



On the Influence of Ganpo Elements on Oil Painting Creation in Education and Teaching Under the Background of Ant Colony Algorithm

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Abstract. “Image” is the core category of Chinese traditional aesthetics and the core spirit of Chinese art. Image landscape oil painting is the product of the fusion of “oil painting”, a Western media, into China since it was introduced into China. It not only contains the influence of western literary concepts and technical language on Chinese oil painting, but also contains the impact of national literary spirit, especially aesthetic feelings and landscape spirit on landscape oil painting. This study takes the image landscape oil painting as the research object. The basic idea of the research is to trace and analyze the related concepts of the image landscape oil painting in the context of Chinese traditional aesthetics; elaborate the self-consciousness and the “image” characteristics of the image landscape oil painting; explore the influence of Chinese traditional aesthetics on the image landscape oil painting and its internal logic; through comparative study, exchange interview, self exploration and other ways, this paper analyzes the development status and problems of image landscape oil painting, and puts forward personal opinions. On this basis, this study makes a further cultural consideration and Prospect of image landscape oil painting. Ant colony algorithm, which has some advantages such as positive feedback, heuristic search and distributed computing, is better used to solve the optimization problem of the solution in the path planning.

Keywords: Ant colony algorithm · Chinese traditional aesthetics · Context · Image landscape oil painting

1 Introduction

Oil painting is a kind of painting originated from the West. “Image landscape oil painting” is the product of oil painting blending with Chinese local literature and art since it was introduced into China. It has experienced a process of exploration from unconsciousness to consciousness [1]. The study of “image landscape oil painting” should be based on three dimensions, one is “oil painting”, oil painting is its form language and painting medium. In the exploration process of image landscape painting (especially in the early stage), the development and evolution of Western landscape oil painting provide a strong language basis for it. The other is “scenery”, which is the subject matter and the object

of expression. Different from the subject matter of characters, the theme of “landscape” has its “particularity” and “openness”. In addition, due to the different understanding of nature, the expression of “landscape” is different in the process of artistic creation. For example, the western countries speak more about “landscape”, and the Chinese side speak more about “landscape” [2]. There are differences between the performance objects themselves. For a single ant, its behavior movement is relatively simple, while the biological groups formed by a large number of ants show very complex species information. Ants in the process of movement will leave a chemical substance on the path, which is called pheromone. This substance can lead other ants to higher concentrations. Ants are evenly distributed at the beginning [3]. When they encounter obstacles, they choose the next feasible path according to the principle of equal probability. Later, with the increase of the number of iterations, ants tend to move to places with high pheromone concentration, which makes the number of ants on the shorter route increase, while the number of ants on the longer route decreases. The ants choose the shortest route to transport food through pheromone communication.

2 Research on the Formal Beauty in the Teaching of Oil Painting Landscape Painting

The connotation and embodiment of formal beauty are different in different historical periods. It is an important carrier and expression of aesthetic feeling in artistic works. The theme of artistic creation determines the basic framework and connotation of formal beauty. In the teaching and research of landscape painting in oil painting, the content and form of painting depend on each other and cannot be separated. How to raise the rich natural image elements to the form of painting with artistic beauty, form a unified and harmonious picture relationship, and create a unique painting language is a problem that teachers and students face and need to solve. In the teaching and research of landscape painting in oil painting, we should gradually guide students to reasonably use the modeling means such as lines, modeling, light and shade, color, space and perspective, follow the artistic principle of “from life, higher than life”, and create paintings that meet the inner needs and are different from others through various painting languages and forms. In the abstract painting art, the simple use of point, line, surface and abstract form and color structure for artistic creation can also create a harmonious, unified and unpredictable painting mood. It can be seen that the constituent factors play an important role in the creation of formal beauty [4]. The formal beauty of painting language also depends on the artist’s performance skills. On the basis of the rules of modeling and formal beauty, we can reasonably summarize and utilize the picture factors such as ups and downs, changes and unity, contrast and harmony, size and number, height and density, so as to form a well ordered picture, achieve the unity of form and content, and convey the artistic beauty. The rule of formal beauty is that after the factors of point, line, surface, shape, color, texture and their combination are creatively recombined and sublimated by the painter, a picture relationship of mutual coordination and restriction is formed. The painter will make reasonable and orderly treatment and adjustment of these form factors from life according to the law of formal beauty, so that the picture has a unified and harmonious aesthetic feeling [5]. The law of formal beauty originates

from the laws of nature and human physiology and psychology. It is the experience of artists based on long-term life accumulation and artistic practice. Through the teaching practice of landscape sketching, we can know that many form factors of an excellent painting are interrelated and interdependent organic whole, which is not the replication and accumulation of naturalism. In reality, the images are changeable, and the beauty of form is hidden in them. It needs painters to explore and discover [6]. In this point, students are facing greater challenges. Therefore, in the teaching practice of oil painting landscape sketch, teachers should constantly infiltrate the objective law of formal beauty creation into the teaching of oil painting landscape sketch. The natural scenery is complicated and complicated. Teachers should cultivate students' ability to analyze, select and reconstruct the pictures, establish the correct concept of formal aesthetics, and guide students to explore the formal beauty of art in the performance of natural shapes. After long-term practice and training, the law of creating formal beauty has gradually transformed into subconscious instinct in the practice of sketching. Figure 1 below is an oil color picture of the snow cloth in the East and north of Renji [7].



Fig. 1. The oil color picture of the snow cloth in the East and north of Renji

The emotional expression, image building and artistic conception of an excellent work can not exist in isolation from form. In the teaching and research of oil painting landscape painting, we should gradually guide students to recast the content and spirit of the work through art forms, so as to obtain spiritual perception. Without the formal beauty, the image performance and artistic conception building have the risk of falling back into the description of nature. Art form is higher than genre and real image, and also higher than the narrative expression of the picture, which is the artist's understanding and perception of the aesthetic law of all things in nature. The teaching research of formal beauty in oil painting landscape painting needs to guide students to use the rules of formal beauty to make a reasonable but detached expression of the real representation of nature and convey aesthetic interest [8–10].

3 Research on the Formal Beauty in the Teaching of Oil Painting Landscape Creation

Wu Guanzhong thinks: “art teachers mainly teach the art of beauty, and teach the laws and rules of formal beauty Formal beauty is the main content of art teaching...” Therefore, in the teaching practice of oil painting landscape towards creation, we should pay attention to guiding students to understand and comprehend the beauty of painting form, and take the expression ability of reorganizing nature as an important basis for creating the beauty of painting form. From the stage of landscape painting to the stage of creation, we need to gradually abandon the description of pure naturalism, and make the picture tend to the expression of formal beauty through reasonable subjective adjustment, so that the work can achieve the improvement of aesthetic level [11]. The law of formal beauty originates from nature, so we should guide students to extract the formal beauty under the real image, and use the complex and changeable abstract beauty law to connect and expand with the real scenery properly, so that students can constantly summarize and understand the law of formal beauty from the aesthetic experience, and lead students to a higher level of oil painting landscape creation stage. In the teaching and research of oil painting landscape creation, the guidance of form and style should be different from person to person, because each individual has different feelings and understandings of nature. Teachers should pay special attention to the self feelings of students with different temperament to ensure the uniqueness of individual life in artistic expression. In the teaching process of oil painting landscape creation, the development of color personality is particularly important. Teachers should fully guide and protect students’ color personality in oil painting landscape learning [12]. In the scene selection of oil painting landscape painting and creation, we need to change different regions, guide students to exercise their observation ability in the flowing and changing colors of scenery, and constantly cultivate students’ ability to learn from objective and natural colors the ability to transform into the subjective beauty of form and the color of the picture. Figure 2 is the fifth of Ren Jidong Wuyuan painting series.



Fig. 2. The fifth of Ren Jidong Wuyuan painting series

In the field of contemporary painting, painters pay more and more attention to the pursuit of formal beauty. It has become an important means to express the feelings and personality of painters and to express their personal feelings. Therefore, in the teaching of oil painting landscape creation, we should pay attention to guiding students to understand and grasp the rules of formal beauty, summarize the rules of formal beauty and the exact aesthetic connotation, emphasize that the creation practice should have a distinct personality and sense of the times, avoid stylization and moaning without illness in expression, pay attention to the perception of life and the true appeal of emotion, integrate into the painter's thoughts and emotions, and actively explore the differences between art and art. In the past, different from other people's art form, the picture has rich connotation and strong artistic appeal. The excellent landscape painting works of all ages do not take the reproduction of nature as the ultimate goal, but look for the unique art form, internal structure, framework and the relationship with life in the landscape. The application of the rule of formal beauty should be based on the painter's emotional intention, follow the principle of artistic creation, and create a unified picture form of external image and connotation [13–15].

In the teaching of oil painting landscape creation, we should train students to pay attention to the structure and painting language of the picture, help them gradually get rid of the dependence on the objective description of the natural scenery, and use various rules of forming the formal beauty to realize the reconstruction of the picture order and the creation of the artistic conception. The factors of formal beauty in oil painting landscape creation have the characteristics of diversification, and nature is originally a rich and changeable whole [16]. The pursuit of oil painting language and form also needs diversification, in order to constantly enrich the connotation of formal beauty of works. However, diversity needs to be based on harmony and unity. It should be closely related to the theme of the picture and form an organic whole with different shape languages. In the teaching of oil painting landscape creation, students can be guided to integrate the proposition of society and humanity with the thinking of culture, highlight the theme and aesthetic taste of landscape painting through the unique perspective of the times, stimulate students' interest in landscape painting, constantly experience the artistic height that landscape painting can achieve, and show the unremitting pursuit of painting form and language [17].

4 Ant Colony Algorithm

4.1 Mathematical Model

Ants make a choice between the paths, each time only one path selection, then use the tabu list to place the selected city. When the ant traversal completes a search for all nodes, that is, all nodes are placed in the tabu table, and then the corresponding tabu table will be cleared to facilitate subsequent ants to do the next search. In a certain period of time, the pheromone concentration in ants' path will be evaporated as time goes on. In order to ensure that the probability of state transition is affected, it is necessary to control the pheromone concentration effectively. After N seconds, the pheromone concentration on the path (i, j) is updated as follows.

$$\tau_{ij}(t+n) = (1 - \rho) * \tau_{ij}(t), \rho \in (0, 1) \quad (1)$$

$$\Delta\tau_{ij}(t) = \sum_{k=1}^m \Delta\tau_{ij}^k(t) \tag{2}$$

In the above formula, $\Delta\tau_{ij}(t)$ represents the total pheromone amount left by all ants on the link between nodes after traversing the complete path node ij; the size of ρ fluctuates between 0 and 1.

4.2 Update of Pheromone Volatilization Factor

The factors that affect the global convergence ability and optimal solution are the volatility coefficient of pheromone, which also affects the pheromone content of the path to a certain extent. The size of pheromone volatilization factor indicates the change of pheromone over time. Generally speaking, the setting of this factor cannot be too large or too small. If it is set too large, it can speed up the convergence of the algorithm, but it will also make the pheromone volatilization faster on the path that has not been passed. If the setting is too small, the ant will fall into the current local optimal state when searching for the path, so that the ant can not jump out to find more solutions.

After improving the ρ value of pheromone volatilization factor A, the formula 3 is obtained.

$$\rho(x = k) = \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{(k-\mu)^2}{2\sigma^2}} \tag{3}$$

Where k is the number of the outstanding ants.

$$\mu = \frac{\sum_{k=1}^m \tau_k}{m} \tag{4}$$

$$\sigma = \frac{\sum_{k=1}^m (\tau_{ij} - \mu)^2}{m} \tag{5}$$

In the above formula, τ_k is the pheromone quantity of ant excellent solution in the current state; μ is the search expectation of ant excellent solution after the completion of iteration; σ is the variance value of optimal ant k and poor ant pheromone quantity of traversing path after the ant completes an iteration; and M represents the iteration times of ants.

4.3 Advantages and Disadvantages of Ant Colony Algorithm

- 1) The advantages of ant colony algorithm are as follows: Because of its strong ability to find the optimal path and its own positive feedback mechanism. The algorithm can quickly find the optimal solution. Through pheromone communication and feedback, ants can find feasible solutions in a short time. In addition, ant colony algorithm can also absorb some advantages of other algorithms and fuse them, so as to improve the overall performance of the algorithm to a certain extent [18].

2) The disadvantages of ant colony algorithm are as follows:

Ant colony algorithm is prone to premature stagnation in convergence speed and search performance, and when the number of ants is too large or the search space changes greatly, the selectivity of ants in a short time is relatively low. In addition, because of the positive feedback phenomenon of the algorithm itself, the quality of the solution is enhanced and the selectivity of the solution is weakened. At this time, the amount of path pheromone is also continuously enhanced. In addition, the pheromone is constantly volatilizing with the change of time, which leads to less chances for the previously unselected path to be selected later, As a result, it is impossible to find better path information, and the search scope of the solution is shrinking and even the search is stagnant. In order to slow down the occurrence of this phenomenon, we must measure the proportion between the search speed and the search space, and use the correct and effective improvement method to avoid the algorithm falling into the local optimal solution (see Fig. 3).

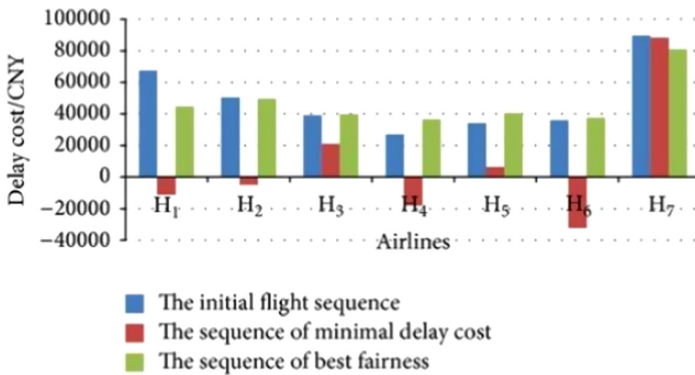


Fig. 3. Simulation for colony algorithm

5 Exploration Trend and Problem Analysis of Image Landscape Oil Painting

The language form of art is always closely related to the creator. In the exploration process of image landscape oil painting, due to regional factors, the aesthetic tendency of subject and object, as well as the different technical language and aesthetic pursuit, image landscape oil painting also presents different exploration trends. Based on this, this chapter will explore the current situation of the development of image landscape oil painting combined with cases. Things always develop in contradiction. In the development process of image landscape oil painting (which can be extended to the current Chinese landscape oil painting to a certain extent), there are also some problems that appear or appear. These problems need us to make calm thinking and rational judgment. This chapter will discuss and analyze these problems, and put forward some humble

opinions, hoping to arouse the thinking of landscape painting creators and lovers on related issues [19].

British critic Richard Richards once said: “a poet’s creation not only stems from his life experience, but also comes from his language which he can use freely.” The same is true for art creation. Personalized artistic language is often a sign to measure whether an artist is mature or not. In the development of landscape oil painting, the jumping light and color language in Monet’s works, the gorgeous color expression in Van Gogh’s works, the ink charm in Wu Guanzhong’s works, and the Chinese style brush and ink flavor of Zhang Dongfeng’s works have attracted much attention due to their strong recognition. Because of this, the pursuit of personalized artistic language has become an upsurge in the exploration process of image landscape oil painting. However, as far as the “meaning” of landscape oil painting is concerned, the formation of personalized art language is not achieved overnight. It needs a long-term exploration process [20, 21]. At present, the blind pursuit and even imitation of personalized art language also leads to the “convergence of artistic language”: in terms of individuals, it is shown as blindly following famous artists; in terms of creation itself, it is shown that the individual art language is blindly following the famous artists; in terms of the creation itself, the personalized artistic language is not easy to achieve, It shows that the pursuit of personalized art language is too superficial. Figure 4 shows the image simulation of landscape oil painting.



Fig. 4. Simulation for image landscape oil painting

6 Conclusion

Image landscape oil painting is an exploration of Chinese oil painters based on the reality of Chinese society, practicing the spirit of Chinese literature and art, taking landscape as the theme and oil painting as the media. Although its artistic media was introduced

from the west, its creative and aesthetic subjects are more Oriental. Image landscape oil painting is not a whim to convey the spirit of Chinese literature and art, nor is it a superficial expression. Image landscape oil painting has a self-knowledge of its culture, and also has a profound understanding of the state, role and status of its culture. Image landscape oil painting is based on the integration of Chinese and Western literature and art, and the embodiment of cultural consciousness and cultural confidence in the process of Chinese oil painting localization.

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