VEHICLE DETECTION AND SPEED DETECTION

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ABSTRACT

vehicle speed detection is used to estimate the velocity of the moving vehicle using image and video processing techniques. Without any camera calibrations video is captured and analyzed for speed in real time. By employing frame subtraction and masking techniques, moving vehicles are segmented out. Speed is calculated using the time taken between frames and segmented object traversed in that frames. Finally frame masking is used to differentiate between one or more vehicles. With an average error of +/- 2 km/h speed detection was achieved for different video sequences.

1. INTRODUCTION

vehicle speed detection is useWith the increase in urban population in many cities, amounts of vehicles have also been drastically increased. In a recent study over-speeding caused most of the accidents, followed by drunken driving. Over-speeding of two-wheelers and threewheelers is one of the major reasons of accidents. In order to support traffic management system in our country we need to build economical traffic monitoring systems. In recent times image and video processing has been applied to the field of traffic management system. This paper explicitly concentrates on the speed of the vehicles, which is one of the important parameters to make roads safe.d to estimate the velocity of the moving vehicle using image and video processing techniques. Without any camera calibrations video is captured and analyzed for speed in real time. By employing frame subtraction and masking techniques, moving vehicles are segmented out. Speed is calculated using the time taken between frames and segmented object traversed in that frames. Finally frame masking is used to differentiate between one or more vehicles. With an average error of +/- 2 km/h speed detection was achieved for different video sequences.

Relatively few efforts have been attempted to measure speed by using video images from uncalibrated cameras. Similarly, several other papers suggest estimating speed by first placing two detection lines (separated by a known distance) and then measuring travel times between the lines. This paper provides a low cost and versatile vehicle speed detection using a computer vision based approach. In this setting, the speed is detected using video cameras commonly available.

2. LITERATURE SURVEY AND RELATED WORK

Many projects addressing similar problems have been done in international level. One such approach has been discussed in the research paper by Leo Cetinski and David Dawson. Use of speed gun for speed detection and LPR software for vehicle recognition has been explained in the paper.

A number of different approaches have been used by many researchers to detect speed of moving vehicle. One of the most popular ways of speed detection is based on LASERcrossing. Two LASER lights placed on the path of a moving vehicle can be used to determine the speed by measuring the time difference between the crossings.

However this approach is now less frequently used for speed detection after the advent of Doppler radar guns. Speed detection using Doppler sensor is based on the principle of DopplerEffect.Commercially available speed guns are based on this approach of speed detection and provide high degree of accuracy.

The history of automatic vehicle number detection dates back to mid-1970s. In 1976, the Police Scientific Development Branch in the UK first invented this system. Systems were working by 1979, and contracts were let to produce industrial systems, first at EMI Electronics, and then at Computer Recognition Systems (CRS) in Wokingham, UK. Early trial systems were deployed on the A1 road and at the Dartford Tunnel. However it did not become widely used until new developments in cheaper and easier to use software was pioneered during the 1990s.

The issue of Number Plate Detection is still not solved completely because the accuracy in Number Plate digitization achieved so far is not satisfiable. Different approaches for LPR havebeen developed but the research still continues for the best result. Initial approaches were based on boundary line properties. Gradient filters were used to enrich boundary lines. Algorithm such as Hough transform was then used to detect boundary lines.Two sets of lines parallel to each other were then considered as boundary of the plate.

Another approach focused on some properties of plate images such as their position, dimension ratio, brightness, symmetry, angles, etc.Morphological processings were done todetect similar properties in the image so as to locate the position of number plate. Another approach was by using statistical properties of the characters in the plate. This approach is based on finding the regions for Number Plate character based on the the variance of gray level, number of edges, edge densities in the region. This method is very accurate if the number of characters on the plate is fixed.. The research and upgrading of these algorithms continue with many researchers working on the project over a long time.

In the case of our country, very few works have been done in this field in the past. One such project on Digitization of Nepali Number Plate was done by the students of IOE, Pulchowk campus. The paper explains the use of neural network in digitization of characters of Nepali Number Plate and the accuracy achieved in Digitization of each character.

Similar uses have been implemented in many more developed countries so far with the success rate being low. However, in the underdeveloped countries like Nepal; the overall system that we are proposing is not even in the discussion.

3. EXISTING SYSTEM

One of the technologies our law enforcement department uses to measure the speed of a moving vehicle is Doppler radar. It beams a radio wave at a vehicle, and then estimate the vehicles speed by measuring change in reflected wave frequency. It is a fixed or hand-held device and is reliable when a moving object is in the field of view and no other moving objects are nearby. Cosine error has to be taken care if the gun is not in the line of sight. Also, Radio interference which causes errors in speed detection has to be taken care.

Some of the previous works using image and video processing applied for vehicle detection and speed measurements are vehicle detection based on frame difference, calibrated camera, motion trajectories, Optics and digital aerial images.

Also, blurred images were used to find out the vehicle speed along with high-end camera motion detection for automated speed measurements and feature point tracking for vehicle speed measurements were used.

Currently highly reliable GPS systems are used to track vehicle speeds in US. Cost-effectiveness is a concern in such a case.

In our method moving vehicle video from any video camera or mobile source is utilized. The algorithms are implemented in 'C' language using OpenCV and Visual Studio. Later this code can be ported to a simple processor where vehicle speed can be measured. Example: a simple smart phone with average processing capacity. Our aim was to implement real-time vehicle speed detector.

4. PROPOSED SYSTEM

A video signal is the term used to describe any sequence of time varying images. A still image is a spatial distribution of intensities that remain constant with time while a time varying image has a spatial intensity distribution that varies with time. Videos can be in various formats based on the different cameras or mobile phones used. The video format used is an AVI file with the extension

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Figure1. Frames extracted from the video.

This video is converted into frames. Since the video had 30 frames per second, extracting all the frames would lead to unwanted redundancy and these increases the delay time to execute the program. Hence, we sampled the frames so that we get 3 frames per second, which serves the need.

Further above reference frames which are consecutive in nature are selected and converted into grayscale. Conversion to grayscale further reduces the amount of computation.

Next steps include preprocessing, moving edge detection, morphological operations, edge detection, vehicle segmentation and corner detection.

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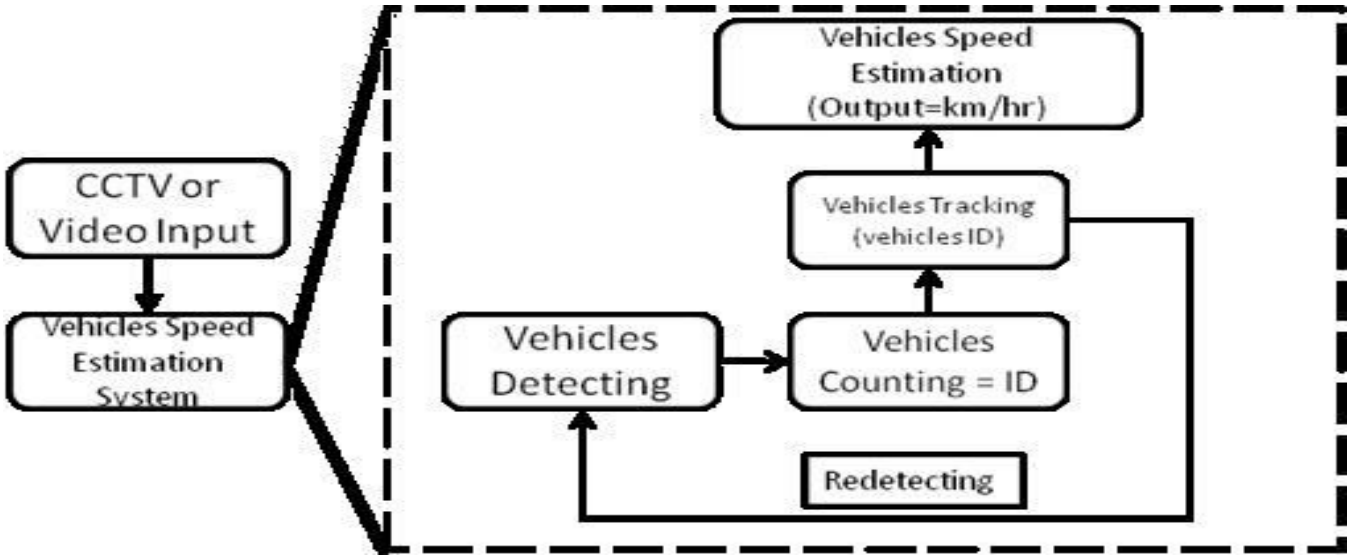


FIG 2- SYSTEM ARCHITECTURE

5. METHODOLOGIES

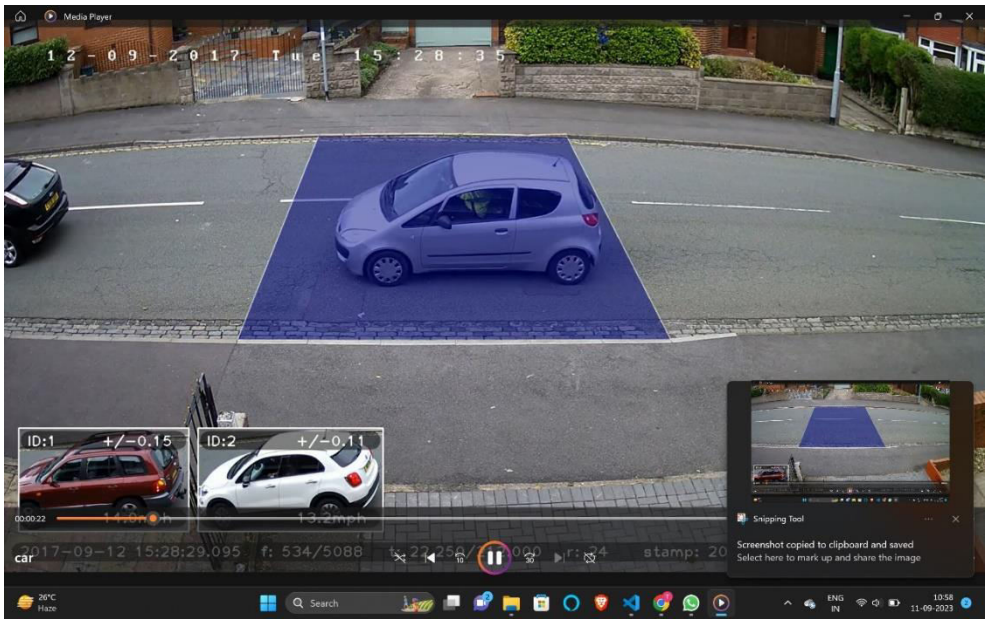
MODULE

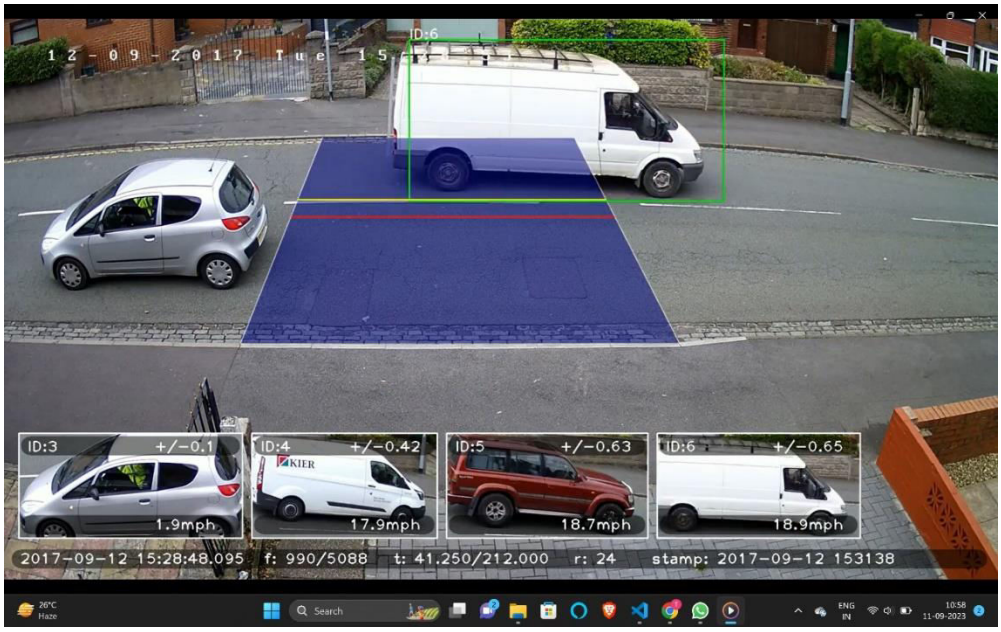
- Upload INSAT Image:
- Detect Cloud & Movement

To implement this project we have designed following modules are

1. **Upload INSAT Image**: button to upload images.
2. **Detect Cloud & Movement :** button to detect cloud movement. Application will continuously display all 45 original and cloud movement detection image with one second pause.

6. RESULTS AND DISCUSSION SCREEN SHOTS





7. CONCLUSION AND FUTURE SCOPE

CONCLUSION

The designed speed detection system was capable of continuously monitoring the speed of the approaching vehicle. The output was more accurate with no other moving objects in the surrounding. The value of speed of each passing vehicle was displayed . With each over speeding vehicle passing by , the camera was triggered and the image was saved in the folder Vehicle detection and speed recognition is an important mission in ITS. There are three steps to realize such processing, namely, background subtraction, object extraction and speed recognition. In the first step, the mean filter method for background generation that was one of the effective ways for background extraction was used. In the second step, a novel algorithm which takes advantage of the two-color based characteristics and combines them for object extraction is introduced. This approach is more robust against misdetections and the problem of the merging or splitting of vehicles and finally, in the third step, the vehicle speed is determined. The approach used is not affected by weather changes. Vehicle extraction and speed detection has been implemented

FUTURE SCOPE

This system will come handy for highway traffic police as it will not only provide a digital display in accordance with a vehicle's speed but also sounds an alarm if the vehicle exceeds the limit speed for the highway.

8. REFERENCES

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