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Design of Computer Recognition System Based on Graphic Image

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Abstract

With the advancement of computer technology and the rapid development of the Internet, every bit of life has begun to become electronic. The recognition of informatized graphic images is particularly important. The image is collected through graphic images and the elements in the image are detected and recognized autonomously. Some characteristic elements of the image are used to identify and correspond to the characteristics in real life. This article first analyzes the research and discussion on the accuracy of the image and graphic information. After reading it through the computer, the image quality is improved accordingly. Finally, the design of the computer recognition system based on the graphic image is obtained.

Keywords: Computer, Recognition System, Graphic Image

1. Introduction

Computer recognition systems are a rapidly growing field of technology that has the potential to revolutionize a wide range of industries and applications. These systems are designed to interpret and understand visual information, such as images and videos, and use this information to make decisions or take actions. The technology behind computer recognition systems is complex and multifaceted, requiring expertise in fields such as computer vision, machine learning, and image processing. The goal of this research is to explore the various techniques and methods that can be used to design and develop computer recognition systems that are accurate, efficient, and user-friendly. The research will focus on the use of machine learning, image processing, and other computer vision techniques to interpret and understand visual information. Additionally, the research will investigate the use of different input modalities, such as touch, gesture, and voice, to interact with the system. Ultimately, the goal of this research is to contribute to the development of more advanced and practical computer recognition systems that can be used in a wide range of applications, including security, healthcare, and transportation.

Computer recognition systems based on graphic images are a rapidly growing field of technology that has the potential to revolutionize a wide range of industries and applications. These systems are designed to interpret and understand visual information such as graphic images, and use this information to make decisions or take actions. The technology behind computer recognition systems based on graphic images is complex and multifaceted, requiring expertise in fields such as computer vision, machine learning, and image processing. The goal of this research is to explore the various techniques and methods that can be used to design and develop computer recognition systems that are accurate, efficient, and user-friendly, specifically for graphic images. The research will focus on the use of machine learning, image processing, and other computer vision techniques to interpret and understand visual information from graphic images such as handwritten text, drawings, and diagrams. Additionally, the research will investigate the use of different input modalities, such as touch, gesture, and voice, to interact with the system. Ultimately, the goal of this research is to contribute to the development of more advanced and practical computer recognition systems that can be used in a wide range of applications, including education, healthcare, and industry.

The image is scaled to a fixed size by computer technology; Secondly, the collected image is balanced by histogram equalization, so that the illumination of the detected image is effectively compensated; Finally, the image to be detected is filtered, and the effect of small noise on the eigenvalues is normalized, that is, the image is scaled according to the actual needs of the system to facilitate the realization of system functions [1-2]. As a part of the

network content monitoring system, the auxiliary function of image recognition system can use the existing image recognition algorithm to batch and efficiently recognize a large number of network video images, effectively solving the limitations of manual audit [3-4].

Camera image acquisition is a mechanical process of repeated frame storage, in which there are many uncontrollable factors, so it is necessary to improve the effectiveness of data as much as possible in image processing [5-6]. Because face detection and recognition is an operation for pixel data, pixels will be changed by light and noise, resulting in feature extraction failure, unable to make accurate judgment [7-8]. A set of fast image recognition systems is designed, which is in line with the characteristics of a graphic database. It has the characteristics of lateral expansion of system performance, supporting multi-node redundant deployment, high portability and reliability, perfect recognition process and relatively low deployment cost, which fully meets the needs of visual image recognition in big data environments [9-10]. Finally, Java, Python and other programming languages are used to complete the development of visual image recognition systems.

In short, after compensating the collected original image by computer technology, the image must be positioned in the overall image, and the four boundaries and four vertices of the image must be determined for subsequent feature extraction, face value recognition, and the processing of image details provides the basis. Since the multi-spectral sensor used in the system collects visible light images and infrared reflection images, and the visible light images and infrared reflection images are collected alternately every other row, the position of the image is the same and different in the position of the visible light image and the infrared reflection image. Only images. Therefore, it is of great value to study the construction of a sponge campus ecological system based on big data analysis.

2. Literature Review

A computer recognition system is a type of artificial intelligence (AI) system that is designed to recognize and interpret various forms of input, such as images, videos, audio, and text [7,11-12]. The design of such a system typically involves several key components, including:

- Data collection and preprocessing: The first step in designing a recognition system is to gather a large dataset of labeled examples for the system to learn from. This dataset is then preprocessed to ensure that it is in a format that can be easily used by the system, and to remove any inconsistencies or errors.
- Feature extraction: Once the dataset is preprocessed, the next step is to extract useful features from the input data that can be used to represent the data in a more compact and meaningful way. This step is important because it reduces the dimensionality of the data, making it easier to process and analyze.
- Model training: After the features are extracted, a model is trained on the dataset to learn the underlying patterns and relationships in the data. This step typically involves using a machine learning algorithm, such as a neural network, to learn the features that are most important for recognizing the input data.
- Model evaluation: Once the model is trained, it is evaluated on a separate dataset to measure its performance. This step is important to ensure that the model is not overfitting to the training data, and that it is able to generalize to new, unseen data.
- Deployment: After the model is trained and evaluated, it is deployed in a production environment where it can be used to recognize new input data. This step typically involves integrating the model into a larger system, such as a web application or mobile app.
- Maintenance: Finally, the system needs to be maintained to ensure its performance over time, this could be achieved by monitoring the system, retraining the model with new data, testing the model and fine-tuning it.

Overall, the design of a computer recognition system is a complex and iterative process that involves a combination of data science, machine learning, and software engineering. It requires a deep understanding of the problem domain, as well as the various techniques and tools that can be used to solve it.

A sample calculation for a computer recognition system could involve using a neural network to classify images of handwritten digits. Here is an example of how such a calculation might be performed:

Data collection and preprocessing: A dataset of 60,000 labeled images of handwritten digits is collected, where each image is 28x28 pixels in size and is labeled with the corresponding digit (0-9). The dataset is split into a training set of 50,000 images and a test set of 10,000 images.

Feature extraction: The raw pixel values of each image are used as the features for the model. These features are normalized to have zero mean and unit variance to improve the performance of the model.

Model training: A neural network with two hidden layers and an output layer is trained on the training set using a backpropagation algorithm. The input layer has 784 neurons (28x28 pixels), the first hidden layer has 256 neurons and the second hidden layer has 128 neurons. The output layer has 10 neurons, one for each possible digit.

Model evaluation: The trained model is evaluated on the test set, and its accuracy is measured. Let's say the model achieved 98% accuracy.

Deployment: The trained model is deployed in a web application where users can upload their own images of handwritten digits, and the model will classify the digit.

Maintenance: The system is continuously monitored to ensure that it's performance is not degrading over time, and the model is retrained on new data as needed to keep its accuracy high.

It's worth noting that this is a simplified example, and in practice, computer recognition systems are often more complex and may involve additional calculations and considerations.

3. Research Method

3.1. Graphic recognition analysis under the computer

Graphic recognition is a new branch in the field of pattern recognition. It has a wide range of applications, such as recognizing architectural drawings, engineering drawings, maps, circuit diagrams, music symbols, mathematical formulas, and various logos [13]. Therefore, it is caused in the fields of pattern recognition and document analysis. Researchers are of great interest. The "graphic" plays the role of the information disseminator in the visual recognition system, and the "space" that carries the "graphic" acts as a medium for the communication and exchange between the information and the audience [14]. The development of mobile Internet technology and the popularization of mobile digital media have enabled live online video to get rid of the constraints of time and space, enriching the form of live video while taking full advantage of the huge domestic mobile user base, and expanding the emerging media of live online video. Audience. An effective algorithm is designed in the image recognition of network video, which has the following forms.

$$sigmoid(x) = max(LdotN, 0.0) \quad (1)$$

3.2. The value of the recognition system under computer technology

Through the SRC method under computer technology, for a single individual, any one of his images can be represented as a linear combination of several other images of himself [15]. Then for a test image of an unknown category, it can be calculated for all categories of images The sparse representation coefficient of, can get the category of the test image [16]. It enhances the recognition power of the visual recognition system, enhances the aesthetic value, and better realizes the benign communication with the public and society, and then produces positive social effects [17]. In order to be able to parse the document image, the graphic elements need to be segmented, and accurate graphic parameters need to be used in the segmentation process. In the image, it is relatively easy to segment straight lines, but it is challenging to segment the shapes of arcs, ellipses and parabola, so these problems arouse researchers' strong interest in traditional methods.

4. Graphic image analysis under computer technology

4.1. Research on image acquisition innovation

The image collection is captured by the camera for a long time, and due to the influence of weather, light intensity, etc., the collected images are different during the day, and the quality of the recognition result will be affected to a certain extent, so it is necessary to ensure that the image is under different lighting conditions. The degree of impact is as small as possible [18]. The auxiliary function of the image recognition system adopts a modular design scheme, which improves the scalability of the system and facilitates the access of subsequent algorithms and functions [19]. By analyzing the characteristics of the sensitive image recognition algorithm and user characteristics, it summarizes the needs of the system's auxiliary functions, which include the application startup module, the image recognition API module, and the image storage module. As shown in Table 1.

Table. 1. Innovative research on image acquisition

Questionnaire	Class	Dielectric constant	Distribute the questionnaire
Before the experiment	Experimental class	2200	21
Distribution	Control class	2.84	24
After the experiment	Experimental class	18.9	23
Ceramic type	Control class	29.6	22

4.2. Image computer learning planning

In natural neural networks, the learning and processing of text and images are actually complementary. For example, when humans recognize things, they will not only receive the stimulation of visual signals but also the stimulation of natural language [20]. Humans often understand natural language. I think of the image features of the corresponding things, and when I see some images, I often think of the natural language descriptions that correspond to them. The image recognition system must be oriented to the recognition of massive image data, and performance issues should also be paid attention to. In order to avoid increasing the burden of the server, the update and insert operations of the database data should be performed in an asynchronous manner, and the time period when the server is idle. One more thing to note is that frequent connection and disconnection of image recognition algorithm modules will also produce additional resources and time overhead.

Table. 1. Different loads and vehicle speeds

load	300N	400N	500N
vehicle	0.1m/s	0.1m/s	0.1m/s
	0.5m/s	0.5m/s	0.5m/s
	1m/s	1m/s	1m/s

According to the collected data, the dynamic load on the road surface when the vehicle is moving is obviously more than that under the static load, and the higher the speed, the more obvious the dynamic load increase. The maximum dynamic load increased by about 3.2% under 300N load and 4.2% under 500N load. The maximum dynamic load at 1 m / s velocity and 0.1 m / s velocity increased by about 3% [12-13].

5. Analysis of the recognition system of graphics and images

5.1. Computer image research technology

For vector image research, although it has rotation and scaling invariance, this method is susceptible to noise and various distortion processes. Combining statistical-based methods with structure-based methods to propose a hybrid-based method, the general idea is First calculate the structural characteristics of the symbols, and then use statistical methods to integrate these characteristics. Each kind of descriptor can only get a certain characteristic of the symbol when it represents the symbol, so it is necessary to choose a variety of descriptors to represent the symbol. There are some differences between the preprocessing operation before the implementation of the image recognition algorithm and the preprocessing operation of face detection in size normalization. The size normalization preprocessing before face recognition needs to pass the human eye pair positioned during face detection. The detected face is rotated and adjusted, and then the size of the face image is scaled to a fixed size. As shown in Figure 1;

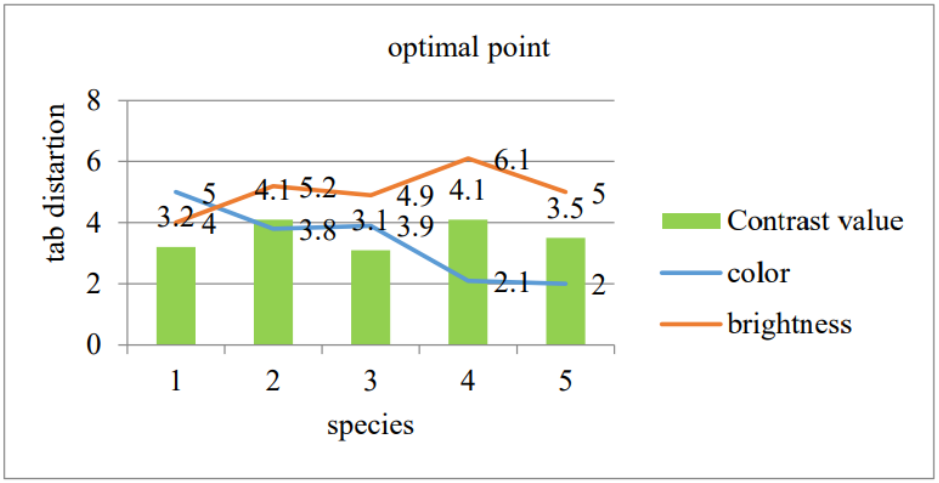

Figure. 1. Computer image research technology

5.2. Image recognition analysis of neural network under computer

When using the neural network model to identify objects in the image, in order to solve the problem of inaccurate recognition caused by the possible position deviation of the target object in the image, people proposed an algorithm called MultiviewTest. The algorithm divides the image to be recognized into several sub-pictures of the same size for recognition, and then sums the results of each sub-picture to get the final recognition result. After the camera captures the image, it is displayed on the display screen. In order to make the image complete, the captured image is set to a specified size: then when performing feature extraction, in order to speed up the detection image, the size of the detected image also needs to be normalized: afterwards, face recognition, In order to compare with the images in the library, the cropped face part needs to be scaled to the same size as the library picture, which is conducive to the comparison and recognition.

5.3. The development of image element reading

When the graphics are simple, the vectorization method is better to recognize the graphics. The straight line is the most basic element in the image and exists in a large number. After the vectorization method is used to identify the straight line, the image content can be simplified. Recognizing circles in the image When arcs and other complex graphics are used, the above vectorization method is not effective. The reason is that when the arc intersects multiple graphics, it is difficult to accurately obtain the direction of the next processing process, which results in the parameter information of multiple short line segments. Accurate, the type of graphics cannot be accurately obtained in the end. The method also has the same shortcomings when dealing with complex graphics such as ellipse and parabola. This article judges the types of various complex graphics by directly processing the pixels in the image to achieve accurate reading.

6. Conclusion

In conclusion, the design of a computer recognition system based on graphic images is a complex task that involves several steps, including data collection and preprocessing, feature extraction, model training, model evaluation, deployment, and maintenance. The choice of methods and techniques used in each step will depend on the specific application and the type of image data being analyzed.

One of the key components of a computer recognition system based on graphic images is feature extraction. Researchers have proposed various methods for extracting features from images, such as edge detection, texture analysis, and principal component analysis. These methods are used to extract useful information from the images that can be used to train a machine learning model.

Machine learning algorithms, such as neural networks and support vector machines, are widely used in computer recognition systems for graphic images. These algorithms can learn to recognize patterns in the image data through training, and can be used to classify images or detect objects in them. Convolutional Neural Networks (CNNs) are widely used in image recognition, it's a type of neural network that is particularly well suited for image classification tasks.

Evaluation metrics, such as accuracy, precision, recall, and F1-score, are used to assess the performance of a computer recognition system based on graphic images. These metrics are important for evaluating the system's performance and determining its suitability for a particular application.

In general, the design of a computer recognition system based on graphic images is an ongoing research topic, with new developments and breakthroughs being made regularly. Future research in this field will likely focus on improving the performance and accuracy of these systems, as well as exploring new applications for them.

In summary, according to the current status and value of computer research, the main points of the design of image graphics reading are analyzed. With the continuous advancement of image recognition technology, more and more technology companies have begun to be involved in the field of image recognition. Both Baidu AI open platform and Alibaba Cloud platform have successively provided image recognition service interfaces. This marks the official arrival of the era of reading pictures, and it also brings a huge market share. Finally, the design of a computer recognition system based on graphics and images is studied.

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