

# Studies on Computer Intelligent Image Recognition Algorithm and Technology

Feng Ling\*, Yushui Xiao, P. Rajamohan, Ashley Ng

SEGi University, Kota Damansara 47810, Malaysia. E-mail: lintel\_1@qq.com

**Abstract:** With the rising level of economic development in China year by year, there have been obvious technological advances in many fields of science and technology, including the computer field. Relevant Chinese ministries attach importance to computer technology. The technology has been updating and developing all the time while researchers in the computer field are also constantly improving their researches on the intelligent technology in order to study and explore more new things. One can better be recognized with the current computer intelligent technology, even in an environment that is difficult to identify. In this article, the algorithm and application of computer image recognition technology is studied and analyzed to lay a theoretical foundation for its further development and application.

**Keywords:** Image Recognition Technology; Algorithms; Computer Technology

As far as the current development is concerned, the image recognition technology has been widely used and it is not limited to scientific research. For example, image recognition technology is applied when the police simulate the facial features of criminal suspects to draw simulated images during investigation. It is common to use carriers when applying the image recognition technology to ensure its successful working, which means it is not advisable to use this technology without the carrier. Currently, most common carriers are embedded terminal equipments, personal computers, smart mobile phones and so on, which have a positive impact on the technologies of fingerprint identification, facial identification, etc. It is of great practical significance for both society and individuals to carry out in-depth research and development that can be scientifically used.

## 1. Studies on computer intelligent

### image recognition algorithm

Image recognition is a relatively important category in artificial intelligence technology. It can be used to recognize different targets or objects. In current researches, two most common algorithms are *Hu* invariant moments and *D-S* evidential reasoning, which are discussed as follows.

#### 1.1 Hu moment invariants

*Hu* invariant moments is the algorithm that appeared and was applied earlier in intelligent image recognition technologies. It appeared around 1960. M. K. Hu first proposed that the normalized center distance in low order in the image should be combined into 7 variables<sup>[1]</sup>, as follows:

This  $f(x,y)$  graphical moment is defined as a representation of a two-dimensional digital image:

$$m_{pq} = \sum_x \sum_y x^p y^q f(x, y), (p, q = 0, 1, 2, L) \quad (1)$$

Meanwhile, the center distance of  $(p+q)$  is defined as follows:

$$\mu_{pq} = \sum_x \sum_y (x - x_0)^p (y - y_0)^q f(x, y) \quad (2)$$

$$x_0 = \frac{m_{10}}{m_{00}} \quad y_0 = \frac{m_{01}}{m_{00}}$$

among which,

For two-dimensional digital graphics, the centroid coordinate is  $(x_0, y_0)$ , among which  $x_0$  refers to the centroid of a grayscale image in the horizontal direction. Relatively,  $y_0$  refers to the centroid of a grayscale image the vertical direction. The normalized center distance of  $(p+q)$  is defined as follows:

$$\eta_{pq} = \frac{\mu_{pq}}{\mu_{00}^r} \quad (3)$$

among which  $r = (p + q + 2)/2$ ,  $p + q = 2, 3, L$ .

## 1.2 D-S evidence reasoning

Image recognition technology belongs to the category of multi-source information processing. Data fusion in similar information processing technologies is a relatively late-model and common technology. *D-S* evidence reasoning is the most major research approach which relies on non-empty sets,  $\theta$ .  $\theta$  is also known as discrimination framework. This framework can describe the sets of elements in all the constituent hypothesis spaces. Its requirement for elements is to ensure mutual exclusion. Formed from  $\theta$  subset, power set is usually described using  $2^\theta$ , and trusted assignment function is defined for power sets<sup>[2]</sup>.

Among  $m(A) \rightarrow [0,1]$ ,  $A$  mainly describes random subsets in the framework, and  $m(A)$  refers to how much is the evidence supports proposition  $A$ . Therefore, it is necessary to ensure that  $m(A)$  meets the following conditions:

$$m(\phi) = 0 \quad \sum_{A \subset 2^\theta} m(A) = 1$$

The total trust generated for  $A$  can be described by  $Bel(A)$ . The trusted function is defined as follows:

$$Bel(A) = \sum_{B \subset A} m(B)$$

With the usage of appropriate combination rules, two or more confidence functions can be obtained, and new confidence functions can be defined by using orthogonal sums.

## 2. Researches of computer

### intelligent image recognition technology

Based on computer system, intelligent image recognition is a critical field in the development of artificial intelligence technology, which provides an effective way for image recognition. Overall, under the background of such rapid development and progress made in science and technology, the basic characteristics of intelligent image recognition and its main applications are discussed as follows.

#### 2.1 Basic characteristics

Generally, image recognition system analyzes images with the support of computer. It converts them effectively into digital information content, ensuring accurate recognition at the same time. In order to considerably improve its basic performance, operators need to define image features according to spatial mapping. Image recognition technology is of much technical nature. Conventional comprehensive performance is presented in aspects of overall analysis ability of data, strengthening internal coordination of the system, the image analysis quality level, and *et al*<sup>[3]</sup>.

Referring to its basic characteristics, the technology is considered to have the following advantages:

Firstly, the technology can carry a relatively rich amount of information. After being processed by the computer, the image is converted into two-dimensional information. The continuously increased two-dimensional information may slow down its running speed during the process of usage of the computer. If the configuration is low, the computer system may crash and lead to a declining performance. However, image recognition can be completed by referring to the image transmission when the intelligent recognition technology is used for imaging, so the information load is relatively large.

Secondly, the technology is of high accuracy. For the traditional image processing technology, in most cases, analog images are converted into digital images. In this process, merely two-dimensional combinations can be obtained. The pixels is not higher than 32 bits, and it cannot be handled properly beyond 32 bits<sup>[4]</sup>. However, under the intelligent recognition technology, more accurate image information can be obtained to

meet the needs of different audiences through different image accuracies. Intelligent recognition technology can properly handle the relationship between images and information, and it can store image information completely to prevent image loss. In addition, the technology can restore images in almost all cases.

Thirdly, there is a more significant correlation. In the process of recognizing images with the aid of computer systems, specific analysis and exploration must be carried out for different images, and the images should be compressed appropriately to obtain and classify information related to the images, so that higher pixels can be generally allocated. For 3D images, it is difficult to obtain 3D geometric images when inputting. It is required to re-measure images with hypothesis based on experience. In intelligent recognition technology, however, 3D objects can be directly displayed and guided to prevent recognition problems<sup>[5]</sup>.

Fourthly, high degree of flexibility. In the process of processing images, intelligent recognition technology can enlarge and recognize images anytime and anywhere, such as large-area celestial body schematic diagram and fine cell schematic diagram, etc. By means of combination of nonlinear and linear, information completeness can be enhanced. Detailed combination can be completed by computer after images are compiled. It is flexibility, and the definition of the image is ideal as well.

## 2.2 Main applications

With the widely application of computer technology, it has positive significance in many fields, especially in image recognition, which has been generally recognized because of its strong performance. There are many derivatives with significant advantages emerged as the times require, which changed the way people live in daily life. Besides, some micro or macro things are also possible to be identified, the most representative of which is the traffic management system in daily life. Through comprehensive analysis with the help of image technology and vehicle information, data of vehicles that violate traffic regulations can be judged in a short time, and the comprehensive management system will give the penalty<sup>[6]</sup>. Moreover, it is the same for security cameras which are commonly seen in our life. It is helpful for safety management and criminal investigation judgment,

and so on.

There are three common carriers by analyzing the differences of graphic identification carriers. They are personal computers, mobile phones and embedded terminals. Among them, personal computers and mobile phones are more inclined to personal applications. Basically, every family or individual will own at least one mobile phone. People can successfully complete communication activities and information exchange through image recognition technology. The newer mobile phones can combine image recognition technology to carry out face recognition too. After setting fixed information, one can unlock the phone screen or make the payment by using face scanning, without using complicated manual operations, and therefore improving the use efficiency. On the other hand, embedded terminals are mainly inclined to public facilities, such as monitoring equipment or the traffic management system mentioned above, which are usually combined with big data and cloud technologies to effectively relieve staff working pressure with less work time loss<sup>[7]</sup>.

In addition to the main application fields, intelligent identification technology go deep into many other fields due to the rapid development of science and technology in China. For example, intelligent identification technology is widely used in the urban planning work. Aerial photography is used to obtain the layout data of the whole city. There are still many deficiencies combined with big data analysis in the urban planning. Image recognition technology can also be used to monitor the construction of roads and bridges in cities to ensure that the engineering quality can meet the requirements in the construction plan<sup>[8]</sup>.

Although as a whole, there are some contents that still need to be improved and optimized as soon as possible in the current recognition technology. For example, processing technologies of gray scale processing and gray scale stretching also need to be improved during image preprocessing. It will comprehensively improve the image processing efficiency of operators, and these technologies can also make the obtained data more perfect and accurate if the problems have been solved. In the identification process, taking instant samples' characteristics as the basis for research, one should pay attention to the algorithm to

effectively classify the existing data with active conversion of the required format that is stored in the corresponding path.

### 3. Conclusion

To sum up, image recognition technology is of practical value for the development of computer science and technology, and its algorithm is the core content. Meanwhile, it is necessary to be clear and familiar with the relevant process to effectively ensure the expected rational effect in the process of practical application of this technical means. For a long period of future development, it is needed to emphasize the in-depth research of the technology. In addition to improving this algorithm, it is also inevitable to improve some other derived technical means so that the intelligent image recognition technology can be widely popularized and applied in depth.

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