Journal of Engineering Sciences
Vol 11, Issue 2, FEB/2020
ISSN NO:0377-9254

TRAFFIC DATA CONGREGATION EXAMINING IMAGE TEXTURE OVERHAULING CANNY EDGE DETECTION

[1]DHANYA.K & [2]DR.P.SRIVARAMANGAI
[1] Mphil, Dept of Computer science, Marudupandiyar college (Arts and Science), Thanjavur-613403, Tamilnadu, and Mail Id: - dhanyakmail@gmail.com
[2]Associate professor, Dept of Computer science, Marudupandiyar college (Arts and Science), Thanjavur-613403, Tamilnadu, and Mail Id: - srivara.padma@gmail.com

Abstract
As the problem of urban traffic congestion intensifies, there is a pressing need for the introduction of advanced technology and equipment to improve the state-of-the art of traffic control. The earlier methods used such as timers or human control are proved to be inferior to alleviate this crisis. In the existing system, in order to control the traffic by measuring the real time vehicle density using canny edge detection with digital image processing was proposed. This traffic control system offers significant improvement in response time, vehicle management, automation, reliability and overall efficiency over the existing systems. Besides that, the complete technique from image acquisition to edge detection and finally green signal allotment using four sample images of different traffic conditions is illustrated with proper schematics and the final results are verified by hardware implementation. Proposing a fast detection algorithm for urban road traffic congestion based on image processing technology. Firstly, to speed up the processing and to freely select the interesting area, the human-computer interaction vehicle area detection was put forward. Then, by using the difference of texture features between congestion image and unobstructed image, proposing vehicle density estimation based on texture analysis. Through image grayscale relegation, gray level co-occurrence matrix calculation and feature extraction, the energy and entropy features that could reflect vehicle density were obtained from vehicle area. After features training, the decision threshold could be obtained and traffic congestion was carried out. Experimental results showed that the accuracy of algorithm was as high as 99%, and the processing speed could satisfy the real-time requirement in engineering.
Keywords: - Vehicle Area Calibration, GLCM Calculation, Features Extraction, Road Congestion Recognition

Journal of Engineering Sciences

1. INTRODUCTION

Object recognition technology in the field of computer vision to find the objects in the image or video sequences and selects them. Humans realize many things in images with little effort, despite the fact that the image of objects may vary somewhat in different views, in many different sizes and scales or even when they are translated or rotated. Objects can be recognized even when they are partially obstructed from the point of view. In modern life, we have to face with many problems, one of which is traffic congestion becoming more dangerous day by day.Currently, the problem of road congestion becomes the national focus. Road congestion seriously affect people's normal travel, restrict the economic development of society, so this is a problem to be solved as soon as possible. With the wide use of traffic monitoring system, using video and image processing technologies to detect road congestion is attracting more and more interests. As a result of the increase in vehicle traffic, many problems emerged, for example, traffic accidents, traffic congestion and so on. Traffic congestion was a very difficult problem. As a result, many investigators have paid attention to ITS (Intelligent Transportation System) , such as predicting traffic flow based on traffic monitoring at the traffic junctions to detect bottlenecks . This task remains a challenge for computer vision systems. Several approaches to this task have been implemented over many decades . There are many methods of detecting vehicles on road such as motion detection, installing lasers on both sides of the road etc., which is tedious and involves a large number of hardwares. This method uses image processing techniques to count the number of vehicles on road and estimate the density. The number of vehicles found can be used for surveying or controlling the traffic signal. This is one of the best modern methods that countries are seeking to introduce into the traffic system. It organizes the traffic in a smart way, in this way you can organize the traffic without needing for a person to do it. Through the continuous efforts of researchers, there is a set of relatively fixed process of road congestion detection based on image processing, which contains training monitoring background, road foreground detection, feature extraction and training, road congestion estimation. However, in this process, training background is time-consuming, and some factors can easily influence the result, such as scenes change, camera shaking, and the light changes. But, accurately obtaining traffic conditions in real time is the key to relieve road congestion. In this project, a real-time road congestion detection algorithm based on texture analysis is proposed, which deals with image data from road surveillance systems and carries out the accurate identification of vehicle density in different scenes. It is considered to successfully provide quick and reliable traffic information to the traffic administrative departments.

2. RELATED WORK

Existing system

In the existing system, a system in which the density of traffic is measured by comparing the captured image with real time traffic. Information against the image of the empty road is proposed as a reference image. Here, in figure 1, the block diagram for proposed traffic control technique is illustrated.

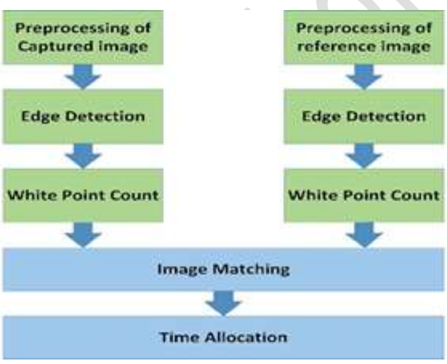

Fig 1:Block diagram of proposed density based smart traffic control system.

Each lane will have a minimum amount of green signal duration allocated. According to the percentage of matching allocated traffic light duration can be controlled. The matching is achieved by comparing the number of white points between two images. The entire image processing before edge detection i.e. image acquisition, image resizing, RGB to grey conversion and noise reduction canny edge detection operation and white point count are depicted. Canny edge detector operator is selected because of its greater overall performance. Percentage matching for different sample images and traffic time allocation for them are demonstrated in. The content of this project completely serves the purpose of demonstrating the limitations of current traffic control techniques and the solution of this limitations with detailed explanation. Image matching by comparing detected edges is a novel approach to identify the vehicular density with propitious accuracy. As far as we know, matching images by comparing detected edges has not been used before for smart traffic control application.

Proposed approach

The algorithm proposed in this project includes four steps, which are vehicle area calibration, GLCM calculation, feature extraction and road congestion recognition.Image analysis involves investigation of the image data for a specific application. Normally, the raw data of a set of images is analyzed to gain insight into what is happening with the images and how they can be used to extract desired information. In image processing and pattern recognition, feature extraction is an important step, which is a special form of dimensionality reduction. When the input data is too large to be processed and suspected to be redundant then the data is transformed into a reduced set of feature representations. The process of transforming the input data into a set of features is called feature extraction. Features often contain information relative to colour, shape, texture or context. The details are as follows.

- Vehicle Area Calibration
- GLCM Calculation
- Features Extraction
- Road Congestion Recognition

3. IMPLEMENTATION

Capturing Image

We can take the capture image from live camera that can take every 10 sec a capture image. But in my paper we will take the video and divide it into frames and take every few seconds a frame.If we use the camera we should install it in a fixed place so it does not vibrate.

Foreground Detector

Foreground Detector is considered as the most important function in this code; it plays a big role

Journal of Engineering Sciences
Vol 11, Issue 2, FEB/2020
ISSN NO:0377-9254

in the filter and detects the ground.Foreground Detector detect foreground using Gaussian Mixture Models (GM- M) .Foreground Detector also changes the image type from “RGB” to “Gray” then to “Binary” and applies filtering at different levels. Converting images to binary type is done by replacing all pixels according to the specified luminance with either white (logical 1) if the pixel is equal or greater than the level or black (logical 0) otherwise. Specified level should belong to the range [0, 1].

Image Enhancement

Image enhancement is the process of adjusting digital images so that the results are more suitable for display or further analysis. For example, we can eliminate noise, which will make it easier to identify the object.Image enhancement are the same used in image detecting and video detecting except in image rode process are not used.

Vehicle Detection

Moving vehicle detection is in the video analysis. It can be used in many regions such as video surveillance, traffic monitoring and people tracking. There are many motion segmentation techniques, like frame difference. Frame difference method has less computational complexity, and it is easy to implement; its difference between the current frame and the reference frame is above the threshold is considered as moving vehicle. Another method Optical flow method can detect the moving vehicle even when the camera moves, but it needs more time for its computational complexity, and it is very sensitive to the noise.

Vehicle Tracking

Vehicle tracking involves continuously identifying the detected vehicle in video sequence and is done by specifically marking the boundary around the detected vehicle. Vehicle tracking is a challenging problem. Difficulties in tracking vehicles can arise due to abrupt vehicle motion, changing appearance patterns of the vehicle, vehicle-to-vehicle.

Counting Vehicle

It’s considered as the last stage in my paper, it gives the number of cars according to the number of boxes detected around the cars.

4. EXPERIMENTAL RESULTS

The experiments were carried out on computer of 2.6GHz CPU and 4GB memory with Windows 7 operating system. The experimental data included two parts, some were downloaded from the Internet, and others were taken from self-made monitoring system. First, 100 frame of crowded vehicles images and 100 frames of sparse vehicles images were chosen as samples. Two of them are shown in Fig.6.a and 6.b. Then, car area was celebrated and the results were shown in Fig 6.c and 6.d. Next, greyscale reduction and GLCM calculation were performed. Four GLCM with different direction θ were calculated from each image. Then energy and entropy features were extracted using Eq. 2 and 3. The eigenvalue S could be obtained by Eq. 4. Now, a set of eigenvalue $\{Si\}$ was got, where $i \in \{1,2, 3,\ldots,200\}$. Numeric statistical results showed the eigenvalue S of crowded and sparse vehicles was easily recognized. For most sparse vehicles images, S is less than 6. For most crowded vehicles images, S is bigger than 7. Therefore, the decision threshold ST was set to 6.5. To test the accuracy of our algorithm, we dealt with another 100 frames of images randomly chosen from our data set. The result showed that 99 images were successfully estimated.

Fig.2. (a) sparse vehicles; (b) crowded vehicles

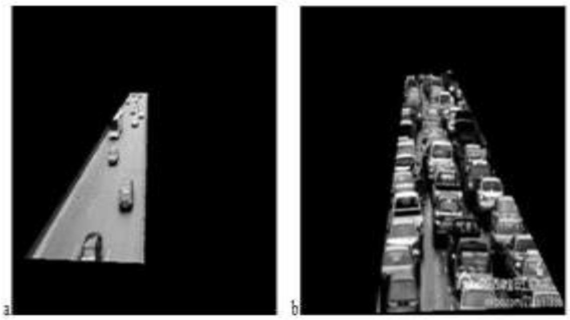

Fig.3. (c) detection result of sparse vehicles; (d) detection result of crowded vehicles.

For real-time testing, we selected a 60-second long traffic monitoring video, including 1500frames. Because the monitoring scene was fixed, it only needed one-time vehicle area calibration. The results showed it took 6,088ms to deal with this video, that is 4.059 frame per microsecond. The speed can completely satisfy the real-time requirement of engineering. The following chart represents the performance comparison of the two

Vol 11, Issue 2, FEB/2020
ISSN NO:0377-9254

algorithms Canny Edge and GLCM.

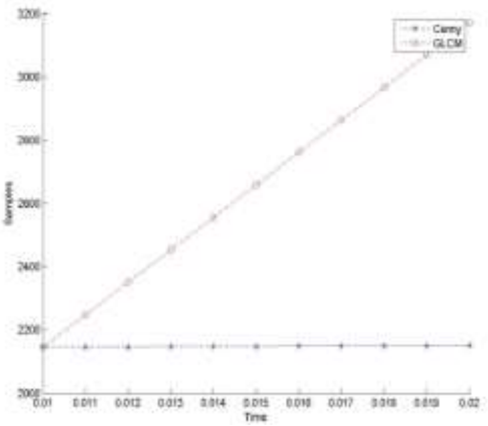

Fig.3 Performance Graph

5. CONCLUSION

In this project, a real-time traffic congestion estimation approach was proposed, which is based on image texture feature extraction and texture analysis. The main innovations are as follows: First, proposing human- computer interaction approach to set vehicle area,which is not only faster than the common used background training method, but more convenient to select an area of interest. Second, we proposed extracting texture features to estimate vehicle density. Researchers have used texture analysis method to estimate the density of pedestrian and fish, but no one else used it to estimate the density of vehicles. Our experimental results showed using our new texture feature to estimate vehicle density, the accuracy could be as high as 99%, and the speed is very fast, which could meet the real-time demand in engineering. We believe that our approach would be integrated in road video surveillance system in the future and provide reliable and fast road information for traffic managers.

6. REFERENCES

[1] Haralick, R., and Shanmugnm, K., 1973. Textural features for image classification. IEEE Transactions on Systems, Man. and Cybernetics, 3(6),610-621.

[2] Huang, L., et al., 2014. Research on road congestion state detection based on machine vision. Journal of China Computer Systems, 35(1), 148-153.

[3] Li, W.,2011. Research of crowded objects dynamic analysis. Shandong University, Shandong, China.

[4] Liu, L., and Kuang, G., 2009. Overview of image textural feature extraction methods. Journal of Image and Graphics, 14(4), 622-635.

[5] Wang, C., 2010. Research of urban traffic congestion detection based on video processing. Ph.D. thesis, Chongqing University, Chongqing, China.

[6] Wang, D., 2012. Research of detection and monitor technology in super highway ramp based on vision sensor. Ph.D. thesis, Zhejiang University of Technology, Zhejiang, China.

[7] Wu, X., Liang, G., Lee, K., and Xu, Y., 2006. Crowd density estimation using texture analysis and learning. In proceedings of the International Conference of Robotics and Biomimetics.

[8] Zhao, Y., et al., 2010. Traffic congestion detection based on global optical flow field. Application Research of Computers,27(11), 4355-4357.

[9] E. Argyle. “Techniques for edge detection,” Proc. IEEE, vol. 59, pp. 285-286, 1971

[10] J. F. Canny. “A computational approach to edge detection”. IEEE Trans. Pattern Anal. Machine Intell., vol. PAMI-8, no. 6, pp. 679-697, 1986

Journal of Engineering Sciences