Research on Image Recognition Technology Based on Artificial Intelligence

Rui Li

Software College, Nanyang Institute of Technology, Nanyang, Henan, 473000, China

Email: 2065224856@qq.com

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Abstract: In recent years, with the continuous development of science and technology, image recognition technology has been significantly developed as an important field in information processing technology. The artificial intelligence-based image processing recognition technology mainly uses computers and other information-based intelligent tools to replace artificial recognition, thus processing images, and more and more fields have begun to use this technology.

1. Introduction

In today's 21st century, it is the information age of the Internet. As the cutting-edge technology in the development of today's era, computer and Internet technologies can be said to be changing with each passing day[1]. In this regard, the image recognition technology based on artificial intelligence can be said to be a mainstream development trend in the future. It has played a vital role in the fields of medical treatment and information processing, while greatly reducing the relevant investment and expenses. Image recognition technology processes images according to specific methods through computers. This technology has brought certain protection to the existing production and manufacturing industry, and also solved a series of problems such as the inability to recognize fine images manually or low recognition efficiency.

2. The Image Recognition Technology

Image recognition is an important field of artificial intelligence. In order to compile computer programs simulating human image recognition activities, different image recognition models have been proposed. For example, the template matches the model. The model holds that in order to recognize images, memory models of images, also called templates, must exist in past experiences. If the current stimulus matches the template in the brain, the image is recognized. The development of image recognition has gone through three stages: text recognition, digital image processing and recognition, and object recognition[2]. The research of character recognition began in 1950, and usually recognizes letters, numbers and symbols, from printed text recognition to handwritten text recognition, and is widely used. The research on digital image processing and recognition began in 1965. Compared with analog images, digital images are easy to store and compress and are not easy to distort during transmission[3]. It has the advantages of easy processing and provides powerful power for the development of image recognition technology. Object recognition mainly refers to the perception and understanding of objects and environments in the three-dimensional world, which belongs to the category of advanced computer vision. For this technology, the information needed to deal with the main problems is troublesome. For computer processing, all technologies are based on a certain foundation. The computer-based image recognition processing technology and the manual image recognition processing are interconnected in essence. For manual recognition, the image recognition is not realized by establishing the concept of the image in memory and the comparison between the images. Instead, it relies on classifying the characteristics of existing images and processing them through different specific details between different categories. It is just that our subconscious mind cannot make us acutely aware of this. When we first see an image manually, we will first search for such images in our memory, analyze whether we have seen such images before, and in fact, there is an identification process in the process of seeing and searching for images. In

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fact, if the recognition process is embodied in the computer, it is the search process. During the search, we will classify the images according to the past memory, while the computer recognizes the images by calling and classifying its own database to extract the salient features in the images[4]. However, we know that some images have certain uncertainties, which leads to the speed and progress of the computer in the image processing process, affecting the speed and efficiency of information processing. We know that the human eye's image recognition ability is to find key features from images by classifying different shapes, sizes and structures of the images, and the image recognition also roughly applies the human information recognition principle. In order to reduce the influence of extraneous factors as much as possible, the computer system simulates and compares the human recognition features during program design. When the computer obtains information input, if the corresponding images can be matched in the information base, it is deemed that the recognition process has been completed for this image.

3. The Image Recognition Process

First of all, information is acquired. Obtaining image information is very important in the process of image recognition. Signals such as photoacoustic signals are converted into electrical signals through specific sensors so as to obtain information that can be input into a computer[5]. In this technology, when we need to acquire data information, image characteristics and special information data are stored by a computer so as to facilitate subsequent processing. Graphic stimulation acts on sensory organs. People realize that it is a process of learning a certain person, also known as image recognition. In image recognition, there must be information entering the senses at that time and information stored in the memory. The image can only be recognized by comparing the stored information with the current information. Next, the obtained information is preprocessed, and the information is subjected to simple denoising, smoothing and other processing, so that the image is easier to identify and process; next, features are extracted; in the process of image processing, the requirements on the obtained image are very strict, and the effect after image processing is also very important; finally, classification is carried out, and identification and classification are carried out according to certain rules, and processing and identification are carried out according to certain rules, so as to finally obtain the identification purpose.

4. Common Forms of Identification Technology

The first is the pattern recognition form. In our common artificial intelligence image recognition technology, pattern recognition is the most efficient[6]. If a large amount of data and images need to be recognized, pattern recognition is the most suitable. After years of experiments and summaries by relevant researchers, the images are recognized and calculated by computers suitable for various fields in recent years. Finally, classification processing is carried out through certain mathematical principles. Finally, the image's shape, style, morphology and other characteristic factors are classified. On the one hand, the image is recognized, and on the other hand, the data is archived. The process is usually divided into two stages. The first stage is the learning and processing stage of various image information. The main task of this stage is to store the information, and finally complete the recognition program by using the computer's own large storage characteristics and memory function to classify and identify the information[7]. The second is the identification stage of image information. In this process, it is often required that the identified image should correspond to the information in the template stored in the system one by one. Although the information identification process of the computer is very different from the information identification process of human beings from the external perspective, from the perspective of the computer, the information to be processed is matched and compared according to the previously filed information in the identification process. If the matching process is completed, the result obtained is successful identification. However, this method also has some shortcomings. If there are some features in the recognized images that are very similar to those in the database, the system cannot recognize them and errors may occur.

The second is the neural network recognition technology, which is a new recognition technology. Based on the previous traditional recognition methods, the information is recognized by combining neural networks. The first thing to be clear is that the computer itself does not have a corresponding neural network model, which is realized by simulating the neural network of animals. This technology is applied to various project fields at the same time[8]. First, the neural network Xiyong is established to acquire the image features to be identified, and then the obtained features are reflected in the neural network for identification and classification. The captured image features here are often more precise and clear, and can be classified and processed comprehensively and accurately. What is more significant is that in the traffic management control system, in the process of only monitoring and identifying cars, the equipment senses after the car passes through the camera, captures the image features of the car through the camera device, and then uploads the obtained image features to the computer. Finally, relevant modules will identify and extract important information.

The third is the non-linear dimensionality reduction recognition mode. This recognition mode is based on high-dimensional recognition mode. In other recognition modes, there are often cases that cannot be recognized due to different image clarity and resolution. The generated data are often multi-dimensional. If it is very difficult to recognize by computer alone, if you want to process images with different resolution with higher efficiency, you need to apply this non-linear dimensionality reduction recognition mode. The characteristic of this mode is simple, data processing is carried out on the whole set. This mode can obtain its non-linear structure by analyzing the structure of the data image, and reduce its dimension without destroying its own structure, thus greatly improving the processing speed. For example, in common face information recognition, different dimensions will bring great troubles to computer recognition. The image information of faces in different dimension spaces is extremely scattered. However, if this technology is used for recognition, a more compact and easy-to-recognize image can be finally obtained, which greatly increases the recognition degree and recognition efficiency[9].

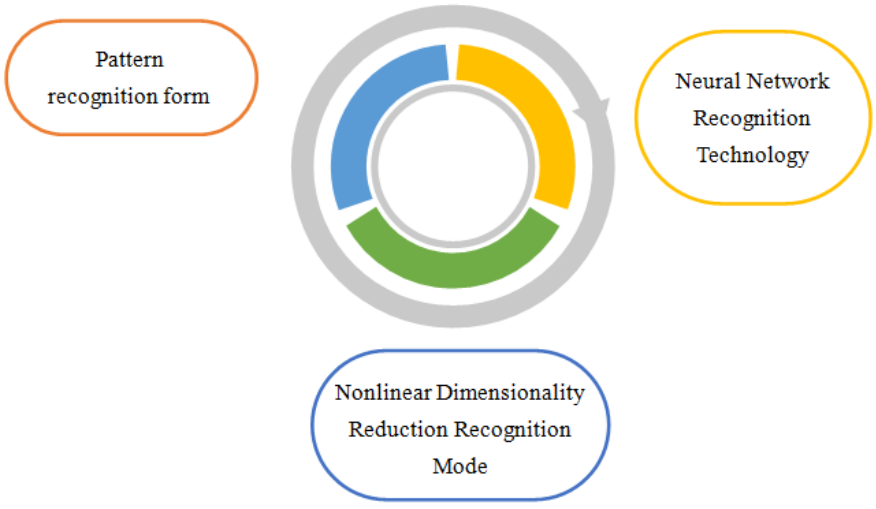

Fig.1. Three common identification techniques

5. Conclusion

With the continuous development of computer and modern science and technology, image recognition technology has also been widely applied in different fields. The latest survey results show that the recognition ability of computer systems has gradually surpassed that of human beings, and the recognition efficiency has also greatly exceeded that of human beings. This also shows that in the future, image recognition technology has very important research potential. At the same time, computers have many advantages that human beings do not have. I believe that in the future, image recognition technology will be accepted by more people and bring more convenience to society. At present, although image recognition technology is a new industry, in this industry, the technical

means used are also increasing, and people's processing of information images is also increasing. In this era of rapid information development, image recognition has become more and more encrypted with our daily life, making great contributions to people's economic development, personal safety and property safety.

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