Research on Statistical Flow of the Complex Background Based on Image Method

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Abstract: Along with our country city changes a process continues to accelerate, city road traffic system pressure increasing. Therefore, the importance of intelligent transportation system based on computer vision technology is becoming more and more significant. Using the image processing technology for the vehicle detection has become a hot topic in the research field of. Only accurately segmented from the background of vehicle can recognize and track vehicles. Therefore, the application of video vehicle detection technology and image processing technology, identify a number of the same sight many car can, types and moving characteristics, can provide real-time basis for intelligent traffic control. This paper first introduces the concept of intelligent transportation system, the importance and the image processing technology in vehicle recognition in statistics, overview of video vehicle detection method, and the video detection technology and other detection technology, puts forward the superiority of video detection technology. Finally we design a real-time and reliable background subtraction method and the area of the vehicle recognition method based on information fusion algorithm, which is implemented with the MATLAB/GUI development tool in Windows operating system platform. In this paper, the application of the algorithm to study the frame traffic flow image. The experimental results show that, the algorithm of recognition of vehicle flow statistics, the effect is very good. *Copyright © 2014 IFSA Publishing, S. L.*

Keywords: Pattern recognition, Algorithm, Database, Background subtraction, information fusion.

1. Introduction

In recent years, with the rapid development of the world economy, and gradually improve the comprehensive national strength, the city of urbanization gradually accelerated, with the amount of cars in the city has increased year by year. In this situation, the city traffic pressure increased significantly, both developed and developing countries bear the traffic problem has worsened the problem. Therefore, how to solve the traffic problem has become a hot topic in the field of modern traffic [1]. In today's society, intelligent surveillance system in the military, transportation, banking and other key sectors of the warning, the demand and application security and modern management is more and more extensive in the [2]. Therefore, to realize the intelligent traffic and modern management has become an important way to solve the traffic problems. In this situation, it is natural to the intelligent transportation system (ITS) [3].

Vehicle detection technology is an important basis for the intelligent traffic monitoring system. Accurate segmentation of vehicle from the

background, and then identify and tracking of a vehicle, measurement and analysis to various parameters of traffic flow. So lay the foundation for the development of intelligent transportation. So, the rapid identification of vehicle has a very important significance traffic statistics. At present, domestic and international research in this area has a lot of, lots of methods have emerged [4-5].

Loop detector is a kind of traffic detection device is the most commonly used. It emerged in the nineteen sixties, is the forerunner of traffic control of the most extensive traffic detector "which is the most widely used, the oldest, is also considered a low price, high accuracy, vehicle detection method and accumulate more experience, widely used in intelligent traffic monitoring system of city, highway monitoring system it can be used to detect the traffic flow, speed, occupancy, the parameters such as. The annular coil vehicle sensor is matched with the annular coil vehicle detector. The annular coil vehicle sensors embedded in the lanes of the road, is generally hollow coil made of a few turns of wire winding, the feeder is connected with the detector, the detection principle of annular detector is: one or a group of induction coil embedded in the pavement layer, a tuned electronic system composed of the toroidal coil and electronic unit the current in the coils, the magnetic field generated, when the vehicle passes through or stop on the coil, will change the inductance of the coil, excitation circuit generates an output, thus detected by or stop on the coil car [6].

As a modern information technology, more and more applications in video detection technology in intelligent transportation system, plays the role play a decisive role in the field of application of intelligent traffic system, and become a focus of current traffic flow recognition statistical method [7-8]. Real-time detection and segmentation of video vehicle detection system is the key of video detection technology, and analysis. Based on the part of the video image, the other function of video image analysis are based on the. At present, research on the real-time detection and segmentation of vehicle is divided into a fixed camera and two type of camera motion [9].

This paper introduces the research background and significance, which explains the concept and importance of intelligent transportation system [10]. The video detection technology and image processing technology in vehicle recognition, the importance of traffic statistics, and then introduces statistical system structure diagram of various vehicle detection and vehicle recognition, and summarized the current research and development of domestic and external video vehicle detection system dynamic [11]. Research on image processing based on knowledge related to the application of video vehicle detection, first proposed graph and image acquisition process of image processing system, and then introduces the digital image processing used algorithms such as gray, filtering, image enhancement, sharpening, basic knowledge, and the knowledge of it has conducted the comparison research method, and then its

application in the treatment of the vehicle, comparison of various methods of treatment results [12]. Study on the application of video vehicle detection in image segmentation. A comparative study is conducted on recognition statistics; then the background difference method and area method of information fusion method for identification of the vehicle, traffic statistics, and on the background difference method, the area method and two kinds of method of information fusion in statistics of vehicle flow, vehicle identification were studied, and the results were compared analysis [13].

2. Application of Image Processing Technology of Video Vehicle Detection

2.1. Structure Diagram of Image Processing System

Image processing technology is the essential part in video detection system. In recent years, image processing technology has been more and more widely used in traffic flow detection in intelligent transportation, it has become a hot spot in video detection system, more and more get the favor of people [14, 15]. Usually, the image processing technology can be divided into analog image processing technology and the digital image processing technology two. Analog image Processing for real-time processing, including the optical processing (through the lens) and electronic processing of two different treatment ways. However, its content richness is not high, the processing precision is low, judgment ability and the nonlinear processing ability is very poor. Therefore, in the actual application in general do not have analog image processing [16].

Generally speaking, for computer processing or real-time hardware processing is digital image processing [17]. The flexibility of flexible processing, rich in content, high precision can be nonlinear processing complex. This is the kind of image processing technology. Digital image processing technology refers to the use of digital computers and digital technology, operation and processing of the image, so as to achieve the effect of a prospective technology. For example, fade blurred picture clarity; digital image processing technology has a strong practical value [18]. At present, the digital image processing technology has been widely applied to various fields of production and life of people, such as scientific research, military affairs, city traffic, many fields, such as medicine and its development prospect, more and more widely.

At present, the image processing technology has been emphasized in many different application areas, and has made great achievements. It has powerful functions, occupies an important position in the vehicle recognition, the system structure as shown in Fig. 1.
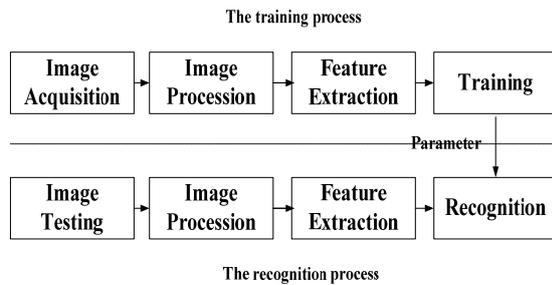
The training process

The recognition process

Fig. 1. Structure diagram of image processing system.

2.1. Image Acquisition and Smoothing

In fact, the traffic image acquisition in the system consists of image acquisition are analog signal, the computer is unable to process [19]. Therefore, the need of image acquisition in the analog to digital conversion, the analog signals into digital signals. The converted image sent to the corresponding computer processing. In order to improve the quality of the image, in the image processing process, generally the first image quality low input to the system, and then use the image enhancement, filtering is improved, so as to provide good conditions for subsequent processing. The image acquisition of car flow was shown in Fig. 2.

Fig. 2. The image acquisition of car flow.

In general, the gray image is the image type is often used in image processing. Gray image is an image containing only the luminance information does not contain color information. In practical applications, the image is in color. Therefore, to carry out gray processing each frame of the image acquisition, the color image into grayscale. The research of this paper is based on the gray image as the object of study. Gray image will usually brightness values were quantified, divided into 0 to 255 a total of 256 levels. Know the image of a point R, G, B, to get the brightness information called gray information, can be calculated by the formula:

$$Y = 0.300 \times R + 0.588 \times G + 0.110 \times B, \quad (1)$$

In fact, the image obtained is generally more or less because of outside interference and noise. There are many reasons that cause noise, camera jitter as the filming process, day light and light disturbance, the transmission channel of external noise and quantization noise etc. Usually, noise mainly includes two kinds of additive noise and multiplicative noise. The additive noise and image signal f (x, y) is irrelevant, noisy image g (x, y) can be expressed as:

$$g(x, y) = f(x, y) + n(x, y), \quad (2)$$

In contrast with additive noise, multiplicative noise and image signal G (x, y) is a relationship. For example, flying spot scanner will produce noise in the scan image, and the noise is correlated and image signal. If the noise produced when scanning image n (x, y) and G image signals f (x, y) is proportional to, the noisy image g (x, y) can be expressed as:

$$g(x, y) = f(x, y) + n(x, y) f(x, y), \quad (3)$$

$$z = (1 + n(x, y)) f(x, y) = nl(x, y) g(x, y), \quad (4)$$

Generally speaking, the noise in the image and the image signal is often mixed together. In the process of image processing, if improper for image smoothing, image analysis brings difficulty to will, under the influence of the processing step. Therefore, before the image can be further processed to denoise for its. Usually, image noise removing method mainly linear filtering, median filtering and adaptive filtering are three methods. The following introduces the 3 filtering methods, and makes a comparative study.

A linear filter is a kind of spatial smoothing technique, it is mainly used in neighborhood average method, used to remove the image noise and the particles obtained by scanning. The basic principle of neighborhood average method is used to represent a pixel averaging several pixel neighborhood values. A given image f (I, J), which, like the point (m, n) in the neighborhood of S. Let S containing M pixels, the image processing image point (m, n) of the gray scale can be averaged to pixel gray. According to the characteristics of images can be determined within the shape and size of the S, assuming S 3*3 neighborhood, point (m, n) located in the center of the S, then

$$f(m, n) = \frac{1}{9} \sum_{i=-1}^{1} \sum_{j=-1}^{1} f((m+i), (n+j)), \quad (5)$$

A type can be seen through a linear filter, the neighborhood average method after the noise mean remain unchanged, the noise variance is smaller. Therefore, the neighborhood averaging, smoothing the image signal, weaken the intensity of image noise, noise suppression, and makes the image object boundaries become blurred. The results showed that, select the neighborhood average smoothing the image signal, is effective in suppressing the noise. But along

with the increasing degree of neighborhood, the fuzzy boundary of target region image has become more and more serious.

2.3. Image Gray and Enhance

Generally speaking, noise and distortion of the source image by image input system usually contains a variety of, thus greatly influence the quality of the image. Therefore, in the analysis of images before, we must first improve the quality of the image. In order to improve the quality of the image, generally uses the method of image enhancement. Image enhancement refers to highlight some of the information in an image according to specific needs, processing method and weaken or remove some unwanted information. Its main purpose is to make the processed image of a particular application, more practical than the original image. Generally speaking, image enhancement methods have spatial domain method and frequency domain method two methods. In view of the merits, speed of spatial domain processing is faster than the speed of frequency domain method. Therefore, generally use the airspace enhancement method. Image enhancement method is generally called enhancement method in the time domain. Commonly used time-domain enhancement methods have gray transform enhancement, gray-scale transformation, histogram, histogram equalization.

Gray transform enhancement is a certain point by point transform the relationship between each pixel gray values in order to achieve some goal condition in original image. Generally speaking, gray enhancement can be expressed as:

$$g(x, y) = T[f(x, y)], \qquad (6)$$

$$D = T(D), \qquad (7)$$

Among them, D=f (x, y) as the source image pixel gray value, D for the treatment of the image pixel intensity values of D.T (D) is usually a single value function. With the image pixel gray value by gray level transformation after the treatment of the source image pixel value, can achieve the effect of contrast enhancement. As an important means of image enhancement, image gray transform has increased dynamic range, extended image contrast, to enhance the image effect. The gray level transformation methods, namely linear transform, piecewise linear and nonlinear transform.

Linear transform, can be mapped according to the transformation curve of the image pixel values. Fig. 3 is a D, the D 'linear transformation is the slope of the curve. Piecewise linear transformation is a transformation according to the requirements of compression can be free. The expansion of gray scale range enhancement method. It will be the image domain into multiple range and linear transformation

of different. This method transforms the image grayscale range before and after total unchanged. Application of piecewise linear transformation, gray range can be extended care about details of the image, contrast enhancement, image can be compressed image details are not concerned, decrease the contrast.
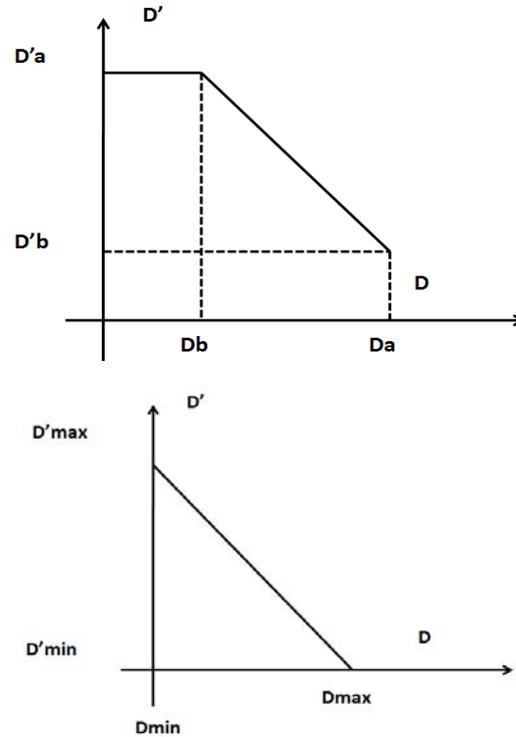

Fig. 3. The slope of the curve of D and D 'linear transformation.

The nonlinear transform of gray is defined by a nonlinear single-valued function D'=T (D) gray transform the determined, also referred to as the nonlinear transformation. In practical application, usually use the logarithmic transformation. The Nonlinear transform curve as shown in Fig. 4.
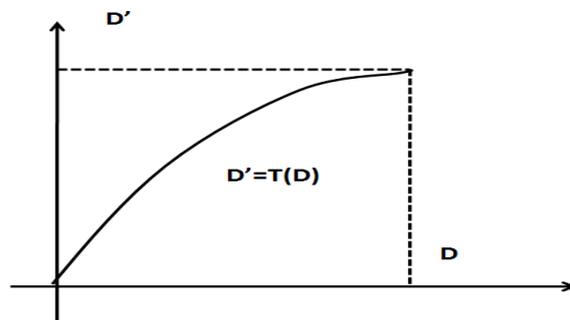

Fig. 4. The Nonlinear transform curve.

The basic principle of logarithmic transformation is the expansion of low gray value, the gray compression of high value, the transform result is that

the low value the details of the image gray to see more easily, in order to enhance the effect of. The logarithmic transformation expression:

$$D' = C \times \lg(1+ \mid D \mid), \qquad (8)$$

Method of histogram transform is the most commonly used method of image gray transformation. Generally speaking, it can be used as important statistical features of the image histogram as approximate image gray distribution density function, and the gray distribution density function and the pixel location related. In general, it is difficult to obtain the correct image gray distribution density.

Histogram describes not only the maximum gray value distribution, and the overall description of the gray image all values. It can be seen from Fig. 5, the image contrast is too small, gray histogram is an emphasis on a gray area; while for the image contrast is moderate, the gray histogram mostly distributed in the gray area wide in. If an image using only a small range of gray, do not use all the gray level is allowed, then feedback to the histogram, gray function value in this range is not zero, the rest is zero. In this way, will not easily detectable intensity changes in details, and the overall image contrast is low. Therefore, in order to effectively and reasonably use the gray scale bandwidth, should be the gray image of the dispersed throughout the allowed range of gray. It can be seen from Fig. 5, by changing the shape of the histogram to enhance image contrast. In fact, the histogram equalization method is commonly used to change the shape of the histogram. Through the histogram equalization, we can solve this problem very well.
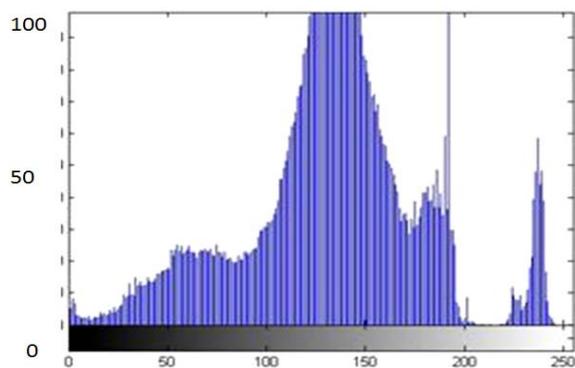

Fig. 5. After histogram equalization histogram.

3. Result and Discussion

3.1. Traffic Image Segmentation

Image segmentation is based on image gray, color, texture, shape feature of an image or scene is divided into several disjoint regions (i.e. the image primitives), make these features in the same area showed the same or similar, but markedly different in among different regions. The image segmentation is the basis of image analysis and understanding. The aim of image segmentation is to image space into meaningful regions. For example, for safety monitoring image, vehicle segmentation is very important. Research on image segmentation can be for each pixel based, can also use the provisions in the field of image information to segmentation. Image segmentation is widely used, almost involves all areas of the image processing.

For example, in remote sensing applications, the segmentation of synthetic aperture radar image, segmentation of remote sensing images of different cloud and the distribution of background; segmentation of brain images in medical applications in the analysis of traffic video image; in the segmentation of object and background, vehicles and so on. In these applications, image segmentation plays a very important role, it has very important significance. Image segmentation methods often use a threshold segmentation, region growing, edge detection, morphology, texture analysis. The implementation framework of the traffic flow detection system is as Fig. 6.
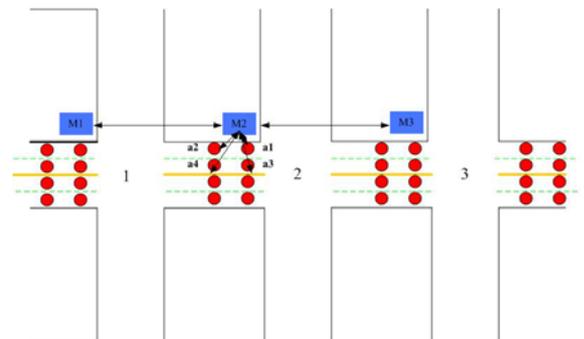

Fig. 6. The framework of traffic detection system.

Threshold method is one of the most commonly used method of image segmentation is the most simple and at the same time, it has been widely used in many fields. Its realization process is simple, easy to calculate and the amount of calculation is small, stable performance, and thus become the most basic and applied in image segmentation is one of the most extensive segmentation techniques. The basic principle of threshold method is the use of threshold grayscale image is divided into several parts, in which several parts which belong to the same part of the pixel as the same object. In the application for further image analysis, segmentation, recognition of the premise, the effectiveness of the accuracy of segmentation directly influences the subsequent tasks, including selection of threshold value is the key technology of image threshold segmentation method. In image segmentation, the threshold value is the distinction between object and background pixel threshold, when the image pixel value is greater than or equal to the threshold, the pixel belongs to the object, the other pixel belongs to the background.

When selecting the appropriate threshold value, will select the threshold value for each pixel is

compared, finally carries on the value of the two or half value of treatment, so as to separate the objects from the background. Image threshold segmentation to some extent can greatly reduce the amount of data, which greatly simplifies the analysis and processing steps. In many cases, the image threshold segmentation is the image analysis, image pretreatment process necessary one of feature extraction and pattern recognition of. Set the original image is p (x, y), according to a certain criterion in P (x, y) to find the characteristic value T, the image is divided into two parts, the image after segmentation for:

$$f(x, y) = \begin{cases} 1, p(x, y) > T \\ 0, p(x, y) \leq T \end{cases}, \quad (9)$$

3.1. Image Sharpen

The main purpose of image sharpening the edge enhancement and gray scale image change part, to increase the image contrast, thus make the image fuzzy become clear. Because the difference operation is direct, an image of the edge and contour are often arbitrary direction. Thus, when and the direction difference in direction, the image edge detection and contour is not out of the right. So, detection operators need to find some arbitrary direction isotropy of the edge and contour has the detection ability of. This paper mainly introduces the method of differential operator, Laplace operator method of image sharpening method. Differential method is one of the methods of image sharpening, the gradient method is the most commonly used method of differential sharpening processing, for an image f (x, y), it can be expressed as the gradient:

$$G[f(x, y)] = \left[\frac{\partial f}{\partial x}, \frac{\partial f}{\partial y} \right]^T, \quad (10)$$

To calculate the gradient image sharpening output can be determined. Usually, the gradient sharpening values as output. This method is simple, but the enhanced image to display only the edge gray more radical changes, other areas appear black, the whole image will look very dark. In addition, method by setting a threshold sharpens the image. When the gradient threshold is higher than the set, with the gradient values instead of the original pixel gray value, otherwise the pixel gray value remains unchanged. Therefore, the appropriate selection of threshold, not only can enhance the distinct edge contour, and can keep the original gray in the image varies smoothly area.

This chapter mainly introduces the basic knowledge related to the application of image processing in video vehicle detection. First proposed graph and image acquisition process of image processing system, and then introduces the basic algorithms of digital image processing is used, such

as gray, filtering, image enhancement, sharpening and other basic knowledge. Through analysis and comparison of application of existing image processing methods are made, and find the treatment method with video detection of traffic flow and vehicle recognition system characteristics.

3.2. Feasibility of Applying into Traffic Flow Detection System

Suppose the number of vehicles on the roadside park is n, assuming S (t), t≤0 in time (0, t] range driving park the vehicles passing through the number of vehicles. With S (t)-S(t_0)=S (t_0, t), 0≤t_0 ≤t, represented at time (t_0, t) within the scope of the number of vehicles after the vehicles traveling park. Then S (t_0, t) can be expressed as follow:

$$Q(t_0, t) = Q\{S(t_0, t) = k\} \quad k = 0, 1, 2, ..., \quad (11)$$

The S(t), t≥0 meet the conditions of the Poisson distribution, so the S(t), t≥0 can be considered a Poisson distribution with parameter, then $Q(t_0, t)$ can be expressed as:

$$Q(t_0, t) = \frac{\lambda(t - t_0)}{k!} e^{-\lambda(t - t_0)} \quad t > t_0, k = 0, 1, 2, 3, ..., \quad (12)$$

We define W as a random number, and with the time different and not the same as here from the beginning to enter the road until the i park the vehicle waiting time. The distribution function can be expressed as a W:

$$Fw(t) = \sum_{k=n}^{\infty} e^{-\lambda t} \frac{\lambda t}{k!} \quad t \geq 0, \quad (13)$$

$$fw(t) = \frac{\lambda(\lambda t)^{m-1}}{m - 1} e^{-\lambda t} \quad t > 0, \quad (14)$$

An Intersection is a basic node of the urban traffic network. How to gather traffic information and control the traffic flow around it is a hot research topic. There are two main methods in signal control: periodical signal control and sensor-based signal control. Due to the randomness of the traffic flow, the periodical signal control method is unable to adapt a signal control to the dynamic traffic flow, and it only works for the less busy intersections, the expectation can be expressed as follow:

$$E(t) = (\frac{m}{\lambda} + \frac{r}{v}) - (\frac{1}{\lambda} - \frac{r}{v}) = \frac{m - 1}{\lambda} + \frac{2r}{v}, \quad (15)$$

The main difficulty of traffic control is usually the forecast of the incoming vehicles. If we know the exact time when the vehicles arrive at the intersection, the algorithm will be easy to implement. Almost all

of today's road vehicles contain a large mass of steel. The steel has a much higher magnetic permeability than the surrounding air, so vehicles can be detected using magnetic sensors. Magnetic traffic sensors detect passing vehicles by measuring disturbances in the Earth's magnetic field. Magnetic traffic sensors are much more compact than inductive loop traffic sensors, and thus are better able to count vehicles in bumper-to-bumper traffic. Also, the manager node in wireless sensor network can communicate with each other, it can transfer traffic flow data to the previous intersection or to the next intersection, it can also help the traffic controller algorithm to output more exactly traffic control symbol. We can dynamically add more sensor nodes into the network after we input some parameters into nodes, then the nodes can communicated with each other dynamically, this can make sure the traffic control system Scalability and fault tolerance.

3.2. Detection and Extraction Method of Vehicle

Vehicle detection is the key traffic monitoring system, accurate and effective detection and extraction of vehicle, has an important role in intelligent traffic control. Based on a lot of video vehicle detection algorithm, the video vehicle detection algorithm is used, the optical flow method, matching method and difference method. Fig. 7 is the result image morphological processing of an image extracted.
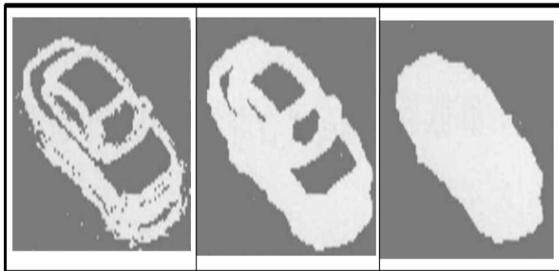

Fig. 7. The result image morphological processing of an image extracted.

Optical flow method: the velocity components to determine the location of image points caused by calculating the motion. Usually the relaxation method is used for computing optical flow. The basic principle of the optical flow method is: first, to form an image motion field, the first to every pixel in an image given a velocity vector. By the projection can be, a point on the image and 3D object point is corresponding one at a given moment movement, then according to the analysis of dynamic image velocity vector of pixels. When the image is not driving the vehicle, optical flow vector in the entire image region is continuous change; when the image of a vehicle, the velocity vector and the background

velocity vector of the moving vehicle is different, which can detect moving vehicle location.

Matching method refers to the characteristics to establish the target set, then according to the feature set to search and determine the target at each image position in the image, so as to find the target in the correspondence between different frames. Many matching method, commonly used in template matching based on recent, matching method based on feature. In practical application, generally use the matching method based on feature.

Difference method is simple in calculation, easy realization, fast operation speed, in most cases, good detection effect, therefore, become generally use the moving vehicle detection algorithm. If the gray value difference value is very small, then think here scenery is still; if the image area somewhere large values of the difference of the values, will be down the pixel region labeling, to calculate the moving target position in the image.

An important objective of morphological operations is to regional and internal features connected appear, in order to better extract useful features. Morphological operation filling operation is a pixel region of operation according to the. Its purpose is to make the features more obvious, which is one of the most commonly used morphological operations. Image filling operation must be carried out before the two value of the image, and then use the fill function to a value of two adjacent background pixel of the image (value 0) set as the boundary pixels of object (value of L). In order to realize the filling operation, must first specify the connectivity of the filling operation; and then specify the binary image of the filling starting point, finally the region filling. The filling operation calls the fill function in MATLAB toolbox to realize the regional. The fill function will be deleted without connecting to the boundary of the local minima.

3.3. Vehicle Identification and Traffic Statistics

In the development process of intelligent transportation, the emergence of a variety of vehicle identification, traffic statistics method. Such as optical flow method, matching method and difference method (background subtraction method, frame difference method). Although some methods to identify and statistics of traffic are more accurate in a certain extent, but these methods are more or less some drawbacks. Vehicle recognition statistical algorithms in the past usually exists many noise points after image segmentation. The regional edge map image was shown in Fig. 8.

Many vehicles recognition as a car, vehicle adhesion, blocking vehicles, vehicle identification incomplete statistical problems, often affect the recognition results, thus affecting the coordinated control of the intelligent transportation system. Traffic statistics algorithm, and proposes a new

vehicle identification, traffic statistics algorithm, modified various shortcomings and disadvantages of good usually algorithm. Thus, the application area methods to identify vehicles, traffic statistics thoughts arise spontaneously. The vehicle identification software interface was shown in Fig. 9.
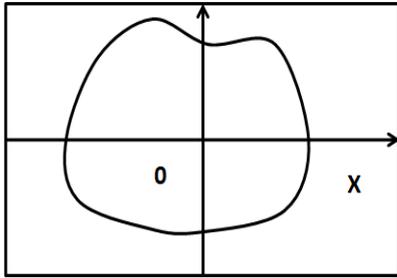

Fig. 8. The regional edge map image.

Fig. 9. The vehicle identification software interface.

Area method is proposed in this paper is a simple and convenient traffic identification and statistics method. It is in the original background subtraction algorithm based on operation. In the statistical process of vehicle recognition, area can be noise, very good solution to the vehicle image segmentation after vehicle adhesion, blocking vehicles, many vehicles recognition as a car and other phenomena, the calculating method is simple, easy to operate, high recognition rate, not only in the vehicle identification, traffic flow statistics has important application value, but also conducive to the development of intelligent transportation, prospect is more and more widely. The basic principle of area method is based on the background subtraction method for the area is closed, and then some algebraic operations on the. The area enclosed is often an important parameter calculation region identification process. We usually use edge tracking algorithm interpolation and technology to obtain the edges of regions is described, based on the further calculation area.

Method of area calculation method is simple, easy to implement, can't solve the vehicle adhesion is a good solution to the background subtraction, vehicle occlusion problem, so more and more people of all ages. But the area method is simple also exist many drawbacks, such as for near vehicle area method recognition rate is very high, but the identification of distant traffic, area rule is not heart. Therefore need to find a better way to solve these problems to achieve the statistics of the vehicle identification. Therefore, this paper puts forward method and area method is the method of information fusion for vehicle identification of the vehicle by the background subtraction, traffic statistics.

4. Summary

Along with our country city changes a process continues to accelerate, city population growing and growing city vehicles, the city road traffic system, the increasing pressure of. Therefore, the vehicle identification based on computer vision technology, the importance of increasing car traffic statistics, attracted widespread attention, and has become a hot spot in the research field. Therefore, the application of video vehicle detection technology and image processing technology, the same number recognition in the view of many cars, types and mobile features, can provide real-time basis for intelligent traffic control. We use the information fusion method of vehicle recognition, traffic statistics, and several problems which are discussed. But because of the time, energy and other objective conditions, the content of this research as well as the depth is to be further extended. At the same time, not some problem in intelligent transportation system involved, such as the information fusion method is applied to the field of video tracking, vehicle speed estimation, model recognition.

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