Computer Vision Based on Computational Intelligence and Its Application Analysis

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Abstract. Under the background of modern information technology intelligence, the comprehensive processing technology formed by the processing and calculation of information and data. The purpose of this paper is to analyze the vision application under the intelligent computer, and the computer and technology application based on intelligent integration is to scientifically design various computer sectors by expanding and extending the functions of the computer. The method used in this paper is based on face recognition in computer vision. First, image recognition is used as the image description, and then the feature points are used to extract the K-means clustering algorithm. The clustering algorithm is used to determine the k value of M. Then clustering can get M keywords, generate a classification model using the independent features of the histogram, and then use local and global visual features to extract computer vision recognition data with obstacles. Experimental research results show that computer vision is an important development direction of artificial intelligence, which uses cameras and computers instead of human eyes to perceive, recognize, track and measure targets, obtain three-dimensional information of corresponding scenes, and process captured pictures or videos.

Keywords: Intelligent Computer, Intelligence, Computer Vision, Application of Vision

1. Introduction
With the application and popularization of computer technology, computer vision technology also has broader development prospects and development value. At present, my country's computer vision has gradually developed into a relatively systematic discipline[1]. Through the learning of computer vision, it can not only realize the systematic processing of information related to vision, but also become an effective tool for expanding people's eye vision[2]. Judging from the current investigation and research, at this stage, computer vision has been widely used in various fields of social life in my country, including remote sensing image analysis, medical image processing and other technical aspects[3].

The practical characteristic of computer technology in intelligent integration lies in the intelligent processing of network information, which specifically includes various types of information resources generated by different services during the operation of the computer[4]. In the cyberspace of computers, in the face of large-scale and diversified information resources, its propagation path and flow rate
present prominent uncertainties. Therefore, how to classify information resources according to their attributes is the key for computers to process network information\cite{5}. Based on intelligent integration, the computer can accurately analyze the changes of network information data through intelligent data collection, comprehensive meter information processing and other functional sections, and then store it in the computer information management system according to categories and attributes\cite{6}. To enable information resource management personnel in various industries to combine the law of data changes, grasp the current status of market and industry development, and take advantage of the processing of network data information\cite{7}.

Modern visual processing technology has formed a relatively systematic theoretical framework, which has achieved a successful fusion of the theories of artificial intelligence and neuroscience in the current human development\cite{8}. This technology can perform more hierarchical and modular information processing, and has the ability to process different levels of information\cite{9}. Computer vision technology for information processing can be divided into different processing stages. In different information processing processes, it is necessary for staff to carry out corresponding technical applications according to different requirements, and more accurate and precise intelligent processing of image information through professional technology\cite{10}.

2. Method

2.1. CFM Algorithm

Algorithm definition: Find the core backbone of each intelligent computer. Its time responsibility is O(n+m). Calculate the number of each intelligent computer, save the results in a list, and then sort the list in descending order. Create a new backbone area, and select the maximum backbone degree in the list as the initial backbone of the new area. Then add the largest SC to adjacent vertices in sequence. Adjacent vertices are adjacent sets of this community. SC definition: the sum of the edge from the vertex mine point to the area C to the backbone. S represents the sum of intelligent computers, and C represents the community. Ud\(v\) is the backbone of edge (u, v).

\[
SC_v = \sum_{u \in C, v \in C} D_{uv}
\]  

(1)

If the expansion becomes smaller after adding new adjacent vertices in the current community, the maximum SC will continue to be added as adjacent vertices. Otherwise, add adjacent vertices to the community boundary set, and continue to find the vertices with the largest SC connected to the current community until there are no more qualified vertices in the neighbor set, thus creating a new independent community. Repeat the second step algorithm to process the remaining vertices until no backbone is greater than the threshold factory in the backbone list, or the number of remaining fixed points is less than the parameter w. Collect these vertices that are divided into no-community and multi-community according to SC, sort the member probabilities of these vertices, and then find out the mixed member probabilities of these fixed-points. Member probability definition: the probability that vertex v belongs to community C.

\[
P(V \in C) = \frac{SC_v}{SC_v + SNC_v}
\]  

(2)

2.2. Generate a classification model

The model can be viewed as a histogram representation based on independent features. The histogram uses keywords as the abscissa, and the frequency of occurrence of each keyword in the image is the ordinate. When generating a histogram, each feature point in the image is matched with each keyword, and the number of keywords corresponding to the successfully matched feature points is increased by one. Feature point matching selects different methods according to different feature points. For SIFT, feature point extraction and clustering algorithm matching can use the distance matching method, where A=2 is the Euclidean distance, and the Euclidean distance can be calculated in this algorithm. The word bag model through the above three-step image is formed.
\[ d_{ij} = \frac{1}{\mu} \sum_{k=1}^{n} (x_{ik} - x_{jk})^u \] (3)

3. Experiment

3.1. K-means clustering algorithm
First, randomly select \( k \) samples from the samples as the center of the initial cluster, and then sequentially calculate the distance between the sample data and each cluster center, and divide the data into the closest cluster clock. The distance calculation method can use even distance, Manhattan distance or Minkovsky distance clock, after the classification is completed, recalculate the center of the point group, the average of the coordinates of each point can be used to calculate the center of the point group.

3.2. Extraction of local and global non-computer intelligent visual features
Through further analysis, the sequence frames of the gradually changing visual content have a similarity function of the frame sequence, and a specific algorithm for detecting the gradual edge of the lens: \( D \) in the algorithm represents the number of frames of the video, \( F(i), i=1, \ldots, p-1 \) is the similarity measure, which is also the input of the algorithm, and \( G \) is the moving average curve, which is divided into the following four steps:

1. Calculate the moving average vector \( G \) according to the formula)
2. Calculate the first derivative function \( E(k) \) of \( G \)
3. Let the first derivative function be 0 and find the local minimum and local maximum points of \( G \), and store them in vectors \( G_{\text{min}} \) and \( G_{\text{max}} \) respectively;
4. Calculate the difference metric vector \( D(k) \), the value of seven is from 1 to \( T-2 \), if the \( k \)th frame corresponds to the Path element in the \( G \) blood vector.

4. Results

4.1. Measured data results based on face recognition with barrier-free objects

![Figure 1. Results of measured data](image)

As shown in Figure 1, it is clearly seen that the face recognition mode clock in the application field of computer vision has no obstacles. The comparison has been seen. From the figure, we can see the actual measurement clock calculated by the method formula The results obtained show that under computer face recognition, the recognition of obstacle-free objects within 10cm is 87.2%, which is high. However, as the distance continues to increase, the accuracy of recognition becomes lower and lower. Conversely, in the case of obstacles, although the distance increases, the accuracy of recognition does not decrease significantly. It can be seen that the method of using computer intelligence in the recognition process makes the recognition degree in the presence of barrier-free objects very high, and sometimes can achieve the effect of accurate recognition.
4.2. Application scenarios of computer vision

Table 1. Analysis of computer vision application results

| Features                  | 1:1 identification application | 1:N identification application |
|---------------------------|---------------------------------|---------------------------------|
| Recognition difficulty    | Used to prove that they are common | Used for dynamic identification |
|                           | Low difficulty and high accuracy | Reduce recognition due to light and other factors |
| Application               | Airport security               | Suspect tracking               |
|                           | Remote account opening         | Explosion warning              |
|                           | punch card                      | Explosion warning              |

As shown in Table 1, the face recognition in the computer vision application scenario is analyzed separately, and the analysis adopts the method of result comparison, respectively in the recognition difficulty of 1:1 recognition application and 1:N recognition application and the characteristics of the application occasions For analysis. The analysis results show that under the comparison of the two, there are advantages and disadvantages. In the era of informatization, data processing is fast and recognition is high, so face recognition in the 1:N recognition scene is better.

5. Conclusion

In the era of information technology, computer vision is widely used in all aspects of real life. For example, it has been widely used in unmanned driving, network, education, scientific research, agriculture and other industries and has achieved remarkable results. From the research trend, machine self-learning is the breakthrough point, and data is the ultimate driving force. I believe that with the investment of talents and resources, and the development of professional equipment, computer vision technology can achieve leapfrog development and better meet my country's current economic and social development needs. In the future, with the continuous maturity of technology and deep integration with the industry, computer vision technology will surely bring about a huge change for all walks of life in society.

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