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*Research Article*

# An Improved Oil Painting Formation Using Advanced Image Processing

**Xiaodong Liu**

*Academy of Fine Arts, Linyi University, Linyi, Shandong 276000, China*

Correspondence should be addressed to Xiaodong Liu; liuxiaodong@lyu.edu.cn

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The fast advancement of computer science and information technology has resulted in a significant revolution in the commercial painting sector. The professional painting industry has experienced a dramatic breakthrough with the rapid expansion of computer science and technology. With the rapid development and comprehensive popularization of computer technology, more and more people use computer image processing technology in oil painting created as a new way of creation. Some artists use a variety of ways to study the way of oil painting creation and use image processing technology to stimulate the creator's imagination and improve the efficiency of drawing sketches in optimizing creative ideas, drawing, and processing original works. However, the value of art comes from creation. Oil painting creation based on computer image processing is a new type of artistic production that still requires the integration of different artists' ideas and creative concepts. The image processing technology is a tool and a way for artists to make art while also realizing the convergence of science, technology, and art. This paper uses computer image processing technology to study oil painting creation. First, it briefly discusses computer image processing technology, focusing on picture preprocessing and image graying, and then uses this technique in formation of oil painting. Second, it establishes the oil painting mathematical, direction field, and color conversion models completing the oil painting image creation by using this model. Finally, the advantages of this technology are analyzed from the two aspects of oil painting creation, painting technique, and brush direction. The results show that 75% of artists are very satisfied with the digital painting technique, and 65% of artists are very satisfied with the painting brush direction, which shows that the application effect of computer image processing technology in oil painting creation is remarkable.

## 1. Introduction

The fast advancement of computer skill has hastened the adoption of digital products and computer-based scheme operating systems. As a result, it has directly influenced the development of application development technologies and had a tremendous impact on the artistic creativity field, particularly computer graphics innovation, with its strong visuals and pictures. The computing feature, which is exclusively available to professionals, has been improved to make it more effective and user-friendly. Due to these, common people can also utilize it effectively after understanding it, promoting its fluency [1]. It has swiftly become a popular supplementary tool in the making of oil paintings. We may flexibly edit photographs as required, alter ordinary pictures into various shapes, and flawlessly blend diverse items that are entirely impossible to exist on the same display utilizing image processing techniques, giving us a variety of significant and unexpected effects.

An oil painting generating method has been created using computer image analysis technologies. According to system testing, the painting impact of the oil painting generating system is similar to the fake painting impact. It emphasizes showcasing the qualities of oil painting in terms of brushstrokes and colors, which is strongly under people's customization and originality of oil painting. The drawing approach is compatible with the mechanical drawing technique, the brush orientation seems to be more acceptable, and the color has been suitably adjusted, resulting in a warmer general pattern. Additional connections exist between the domains of pictures and art. Traditional painting concepts are under significant difficulties.

Extremely rich and new pictures not only make it easier for artists to create but they also motivate many more inventive ideas. In terms of study findings, our country's research on the interaction between oil painting production and digital technology is still in its early stages. When experts discuss Chinese oil paintings in China, they mostly undertake study and inquiry through the use of photographs. The position of an oil painting made in the pattern of contemporary painting art has displayed an increasingly clear tendency of marginalization based on the overall development of the growth of world Art of painting. The attention of the artist to modern social reality and the artistic representation of the human mental state continuously outweigh the focus on a specific art category and innovative method. As a result, oil painting is produced quickly, merged into additional Art genres, and is no longer dominant.

The issue of "oil painting" is the use of computer visuals innovation in oil painting production, which naturally mixes current technology with painting art [2]. It is not only the most recent breakthrough in painting technological history with epic importance, but it also encourages and considerably widens the notion of painting production. It motivates the artist's artistic output to develop his ideas [3]. Therefore, we use computer image processing technology to study oil painting creation. During oil painting creation, this technology should first preprocess the collected oil painting image information, establish a color model, accurately identify the color types in oil painting based on the model, and further grayscale the image [4]. This method can simplify the process of oil painting formation, which is faster than conventional oil painting creation. It is an effective way to enhance the speed of oil painting formation and encourage the rapid growth of oil painting formation [5].

*1.1. Innovations of the Proposed Oil Painting Creation Approach.* This paper has the following main innovations in the process of oil painting creation:

(1) This work describes computer image processing methods such as image preprocessing and image graying and uses this technology to finish the basic image processing of the development of an oil painting.

(2) It employs picture processing of computer skill in the creation of oil paintings by establishing an oil painting mathematical model, a direction field model, and a color conversion model, and then completing the preliminary preparation of oil painting creation based on this model, laying the groundwork for oil painting creation and painting.

*1.2. Structure of the Paper.* Section 2 includes the relevant work of researchers, scholars, and technical personnel. Section 3 will go through the components and techniques of computer image processing technology. Section 4 explains the intended oil painting creation's design. Section 5 will discuss the experimental work of this designing procedure and its analysis, and Section 6 will complete this study work.

## 2. Related Work

The rapid development of the computer has developed graphics and image processing technology. The image pattern drawn by computers has changed people's aesthetics, which is also a characteristic that traditional painting does not have. It makes more scholars use computer picture processing technology in oil painting creation, combined with traditional painting creation and computer image processing technology. Wang proposed to study the oil painting creation mode based on multimedia technology to realize the innovation of oil painting creation. The use of multimedia technology can simplify the oil painting creation process, change the painting visual art into digital symbolization, and promote the development of oil paintings created in a diversified direction [6]. The work of [7] pointed out that the creation process of traditional manual oil painting is complex, it is difficult to modify and store, and the painting speed is slow. He proposed to study the aesthetic standard of oil painting based on genetic algorithms, and improve and optimize the traditional oil painting method. Similarly, in [8], the authors used digital technology for reference to deal with problems in oil painting and product design, deeply understood the current situation, completed oil painting color image analysis and image extraction, and integrated digital technology into product design and oil painting creation.

In addition to the above scholar, in [9], the authors introduced digital technology into printmaking creation, designed a digital printing creation system, and integrated digital technology into printing creation. This technology can enhance picture fidelity and improve the artistic value and novel type, but it will reduce the painting effect and make the painting lack novelty. While, in [10], the authors deeply study the process of oil painting animation creation, analyze the relationship between animation creation and optimization in the information age from the source and characteristics of oil painting, and explain the value of animation created in the development stage of oil painting. Besides, the authors of [11] discussed the application of various mixing models in the study of oil painting, compared and analyzed the performance of different mixing models, and proposed evaluation protocols based on different characteristics, mainly including pigment mapping, spectral reconstruction, and concentration evaluation. Then, the sample test was carried out on the oil painting mixture model, and the results showed that the subtractive mixing model had the best performance in oil painting materials. The early work of [12] collects oil painting data based on a 5G mobile network and dynamic image and carries out art design and simulation processing.

Besides the above, the authors of [13] diversified teaching based on big data analysis is applied in college oil painting teaching. Through the analysis of the problems and disadvantages existing in college oil painting teaching, this paper discusses the application effect of this teaching method. Similarly, the work of [14] proposes a background bilateral filtering algorithm based on visual importance. According to the characteristics of oil paintings, this algorithm combines

mathematical morphology operation and bilateral filtering to form a multilayer reference image sequence with a pyramid structure. It defines the starting point of strokes, the accuracy of calculation direction, and enhances the convenience of image texture in this area, which fully reflects the style of calligraphy and painting. Inspired by the work and achievements of the above scholars, this article employs computer image processing technology for oil painting production, which may greatly enhance productivity. My work improves the color saturation of the oil painting surface, reduces the time required to create an oil sketch, and realizes oil painting invention and composition innovation. My experimental works prove that 75% of artists are very satisfied with the drawing technique, and 65% are very satisfied with brush direction.

## 3. Computer Image Processing Technology

*3.1. Image Preprocessing.* The process of the image is the process of arranging pictures used in model training and validation. This comprises scaling, aligning, and color adjustments, among other things. Picture augmentation refers to picture alterations that are used to produce alternative versions of comparable information to introduce the system to a broader range of training instances. Randomized changing of the orientation, intensity, or size of an input picture, for instance, necessitates that a model evaluates what such a picture subject appears like in several conditions.

There are many color image processing methods, most of which can be divided into the following two types: first, there is a component image in the color image, which can decompose the module image in the color picture, and procedure the module image to synthesize it into a complete color image to obtain a processed color image [15]. Second, there are a large number of pixels in the color image, which can be processed to get the processed image [16].

Currently, there are many types of color models, the most typical of which is RGB, as shown in Figure 1. In this model, green, red, and blue are reasonably distributed in different proportions and are capped in the spectrum of each color. Most hardware supports RGB color model and is widely used in image processing.

A vector in the RGB color model space is represented by $C$ and can be calculated using the following equation:

$$c = \begin{bmatrix} C_R \\ C_G \\ C_B \end{bmatrix} = \begin{bmatrix} R \\ G \\ B \end{bmatrix}. \tag{1}$$

In the above equation, $C$ has three different components, each of which is represented by only one pair of color images, that is, three components at a pixel point, which is called the RGB component. Here, the color component is a function of $(x, y)$ coordinates, which can be calculated using the following equation:

$$c(x, y) = \begin{bmatrix} C_R(x, y) \\ C_G(x, y) \\ C_B(x, y) \end{bmatrix} = \begin{bmatrix} R(x, y) \\ G(x, y) \\ B(x, y) \end{bmatrix}. \tag{2}$$

For dimensions $M \times N$ images, if $x$ is values of 0, 1, 2, . . ., $M$−1 and $y$ is 0, 1, 2, . . ., $N$−1, then the number of $C(x, y)$ vectors in the image is $MN$.

From the 1960s to the present, digital image processing technology has been developing rapidly in the past decades, which has a great impact on all industries. Today, digital image processing technology is applied in various fields, including aerospace, engineering, astronomy, biology, scientific research, archaeology, military, and other fields. The main applications of digital image processing are listed in Table 1.

Image preprocessing is very important during image processing, which can eliminate or weaken the invaluable information in the image, strengthen and highlight the valuable information, and improve the image quality. Image preprocessing has high readability and simple computer analysis, recognition, and processing. As a result, before utilizing the image, it must be preprocessed, that is, sharpened, smoothed, and fuzzified.

Image preprocessing includes grayscale conversion, picture cropping, and image scaling. This phase helps remove extraneous information that would have been retrieved as characteristics and minimizes the amount of effort required during feature extraction. To minimize the number of pixels, grayscale conversion is utilized. Cropping was performed on the facial picture using the Viola-Jones method to eliminate the unnecessary features. The flowchart of the picture preprocessing stage is shown in Figure 2.

*3.1.1. Grayscale Image.* The purpose of graying color images is to meet the basic requirements of image processing and simplify the problems in color images, such as data, storage space, and so on, to facilitate further processing in the later stage. Generally, color images are represented by 3 bytes or 24 bits, and each pixel is 24 bits, each 8 bits corresponds to the brightness of $R$, $G$, and $B$ components. If it is a color image, the values of the $R$, $G$, and $B$ components are different. If it is a grayscale image, the $R$, $G$, and $B$ component values are equal, and the same values are needed in this paper.

Green, red, and blue are the three primary colors in the color model. Mixing these three colors in a certain proportion will result in different colors, as shown in the following equation:

$$C = rR + gG + bB. \tag{3}$$

Company $C$ above is the color value synthesized. $R$, $G$, and $B$ are the three different color components of red, blue, and green in different color pixels. $r$, $g$, and $b$ represent the proportion of the three colors in the color pixels.

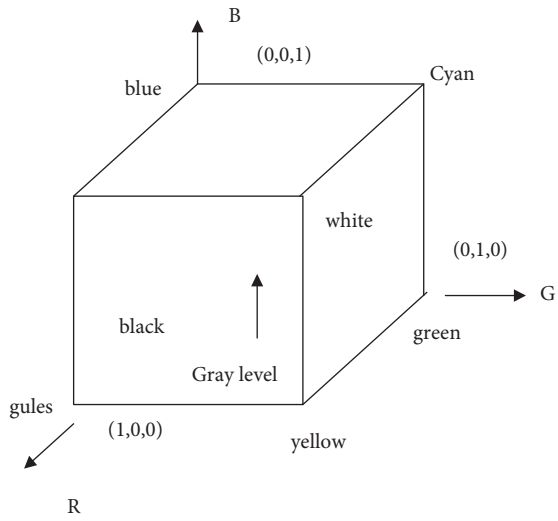


Figure 1: RGB color model.

Table 1: Application of digital image processing in various fields.

| Subject | Application area |
|---|---|
| Physics and chemistry | Crystal analysis, spectrum analysis |
| Geology | Resource exploration and mapping |
| Law | Fingerprint identification |
| Water conservancy | River distribution, water conservancy, and water disaster investigation |
| Farming and forestry | Vegetation distribution survey, and crop yield estimation |
| Meteorological | Cloud image analysis |
| Ocean | Fish exploration and marine pollution monitoring |
| Industry and transportation | Industrial flaw detection, robot, railway route selection, output |
| Signal communication | TV, fax, multimedia communication |
| Economics | E-commerce, anticounterfeiting, and identity authentication |
| Military | Military training, electronic sand table, military survey, missile guidance |
| Environmental protection | Water quality and air pollution survey |
| Biology and medicine | Chromosome classification, CT and X-ray analysis, cell analysis, blood cell classification |

*3.1.2. Cropping of Picture.* The recognized face picture was cropped ensuring that just the facial region containing the relevant elements for age-group assessment remained. Cropping removes superfluous aspects from the picture, like the background, leaving only the section essential to provide the requisite age-relevant facial characteristics. The mean shift method was used to detect the face portion of the photos. The mean shift method identified the frontal face, a unique set of eyes, mouth, and nose.

*3.1.3. Resizing of Picture.* Once the appropriate section of a particular face picture has been collected, it is critical to ensure that the cropped component of the face images is neither too tiny nor too large for further analysis. To prevent picture distortion, it is critical to select the correct size to which photos will be resized. The photos utilized in this study were shrunk to 40 by 40 pixels, containing only the original image's face portion. The picture was resized using the MATLAB function resizes.

*3.1.4. Image Layering.* Layers are used to isolate distinct aspects of a picture in digital image editing. A layer is similar to transparency because it provides imaging effects and may be put above or below a picture. They are now an essential feature of editing software. Layers are essential in the manufacture of oil paint. We may extract elements of the picture and alter them independently of the rest of the image. By transforming our picture layers to smart objects, you may move, modify, and adjust the new image without altering the quality of the old picture.

A painter needs to conceive an image, analyze how to lay the image, determine the number of specific objects in the image, judge the occlusion and occlusion relationship between objects, and provide more information for oil painting. In this paper, the mean shift algorithm is used to split the image, build sites based on the segmented results, and use software to optimize the oil painting page structure.

*(1) Mean shift algorithm.* The mean shift algorithm is among the clustering techniques linked with the largest concentration spots or mean value as the major parameter for building machine learning. It belongs to the category of unsupervised machine learning algorithms. The approach is based on the kernel density estimation (KDE) principle. The kernel is involved with mathematical computations relating

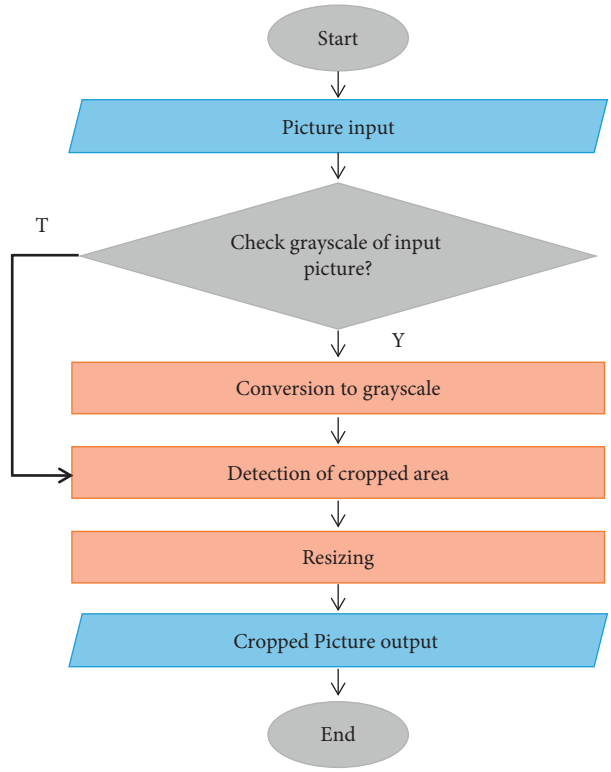


Figure 2: Flowchart of the picture preprocessing stage.

to data point weightings. The flat kernel and the Gaussian kernels are two prominent kernel functions connected with the mean shift method. This approach is typically used for picture separation and machine learning.

There are $n$ sample points in the d-dimensional space $R^d$, $x_1, x_2, \ldots, x_n$, $x_1, x_2, \ldots, x_n$ the mean shift vector of the $x$-point is defined by:

$$M_h(x) = \frac{1}{k} \sum_{x_i \in S_h} (x_i - x). \tag{4}$$

The upper $S_h$ is a high-dimensional spherical region with a height of $h$ that corresponds to the following $y$-point set relationship. This can be calculated using the following equation:

$$S_h(x) = \left\{ y: \ (y - x)^T (y - x) \le h^2 \right\}. \tag{5}$$

In the above equation, $k$ represents the number of points that fall into the region of $n$ sample points $x_i$, $x_i$, while $(x_i - x)$ is the offset of the $x$-sample points compared to the $x_i$ point, and $M_h(x)$ is the offset of the $k$ sample points falling into the sh-area from the $x$-point. After summing up, the average value is calculated. Sampling on the $f(x)$ probability density function yields $x_i$ sample points, since the direction of increase in probability density is usually a nonzero probability density gradient direction. Most of the sample points fall in the direction of probability density in the $S_h$ region, so the $M_h(x)$ direction on the mean shift vector is the same as the direction of the probability density gradient.

## 4. Oil Painting Creation Based on Computer Image Processing Technology

*4.1. Visual Perception of Art.* Oil painting is an individual or artist who creates based on objective things, abstract ideas, and abstract concepts. The products he creates are called works of Art [17]. The artwork incorporates people's subjective thoughts, inspiration, and wisdom. Artists are disturbed by external things when they create inspiration. Artists should perceive and recognize different scenes, further split each scene, identify the location of different things, and determine the area where everything in oil painting is located. Different subjects of painting and cognitive things also have differences. When drawing, we should have a clear order, so that we can also express different characteristics of paintings from other levels. Visual artistic perception is the first link in oil painting creation. Artists need to further refine each scene, analyze the structure of different objects, and locate and determine the drawing direction of the image. When you create an oil painting, you should clearly understand the way a painting compares with others and the direction of the brush. This is closely related to the structure of the main body of the painting. People's thinking is also based on this relationship to ultimately determine the direction of the brush.

In the process of oil painting creation, choose the way of image painting and image color transformation, and roughly sketch out the drawing image in your mind, make clear the specific drawing position, corner and direction on the canvas, then use the brush to sketch out the image step by

step, to achieve the whole painting drawing and creation. Four different models are shown in Figure 3 during painting.

*4.2. Mathematical Model of Oil Painting.* This paper uses a computer to vividly simulate the process of oil painting drawing and creation and synthesizes the process of oil painting generation to get the mathematical process of oil painting. Figure 4 shows the mathematical process of oil painting generation [18].

The numbers 1, 2, and 3 represent the directional field model; 4 represent the color transformation model; and 5 represent the brush model in the oil painting generation process described in the above figure. The author clearly specifies and locates the underlying model in advance in this mathematical model. A brush model is obtained by processing and analyzing different types of brush samples [19].

*4.3. Directional Field Model.* A direction field is a method of graphically displaying the results of a first-order numerical solution without calculating it. The equation $y' = f(x, y)$ specifies a vector, $y'$, that has to be fulfilled by any solution curve going through every point $(x, y)$ on the surface. This can be shown in Figure 5. The vector field is described as a collection of short line pieces that pass across multiple spots and have a gradient that solves the specified mathematical problem at that location. At each location, the real family of curves should have a path that agrees with the direction of the reference line of the directional field at that location. Its objective is to see whether this technique is useful in getting a sense of how solutions behave when the problem is hard to solve or the answer is a complex function. When sketching the directional field, it is sometimes useful to identify the lines or curves, known as isoclines, along which the curve of the orientation field sections is continuous.

The directional field model is composed of three layers, namely, body structure analysis, image hierarchy, and directional diffusion. Figure 6 shows the directional field model.

*4.3.1. Image Layering.* When an oil painting is created, the components of a picture contain multiple hierarchies. There are more items in each hierarchy of the image's several levels, and there is an interference problem between the objects [20]. Everyone understands images differently, and the subjects or viewers have different opinions and explanations. Image layers often have a large overlay so maximize your personalization potential.

*4.3.2. Main Structure Analysis.* The goal of structural analysis is to determine the best allocation of internal pressures, stress, tensions, and deflections throughout the entire or a portion of a structure. Before drawing a picture, an artist should summaries the structure of each item and does a targeted analysis to obtain the matching frame structure of the object, which can be computed using the following equation:

$$W = \arg\max P(I|W)P(W). \tag{6}$$

This paper calculates the body structure of an object based on Bayesian Company. In this formula, $W$ represents the main structure of the image object, and $I$ represents the image of the object in the oil-painted image before separation. The purpose of this equation is to find the maximum joint probability distribution and further calculate the structure of this object. $P(W)$ denotes a priori probability, $P(I|W)$ denotes a likelihood probability.

*4.3.3. Directional Diffusion.* It is possible to compute the direction of a random place on the main structure. However, due to texture or noise in other areas, the rest of the image cannot be deciphered [21].

*4.4. Color Conversion Model.* A color model is a method that combines three primary colors to provide a wider range of colors. There are several color systems used for various reasons, each of which has a somewhat distinct variety of colors that it can create. A color model is the entire spectrum of colors produced by a certain kind of color model. All color is caused by how our eyes receive light waves; however, various ways are used to create that color depending on the medium.

This study reviews a vast amount of material regarding oil painting and the development of oil paintings, making extensive use of the picture color conversion feature to reconcile distinct colors. Convert the natural image color [22] by counting part of the oil painting color. This is done by calling L-alpha-beta spatial Gaussian matching, which assumes that the color distribution satisfies the characteristics of the Gaussian distribution. Equations (7) to (11) are the spatial conversion formula from RGB to L-alpha-beta.

$$\begin{pmatrix} l \\ m \\ s \end{pmatrix} = \begin{pmatrix} 0.382 & 0.581 & -0.04 \\ 0.201 & 0.734 & 0.077 \\ 0.025 & 0.135 & 0.854 \end{pmatrix} \begin{pmatrix} R \\ G \\ B \end{pmatrix}, \tag{7}$$

$$L = \log l, \tag{8}$$

$$M = \log m, \tag{9}$$

$$S = \log s, \tag{10}$$

$$\begin{pmatrix} 1 \\ \alpha \\ \beta \end{pmatrix} = \begin{pmatrix} \frac{1}{\sqrt{3}} & 0 & 0 \\ 0 & \frac{1}{\sqrt{2}} & 0 \\ 0 & 0 & \frac{1}{2} \end{pmatrix} = \begin{pmatrix} 1 & 1 & 1 \\ 1 & 1 & -1 \\ 1 & -1 & 0 \end{pmatrix} \begin{pmatrix} L \\ M \\ S \end{pmatrix}. \tag{11}$$

In the above equation, $\alpha$ and $\alpha'$ are pre- and post-transform values, representing the mean and variance of the

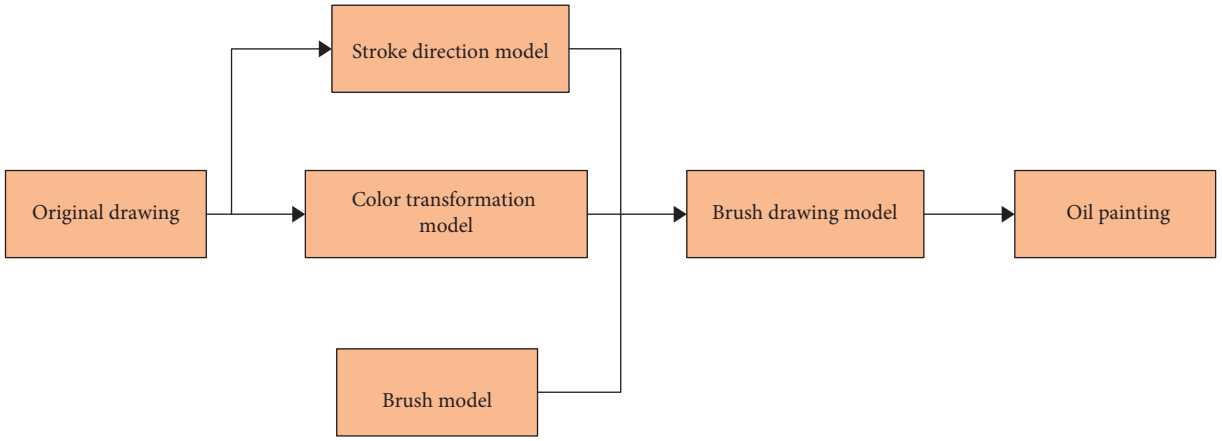


Figure 3: Oil paint generation process.

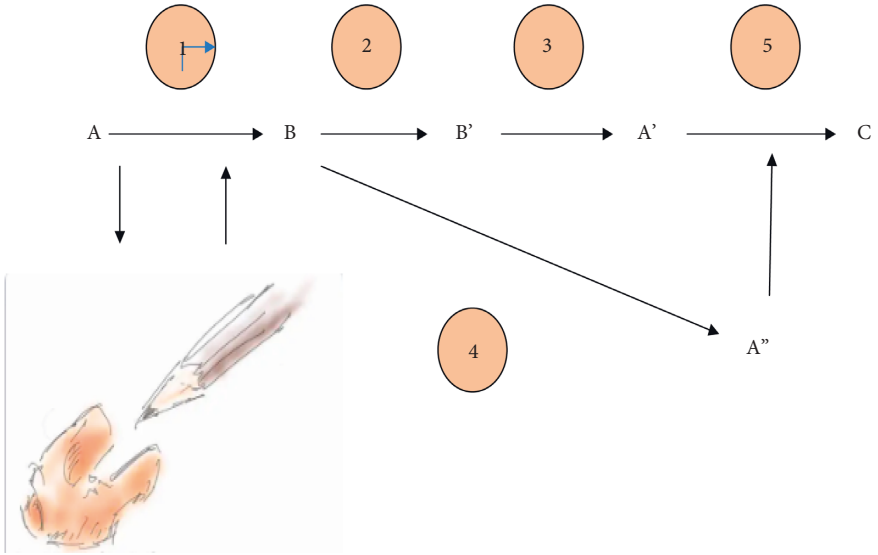


Figure 4: Mathematical process of oil painting generation.

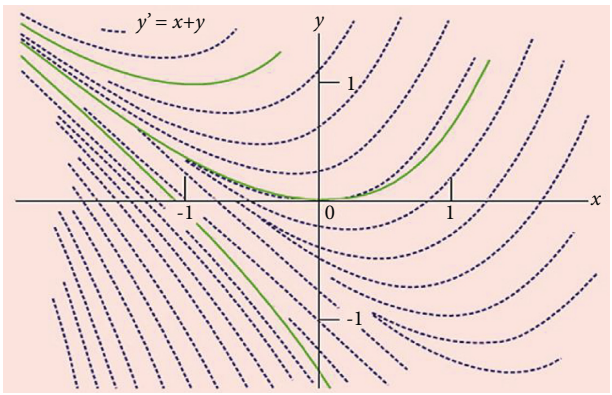


Figure 5: Directional field lines.

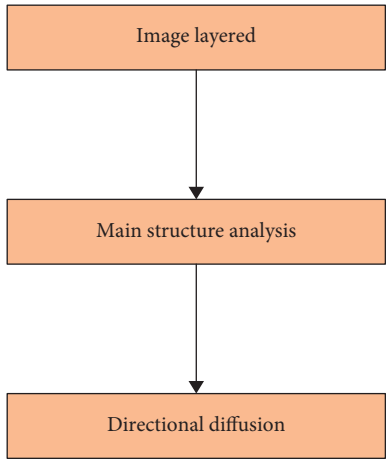


Figure 6: Directional field model.

original image, and then after the inverse conversion of the image to study the effect of drawing before and after the conversion.

## 5. Experimental Work and Analysis of Oil Painting Creation

*5.1. Application and Analysis of Image Processing Technology.* This paper uses computer image processing technology to study the process of oil painting creation. By comparing the results of Herzmann drawing, it is found that the oil painting creation and drawing effect based on computer image processing technology are closer to the real effect of the painting. The analysis from the direction of stylus, color matching, and other aspects can highlight the drawing characteristics of oil painting, which meets the artist's drawing optimization needs. In this paper, 20 artists and 20 students majoring in the painting are selected to analyze the impact of computer image processing technology on oil painting creation. Tables 2 and 3 show the comparison of drawing manipulation and brush direction results based on image processing technology.

According to the above table, 60% of students and artists are very satisfied with the drawing method, while 30% are just satisfied with the drawing technique. Similarly, just 10% are commonly satisfied, and 10% are dissatisfied with their drawing skill.

In addition to the above table, Table 3 explains the drawing results of brush direction. According to this table, 65% and artists are extremely satisfied with the brush direction method, whereas 15% are just satisfied with the drawing approach. Similarly, 15% are generally satisfied and just 5% are dissatisfied with the brush direction approach.

Figure 7 shows the proportion of artists' painting techniques to brush direction. This figure has combined the results obtained from the artist's painting and brush direction, which can be explained after the figure.

Combining the data shown in Table 2 and Figure 6, it can be concluded that artists and students majoring in the painting are more satisfied with the painting techniques and brush direction of computer image processing technology. The proportion of artists expressing their satisfaction with the painting techniques was 75%, totaling 15 people. Brush direction is very satisfactory accounting for 65%, the number of people is 13. The result given by the students majoring in the painting shows that 12 of them are very satisfied with the drawing technique, accounting for 60%, and 13 of them are very satisfied with the direction of the brush, accounting for 65%. Based on these data, it is shown that computer-based image processing technology achieves better drawing results and is more reasonable in drawing maneuvers and brush direction.

*5.2. Production Efficiency Analysis.* Production efficiency is an industrial way of describing the point at which industry or organization can no longer sustain more of one thing without diminishing the level of production of the other. It assists industrial and assembly organizations in determining their max capacity with their existing set of assets. It assists companies in analyzing whether they are making the best use of their given resources or whether there is room for improvement in process performance.

By comparing the efficiency of traditional painting and computer image processing techniques, the artist should think about, measure, and clarify the direction, connotation, and artistic expression of a painting before he creates it. Portrait drawing and creation with time constraints are now deficient in artistic form and artistic value. Traditional painting takes a long time, several years or even decades, to complete a job and enjoy the process of painting. Digital painting is fast, convenient, simple to modify, and more powerful in three-dimensional effects. This paper takes the students of the Academy of Fine Arts as the research object when analyzing the efficiency of digital printing production, and lists.

*5.3. Analysis of Oil Painting Creation Process.* The visual language symbols in computer image processing technology are of various types and can get the desired effect based on standards. Therefore, when creating oil paints, they can add mysterious images such as styling and science fiction. By using 3D MAX three-dimensional software to design images, combined with Photoshop software to process the style of oil painting images, the whole oil painting will be full of a sense of epoch and mystery. In the early stage of oil painting creation, we need to look for a large amount of image data about the creation. It makes use of computer image processing technology to make the image more stereo and task more unique and use this technology to make oil painting composition. This paper is based on computer image processing technology for oil painting creation, and the oil painting creation process is divided into three stages, the first stage is stroke direction modeling, color transformation modeling, and brush model. The second phase is to draw the brush model. The third stage is painting. Each stage has different proportions as shown in Figure 8.

Figure 9 shows the comparison of traditional painting and digital painting time. According to this figure, students of the Academy of Fine Arts use traditional painting

Table 2: Drawing results of manipulation.

| Number/proportion | Drawing technique | | | |
|---|---|---|---|---|
| | Very satisfied | Satisfied | Commonly | Poor |
| Number of artists | 15 | 3 | 2 | 0 |
| Proportion of artists (%) | 75% | 15% | 10% | 0 |
| Number of students majoring in painting | 12 | 4 | 2 | 2 |
| Proportion of students majoring in painting (%) | 60% | 20% | 10% | 10% |

Table 3: Drawing results brush direction.

| Number/proportion | Brush direction | | | |
|---|---|---|---|---|
| | Very satisfied | Satisfied | Commonly | Poor |
| Number of artists | 13 | 2 | 4 | 1 |
| Proportion of artists (%) | 65% | 10% | 20% | 5% |
| Number of students majoring in painting | 13 | 3 | 3 | 1 |
| Proportion of students majoring in painting (%) | 65% | 15% | 15% | 5% |

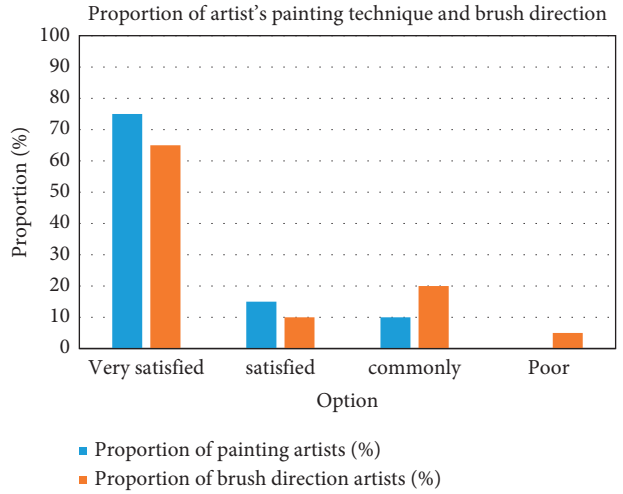


Figure 7: Comparison of artist's painting skill and brush direction contribution.

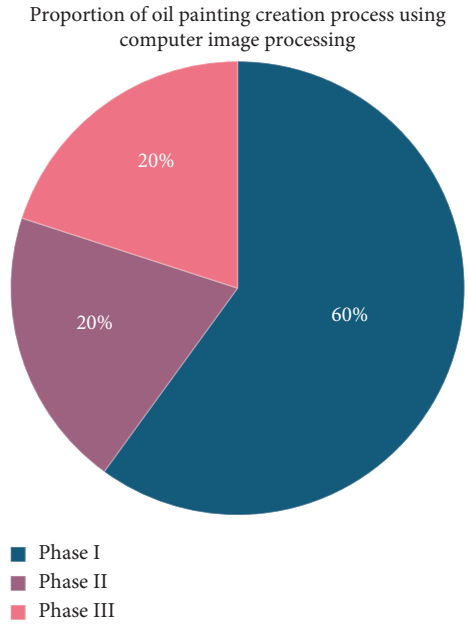


Figure 8: Proportion of oil painting creation process based on computer image processing technology.

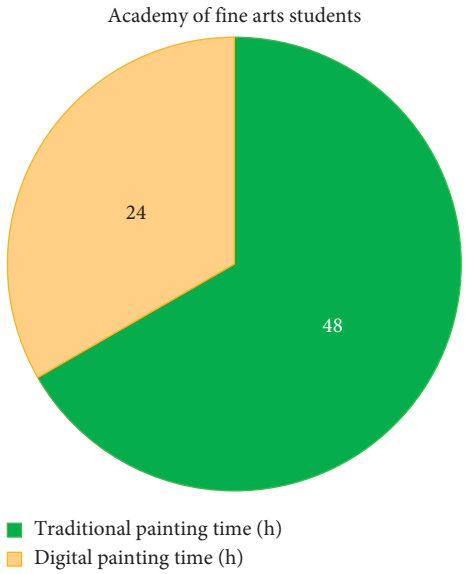


Figure 9: Comparison of traditional painting and digital painting time.

methods, which take a different time to create oil painting than digital painting. The traditional painting time to complete the same work is 48 hours, the digital painting time is 24 hours, and the digital painting time is shorter. This is due to the ease with which digital painting can extract digital drawings such as 3D drawings and vector drawings, as well as scan pictures and make digital images. This approach uses the genuine color of the collected images to outline the structure of the oil painting to speed up the process.

## 6. Conclusions

With the increasing enrichment of people's material resources, more people begin to pursue spiritual satisfaction, due to which the creation and appreciation of oil painting have become the focus of people's attention. Traditional oil painting creation ideas and methods are backward, and the oil paintings created cannot attract people's attention, thus losing a large number of potential customers. Because of the above, this paper uses computer image processing technology for oil painting creation. It can significantly improve the efficiency of oil painting creation by increasing the color saturation of oil painting surface, shortening the drawing time of oil sketch, and realizing the oil painting creation and composition innovation. In addition, this paper builds the mathematical model, direction field, and color conversion models of oil painting that complete the basic work of oil painting creation based on this model. Finally, it draws optimization according to the obtained oil painting color, direction, and mathematical model. This paper analyzes the application effect of image processing technology in oil painting from two aspects of drawing technique and brush direction. The results show that 75% of artists are very satisfied with the digital painting technique and 65% of artists are very satisfied with the painting brush direction, which shows that the application effect of computer image processing technology in oil painting creation is remarkable.

## Data Availability

The author included all the data in this paper for publication.

## Conflicts of Interest

The author declares no conflicts of interest for publication of this work.

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