Analysis on the Algorithm and Practical Application of Computer Intelligent Image Processing Technology

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Abstract. With the continuous improvement of computer science and technology, the role of computer in the development of the whole society is more and more prominent. Based on this development background, people begin to pay attention to the research of computer intelligent processing technology, which can accurately identify and process objects in different environments. At present, the technology in this field has been greatly improved in China, and the application scope of computer intelligent image processing technology has been gradually expanded. The purpose of this paper is to realize the further breakthrough of the computer intelligent processing technology through the exploration of the algorithm and the analysis of the practical application. This article first to the intelligent image processing technology has carried on the summary of relevant, then combined with the existing research materials and the characteristics of the intelligent image processing technology, mathematical morphology of image processing algorithm is proposed, and the effectiveness of the proposed algorithm has carried on the inspection, finally the technology application in the field of industry, agriculture and transportation related instructions. The experimental results show that the image processing algorithm of mathematical form proposed in this paper can realize the accurate processing and recognition of the image and promote the improvement of the technology.

Keywords: Intelligent Image, Processing Techniques, Mathematical Form, Application Field

1. Introduction

In the information age, the level of computer technology has been greatly improved, and the computer
intelligent image processing technology supported by this technology has also been developed and widely applied in various fields. The basic principle of the technology is to digitize the image, then calculate the image data with the help of computer algorithm, and finally input the image data. The application of computer intelligent image processing technology has a profound impact on social development. However, at present, there are still some defects in the computer intelligent image processing technology in China, which are mainly caused by the image processing algorithm. Therefore, the analysis of the algorithm of computer intelligent image processing technology and its practical application is of great significance to the promotion of intelligent image processing technology.

With the continuous improvement of computer technology, computer image processing technology has become the focus of people's attention in recent years. In [1], the author focuses on the application of image processing technology in intelligent traffic. The author first discusses the meaning of intelligent traffic, and then explains its specific application in intelligent traffic from the perspectives of license plate recognition, vehicle detection and electronic police. In [2], in the context of computer development, the author first introduces the computer image processing technology comprehensively, then discusses the advantages of the technology, and finally systematically introduces its practical application. In [3], the technical points of computer image processing technology are analyzed, and its application in the field of painting surface is discussed.

The result of image processing is directly affected by the image processing algorithm. In [4], the author introduces a variety of algorithms, such as refinement and expansion, and tries to introduce each algorithm into image processing, and compares and analyzes the image processing results of different algorithms. In [5], on the basis of deep learning algorithm, the author establishes a MaskR model and develops a computer intelligent image processing system suitable for multiple fields. In [6], on the basis of d-s evidential reasoning, the author proposed an intelligent algorithm, combined this algorithm with information technology, and made an in-depth analysis of computer intelligent image processing technology.

In order to achieve the rapid upgrade of computer intelligent image technology, to promote its further application in other fields, this article first to the intelligent image processing technology has carried on the summary of relevant, then combined with the existing research materials and the characteristics of the intelligent image processing technology, image processing algorithm of mathematical morphology was proposed, and the effectiveness of the proposed algorithm has carried on the inspection, the last of the technology applied in the field of industry, agriculture and transportation for the relevant specification [7-8]. The research in this paper not only promotes the rapid improvement of computer intelligent image processing technology, but also lays a theoretical
foundation for the related research in the future.

2. Method

2.1. Intelligent image processing technology

Different from the traditional image processing technology, the intelligent image processing technology takes the computer as the hardware support, inputs the image data into the computer, and then carries out special analysis on the image data with the help of the data analysis software, and then forms the required image with the help of the data reduction [9]. Image data conversion is the core of intelligent image processing. Algorithm processing is the key to realize image data conversion. In general, the research focus of intelligent image processing technology is to realize diversified image conversion. Intelligent image processing technology can be divided into digital and analog intelligent image processing technology [10-11]. The former can realize high precision image processing, processing steps are relatively convenient. Generally speaking, digital intelligent image processing technology can basically meet a series of requirements of current image processing: Simulation intelligent image processing technology is far less accurate and flexible than the former, but this type of technology shows great advantages in image output. The main technical points of intelligent image processing technology include four aspects: digital visualization, development of restoration function, pattern recognition and image coding. Digital visualization is the sampling and digitizing of sample images, helping to realize the digital conversion of modified images and images; The restore function is mainly aimed at the processing of damaged images, which can not only restore the damaged images, but also enhance the source effect. Pattern recognition can recognize and process the key information of the input image, thus ensuring the accuracy of the image. Image coding is the last step of intelligent image processing, through which image information can be compressed and transmitted [12-13].

2.2. Image processing algorithm of mathematical form

Combining the related research data and the characteristics of intelligent image processing technology, this paper puts forward the image processing algorithm of mathematical form for computer intelligent image processing technology. Different from the traditional image processing algorithm, the image processing algorithm of mathematical form is based on the mutual operation and interaction between objects and structural elements, which can realize the restoration of the essential form of object image, and the final image processing effect is also consistent with the expected effect. As mentioned above, image data conversion is at the core of intelligent image processing, and its specific conversion formula is as follows:
\[ U = f(x) \cdot 0.17(f(x) + \frac{a}{m}) \] (1)

In formula (1), \( U \) represents the degree of image datamation. The higher \( U \) value is, the better the image data conversion effect will be. \( F(x) \) represents the conversion function, \( a \) represents the required conversion times, and \( m \) represents the number of image elements. In the intelligent image processing, the most important thing is to calculate the difference between the image and the architecture elements, that is, to find the gray image. The final calculation result of grayscale image is the direct value to measure the effect of image processing. The specific algorithm of grayscale image is as follows:

\[ g(x, y) = g(x - \frac{st}{T} \cdot y) \cdot \triangle t \] (2)

In the formula, \( g(x, y) \) represents the gray value of an image. Generally speaking, when the gray value is 0, the processing effect is the best; when the gray value is greater than 0, the processing image is darker; otherwise, it is brighter. \( X \) represents the image, \( S \) represents the total displacement of image \( X \), and \( T \) represents the motion time of image.

3. Experiment

In order to ensure the normal operation of mathematical image processing algorithm in computer intelligent image processing technology, it is necessary to ensure the effectiveness of mathematical image processing algorithm. The specific environment of this experiment is as follows: the computer system platform of the experiment is matlab2.0 software system, the computer software is Windows10 XP system, and the main frequency of the computer hardware processor is 2.5ghz. First, the collection of experimental data. In this paper, the experimental camera to gather the figure as the experimental data, the traffic image as experiment object, in order to guarantee the accuracy of the results, this article will be experiment when the camera is placed in the height of 2 meters off the ground, acquisition within 7 days of different time and weather conditions of traffic image, with the aid of mathematical morphology image processing algorithm to deal with sampled traffic image. Secondly, the processing of image acquisition. The collected image data are processed by computer, a series of values are obtained, and the values of image processing are recorded accurately. Finally, the image processing numerical calculation. The image processing value obtained in the above steps is substituted into the image processing algorithm of data form, relevant value is calculated, and the final effect of image processing is judged through the comparison of numerical results.

4. Discuss
4.1. Experimental results and analysis

Through the validity test experiment of the image processing algorithm of the above mathematical form, the following experimental data can be obtained. The specific experimental data are shown in table 1 and figure 1. The data in the chart is the result of the author's experimental arrangement.

| Project     | Data and information | G(x,y) |
|-------------|----------------------|--------|
| Convenience | 97.18%               |        |
| Precision   | 97.29%               | 0      |
| Accuracy    | 99.35%               |        |

*Data came from experimental analysis results

As can be seen from the data in table 1, the convenience, accuracy and accuracy of image processing under the mathematical morphological image processing algorithm are all above 95%. In addition, G (x,y) value is equal to 0, which indicates that the image processing effect is the best. As can be seen from the data in figure 1, compared with the traditional image processing algorithm, the image processing algorithm of mathematical morphology proposed in this paper is far superior to the traditional algorithm in different aspects. To sum up, we can draw the conclusion that the mathematical image processing algorithm proposed in this paper can ensure the accuracy of the image processing results, which indicates that this algorithm is an effective algorithm.
4.2. Specific application of computer intelligent image processing technology

(1) Application of intelligent image processing technology in industrial field

With the rapid improvement of science and technology, industrial manufacturing has gradually developed towards automation, which has become an irreversible trend of development. Computer technology is an important technical support for industrial production automation. The application of intelligent image processing technology in the industrial field promotes the rapid improvement of industrial production efficiency. Requirements of industrial production automation can to intelligent identification of parts and the entire production process, and to identify the information into the intelligent operation of the machine, operating machine receive the input information into a production order, thus for automatic production, the production process is under the support of intelligent image processing technology. In addition, the intelligent image processing can also realize the automatic selection of damaged parts, which improves the production quality and saves the detection cost.

(2) Application of intelligent image processing technology in the field of agriculture

The application of intelligent image processing technology in agricultural field can be used to identify crop images to carry out the operation of agricultural machinery and the picking of agricultural products. For example, when picking fruit, a fruit image recognition system can be set up in the computer system to effectively identify the growth status of fruit. This not only frees farmers from a lot of work, but also reduces the damage to crops caused by harvesting. Because China's agricultural development is deeply influenced by traditional farming methods, agricultural automation started much later than developed countries, so the application of intelligent image processing technology in the agricultural field is not deep enough. With the rapid development of large-scale agricultural production and technology upgrading in China, intelligent image processing technology will be widely used in agricultural production in China in the future.

(3) Application of intelligent image processing technology in the field of transportation

With the help of intelligent image processing technology, traffic conditions at each intersection can be monitored in real time, especially in areas with large traffic flow. This technology can accurately record and track vehicle characteristics such as vehicle models and license plates, thus improving the efficiency of traffic supervision and greatly reducing vehicle violations. Moreover, intelligent image processing technology can realize accurate identification of vehicles and reduce the probability of traffic accidents. For example, the intersection camera can monitor the driving behavior of vehicle drivers, so that the traffic law enforcement personnel can punish the violators accordingly and promote the safety awareness of drivers, thus effectively reducing the probability of traffic accidents.
5. Conclusion

The rapid development of information technology promotes the emergence of intelligent image processing technology. Since its emergence, this technology has been gradually popularized in various fields, such as agriculture, industry and transportation, which plays a good role in promoting the overall social development. In order to promote the further development of this technology, it is necessary to promote the progress of image processing algorithm, so that the image processing algorithm reform and technology development. The image processing algorithm of mathematical form proposed in this paper has obvious advantages over the traditional algorithm and ensures the accuracy of the image processing results.

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