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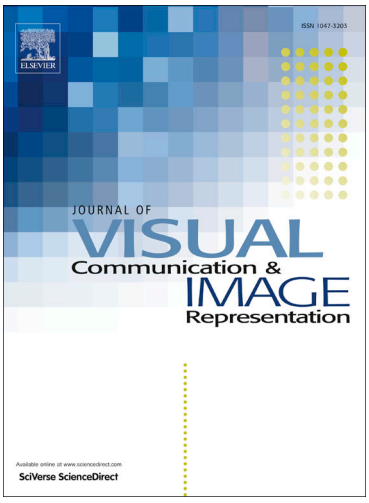

Application Research of Digital Image Technology in Graphic Design

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Application Research of Digital Image Technology in Graphic Design

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Abstract: With the development of the information age and the popularity of Internet computer technology, the application field of digital image technology has been further expanded. Digital image technology can not only buy the interchange of the current picture scene, the image adjustment, but also change the color texture of the image and the shape of the main body of the picture. The application of digital technology and imaging in graphic design has become an inevitable trend, and they play an invaluable role in graphic design. Graphic design is designed to meet the growing cultural needs of people, and it is clear that high standards of digital technology and imaging are not lacking. The development of graphic design is inseparable from the promotion of digital image technology, and there is a close relationship between the two. In the context of the rapid development of the current society, people's needs are increasing, and how to meet the visual needs of the social population has become a top priority. This paper takes the relationship between digital image technology and graphic design as the starting point, discusses the processing criteria of digital image technology in graphic design, and provides reference for relevant researchers.

Keywords: digital image technology; digital image; graphic design; image adjustment

1. Introduction

Digital image processing technology uses two-dimensional data as the information source to improve the visual image effect through the technical processing of image signals [1]. Digital images have outstanding advantages in signal acquisition, recognition, processing and conversion, and have wider application fields. For example, in the aerospace field, aerospace images taken by satellites and spacecraft are converted into digital signals and transmitted to ground equipment. The technicians perform image extraction, analysis, enhancement, segmentation, etc. to obtain the best image quality for development. Scientific planning, construction, and exploration provide image guidance [2-4]. In the field of communication, digital image processing technology in the digital communication, network communication, optical fiber communication, the main method of image signal generation, transmission, exchange, processing, through transform coding, entropy coding and other techniques to optimize image signals, improve data transmission Rate and quality. In the field of science, culture and art, digital image processing technology is widely used in film and television, game screen editing and innovative design [5-8].

The application of digital technology and imaging in graphic design has become an inevitable trend, and they play an invaluable role in graphic design [9]. Graphic design is designed to meet the growing cultural needs of people, and it is clear that high standards of digital technology and imaging are not lacking. The combination of digital technology and graphic design is the result of cross-border intersection and integration of art. It is an inevitable trend in the development of modern multimedia technology. The various elements of digital technology can meet the development needs of complex graphic design [10]. With the development of the market and the improvement of people's aesthetic consciousness, the

requirements of digital design for graphic design are getting higher and higher. Only with the continuous advancement of digital technology can we expand a broad space for the development of graphic design [11-14]. First, there are many similarities and differences between photography and graphic design in digital technology. Similarly, both can reproduce things and express emotions, but photography has the real ability to reproduce objective things, while traditional graphic design is performing. There is a lack of authenticity. This has led to the combination of the two for their own needs, and has also led to the widespread use of digital technology in graphic design [15]. Second, digital technology, as an emerging information carrier, has injected vitality into the new forms of graphic design and has provided multiple possibilities for the development of graphic design in the current environment. Designers use digital technology to record the unique visual form in a limited time and present the value of the work with its own unique charm [16-18]. An excellent digital work is a multi-element fusion, the best way for the author to release emotions. Digital technology and graphic design are interlinked in emotional expression. Third, the graphic design using digital technology is more convenient than the traditional graphic design, and the production cycle is relatively shortened, which saves a lot of time for the fast-paced lifestyle [19-23]. Nowadays, the product is updated at a very fast speed. In order to meet the needs of customers, the efficiency of graphic design should also be improved [24, 25]. With the continuous advancement of digital technology, designers can make up for the lack of traditional graphic design through digital media manipulation tools - software to enhance design efficiency and visual effects of the work.

Therefore, this paper digitizes the graphic design image, according to different application fields, obtains the digital image data by means of the acquisition device, and transfers it to the image data module. The basic elements of the image data at this stage are pixels. The image data is encoded. The main goal of the encoding is to ensure the image quality. The image format and requirements are optimized by reasonable compression coding to meet the needs of transmission and storage, and then the image is restored. The results prove that digital image technology is applied to commercial advertising graphic design to achieve the best design results. At the same time as achieving the desired publicity, we will win more economic benefits for the business. Therefore, in the future design, digital image technology is required to maximize its design functions.

2, Proposed method

2.1 Digital image processing features and processes

With the wide application of digital imaging equipment and digital image sensors, digital image processing technology has also developed rapidly. The characteristics of digital image processing are manifested in four aspects: First, it can ensure the image input and output are consistent. In analog image processing, the application of technology may reduce image quality, while digital images ensure input and output consistency. Second, digital images are more accurate in processing. The digital image is based on the establishment of two-dimensional data, which can realize multi-level processing of image pixels. Such as 16, 32, 64. In the conventional image processing, the image accuracy is often lowered due to the difficulty in processing the number of pixels. When digital images are processed, they are not limited by the number of arrays and pixels, resulting in higher image accuracy. The third is a wide range of applications. Digital images include many types of images, such as visible light images, X-ray images, ultrasound images, infrared images, and the like. Various types of conversions can be performed on digital images in terms of processing. Fourth, the flexibility is high. Digital images can be nonlinearly processed, and digital techniques can be used to analyze the logical relationship of images, thereby realizing the needs of image compression, restoration, matching description and recognition.

In digital image processing applications, there are mainly four stages. First, digitally process the image, according to different application fields, obtain digital image data by means of the acquisition device, and transfer it to the image data module. The basic elements of the image data at this stage are pixels. The second is to encode the image data. The main goal of the encoding is to ensure the image quality, and optimize the image data format and requirements through reasonable compression coding to meet the needs of transmission and storage. The third is the recovery processing of the image. The image is restored mainly to improve the phenomenon of data "degradation" and to obtain more complete image data through recovery processing. For example, image degradation mainly includes defocus, optical system aberrations, and the like. The fourth stage is image segmentation, which divides the image as needed. For example, image pixels are injected into a specified area; image area results are sought, valuable image information is advanced, and the like.

In the process of digital image acquisition, due to the limitations of the hardware conditions of the device and the poor collection environment, the imaging distance is too long, the exposure value is not up to standard, and the image information is interfered in the process of formation, transmission, acceptance, storage, etc. Affect image quality. In general, when analyzing image quality, it is necessary to examine the contrast, color distortion, resolution, and visual effects of the image. For example, the resolution of a mobile phone camera is quite different from that of a lunar imaging device; under different weather conditions, it may also cause blurring, smudging, contrast reduction, color distortion and the like. Therefore, in digital image processing technology, image enhancement technology is widely used. Image enhancement technology itself is to improve image quality, improve image sharpness, contrast, and visibility, and create conditions for enhancing visual effects. Filtering technology is an important image processing technology, which can process some components in the image through filtering technology. For example, smoothing can eliminate noise in the image; sharpening filtering can improve image sharpness. In the smoothing filtering technique, a smooth image is obtained by performing a convolution traversal for each pixel in the image. The filtering of high-frequency components is called low-pass filtering and can be directly used to blur the image to eliminate image noise. However, after low-pass filtering, the texture information is blurred and the edge information is destroyed. From the visual point of view, the larger the size of the smoothing filter template, the better the denoising effect, but the more blurred the image. To do this, we usually adjust the weighting coefficients of each position of the smoothing template to reduce the degree of blur. In image processing, the closer to the pixel in the center of the template, the greater the weight should be, and the weight of the template edge is less important. In the actual smoothing filtering process, each template coefficient is an integer, the peripheral coefficient is 1, the internal coefficient is proportionally increased, and the center coefficient is the largest. Sharpening filtering is mainly to process the edges of the image. In digital image processing, the blurred details are usually sharpened to reduce the degree of blur. There are two kinds of sharpening filters, one is high-pass filtering, which is similar to the low-pass filtering principle; the other is differential sharpening, including gradient sharpening and Laplacian sharpening. In image processing technology, at the edge of the image, where the object intersects the background, the gradient changes greatly, while the background or object portion has a small gradient change. On gradient template types, Robert templates are cross-gradients, and Sobel templates are widely used based on Sobel gradients. Gradient operators always have two templates in different directions to respond to edge information in different directions. The Laplacian operator is a template that contains edge response information in different directions, which can optimize the processing of the image and enhance the expressiveness of the image. At the same time, the Laplacian template has high edge responsivity when filtering, and the image

structure is preserved after the image is enhanced. However, gradient templates and Laplacian templates often increase image noise when sharpening images.

2. 2 digital image processing image preprocessing technology

All image processing based on an algorithm, the image pre-processing step is extremely important, especially in the tracking algorithm, the image preprocessing algorithm can affect the entire trace all subsequent work. Important features of the image pre-processing, the interference element is in the original image, the image features are not required to remove all, or reducing the impact, wherein the information required focused or extracted, to maximize the detectability of the original image, The important information is provided to the subsequent segmentation, identification and classification modules of the algorithm for analysis and processing.

Digital images, is a set of continuous analog image signal is scattered into a set of digital image signals pixel dispersed intact coherent analog image into a digital image by a finite number of pixels of the real visible scene Become a digital language that the machine can recognize. General image digitization can be divided into three steps: sampling, quantization, and encoding.

1. Sampling: sampling the analog image signal acquisition process is depending on the particular step, the continuous signal is discretized. The two-dimensional analog image segmentation into a very small area of a size equal to the square grid, these grids called pixels. The number of times an image is cut is limited, into discrete pixels is limited, the more into discrete pixels, the higher the resolution of the image, the better the imaging results. And the pixel size of the moving image neurofilament proteins employed herein, the size depending on the resolution of the original video. After sampling the sampling frequency related to the quality of the image, the higher the sampling frequency, the higher the resulting image quality, the greater the resolution. The formula for the sampling frequency is as follows:

$$f = \frac{N}{\Delta t} \quad (1)$$

$$f_s = \frac{N}{\Delta s} \quad (2)$$

f represents the sampling frequency , f_s Represents the spatial sampling frequency, N for the sampling points can be seen from the equation, the more sampling points, the smaller the sampling interval, to obtain the richer color image, the more complex content. Take five different sets of motion video, the sampling frequency are calculated, calculation results shown in Table 1.

Table 1 video attribute table

Video sequence	Pixel	Sampling points	Video duration	Frame rate	Magnification
1	472*264	124608	8s	6 frames /s	0.131 μ m/ pixel
2	512*406	207872	18s	10 frames /s	0.131 μ m/ pixel
3	512*258	132096	18s	10 frames /s	0 .131 μ m/ pixel
4	512*372	190464	9s	10 frames /s	0.131 μ m/ pixel
5	510*414	211140	16s	10 frames /s	0.131 μ m/ pixel

2. Quantization: Quantization is to classify the collected image sample points to a specified pixel level, and quantize the continuous uninterrupted analog signal into a finite number of signal levels, is a collection of all the pixels of the image to quantify the results obtained in a picture. You can use the quantization series to represent the quality of an image. The formula is as follows:

$$N = 2^B \quad (3)$$

Among them, the number of bits B can also be referred to as a quantized word length, and generally uses 8 bits, 16 bits, 24 bits, and the like. The larger the quantization word length, the larger the quantization stages, the more the number of pixels of the image, the image close to the original analog image, the greater the space.

3. Encoding: Encoding is to encode the quantized image data in the form of 0/1 binary. Since the data obtained after quantization is very large, reading and calling are very troublesome, and each discrete point of each set of data needs to be encoded to facilitate local processing of the image in the future. The image sampling method used in the experiments in this paper is to use digital photography technology to collect video information.

In the process of acquiring images, transmitting data, and processing images, distortion caused by external disturbances occurs, causing a large amount of noise to be added to the image, and the image becomes blurred. This is called image degradation. There are many types of image degradation, the type described herein causing image degradation of neurofilament proteins comprising: imaging blur due to natural factors external imaging problems caused by optical photo photographing height and angle of the video image caused discomfort blurred fluorescence images Image distortion caused by nonlinear changes caused during transmission , and additional noise added during subsequent image processing. Degradation of the image may result in poor image quality, which is not conducive to the segmentation and recognition of the image. Therefore, the degraded image needs to be restored. First, create an image degradation model g(x, y):

$$g(x,y) = \rightarrow \int_{-\infty}^{+\infty}\int_{-\infty}^{+\infty} f(\alpha,\beta)h(x-\alpha,y-\beta)d\alpha d\beta + n(x,y) \quad (4)$$

The image is a normalized image of the various imaging characteristics due to the external factors is a set of color space, resolution, data format of different images, without changing the important feature information for certain processing, so that The unimportant non-detected feature information in the image becomes weakened or directly eliminated , and the original image group is changed into a unified standard format. For different motion video, external conditions are different, such as lighting conditions, trajectory, while recording length, shoot height and photographing angle, the microscope magnification rate, human error and other factors, each of the pixels of the video, size, duration, content not Similarly , after splitting the video into one frame and one frame , the number of channels, data format, and resolution of the image may be different. In order to reduce the complexity of the subsequent steps and improve the computational efficiency, we will normalize all the videos. Image normalization manner generally divided into three,colors normalized, and the normalized geometric transformation normalization.

Usually, the video image obtained by the experiment is an RGB color image, but the protein itself does not have any color information, that is, the color cannot be used as the feature information for identifying the neurofilament protein, and the use of the RGB color image may increase the calculation amount and reduce the recognition efficiency. Conducive to the next steps of the experiment. Therefore, we need this neurofilament protein video image as a grayscale image. RGB is one of many color spaces. For each RGB image, each pixel value that makes up an image is different from the three primary colors of R (red), G (green), and B (blue). The weights are composed of composites. Each pixel value of the grayscale image consists of only one sample color, usually black to white, ranging from 0 to 255, black to 0, white to 255, and color from 0 to 255 from black to dark gray. Light gray to light white. RGB images can be converted to grayscale images, which are defined as follows:

$$f(x,y)=0.299\times R(x,y)+0.587\times G(x,y)+0.114\times B(x,y) \quad (5)$$

However, when the actual computer processes the data, the floating-point operation will affect the calculation amount and affect the calculation efficiency. Therefore, the above formula can be enlarged by 100 times and then divided by 1000 to become the integer operation form, because the modified formula is 32. Bit-integer operation, for 8 -bit precision RGB images, the amount of computation is still too large, so we round it up and get the following form:

$$f(x,y)=\frac{[30\times R(x,y)+59\times G(x,y)+11\times B(x,y)+50]}{100} \quad (6)$$

Geometric normalization When processing a group of images , the geometric feature information such as format, size, channel number, resolution, etc. of each image may be different , but when processing this set of images , these geometric feature information is not Important feature information , in order to reduce the calculation amount of each step of the subsequent image processing and improve the efficiency , geometric normalization processing is required. When dealing with images of different sizes, the Euclidean distance can be used as the judgment function:

$$D(i,j)=\sum_{m=1}^{M}\sum_{n=1}^{N}[S^{ij}(m,n)-T(m,n)^2] \quad (7)$$

When the distance between two points in two dimensions D = $x2 + y2 = 0$, the image size is equal to two, or to make the normalization process, which will expand to give:

$$\sum_{m=1}^{M}\sum_{n=1}^{N}[S(m,n)]^2=\sum_{m=1}^{M}\sum_{n=1}^{N}S(m,n)T(m,n)+\sum_{m=1}^{M}\sum_{n=1}^{N}T(m,n)^2 \quad (8)$$

When acquiring images, due to external factors, such as imaging equipment, sensor factors, atmospheric factors, light factors, etc., when generating images, some isolated bright spots or pixel blocks appear on the image, or in the process of image processing, Because some program steps are not appropriate, they will also interfere with the image information. These are so-called noise pollution, which generally includes Gaussian noise and impulse noise. They are all useless information in the picture, which will interfere with the view effect and reduce the image quality, resulting in the use of feature information in subsequent steps such as image segmentation, feature extraction, and image recognition. In order to ensure the normal use of the information in the image, and to maximize the original imaging information of the image, the image must be denoised. The method of noise reduction is image smoothing, that is, image filtering. When using the filter, we must ensure that the geometric features such as the boundary contour and shape of the image target are preserved while maximizing the noise mixed in the background. The general filtering methods can be divided into two types according to linearity. One type is linear filtering. Common methods include: mean filtering, Gaussian filtering, box filtering, Laplacian filtering, etc., which are generally used to remove Gaussian noise. The other type is nonlinear filtering, which generally includes median filtering, bilateral filtering, particle filtering, Kalman filtering, and the like. Linear filters are typically used to reject unwanted frequencies in the signal or to select a desired frequency. Usually the difference between different linear filters is that their templates are different. The basic principle is to replace the individual pixel values in the original image with the mean. Among them, the mean filtering is the most common and simple, and the main method adopted is the neighborhood averaging method. The so-called domain averaging method is to obtain the grayscale pixel value fm(x, y) of the coordinate points in the eight directions around the coordinates of

the target pixel (x, y), find the sum of these pixel values, and then find the average value, let This average replaces the pixel value of the original target pixel (x, y), layer-by-layer replacement, and the resulting new image is the average filtered image. The formula is:

$$g(x,y)=\frac{1}{n}\sum_{I\in Neighbour} I(x,y) \qquad (9)$$

2.3 The significance of digital advertising technology in graphic advertising design

1. The practical significance of applying computer digital image technology. First of all, traditional graphic design is based on artificial creation design, which not only prolongs the creation time, but also makes it difficult to guarantee the design effect. The advertising style, picture color, design content, etc. are severely limited and should not be modified. These problems can be effectively avoided by using computer graphics image processing software. The graphic image processing software uses the computer as the operating platform, which greatly broadens the design theme, enriches the performance of the advertising design, deepens the design concept and product connotation. After completing the graphic advertisement design work, the computer graphics and image processing software is used to modify the picture to ensure the integrity and perfection of the advertisement design, thereby satisfying the requirements of customers and consumers. Secondly, computer graphics and image processing software can effectively enhance the creative content of print advertising design. Traditional advertising design adopts the method of manual drawing, which makes the advertising design subject to color and style constraints, and it is difficult to guarantee the fullness of advertising products. The application of computer graphics and image processing software is to supplement and extend the traditional design method, so that the visual effect of the advertising screen is stronger and more likely to attract consumers' attention. The rich subject matter and diverse expression methods make the creative connotation of graphic advertising design more prominent. Fully reflect the practical significance of print advertising design. Finally, the application of computer graphics and image processing software in print advertising design is conducive to the liberation of design thinking. Designers can combine other production software, constantly innovate advertising design methods, enrich design themes and styles, and promote the development of the advertising industry. The graphic image processing software effectively simplifies the complicated process of advertisement design, facilitates the storage, modification and dissemination of design ideas and design products, and improves the efficiency of graphic advertisement design.

2, the application effect of digital image technology in print advertising design (1) to enhance the color of the screen, the strong color of the screen can stimulate the inner feelings, the personalized color can attract the attention of consumers, so the color expression becomes the success or failure of the advertising design. The key factor. The computer graphic image processing software has various color design modes. The designer can select the color that is easy to express the design effect according to the design requirements, and adjust the color contrast by the contrast, the color gradation and the curve adjustment. (2) Deepen the creative connotation of advertising. Graphical images are a silent language that is a core element of print advertising design. Designers use graphic images to convey design concepts and product connotations, and use computer graphics and image processing software to deepen the creative connotation of advertising. There are many design tools in computer graphics and image processing software, such as pencils, erasers, brushes, etc. Designers use these drawing tools to create advertising designs. Use mobile, copy, and other tools to re-create advertising design, add new design concepts, design content, and create new design products. Use the Mito tool to filter and artize the design

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that does not meet the requirements, so that the flat product design can achieve the effect of promoting the product. (3) Integrated advertising content layout. Excellent print advertising design must be processed through reasonable layout to present more beautiful and attractive advertising content to the audience. Coordinating the relationship between layout and viewing effects can effectively improve the design of print ads. In the design of print advertising, we constantly explore new design forms and individualized creative methods, and reasonably handle the advertising layout to accurately convey the design concept and product connotation. The computer graphics and image processing software enables the designer to complete the aesthetically pleasing layout design, realize the effect of information communication and product promotion, and then promote the development of the advertising industry.

3, experiment and discussion

After smoothing the image while weakening or removing image noise, also the original image boundary lines of weakness, so that the image becomes unclear, then you need to use the image sharpening process, the boundary contour compensation image object ,the edge feature in the previous step to strengthen the weakened information by means of sharpening the image gray value transitions sensitive to this feature, the strengthening of the gradation jump and the background object contrast, the linear profile of the object image Stand out . Divided into two differential method for image sharpening and high-pass filtering method, wherein the method is divided into differential gradient Laplace sharpening and sharpening.

The formula for gradient sharpening is:

$$g[f(i,j)] = \sqrt{[f(i,j) - f(i+1,j+1)]^2 + [f(i+1,j) - f(i,j+1)]^2} \quad (10)$$

Sharpening comparison shown in Figure 1:

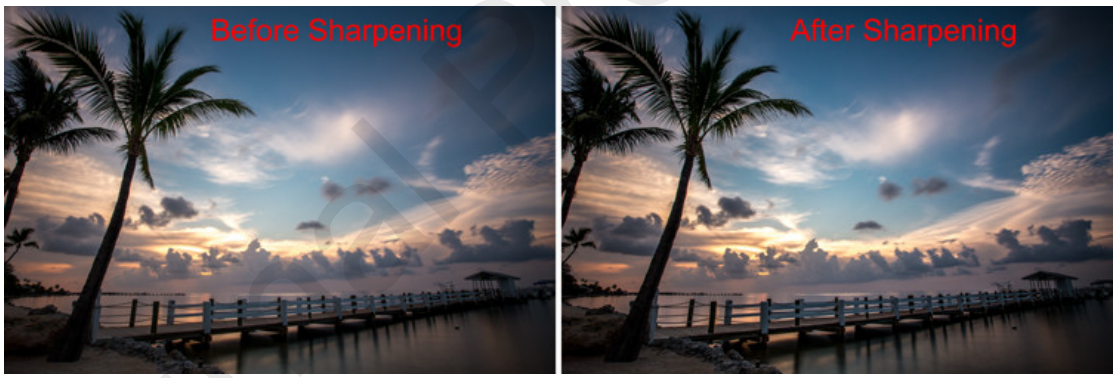

Figure 1 Sharpening contrast

Graphic design carries the task of conveying information and pleasing consumers. Therefore, whether digital images are processed properly in graphic design is an important factor in determining the success of graphic design. Since digital technology was introduced into graphic design, many traditional techniques for acquiring images have completely changed, and the role of the designer has undergone a major transformation. It is both a graphic designer and a photographer and image processor. Therefore, only designers with comprehensive qualities can be handy in the design. Designers must grasp the following guidelines when dealing with digital images in graphic design.

First, accurately express the design theme. Accurately expressing the design theme is the basic requirement of graphic design, and it is also the artistic realm pursued by excellent designers. Therefore, the designer should use the appropriate digital technology to process the graphic design according to the needs of the customer, and accurately express the design scheme instead of stacking the special effects or doing whatever they want. Today, whether it is print advertising, book binding, product packaging, commercial posters, etc., are inseparable from digital technology. Therefore, after the designer has

figured out the idea and theme of the design, he should appropriately select some image processing editing tools (such as Photoshop, etc.) to make the ordinary image into a work that meets the design theme. For example, the digital image processing of the snow mountain landscape print advertisement (Figure 2) makes the charm of the product itself vivid.

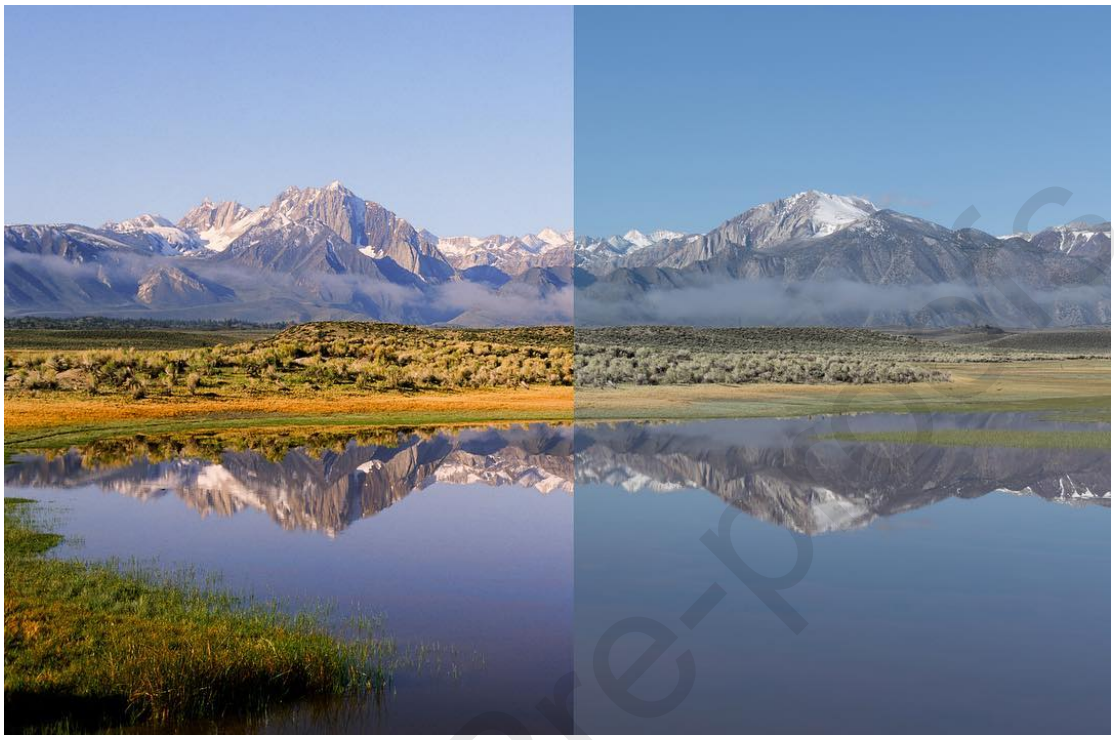

Figure 2 Digital image technology processing landscape graphic design

Second, follow the aesthetic principles in digital imaging. The audience stayed in front of the graphic design works, mostly not attracted by the images of the works themselves, but by the emotions in the works. The current design market is a visual market. Designing only digital technology can better interpret the aesthetics of the design (Figure 3). Although digital image and post-digital processing are a new form of graphic design, graphic design still requires designers to have a strong artistic and solid artistic background. Obtaining digital images requires graphic designers to have a strong control ability, and requires them to have certain processing power for color, proportion, composition, etc. Only in this way can they create graphic design works that conform to the public aesthetic standards and consumer mentality. For example, when acquiring digital images, consider elements such as light, color, lines, and tones, and apply formal aesthetics to the design process. These elements are the basic points of image formation in graphic design. Formal beauty is these basics. The connection of the points, only the use of the link to connect these basic points perfectly, in order to harmoniously reproduce the aesthetic features, artistic emotions, visual impact.

Figure 3 Digital image technology to deal with character graphic design

Third, the processing technology and commercial art are highly unified. Proper post-processing plays a decisive role in graphic design. Many graphic design advertisements use advanced digital cameras to acquire images, and then use digital technology to process them to obtain high-quality design images. Of course, designers should fully consider independent synthetic elements when using digital technology to process images, so that the perfect combination of light source, perspective, environment, color and other factors can ensure the authenticity of the work (Figure 4). There are also some graphic designs that need to adopt a re-deconstructed combination of artistic processing techniques to give new meaning and life to the image. For digital processing of such graphic design, it is necessary to consider the processing of the original material, and then combine creative thinking with the form of the US law. Cleverly arrange the original material in a space to shape the content to be expressed. Graphic design is a design for the purpose of conveying information. It serves the business, so it is necessary to implement the design principles of business information. When acquiring digital images, it is inevitable that there are images that are too artistic and idealized. This requires designers to grasp the high degree of unity of art and commerciality in the selection and processing of digital images. Only graphic design that accurately conveys business information and embody artistic emotions can be accepted by the audience.

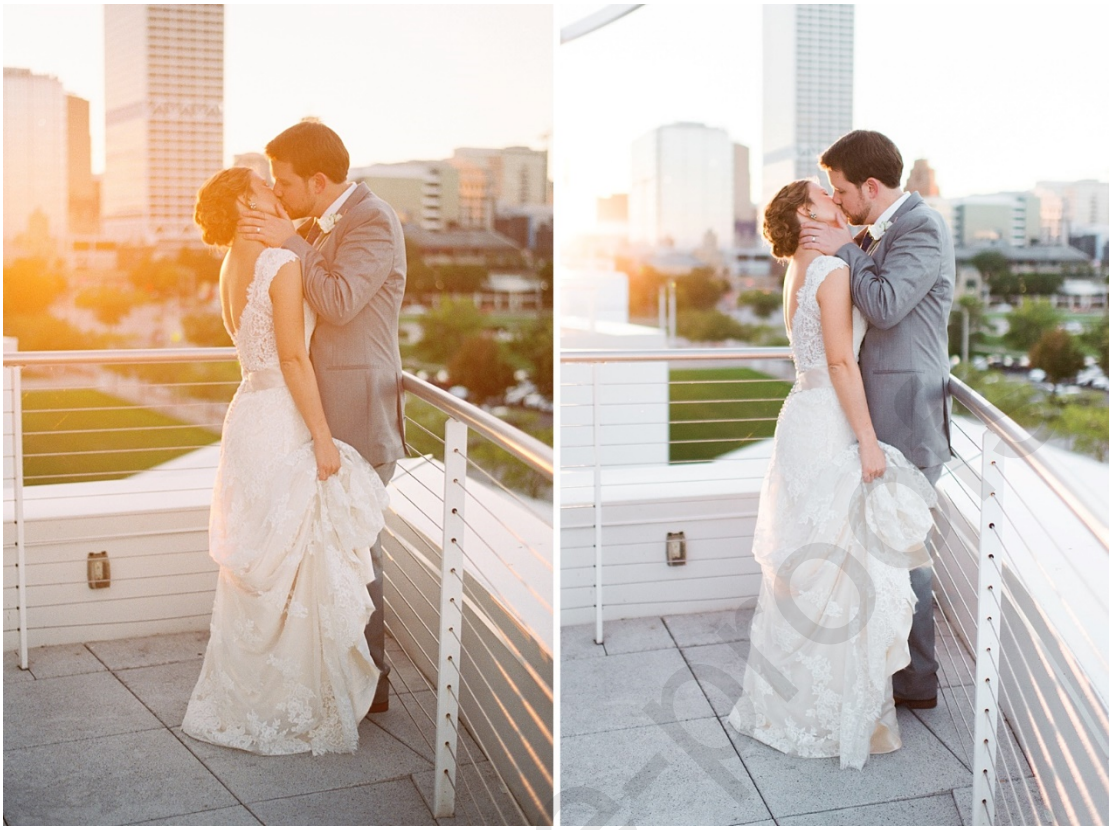

Figure 4 Digital Image Processing Business design image plane

4, Conclusion

With the application of new technologies such as big data and artificial intelligence, digital image processing technology has also achieved greater development. By analyzing image processing technology, image data information is compressed, restored, segmented, and the like. Image enhancement is an important part of image processing. In the image enhancement processing, the type, characteristics and requirements of digital images should be combined to grasp the relationship between the overall and local features. Choose the appropriate enhancement processing technology to improve image quality and meet special analysis needs. In addition, in the digital image processing method, it is also necessary to combine the image visualization features to lead students to understand various algorithm principles and master image processing skills and practical skills. The application of digital image technology in print advertising design not only effectively expands the theme of graphic advertising design, enriches the performance of advertising design, deepens the creative concept of advertising, but also actively promotes the development of the advertising industry. Graphic image processing software effectively compensates for the shortcomings of traditional design methods, strengthens the expressiveness and product connotation of print advertising, stimulates consumers' desire for consumption, and promotes social and economic growth. High-quality graphic advertising design works are closely related to design concepts and technical capabilities. Therefore, it is necessary to continuously improve the mastery and application of digital image technology by designers.

Conflict of interest

There is no conflict of interest.

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