Implementation of Image Technology Based On Algorithm Optimization in Design System

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Abstract. Art design combines image optimization with information optimization. To improve the level of artificial intelligence and user-oriented design, a design method of visual art design system based on image optimization and information optimization is presented. Image art design optimizes the image brightness by using color compensation method, combines pixel quantization method to track and fuse the image, and uses the wavelet de-noising technology to de-noise the image, so as to complete the optimization of image art design. The design art design system is based on the MapInfo software development platform, and has finally completed the art design under the embedded Linux architecture. The software-integrated development of the design system is implemented. System tests state clearly that the design system can effectively achieve the output of artistic images, improve the output quality of artistic design images, have a high output signal-to-noise ratio, and have a better human-computer interaction.

Keywords: Image Optimization, Art Design, System Design, Mapinfo, Creator

1. Introduction

Environmental art design is the comprehensive utilization of architectural space environment. Environmental design is to meet people's needs for daily life use and aesthetic function [1]. Users have higher and higher requirements for the quality of design image. Using algorithms to improve graphics and image optimization technology, and finally applied to art design, can improve the ability of artificial intelligence and real-time optimization of art design. The research of art design system based on image optimization technology has broad application prospects [2].

The image optimization technology in art design mainly includes image noise reduction and image fusion filtering technology, and image purification optimization is carried out through wavelet noise reduction, median filter noise reduction, etc. [3], to improve the ability of image information expression in art design, and combine images The fusion method realizes the ability of image information tracking and recognition in art design, adopts adaptive corner detection and correction method to detect and analyze the key feature points in art design, and improves the ability of expressing feature information in art design [4], in the art design system design Among them, the current methods mainly include the art design system design method based on the Hadoop cloud
platform, the embedded art design system based on the ARM core, and the art design method based on the Software-as-a-Service (SaaS) layer. According to the above design Principles, the design of design system based on image optimization is studied in related literature, which has certain practical value in improving the expression ability of art design. Among them, document [5] proposes an art design scheme based on image block matching and repair, combining The correlation dimension search method performs image correlation feature point matching, improves the visual performance of key information points in art design; Literature [6] proposes an image restoration method based on Criminisi algorithm for image optimization in artistic design. The system does not perform image noise reduction optimization, resulting in poor export image quality and poor artistic design effects.

To solve these problems, this paper discusses a design method of image optimization technology based on improved algorithm. First, the image of art design adopts chromatic aberration compensation method to perform image brightness equalization restoration optimization, combined with pixel quantization tracking method for image fusion, and adopts wavelet Noise reduction technology realizes image noise reduction optimization. Then the art design system is designed on the MapInfo development platform, and the optimization algorithm is used to improve the program loading. Then the software development of the design system is completed under the Linux architecture, and the simulation analysis and effectiveness conclusion of the development and design of the art design system are realized.

2. Image Optimization Algorithm Design

The design of optimization algorithm is the basis of image optimization technology to improve the design of design system. Image optimization mainly includes image noise reduction optimization, image fusion optimization and image edge contour feature extraction optimization [7], using grid matrix block Methods the grid division of the artistic design image is carried out. The block division method mainly adopts the rectangular block and the lasso block method. According to the artistically designed image to be divided, the block is divided into several sub-blocks according to the affine invariant moment. The number of blocks is the same as ((M/16)+1)*((N/16)+1). The schematic diagram of image rectangular block in artistic design is shown in Figure 1.

![Figure 1: An image rectangular block diagram in artistic design](image.png)

In the artistically designed rectangular block model shown in Figure 1, the brightness of the image is improved by Jacobian iterative algorithm. The conductivity equation of the best matching block area is:

$$h(x, y) = \frac{\lambda^2}{\pi \sigma^2} \exp \left( \frac{x^2}{2 \sigma^2} + \frac{y^2}{\sigma^2} \right) \frac{1}{2} \exp[2\pi jFx]$$

(1)

On the basis of the above-mentioned image brightness equalization optimization in art design, image fusion and wavelet noise reduction optimization are combined with the pixel point quantization tracking method [8], in the grid points of the art design image area distribution, assuming the newly extracted The expression equation of artistic image feature is:

$$W^g(x, y) = \frac{G^g(x, y)}{\sum_{i=1}^{m} \sum_{j=1}^{n} G^g(x, y) + \varepsilon}$$

(2)

Establish the gradient information model of the contour distribution of the art design image. When the noise of the export image reaches the set conditions, the program is converted to the current search, so as to complete the image denoising and image fusion optimization in art design. Based on
this result, the optimization design of the design system is carried out, and the image optimization algorithm is loaded into the program loading function of the system to carry out multiple compilation control, so as to carry out the system optimization design [9].

3. System Software Design
Art design system design based on Mapinfo software development platform. The image generation process is synchronized with the input and export process. Select the image fusion program of the art system through Map Texture Tools to load the code and load the program. The image optimization algorithm is loaded. Reading, writing signals and chip information are controlled by the bus [10]. The software of the art design system designed in this paper mainly includes program loading, storage and reading and writing functions, and bus transmission and human-computer interaction. The design of each function is described as follows:

The program loading of the art design system is a program loading function for image optimization algorithms and control instructions. The MVC (Model View Controller) model is used to construct the control components of the graphics rendering system, and MySQL is used as the default system for program loading of the art design system. The boot loader loaded by the system program is mainly composed of the user application (Application) of the graph-oriented management module. The system selects SuperViVi as the BootLoader, and uses the open source Linux kernel for algorithm reading and writing and image self-control. Adaptive optimization, execute program loading and data update according to the following cross-compilation instructions:

4. System Test and Result Analysis
To test the performance of the designed system in achieving the application of image optimization and in the artistic design, simulation experiments are carried out. The development environment of the experiment is in the Windows 10 operating system, using Visual C++7.0, Vega Prime, Multigen Creato and other image optimization Tool for image optimization algorithm design. The 3D model library of the art design system includes MFC42D.DLL and MFCD42D.DLL. The parameter settings of the image optimization algorithm In, the selected image size is 600*400 and 1200*1200, structural information similarity is 3.89, pixel-level parallax D=180, according to the above simulation The environment and parameters are set, and compared the image optimization test of the art design system.

The original the image to be designed is shown in Figure 2

![Figure 2. Original image](image)

Take the Figure 2 as a design template, input it into the art design system designed in this article, and combine the color bar analysis to get the design effect diagram shown in Figure 3. Analysis of the design effect diagram in Figure 3 shows that the method of this article for artistic design, the image export quality is better, and the export signal-to-noise ratio is high, which improves the artificial intelligence of the artistic design.
Figure 3. Export of art design effect diagram

5. Conclusion
This paper introduces artificial intelligence technology into the design system, and uses algorithm improvements to improve the export quality of the design system. First, by improving the image algorithm, the brightness and noise of the image are adjusted to a more suitable state, and then the design software is developed and designed. The focus of this work is the design of program loading modules, data storage and reading and writing modules, bus transmission modules and human-computer interaction modules. Through the comparison test, a clear comparison result shows that the art design system designed in this paper has good graphics optimization and image optimization capabilities. The export of high-quality visual effects contributes to the expressiveness of artistic works.

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