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Research Article

Visual UI Design Image Sharing Scheme Based on Improved FEMD Algorithm

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Based on the improvement of the FEMD algorithm, this article assumes a reversible sharing scheme that can encrypt images. UI design is the most important part of Internet applications, including three parts, namely, interaction design, interface design, and user research. Therefore, the UI directly affects the user experience. It is precisely based on the criticality and importance of the UI algorithm that we intend to further explore the most critical expression language in the product and to innovate the most important visual factors by further digging into the user's demands for the product. The three most important colors in the UI design process are colors, pictures, and text. And interaction design is the most important and critical part of UI design. We need to explore the dynamic relationship among applications, humans, and machines. For visual design, we not only need to deal with the relationship between application, human, and machine, but also better deal with the relationship between plane, time, and space on the basis of these three relationships. Our innovative interface for the UI algorithm is mainly to innovate the first interface that the user obtains, so that the user can get a better reading experience and browse, and the designer can beautify and collect the user interface to achieve the user the purpose of obtaining a better browsing sensory experience. This requires us to get rid of the old copy model, in order to innovate in thinking; innovate a better visual communication interface, and better integrate the user's research interface design and interaction, which is also the pursuit of this article.

1. Introduction

With the further popularization of the Internet in the twenty-first century and the arrival of the information age, the development of the big data era has been born to accelerate the further improvement of data transmission [1]. However, in the process of data transmission, how to encrypt data has become the most important and urgent problem to be solved in the process of image sharing application [2]. Among them, we need to classify different images according to their different characteristic attributes and characteristics. And from this to different people to manage. Suppose that the image we need to save privately is divided into N images, and only when a user has t $(2 < t < n)$ divided images at the same time can the original image that needs to be saved privately be restored [3]. This is used to prevent the private images from being too concentrated, so that a certain degree of security can be achieved. It is precisely based on the criticality and importance of the UI algorithm that we intend to further explore the most critical expression language in the product and to innovate the most important visual factors by further digging into the user's demands for the product [4]. The three most important colors in the UI design process are colors, pictures, and text. And interaction design is the most important and critical part of UI design [5]. We need to explore the dynamic relationship among applications, humans, and machines. For visual design, we not only need to deal with the relationship between application, human, and machine, but also better deal with the relationship between plane, time, and space on the basis of these three relationships [6]. From another perspective, if the user loses a certain part of the image, the user only needs to have the remaining images greater than or equal to t to recover the lost and damaged

secret images. Steganography is often used a technique used for information hiding. People use this technology to realize the safe storage of digital content and safe transportation in the network [7]. Based on steganography, designers deposit different images uploaded by users in different image carriers to achieve the privacy of sharing. Thus, N different dense images are generated. Then, by transporting the secret image, the purpose of safe transport of the secret image is completed [8].

2. Related Work

For the purpose of securely transmitting private images, literature first proposed a secret sharing technology based on the principle of Lagrangian polynomial interpolation, also known as (t, n) threshold secret sharing technology [9]. Literature on this basis, we also proposed a technology for the secret sharing of secret images. At the same time, this private image is not single; it is a connection between the users and cloud storage [10]. Only when the first user and the second user input the password correctly at the same time, this kind of picture can be transported. Literature proposes applying Huffman coding to differential image coding of secret images to reduce the number of divided images [11]. Literature proposed a secret image sharing scheme based on steganography, which hides the generated noise in multiple carrier images, and ensures that all the other people who do not know the password cannot obtain this kind of image, no matter what no means by any means [12]. Based on the algorithm framework, subsequent researchers have proposed many secret image sharing schemes based on steganography. Due to the relatively high value of the two images mentioned above, in order to further ensure the safety of medical images and military images, we need to break the original image transportation mode and adopt a more advanced one that can be private. Image sharing scheme for image sharing. Among them, literature uses OAEP and IDA to further improve the security of the shared secret image key, and uses the FEMD steganography algorithm to improve the quality of the steganographic image [13]. While adopting this technology, we can replace the technology mentioned above by further improving the algorithm and adopting new cell automation technology to improve the quality of the image and optimize the image carrier. Although this method improves the image quality of the data to a certain extent, it also has certain drawbacks and problems. For example, certain carrier images cannot be restored, including some special military images and some images related to medicine. Literature proposed a reversibility sharing mechanism for secret images [14]. For this problem, we have proposed a new improvement plan; this new improvement plan can solve the overflow problem well. The purpose of safe transmission of private images is to better save the images uploaded by users, so that the images uploaded by users will not be stolen by people with ulterior motives and used for other commercial purposes. Literature proposed a reversible bow and arrow workshop for secret images based on (t, n), and this shared development is active, but the quality of the private images generated in this atmosphere needs further improvement [15]. Literature proposed a reversible data sharing scheme, which embeds secret information in the spatial domain, but the amount of embedded data is small. We understand that this technology can meet the transportability of private images [16]. The image is saved through encryption during sharing, so as to further complete the protection of the images uploaded by the users.

3. Research on Image Sharing Background Knowledge of Visual UI Design with Improved FEMD Algorithm

3.1. Secret Sharing Technology. Secret sharing technology is based on the principle of Lagrangian polynomial interpolation. If the user needs to save his own secret, then the saved secret device S will be shared by a secret method. The specific time steps are as follows

$$\begin{aligned} F(x) &= \left(a_0 + a_1 x^1 + \cdots + a_{t-1} x^{t-1}\right) \mathrm{mod} GF(p) \\ y_i &= F(x_i), 1 \le i \le n, \end{aligned} \tag{1}$$

$$F(x) = \left[\sum_{i=1}^{t} y_i \prod_{\substack{j=1 \\ j \neq i}}^{t} \left(x_i - x_j\right)^{-1} \left(x - x_j\right)\right]. \tag{2}$$

3.2. FEMD Algorithm. In this design scheme, we extract specific methods and specific algorithms to achieve the transportation of dense images, and the quality of our extraction methods and algorithms directly determines and affects the quality of the image, which is related to an important and critical factor for the quality of dense images. In order to better enable the transportation of private images to meet the user experience needs, we further upgrade and improve this algorithm, and in the process of continuous practice and application, we will test whether this algorithm can meet the needs of the current design market.

$$\frac{Ibs^2}{2} \frac{\text{bit}}{\text{pixel}}. \tag{3}$$

So, in this square, the larger the X value we bring, the larger the corresponding S value, and the larger the amount of embedding, but at the same time, the corresponding embedding distortion will become more and more in this case. Based on the FEM calculation method, we embed a d in the S binary system into a pixel pair (a_i, $a_i + 1$) to obtain a dense pixel pair (b_i, $b_i + 1$). The specific steps are as follows.

Step 1 defines the extraction function $F(x_i, x_i + 1)$ as shown in the following equation.

$$F\left(x_i, x_{i+1}\right) = \left((s-1)x_i + s x_{i+1}\right) \mathrm{mod}\ s^2. \tag{4}$$

Step 2 establishes a corresponding 256×256 mapping matrix M, as shown in formula.

$$M[x_i][x_{i+1}] = F(x_i, x_{i+1}), x_i, x_{i+1} = 0, 1, 2, \ldots, 255. \quad (5)$$

Step 3 calculates the extraction function value $F(a_i, a_i + 1)$ of $(a_i, a_i + 1)$ according to formula (2).

Step 4 If $F(a_i, a_i + 1) = d$, $(b_i, b_i + 1) = (a_i, a_i + 1)$, the embedding is finished, otherwise, go to step 5.

Step 5: In the corresponding mapping matrix M, a square search box W centered on $(a_i, a_i + 1)$ that can be matched is designed, as shown in formula.

$$W(s, (a_1, a_{i+1}), r) = \{M[a_i - r + u][a_{i+1} - r + v]\}, \quad (6)$$

$$0 \le u \le 2r, 0 \le v \le 2r\}. \quad (7)$$

Step 6 Scan each element in the search box, and when the element meets the calculation conditions, it is brought to the next calculation.

$$D = |p - a_i| + |q - a_{i+1}|. \quad (8)$$

The mapping matrix M constructed in the FEMD algorithm when $s = 4$, as shown in Figure 1.

In this article, the FEMD algorithm we often mentioned is a steganography algorithm that is often used in the design process. This algorithm can complete higher embedding amount and better quality dense images. After that, scientists have improved and further upgraded this algorithm, and based on this, wrote a new algorithm. That is, in the process of data calculation, mathematical calculations can overcome a series of problems caused by the difference of the algorithm and the difference of the pixels, so as to better complete the privacy sharing.

4. The Layout of Visual Elements in UI Design

UI design contains many elements. In the process of UI design, we have applied many elements, such as abstract elements such as points, lines, and surfaces, as well as more specific elements such as pictures, text, and colors. Including the thinking and time that exist in reality, we have combined this series of elements effectively and scientifically, so that the designer can start from different horizontal and vertical planes and more three-dimensional thinking and time. Directions and ideas are explained and analyzed. At the same time, we vividly compare this method of problem-solving to a moving cubic nine-square grid. Just like the Rubik's Cube we often see in our lives, each corresponding grid is composed of three elements, namely, X, Y, and Z, which represent the abscissa, ordinate, and time and space coordinates of thinking. In the abscissa, we explained the distribution of points, lines, and planes in the longitudinal coordinates. We also focused on the psychological sequence of pictures, colors, and text when users read them, and unified the elements on this image into four dimensions. In terms of time, the unity of time, space, horizontal, and vertical is realized. Moving Cube Jiugongge as shown in Figure 2.

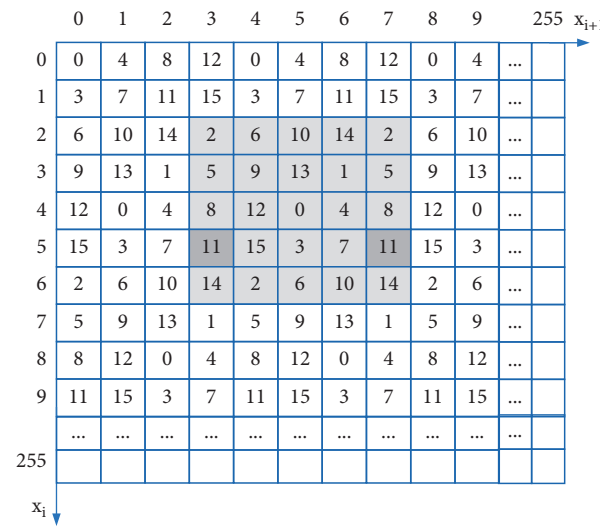


Figure 1: The mapping matrix M constructed in the FEMD algorithm when $s = 4$.

4.1. Horizontal Layout. In designing the image layout of the UI, we not only list the original points, lines, and surfaces, but also improve the two-dimensional design to the three-dimensional design, and change the original points, lines, and surfaces. Expressed in a better and more artistic way, so that the users can get better senses. Experience the horizontal plane structure not only to make the entire design interface look neater and more beautiful, but also to express more complete information, so that the readers can get more information and learn more about the limited pages.

The actual application of an algorithm to the market is often divided into two parts, one is the relationship between the designer and the page design company, and the other is the relationship between the company and the user. Among the companies and designers that commission the design, we need to clearly state which functions the company has commissioned the designers to design. These functions are specific and clear and should be accepted by both parties, because the design company is better than the users. A clearer understanding of a series of structures and procedures is required in the UI design. At the same time, designers have higher requirements to produce higher-quality and more efficient products, which can solve users to a certain extent. The lack of understanding of the series of problems caused by this product has enabled the market share and market CI degree of this product to be improved more broadly, and at the same time, it has also avoided direct contact between the designers and users. The role of a bridge can effectively complete the communication between designers and users. It not only provides a guarantee for designers, but also a guarantee for users, so that users can get more perfect users. With experience, designers can also improve the level and quality of service.

In the process of designing pages, designers should not only consider the use of design functions, but also the beauty of the design interface. In order to make the design interface better provide users with a better experience, designers often the interface is beautified and upgraded to make the

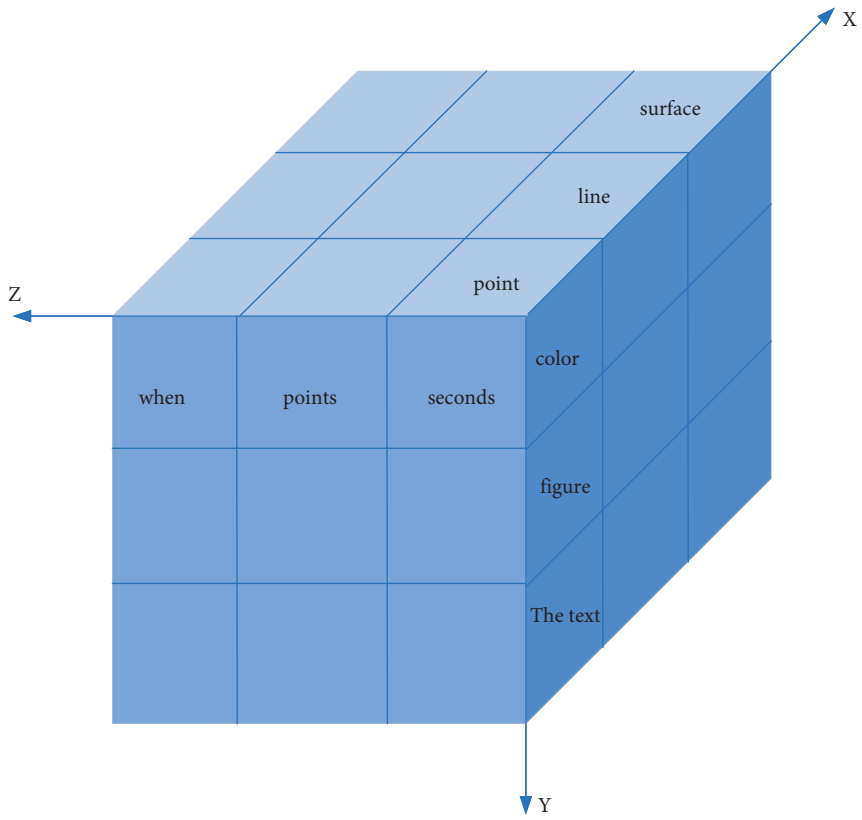


Figure 2: Moving cube jiugongge.

designed page more beautiful. Similarly, among products with the same functions, users tend to choose products with more beautiful user interfaces, simpler practical functions, and easier browsing and reading. In order to better meet the needs of the market, this also requires designers to design a more beautiful, more convenient, and more efficient browsing interface.

In the design process of the vertical space layout, designers regard this UI design as a specific textual expression. The designers use different carriers, such as colors, images, graphics, text, and other different elements to express. Enables the information between people and the information between humans and computers to complete the interaction, and on this interaction-based condition, this foundation is collectively referred to as referents, which not only affects the reading order of users, but also it affects the user's reading experience. From the color to the layer and finally to the text, it realizes the user's acquisition of information and the understanding of the information step by step, and can complete the reception of information in the horizontal and vertical directions, so that people can understand the color of the picture text from static to dynamic; the understanding of time, space, and four-dimensional plane completes the information reception and enhances the user's understanding of the product. Vertical spatial hierarchical structure is shown in Figure 3.

The first level is the color element. This is the first most critical element in this. It is an intuitive and powerful expression language. Color can complete the expression of the

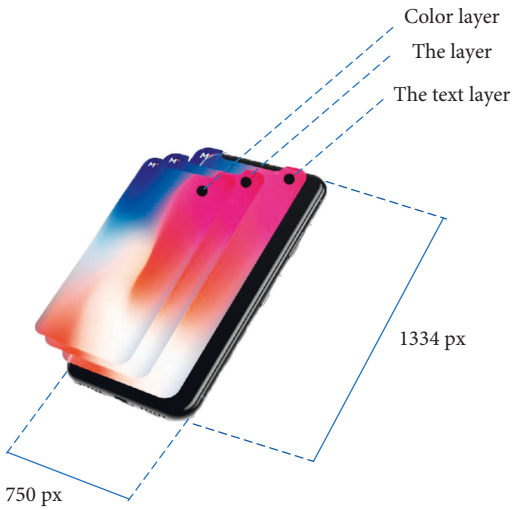


Figure 3: Vertical spatial hierarchical structure.

interface, improve the expressive charm of the interface, and display the attributes of the product. The more experienced designers are, the better they can use expressive colors to achieve the purpose of improving product expression elements. We can understand the role of color more vividly, just as color is like a person's face in this face-seeing era. It is very important for knowing a person and can effectively attract and grab the user's attention and attention. Color can have an impact on people's vision, as well as people's thinking. We can use a situation that appears most often in

Table 1: Summary of mobile device screen resolution.

Size	Resolution	Remarks
10 inches	$800 \times 600(5:4)\backslash l024 \times 768(4:3)$	
12 inches	$1280 \times 800(16:10)$	
13 inch	$1280 \times 800(16:10)$	
14 inches	$1024 \times 768(4:3)\backslash 1280 \times 800(16:10)\backslash 1280 \times 720(16:9)$	
15 inches	$1280 \times 800(16:10)\backslash 1440 \times 810(16:10)\backslash 1680 \times 945(16:9)$	Most used
17 inches	$1440 \times 900(16:10)\backslash 1440 \times 810(16:10)\backslash 1680 \times 945(16:9)$	
19 inches	$1440 \times 900(16:10)\backslash 1680 \times 945(1\ 6:10)\backslash 1\ 680 \times 945(1\ 6:9)$	
22 inches	$1680 \times 1050(16:10)\backslash 1680 \times 945(16:9)$	
24 inches	$1920 \times l200(16:10)\backslash l680 \times 945(16:9)$	

UI design to illustrate, for example, for designers, the simplest and most common prototype black and white. The draft is to avoid the impact of the difference in the color interaction design on the user's experience, so that the user's judgment standard is affected by the color. On the other hand, color can also strengthen the visual focus and refer to information. For example, the user can enter text in the search box, and different cursors and different colors will be displayed during the text input process.

Image transportation can break through the limitations of time and space, effectively convey information, and become a mode of transportation that users love very much. The expression of pictures is not only the expression of symbols, but also includes the understanding of the designers' thoughts and feelings. This relationship requires a certain logical perception of time and space. However, in the process of directly filling in by users, the color is usually obtained first, and then the picture is obtained, which leads to people's recognition of the picture later than the feeling of a color But the amount of information contained in pictures is often huge. People can use pictures to describe a lot of details. Pictures themselves are an expression of symbols and information. At the same time, designers can use this expression of symbols to attract users' attention, thereby achieving emotional resonance between designers and users.

The third level is text. Compared with pictures and colors, text can express more information. However, when users obtain information, they usually get text at the end. At the same time, text has forms of expression that pictures and colors do not have. Text is an important part of human culture. Compared with pictures and colors, text is static, while pictures and colors are dynamic. Therefore, in the user's intuitive experience of the interface, text is often the last thing the user gets, this determines to a certain extent that the text requires the user to read patiently. Although the text takes a long time, the effect of the text is also huge, and it can affect the user's direct experience. People can accurately and effectively obtain product information and product design elements through text, so when we are designing elements in the UI, in order to enable users to get a better experience and increase the frequency of reader users' use of the interface, it is often necessary that we put words on the third layer of visual expression.

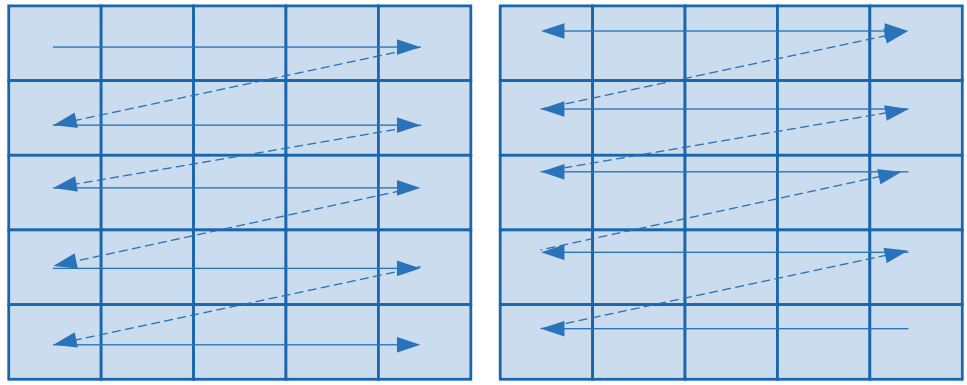
However, due to the rapid development of the current information age, people are in an era of receiving a large amount of information. The further development of data technology enables people to obtain more information through different means. On the one hand, it increases the amount of people receiving information, and on the other hand, it also reduces people's patience for information reading. It is believed that the method of reading text is boring and takes a long time, which makes users visually fatigued. So, this requires us to increase the interest in text reading in the process of designing the interface, so that users can get happiness from text reading.

4.2. The Impact of Display Equipment on Visual Performance in UI Design. In the last century, the rapid development of Internet technology further gave birth to the era of big data. In the past few years, the rapid development of information technology in my country has made the Internet widely used, which has also given birth to different electronic products on the market, and the speed of updating among different electronic products is very fast. Some electronic products can be universally loved by users, but at the same time, most of the products were quickly eliminated and did not gain a high market share. Through this phenomenon, in order to enable our products to gain more users' love and be chosen by more users, which requires our designers to understand the needs of the market and the needs of users, so as to design a product that meets the needs of users and meets the needs of the market, as shown in Table 1.

In the process of an interface design, we have to consider many factors, including the size of the element, the shape of the element, and the volume of the element. If the element we select takes up too much of the entire interface, then this is not the case. Reasonable, it is also unreasonable if the proportion of the selected element in a design interface is too small, so we need to carefully consider the volume of the element we choose to better match the user. For the required size, in such a design process, we also abandoned the unnecessary and cumbersome procedures that existed before, and instead used a simple, convenient, and efficient method to enrich and perfect the user's sensory experience.

5. Design of Reversible Secret Image Sharing Algorithm

5.1. Improved FEMD Algorithm. Aiming at the problem pixel pairs encountered in the process of FEMD algorithm processing, this paper solves the problem of pixel pair



(a) (b)

Figure 4: Scanning direction. (a) Embedding process. (b) Recovery process.

reversibility recovery from two aspects: embedding process and overflow pixel pair processing. Scanning direction as shown in Figure 4.

For the data element that we first received, that is, the original data, we give a mark to record it, and then replace the pixels corresponding to this element with other elements, so that users need to get private pictures. This requires proofreading of the original pixel values and distinguishing between correct and incorrect conditions.

$$sf = \left(a_i \bmod (255 - r)\right)(r + 1) + \left(a_{i+1} \bmod (255 - r)\right). \tag{9}$$

Among them, only one certain element can be matched with it.

$$sf = \min\left(a_i \bmod (255 - r), a_{i+1} \bmod (255 - r)\right). \tag{10}$$

After an overflow pixel is processed by the above method, the following formula can be obtained

$$\begin{aligned} R_j &= \frac{R_j'}{255 - r}(255 - r) + \frac{sf}{r + 1} \\ R_{j+1} &= \frac{R_{j+1}'}{255 - r}(255 - r) + (sf \bmod (r + 1)) \\ X &= \frac{X'}{255 - r}(255 - r) + sf. \end{aligned} \tag{11}$$

Through the above-mentioned processing method of the overflow pixel pair, the value of the original overflow pixel pair can be restored based on the improved FEMD algorithm, and the lossless restoration of the carrier image can be realized.

5.2. Secret Image Sharing and Embedding. In the method proposed in this article, the algorithm we have mentioned and has been applied uses grayscale images as its carrier. This secret sharing technology is used to complete the division of the user interface, and finally FEMD based on the algorithm, a single image becomes N different dense images. When the user needs to obtain the final image, the user needs to provide different elements corresponding to it. In the process of constructing multiple images of $T-1$, we use the algorithm mentioned before. The specific process of the specific algorithm mentioned above is shown in Figure 5.

(1) Rearrange the data in I into a one-dimensional vector.

$$S = \left\{s_1, s_2, \ldots, s_{(h_i \times w_i)}\right\}. \tag{12}$$

(2) Express each pixel in S with a hexadecimal number method to form a vector

$$S' = \left\{d_1, d_2, \ldots, d_l, \ldots, d_{(h_i \times w_i \times 8/a)}\right\}. \tag{13}$$

Among them,

$$0 \le d_t \le 2^{\alpha}, l = 1, 2, \ldots, h_s \times w_s \times \frac{8}{\alpha}. \tag{14}$$

Otherwise, construct equation (14):

$$\begin{aligned} F_j(x) &= \left(f + sfx^1 + ds_1^j x^2 + \cdots + ds_{t-2}^j x^{t-1}\right) GF(2^{\alpha}). \\ F_j(x) &= \left(f + ds_1^j x^1 + \cdots + ds_{t-2}^j x^{t-1}\right) GF(2^{\alpha}). \end{aligned} \tag{15}$$

In this era of rapid development of information technology, the widespread application of big data makes it more convenient to share data, no matter how far apart two users are, whether it is altitude difference, cultural difference, or ethnic difference. They can all realize the sharing of data. This is the benefit that the development of science and technology brings to people. Technology is not superior. On the contrary, the advancement of science and technology can promote the progress of everyone's life. The emergence of technological inventions can be applied in different fields, such as industrial life. The advancement of science and technology can greatly increase the labor productivity of the society, shorten the necessary labor time, and maximize the output of the society within a certain period of time, thereby realizing the operations and further increasing the production profit of the enterprise. For schedule life, the further development of technology can enrich people's further needs for life. New products created by technology can be

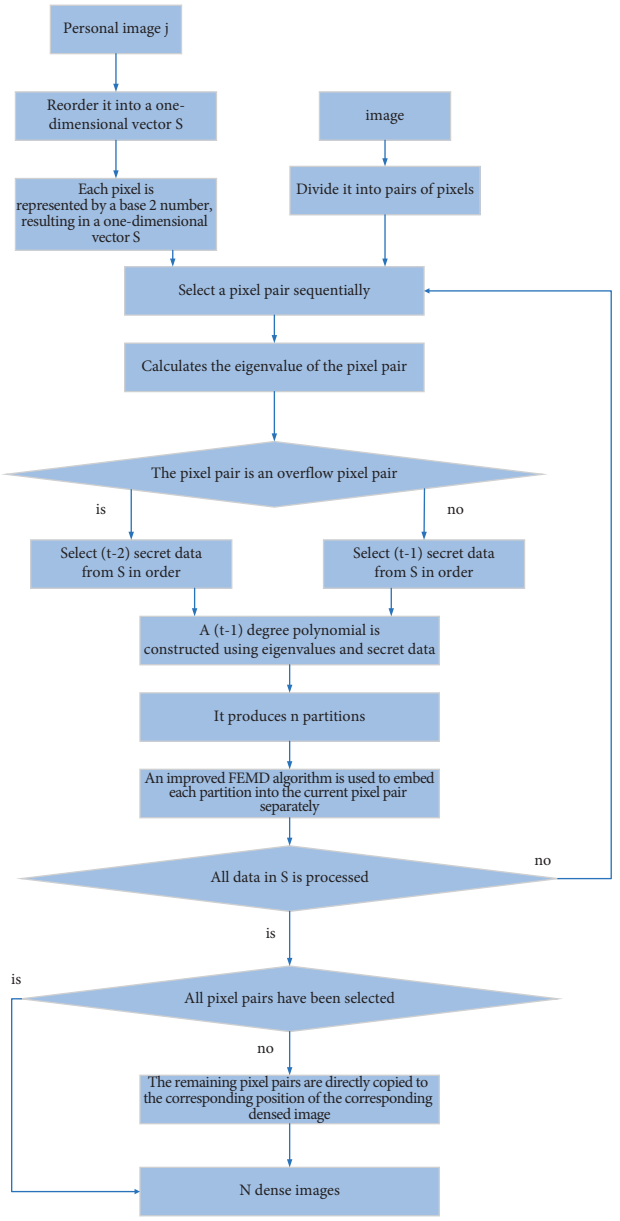


Figure 5: Reversible secret image sharing and embedding process.

applied to different people's lives. For example, light bulbs bring light to people in the dark. The advancement of medical technology makes cross-regional treatment possible. Technology is using its own unique mission to promote world changes step by step, improve people's quality of life and standard of living, and provide people with a higher level and higher quality and a more efficient life. At the same time, people's different needs in life promote the progress of science and technology. It is precisely because people have a variety of different needs, so in order to meet these different needs, scientists and designers will spur their own designs creating a better and more convenient technology for people to apply.

5.3. Secret Image Extraction and Carrier Image Restoration. According to the principle of (t, n)-threshold secret sharing technology, it takes at least t different secret images to recover the shared secret image. It is assumed that the provided secret images are $SI_1, SI_2, \ldots, SI_t$, and the corresponding participants. The keys possessed are $x_1, x_2, \ldots, x_t$, the process of extracting the secret image and restoring the original carrier image is as follows. For each dense image SI_i, $i = 1, 2, \ldots, t$, two adjacent pixels are selected in sequence as a pixel pair (SI, SI), and the extraction function value fi is calculated according to the formula. According to the previously obtained t sets of data (x_i, f_i), $i = 1, 2, \ldots, t$, the polynomial $F(x)$ is reconstructed, as shown in the following equation , where $\alpha = s$.

$$F(x) = \left[\sum_{\substack{i=1 \\ j \neq i}}^{t} \prod_{j=1}^{t} \left(x_i - x_j\right)^{-1} \left(x - x_j\right)\right]_{\mathrm{mod} GF(2^{\alpha})} = \left(a_0 + a_1 x^1 + \cdots + a_{i-1} x^{i-1}\right)_{\mathrm{mod} GF(2^{\alpha})}. \tag{16}$$

In the prediction process based on this algorithm, we can know that if a user wants to obtain a privately stored image, at least t different secret images are required. If the number of images provided by the user is insufficient, then the user will not be able to obtain the encrypted and saved images. Only when the number of encrypted images provided by the user is greater than the number specified by us, can the encrypted and saved images be obtained, which can be better based on this to ensure the privacy of user information, ensure the quality of use of users, and improve the user experience. When other people want to obtain images, but the number of secret images they hold is insufficient, they cannot obtain information about the secret images. At the same time, we will also tell this situation to the user who should have the secret image, usually in this case the user's password or image is threatened. After we inform the user of this situation, the user will think about and further adjust the number of images on the opponent or the password corresponding to it, thereby increasing the protection of this private information and making others the theft of private images by people has become impossible.

Figure 6: Secret image (300 pixels × 300 pixels).

Table 2: Contained image quality.

Carrier image	PSNR of stcgo-l (dB)	PSNR of stcgo-2 dB	PSNR of stcgo-3 dB	Average PSNR (dB)
1-cna	48.4334	48.3989	48.4819	48.4381
Baboon	48.4392	48.3905	48.5022	48.4439
Pepper	48.4293	48.3897	48.4482	48.4224
Boat	48.4547	48.3918	48.4903	48 4456
Bridge	48.4080	48.3437	48.4334	48.3950
Man	48.0157	47.9897	48.0132	48.0062
Tiffany	48.4128	48.3385	48.4199	48.3904
Zelda	48.4270	48.3583	48.3753	48.3869
Alainc	48.4387	48.3894	48.4911	48.4397
Barbara	48.4520	48.3971	48.4917	48.4469
Average	48.3910	48.3387	48.4147	48.3815

(a) (b) (c) (d)

Figure 7: Quality evaluation of dense image. (a) Carrier image. (b) Stego-1 (48.434 dB). (c) Stego-2 (48.3989 dB). (d) Stego-3 (48.4819 dB).

5.4. Experimental Results and Analysis. First of all, through the experimental results, we can know that the quality of the image obtained by this algorithm for different images matching different processing is different. Taking the image used in the simulation experiment we conducted before, we get the maximum size of the matching secret image that is different from the size obtained by the previous algorithm. In this experiment, the image we selected is shown in the figure. Based on this algorithm, we have made improvements and upgrades. We have ensured the application of this algorithm to a greater extent. By ensuring and improving the security of the algorithm to improve the privacy of users' images, the higher the security of the corresponding result, the higher the degree of protection of the

Table 3: Algorithm performance comparison.

Carrier image	Average PSNR (dB with density image)			
	Algorithm A	Algorithm B	Algorithm C	Algorithm
1-cna	42.0387	45.625	647.8035	48.4381
Baboon	42.0487	45.6208	47.8012	48.4439
Pepper	42.0551	45.6321	47.8101	48.4224
Boat	42.0378	45.6029	47.7915	48.4456
Bridge	42.1002	46 7146	47.8436	48.3950
Man	41.9939	45.6981	47.7859	48.0062
Tiffany	42.0353	45.6204	47.8252	48.3904
Zelda	42.0377	45.6236	47.7954	48.3869
Alainc	42.0452	45 6043	47.8068	48.4397
Barbara	42.0498	45.6173	47.8342	48.4469
Average	42.0387	45.7359	647.8035	48.4381

user's image by this algorithm, and the better the user experience.

$$h_s \times w_s = \frac{h_c \times w_c \times (t-1)}{2 \times 8/\alpha}. \tag{17}$$

The secret image selected in the experiment is an image of 300 pixels × 300 pixels, as shown in Figure 6, so the experimental parameters to be set are $t = 3$ and $n = 3$. For algorithms that implement the secret image sharing based on steganography, the less distortion of the generated secret image, the less likely it is to be detected by attackers during transmission on the network, and the better the security. This article uses PSNR index to measure the quality of the dense image.

In the chart shown below, we can see that the improved algorithm using the Md algorithm can get the required Hami image. In addition, Figure 6 also shows the image with the image as the carrier, so we have obtained three corresponding dense images. From the tables and pictures, we can get the results calculated by the improved F1FD algorithm under the conditions of the experiment and the results of the original images. There is not much difference between the calculated results, so we also confirm from another angle that this algorithm improves user privacy protection, and also proves from another angle that this algorithm does have its advantages and specialties, as shown in Table 2.

Quality evaluation of dense image is s shown in Figure 7. For the algorithm in this paper, when $t = 3$ and $s = 4$, using the algorithm in this paper to share and embed a piece of data, the error introduced on a pixel can be calculated as 1.375. When realizing the sharing and embedding of this data, the error introduced on a pixel of the carrier image can be obtained by calculation. When $t = 3$, $m = 3$, $\alpha = 2$, the introduced errors are 5 and 2.5, respectively. Therefore, the quality of the dense image obtained by this algorithm is better, as shown in Table 3.

$$E = \frac{\log_{16} 255}{3-1} \times \left(4 \times \frac{1}{16} + 4 \times \frac{2}{16} + 3 \times \frac{4}{16} + 4 \times \frac{5}{16}\right) \times \frac{1}{2} = \frac{44}{32} = 1.375$$

$$E_{15} = \frac{\log_m 255}{t-1} \times \left(\frac{1}{m} \times 1 + \frac{1}{m} \times 2^2 + \cdots + \frac{1}{m} \times (m-1)^2\right) \tag{18}$$

$$E_{16} = \frac{8/\alpha}{t-1} \times \left(\frac{1}{2^\alpha} \times 1 + \frac{1}{2^\alpha} \times 2^2 + \cdots + \frac{1}{2^\alpha} \times (2^\alpha - 1)^2\right).$$

6. Conclusion

This article focuses on the analysis of the reversible secret image sharing scheme based on steganography. In this article, we focus on discussing and analyzing the reversible privacy image sharing scheme based on the FEMD algorithm. On this basis, an improvement to the FEMD algorithm is proposed as a steganographic algorithm that can be implemented, because in the embedding process, our non-uniqueness of the overflow pixel processing has made the FEMB algorithm unable to complete the reversible image sharing scheme. In this article, we focus on whether the elements in the UI design can be effectively and efficiently used in actual applications. We have conducted an analysis of the feasibility of this, breaking the old concept, and being a UI designer we provide design categories that can be referred to. In this article, the most important and key research result we got is the ability to analyze four-dimensional time from the perspective of space and plane, and on this basis, we conducted a detailed analysis. We also use X, Y, Z, multi-dimensional coordinate axes, just like the Rubik's Cube that we commonly use in our lives, we compare it to a cubic nine-square grid. This requires us to get rid of the old copy model, in order to innovate in thinking, innovate a better visual communication interface, and better integrate the user's research interface design and interaction, which is also the pursuit of this article. To put it simply, we use the principle of Rubik's Cube in this. Each unit in the web page is formed by four spatial coordinates, and the pictures, texts, and colors in these spatial coordinates are expressed in what we mentioned earlier. In the artistic layout of and, in the vertical layout, we mainly express the reading level of colors, pictures, and text when users are reading. In the horizontal and vertical spatial layout, we use the original points, lines, and planes expressed in a better and more artistic way, so that users can get better senses. On this basis, we designed a new language using the improved FEMD algorithm, and proposed a reversible private image sharing scheme based on steganography. Through the experimental results, we can conclude that after improving the algorithm, we can obtain high-quality, high-privacy, and dense images. Applying this image to network transmission can greatly improve the security of the image in network transmission, higher

application value and market demand value, and higher practicability.

Data Availability

The data used to support the findings of this study are available from the corresponding author upon request.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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