emphasizes individual intention is called participatory design. The important theoretical achievement in the report of the 19th National Congress is a new understanding of the main contradiction in Chinese society-the people's need for a better life. Specific to the needs of farmers themselves or those who stay in rural areas for a better life, from the perspective of cities, cities also have new demands for rural areas. According to the principle of structural risk minimization, SVM method can improve the generalization ability of learning machine as much as possible, that is, the decision rules obtained from limited training samples can still get small errors for independent test sets. As a core method with strong nonlinear processing ability, it plays an important role in the field of data processing. It is not only one of the hot spots in the field of data processing, but also a key and difficult point for further development. In addition, SVM algorithm is a convex quadratic optimization problem, which can ensure that the extremum solution is the global optimal solution. This paper mainly researches on SVM image analysis and ““Sansheng”“ landscape design of rural complex, that is, rural development takes rural complex as the core development mode, takes “Sansheng”, that is, production, life and ecology as the construction basis, and takes ornamental design, characteristic design, ecological design and participatory design of rural landscape as the means.*

**Keywords:** Svm image, Pastoral complex, “sansheng”

### I . Introduction

With the birth of computers, information science and technology have developed rapidly, and modern society has entered the information age rapidly. In landscape design, the environment changes because of the individual's participation [1]. This behavior that emphasizes the individual's intention is called participatory design. Image classification is the process of pattern recognition, which uses computers to analyze images quantitatively, and classifies each pixel or region in images into one of several categories instead of human visual interpretation. The important theoretical achievement in the report of the 19th National Congress is a new understanding of the main contradiction in Chinese society-the people's need for a better life. From the perspective of cities, cities also have new demands for rural areas [2]. Cities hope that rural areas can provide urban residents with a good leisure place including material products, ecological products and excellent environment. In recent years, it has been widely used in pattern recognition, regression analysis, image processing and data mining [3]. According to long's structural risk minimization principle, SVM improves the generalization ability of the learning machine as much as possible, that is, the decision rules obtained from limited training samples can still get small errors for independent test sets [4]. Therefore, the participatory landscape design of rural complex is an important way to realize “people-oriented”, which can make the design more humanized and improve the public's participation and environmental awareness.

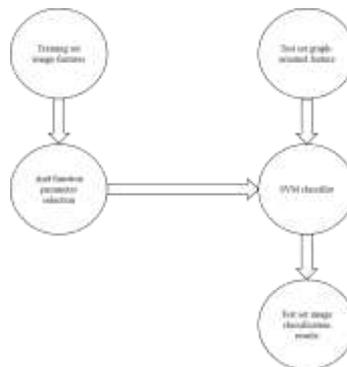
In 2017, Document No.1 of the Central Committee regarded the rural complex as an important boost and carrier of China's rural revitalization strategy [5]. This is another major policy innovation put forward by the country in the face of the new situation of agriculture and rural areas after the strategy of building a new socialist countryside, beautiful countryside and characteristic towns is put forward. As a nuclear method with strong nonlinear processing ability occupies a vital position in the system, it is not only one of the hot spots, but also the key point and difficulty of further development [6]. In addition, SVM algorithm is a convex quadratic optimization problem, which can

ensure that the extreme value solution found is the global optimal solution. These characteristics make SVM an excellent learning algorithm. In the process of implementing the Rural Revitalization Strategy, we should adhere to the principle of giving priority to the development of agriculture and rural areas. According to the general requirements of industrial development, ecological civilization, affluent life and cultural heritage, the modernization of rural agriculture needs to establish an urban-rural integration development mechanism and improve the relevant policy system” As the name suggests, “Pastoral” includes both cultivated “fields” and “gardens” for recreation and leisure [7]. Therefore, in terms of function, rural land has the function of “life” and “ecology” than farmland. It can be seen from the above that it is a meaningful research topic for image and ““Sansheng”“ rural landscape design based on SVM [8].

## II. Image Feature Extraction

### A. Color Characteristics

Color feature is a global feature, which describes the surface properties of the scene corresponding to the image or image area. Generally, color features are based on pixel features, and all pixels belonging to the image or image area have their own contributions [9]. SVM is a revolutionary theoretical achievement in the field of statistical learning, and it is also the youngest and most valuable part in the field of statistical learning. It considers the complexity of the learning model on the basis of training the accuracy of samples, increases the generalization ability of the model, and prevents over-learning. SVM is a better way to realize the idea of structural risk minimization, compared with the traditional learning method based on empirical risk minimization [10]. It shows many unique advantages in solving nonlinear, high-dimensional pattern recognition and regression estimation, small sample problems, and there is no local optimal problem, so it has become a popular method in the field of machine learning. Secondly, the amount of training data also affects the selection of kernel parameters to a certain extent. Therefore, in order to accurately extract and express the color information of the original image [11]. The extraction algorithm must be carried out in the color space that conforms to the physiological characteristics of human visual system and visual perception characteristics of human observation experience. The research on color feature extraction of color image must be carried out in a specific color space [12]. Figure 1 shows the image classification process.



*Fig.1 Image Classification Process*

The rural complex consists of five parts, namely, landscape attraction core, leisure gathering area, agricultural production area, residential development zone and community supporting network, among which the landscape core area is the key area of participatory landscape construction. The widely used kernel parameter selection method is grid search method. Firstly, this method gives the selection range of each parameter, that is, the solution interval, and searches for the optimal solution with a certain step size in the solution interval. But for the small amount of information hiding, the detection accuracy of the algorithm is not good enough [13]. In the construction of rural

complex and landscape design, the aesthetic behavior and aesthetic activities composed of the knowledge, experience, age and attitude of the appreciator are explored to achieve the desired landscape environment [14]

### B. Texture Feature

Texture feature is also a global feature, which also describes the surface properties of the scene corresponding to the image or image area. However, because texture is only a characteristic of the surface of an object, and can not fully reflect the essential attributes of an object, it is impossible to obtain all the image contents only by using texture features [15]. Digital images are generally represented by RGB color model space. The image is composed of three channels of red, green and blue, which respectively reflect the brightness value of the color on a certain channel. Figure 2 shows the RGB space model.

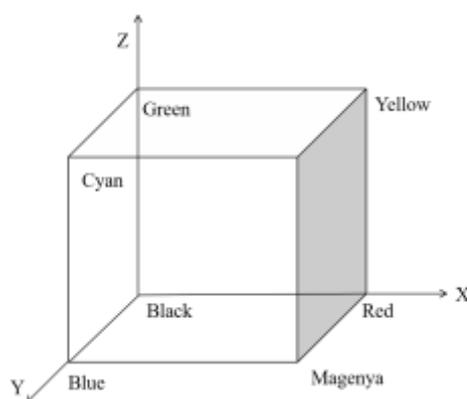


Fig.2 Rgb Spatial Model

The formula for converting RGB to space is as follows:

$$h_i = \left\lfloor \frac{h}{60} \right\rfloor \text{mod } 6 \quad (1)$$

$$f = \frac{h}{60} - h_i \quad (2)$$

$$p = v \times (1-s) \quad (3)$$

$$q = v \times (1-f \times s) \quad (4)$$

$$t = v \times (1(-f) \times s) \quad (5)$$

In landscape design, we should deal with the relationship between space scale and opening, and consider the relationship between landscape and activities. While considering the overall coordination of landscape, we should also consider the interconnection of various landscape elements and nodes. The biggest advantage of SVM is that the linear inseparability problem in input space is transformed into the linear inseparability problem in high-dimensional space by introducing kernel function, which greatly improves the nonlinear processing ability of learning machine. The trained SVM is an effective, high-precision and universal image steganalysis detector. However, China's current farmland contract system lacks effective measures and means of centralized land management.

Penalty factor and kernel function parameters are the key factors that affect performance, but different kernel functions have little influence on performance. Kernel function, kernel parameter and mapping space are one-to-one correspondence. Only by selecting appropriate kernel function and kernel parameter to map data to appropriate feature space can a classifier with good learning ability and generalization ability be obtained. Pay attention to the creation of landscape atmosphere, use different design techniques, such as the group collocation of plants, the selection of color leaf tree species, the vertical design of the site, etc., to meet the practical needs of different types and age groups of tourists. Firstly, the edge of image is obtained by the boundary direction histogram method. Then, the histogram about the size and direction of the edge is made. The usual method is to construct the gray gradient direction matrix of the image.

### III. Sansheng”“ Rural Landscape System Construction and Design Method

#### A. “Sansheng”“ Rural Landscape System Construction Principles

The emergence of rural complex is the upgrading iteration of beautiful countryside. As a new business form, it is the inherent requirement of its development concept to do a good job in ecological protection and realize green development. It can be concluded that climate, topography, mountain, water system and vegetation are the ecological elements of rural landscape, agricultural production and spatial expression of tertiary industry are the production elements of rural landscape, and settlement form, courtyard space, architectural features, traditional culture, historical celebrities, customs and folk crafts are the living elements of rural landscape. Figure 3 shows the composition of rural landscape.

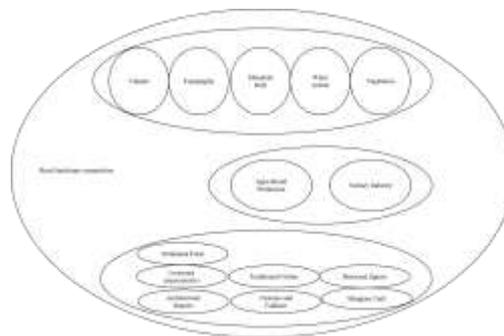


Fig.3 Composition of Rural Landscape

In the process of planning and construction of rural complex, it is necessary to make full use of national policy support, comprehensive land improvement and new technology of agricultural ecological and environmental protection production to vigorously develop circular agriculture and realize ecological industry. Good activity planning is an important link before participatory landscape design. Tourists are usually more willing to choose new and interesting places for event planning. Static waterscape is also an indispensable part of the park, which can bring you a quiet and comfortable feeling, such as hydrophilic platform, boat, waterside pavilion, etc. The connotation of local culture in different regions includes many elements. For example, language, beliefs, religions, customs, values, etc., are the wisdom gradually accumulated and created by the local people in the long-term coordination of the relationship between man and nature and between people. In the process of landscape building, we should firmly inherit the local local culture, incorporate innovative and trendy ideas, combine tradition with modernity, and create a landscape with regional representation. Tourists choose to visit the park in order to stay away from the hustle and bustle of the city. The landscape of the park should be more original and reduce human intervention and decoration.

When examining and approving the rural complex, the government should consider the local characteristics, population distribution, local products and surrounding facilities. The spatial layout is characterized by “functional interaction”, focusing on agricultural products picking consumption, combining with traditional entertainment,

integrating catering, accommodation and fitness activities. Because fruit trees and crops have a certain growth cycle, the ornamental period of the park has obvious seasonality. By using off-season cultivation methods such as greenhouses, fruits can be picked in many seasons. In agricultural production landscape, farmland, as the most basic type of agricultural production landscape, can be further sublimated by combining rice field art, which can not only embody the most basic characteristics of rural areas, but also increase the artistic effect. On the basis of a clear understanding of the living rural landscape, we should guide the rural complex to create the landscape in rural settlements and organize folk cultural activities, so that farmers living in the rural complex can increase their income, improve their living environment and carry forward their cultural characteristics.

### B. “Sansheng”“ Rural Landscape System Construction

Ecological rural landscape is based on local natural environment, in which different combinations of climate, topography, water system, mountain, vegetation and other factors are the basic basemaps of rural complex. Before traveling, everyone will make a detailed travel strategy and have a general understanding of the tourist destination. However, the information learned in advance will affect the judgment of tourists, thus affecting their participation. In particular, develop rural tourism with local characteristics and form the characteristics of the complex itself. In the process of rural complex planning and ural development, increasing the supply of humanistic environment and social public service products can effectively improve the existing living environment of rural residents. Classification in machine learning is supervised learning, which can predict unknown data by learning known samples. Therefore, each training sample has a class label. When the cross validation method is used to evaluate the model, part of the data in the sample set is reserved before each training to verify the trained model. According to the ““Sansheng”“ theory, the content of rural landscape is divided into three categories: “ecology, life and production”, and then constitutes the following landscape system, as shown in Figure 4.



Fig.4 “Sansheng” Rural Landscape System Diagram

Spiritual participation means that tourists receive feedback from the outside world from the spiritual aspect, so as to gain perception. Physical participation means that tourists can participate in activities by themselves, so that their senses and mood can enjoy peace or excitement. These natural environments have been damaged to some extent under the condition of agricultural production and rural settlement construction, but they are an essential part of the whole rural complex. Protecting and improving rural ecological environment is the major premise of sustainable development of agricultural production and life. Therefore, there is no motivation to take the interests of farmers as

the core. On the contrary, it may crowd out the interests of farmers. In traditional industries, the value goal of production is too single, too much attention is paid to the output capacity, and the impact of the output process on the environment is rarely included in it, which is easy to cause excessive consumption of resources and excessive bearing of the environment. If this feature is not considered in information hiding, the correlation will be destroyed to a certain extent. While meeting the normal profit operation of the park, it also allows tourists to experience the joy of harvest.

#### IV. Conclusions

Under the background of rural revitalization, modernization of agriculture and rural areas and development of rural complex, this paper mainly expounds the domestic and international research and concept discrimination of rural complex, rural landscape and the theory of "Three Life". Follow the principles of sustainability, regionality and comprehensiveness, and construct the "Three Life" rural landscape system covering productive landscape, living landscape and ecological landscape. And explore the design methods of industry, culture and ecological landscape, and apply them to the practice of rural complex. Pastoral complex, as a new format and model with the development of agricultural modernization and rural urbanization in a certain period, is still in the exploratory stage in planning and construction. In fact, using different kernel functions and using different methods to realize the conversion from two class to multi class classification also has a significant impact on the classification performance. Mixed kernel function is a hot research direction in recent years, but there is no good solution for the construction of mixed kernel and the optimization of mixed kernel parameters. In fact, SVM has a good ability in image denoising, edge extraction, feature selection and so on. Therefore, expanding the application range of SVM in image processing is also a significant work in the future.

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