

Vehicle Overload detection using Image Processing

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Abstract—This paper focused on prevention and damage of roads vehicle and road accidents. In paper we first capture the moving vehicle side view from that we extract tires using image processing. After that we compare shape of tire in our database if vehicle will overloaded it will capture vehicle registration number. As we know roads play a very important role majorly in transportation and to maintain these transportation smooth roads need to be in good condition but now a days we can see the condition of our roads. Damages of roads caused by moving heavy vehicles in overload due to this road gets damage and sometimes bridges get collapse another problem is that in overloaded vehicle some time break failed.

Keywords—Accidents, Damage, Road, Transportation, Vehicle

I. INTRODUCTION

Overloaded vehicles are becoming the major causes of unwanted accidents. Because overload can reduce the driver's efficiency to break and steering and it can be one of the causes of accident. Due to unnecessary stress on the engine increase the chances of tire failure and it reduces the vehicle's stability. It damages the national road and it is an illegal activity. Due to overload penalty can be charged. According to Road Traffic Act (1998). The police will impound driver's license and also the registration number plate itself. The govt. has brought in a very high penalty system for full vehicles plying on the national highways. The overloading penalties vary from two-to-ten times the counting on toll looking on the additional weight that a truck is carrying. The new rules came into result recently. The sooner rules concerned charging ten times the toll fee regardless of the extent of excess load that a truck was carrying. Full vehicles area unit asked to pay fines as a result of they have an inclination to break the roads and also are unsafe, as they topple sometimes and become a security hazard. In line with the new rules, for carrying further load of 0 to 20% over the whole permissible weight, vehicles can have to be compelled to pay doubly the toll fee. For carrying 20 to 40% excess load over permissible limit, the penalty becomes fourfold the toll charges that a truck driver is meant to pay. For carrying 40% to 60% further weight, the toll charges that a truck driver can have to be compelled to pay is sixtimes, whereas for carrying 60 to 80% excess load, the penalty is eight times the toll charges. For carrying any further weight over 80%, the toll fee becomes ten times.

II. Flowchart

In Fig.1 shows in this paper how to camera capture image and desired frame will be removed from the entire video. After extraction of the frame, all process takes place.

As seen from the literature survey, high computational speed and cheaper equipment are the main reasons for image processing detection algorithms are famous. The good portion of the proposed system is the software model which makes use of various image processing technologies which are implemented in MATLAB 2019 and databases. The proposed system can be classified into following parts as shown below,

- i. Capturing of the vehicle's image.
- ii. Noise removal.

- iii. Adjust Intensity.
- iv. RGB to Gray.
- v. Detection of shape of tire depending on condition following stage occur.
- vi. Detection and Recognition of the license plate in the vehicle's image using image processing.

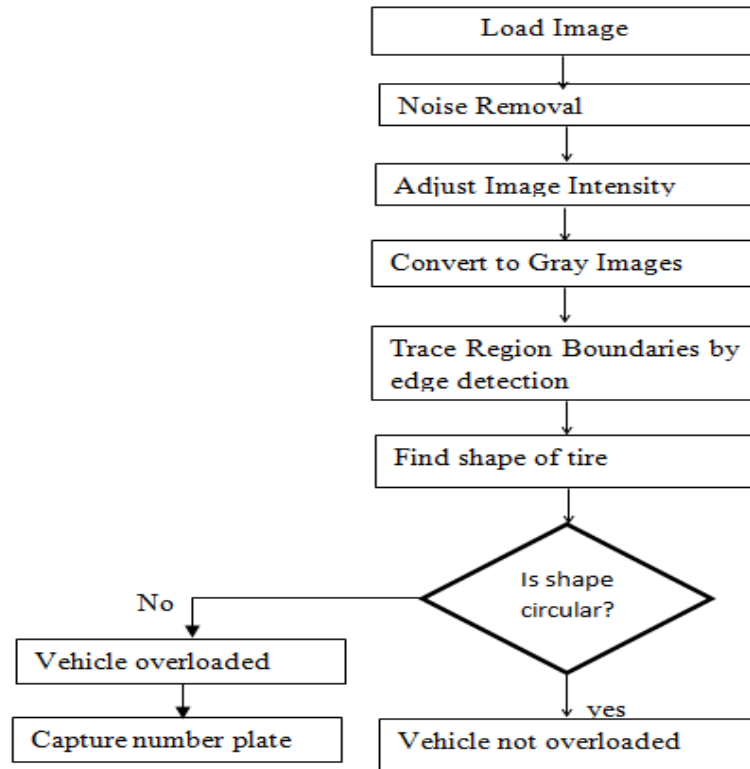


FIGURE 1: Flow of processes

III. MATERIAL AND METHOD

Camera

A camera that streams an image, video in real-time through a computer to a network sort of web. The sort of camera required in our paper may be a high-resolution high-speed camera. There's a requirement to use a camera within the proposed paper to detect the vehicle moving on the road. Capture a picture by setting a particular frame and reserve it to the database.

MATLAB

The name MATLAB means Matrix Laboratory. MATLAB was written originally to provide quick access to matrix software developed by the LINPACK (linear system package) and EISPACK (Eigen system package) papers. MATLAB is an integrated technical computing environment that mixes numeric computation, advanced graphics, visualization and a high level programming language. In proposed paper MATLAB software to used implement code. It are often wont to perform image segmentation, image enhancement, noise reduction, geometric transformations image registration and Three D image processing operations. MATLAB provides a comprehensive set of reference-standard algorithms and workflow applications for image processing, analysis, visualization and algorithm development. Proposed paper is based on software, therefore need use MATLAB software. In the proposed paper find out the shape of the vehicle using MATLAB functions. In Proposed Paper captures vehicle images using Web Cam. This captures the image is load in MATLAB and to read this image use imread() function. For detection of tire shape

in an image use `imfindcircles()` functions.eg: `[centers,radii,metric] = imfindcircles(A,Range)` also returns a column vector, `metric`, containing the magnitudes of the accumulator array peaks for each circle (in descending order). The rows of centers and radii correspond to the rows of `metric`. Using `viscircles` detect circular shape of tyre.eg. `viscircles(centers,radii)` draws circles with specified centers and radii onto the current axes.

RGB2GRAY

This is used to convert 2-D colorful image into gray scale image. Also set the value of threshold as show are syntax given below,

```
I=rgb2gray(RGB)
newmap=rgb2gray(map)
```

HOUGH TRANSFORM

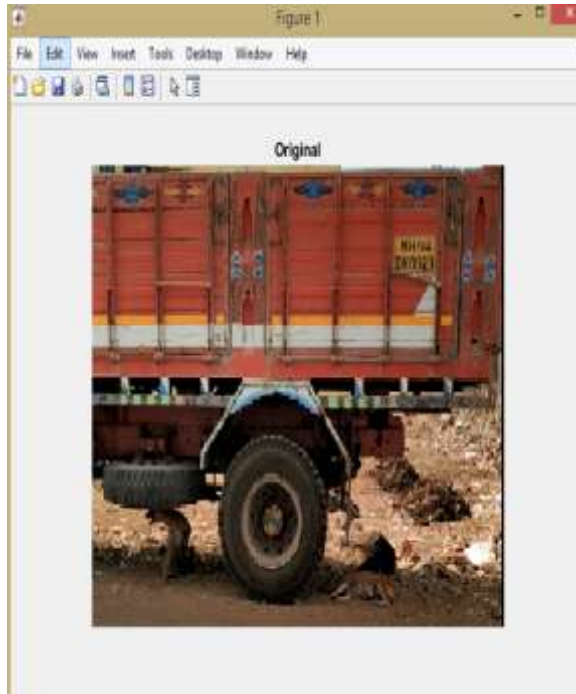
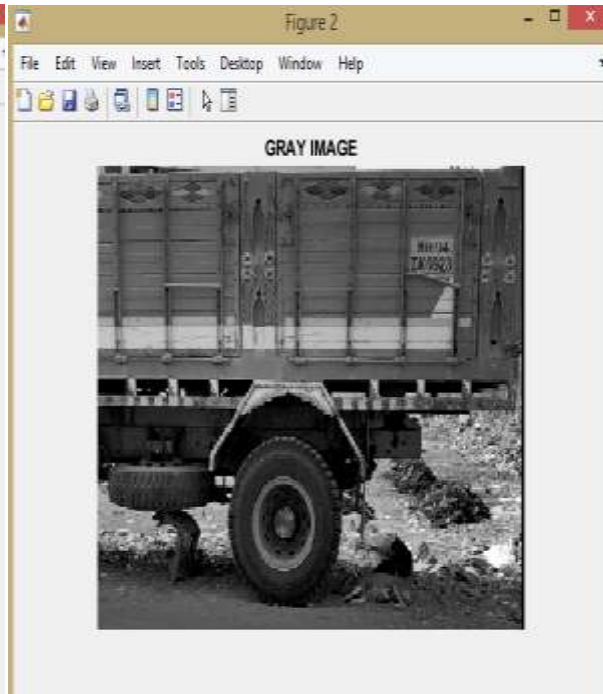
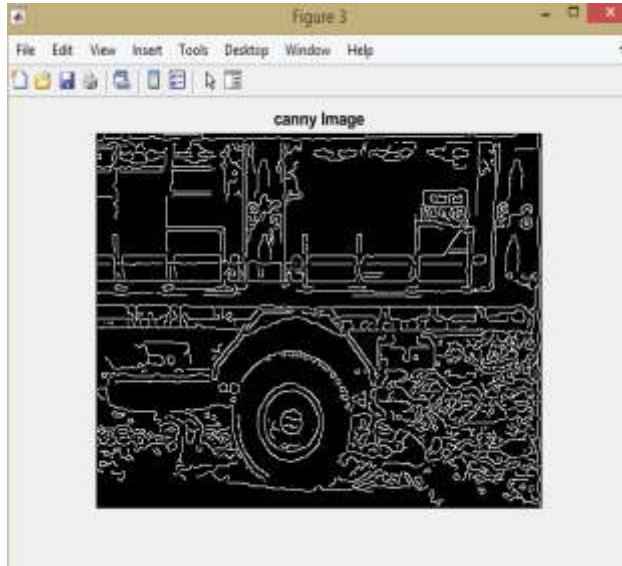
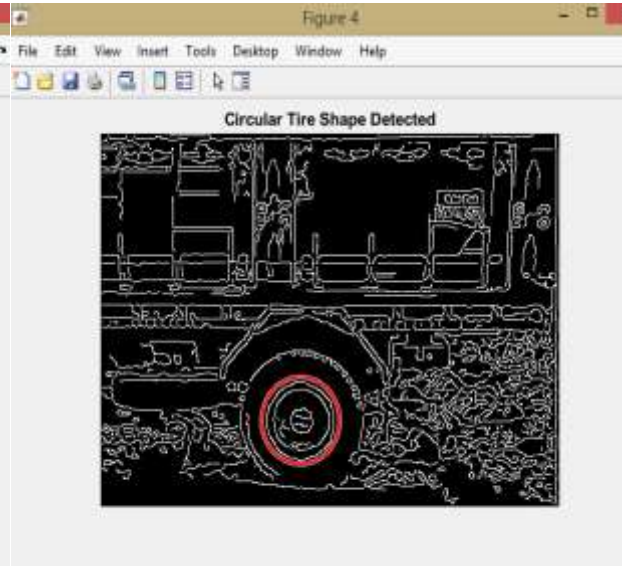
The Hough Transform (HT) is a robust method for finding lines in images that was developed by Paul Hough. Perform accumulation on the accumulator array using the binary edge image. Find peak values in the accumulator array. Verify that the peaks found correspond to legitimate lines, rather than noise.

CANNY EDGE

Canny edge in method that find edges present in image and it provides high accuracy and uses less memory space and also gives highly localized output.

TABLE 1
COMPARISON BETWEEN DIFFERENT TECHNIQUES IN IMAGE PROCESSING

Sr. No	Title of the paper	Advantages	Disadvantages
1	Vehicle Target Area and Tire Detection Image Processing Technique(IEEE) ¹⁴	Perfect target	Moving target capture not possible
2	A New Algorithm for Shape Detection(IEEE) ¹³	Shape of the Tire	Accuracy is less
3	Application of Edge Detection for Vehicle Detection in Traffic Surveillance System	It is an optimal edge detection technique as it provides good detection	It need high pixel images
4	Canny edge detection algorithm[2]	Low error rate, Good Localization and detects each pixels	High response time
5	Shape Template Based Side View Car Detection Algorithm	Segmentation Algorithm, Hypothesis Generation, Hypothesis Verification	Multiple circle detected in Hough transform

IV. RESULT**FIGURE 2: ORIGINAL IMAGE****FIGURE 3: GRAY SCALE IMAGE****FIGURE 4 : CANNY EDGE DETECTION****FIGURE 5 : NOT OVERLOADED VEHICLE**

In fig.2 removing desired image from real time in proper orientation also after that it is converted in gray scale image as shown in fig.3 because maximum operation are perform in gray only.

After that using canny edge detection all the edges are detected it is shown in fig.4 from all the edges now it is very easy to get any shape present in any images. In fig.5 circular shape of tire is detected that means vehicle is under over weight.

V. CONCLUSION

It analyze overloaded vehicle by capturing vehicle images. The system does not need any special hardware kit like arduino etc. Proposed project is based on software. MATLAB software needed to implement this project. Through the literature survey it has been observed that improved canny edge detection technique will be used for the project. As of now, Detection of circular tire has been achieved by using MATLAB's functions from picture of vehicles. A reduction in overloaded trucks is conducive to a reduction in crashes. There are still issues and challenges for this technology and application which require more research and development work. As the proposed project uses toll camera, no extra cost for installation will be needed. It provides 24*7 availability on detection. The proposed project is expected to capture overloaded vehicle and detect illegal transportation.

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