A Review paper on Traffic Load Computation for Real Time Traffic Signal Control

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Abstract- Traffic load computation for real time traffic signal control system has become a challenging problem as well as the need of hour to make road traffic decent, safe, less time and fuel consuming. CCTV Cameras can prove to be a robust and sufficient solution in this direction. Images of the traffic captured with the help of CCTV Camera, can be processed to retrieve the required output about current traffic. This presents a model to count the traffic load by some parameters such as edge detection, histogram equalization, labeling and removing the noise with the help of median filter. The load computed can then be used to control the traffic signals.

The main purpose of the developed algorithm is to compute total traffic load at a particular junction, which is then further used for real time traffic control by generating green light timing of the traffic signal. For computing traffic load, two data source images have to be input, one is blank road image and the other is its corresponding road image with vehicles. The two images are compared to count the number of vehicles present in the traffic load image. The load computed will then be used to control the traffic signals.

Index Terms- Image processing, Traffic load computation.

I. INTRODUCTION

Object detection is an important field of research in computer vision. Before pattern recognition or object classification can be performed, finding the objects of interest from input image or video is vital. Once the objects of interest are detected and segmented, further processing can be done according to system's application. The foundation of many computer vision applications, object detection is crucial in affecting the accuracy of the final output. Generally, there are two types of object detection methods. The first type is by doing background subtraction to locate the foreground pixels, followed by object segmentation to extract the objects of interest. Usually, image preprocessing techniques are required in this type of detection. The second type of object detection methods is more direct. It does not require much of the image preprocessing techniques. It exploits the relevant features of object in training classifiers to directly detect the objects of interest from input images or videos. Frame based object detection belongs to the first type. Most of the frame based object detection systems encounter shadow problem during detection. Shadows create problems that make the system difficult to segment individual objects when they are too close to each other. When more than one objects move closely together, their shadow may stack or overlap, causing the objects joined together. The system will detect them as one object and thus lower down the accuracy.

Hence, an approach is introduced to counter this problem, which is, using shadow removal in the preprocessing phase. This research focuses on the development of a system that works efficiently on traffic flow monitoring with the help of shadow removal algorithm The combination of these blocks is used to perform morphological image analysis. Morphology is the study of the shape and form of objects. Morphological image analysis can be used to perform image filtering, image segmentation, and measurement operations.

1) The image is scanned from top to bottom for detecting the presence of an object.
2) One variable is maintained i.e., count that keeps track of the number of vehicles.
3) This concept is applied for the entire image and the final count of objects is present in variable count.

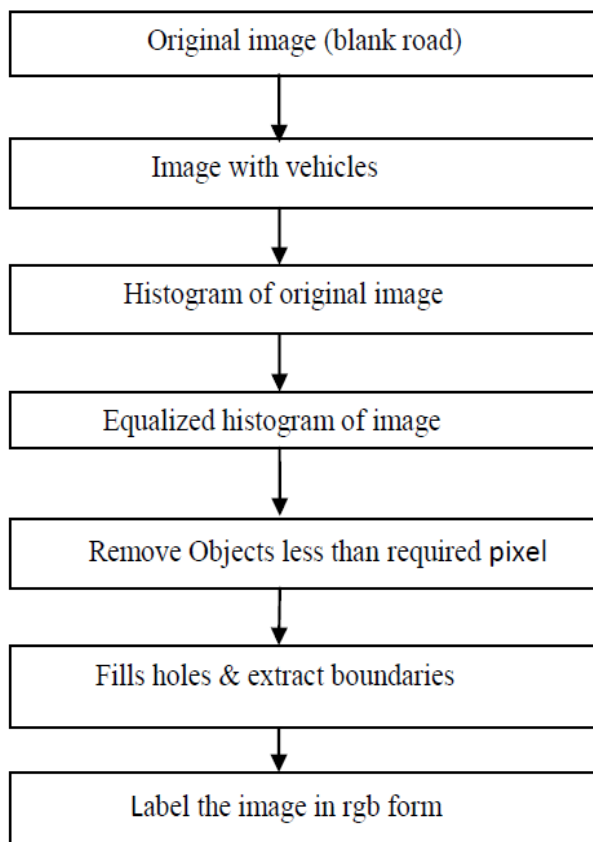The complete procedure is shown by the following flow chart:

Fig.1. Flow chart of proposed approach.

A. Original Image:- Original Image taken from blank road.

B. Image with vehicles:- Original Image consist of images of vehicles.

C. Histogram of original image:-

Using histogram equalization technique the contrast of each image is being enhanced.

D. Remove object less than required pixel:-Remove object from original image which is less than requried pixel in MATlab. Extract the suitable features and then extraction of objects.

E. Fill holes & extarct boundaries:-

There always exist some noise regions both in the object & background region. So fill the holes & extract boundaries with the help of post processing technique. then label the image in rgb format.

II. RELATED WORK

Chin H. L, Ming K. L, Siak W.K. [1] Described a system that is capable of detecting and segmenting objects from video frames which helps in traffic surveillance. Shadow is one of the problems faced by most of the object detection systems. It will affect the result of object detection and segmentation. Hence a shadow removal method is applied in the preprocessing phase of the system to amplify the accuracy of detection.

P. Gupta , G.N Purohit , A. Gupta. [2] Presented an efficient simulation model for counting the vehicles from the colored and gray-scale images through image processing techniques in Simulink environment. Video and Image

Processing Blockset is a tool used for the rapid design, prototyping, graphical simulation, and efficient code generation of video and image processing algorithms. The approach used is morphological operation (Opening) which works very effectively for images captured. The developed process involves object feature identification, detection, and counting objects.

P. Gupta , G.N Purohit , A. Gupta. [3] Focused Corner detection technique is very useful for detect the corners in any traffic image. Corner that exists in any irregular line must be detected so that the irregular line can be interpreted to represent actual line. Corners serve to simplify the analysis of images. The developed Simulink model is reliable & can perform counting the vehicles on roads. This system provides services such as information about the location of the corners, the number of corners, and the corner metric values of the objects. Corner detection methods have a lot scope in future.

Madhavi Arora, V. K. Banga.[4] discussed two techniques for traffic light control. Firstly discussed morphological method of edge detection for real time traffic control and then fuzzy logic. He compare two methods and find that fuzzy logic is simple to implement than morphology method because morphology method is very lengthy procedure, even because it is edge detection method it does not perform well during night time, edges of certain vehicles will not able detect due to dark at night time, but fuzzy logic only counts the number of vehicles not deal with edges, it gives more accurate results, He see cost factor then morphological method is less costly than fuzzy because morphology method only needs high quality camera not sensors which is less costlier. The fuzzy logic allows the implementation of real-life rules similar to the way in which humans would think, so no doubt fuzzy logic gives better result. It also deal with the no of vehicles due to which it gives better results but morphology method depends upon the density of traffic due to which it gives approximate result. This work may extend to find new methods for better results during night time using morphology technique so that cost and good results make the system more worthy.

Monica V., Andreea U., Simona C.[5] The presented a part of the research performed in the framework of the project "Intelligent techniques for modeling, analysis and optimization of urban traffic", financed by the National Center of Programme Management. The main objective is to eliminate congestions in urban traffic, using an adaptive, intelligent and reconfigurable control system. Presented the two modeling methodologies as well as a cross-validation procedure of resulting models, based on the same input data.

III. CONCLUSION

From review of various paper we conclude that there are different techniques are available for traffic load control. Corner detection, Simulik Model, Morphological Method, Fuzzy Logic used for traffic load computation , detection of traffic on road, edge detection.

Therefore at this stage use of real time algorithm for traffic load computation to calculate number of vehicles at a particular instance. Try to Calculate improve result as compare to conventional method in turn of time require for convergence.

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