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Video-Based Detection, Counting and Classification of Vehicles Using OpenCV

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Abstract: In this era people using vehicles is getting increased day by day. To plan, monitor and also controlling of these vehicles is becoming a big challenge. A system is to be implemented without altering the infrastructure, so a video-based vehicle capturing and analysis of that video without affecting the traffic is required, by which traffic accidents and congestion can be determined. In this paper, we have come up with a solution for the above problem using the video surveillance considering the video data from the traffic cameras. We have used adaptive thresholding method, Gaussian based background subtraction with tracking methods such as blob tracking and virtual detector. The implementation was done using OpenCV Python as a tool. Our proposed system can identify, track the congestion and help in counting the objects precisely.

INTRODUCTION

The roads are becoming over crowded due to increasing vehicle count. An Intelligent transport system (ITS) is needed to manage the congestion in traffic and to give smooth planning for drivers. Contrasted with different strategies, the video-put together with arrangements based on the observation camera mounted outside are handily affected by situations, for example, climate, enlightenment, shadow, and so on. Be that as it may, in light of the fact that video based frameworks can offer a few favourable circumstances over different techniques, for example, traffic stream undisturbed, effectively introduced, helpfully changed, and so on., they object. To overcome previous drawbacks a thresholding method called Otsu is used in which adaptive thresholding will be done for background modelling. Here we have also concentrated on false alarms due to shadow, so shadow elimination was also done to get the clear object.

LITREATURE REVIEW

- Bas et al. presented a video examination strategy to check objects [10] depending on the area of the object with respect to the distance of it from camera point. Based on the objects within the frame a boundary will be considered to detect the moving objects that is Region of Interest (ROI). Despite the fact that the calculation is improved to manage some climate conditions it can't follow vehicles when they change their bearings.
- In the other proposed method, the idea of optical flow was introduced. Here the vectors will be generated with respect to the object moment and the complex conjugate values will be determined. These vectors give us the congestion from one object to other. If more vectors are generated it refers to more congestion.
- In certain works, for example, forward and in reverse picture differencing technique used to extricate moving vehicles in a street view. A few examinations demonstrated that the utilization of highlight vectors from picture district can be amazingly productive for vehicle recognitions objectives. Some others spoke about the exact vehicle measurement estimation utilizing a lot of facilitate planning capacities as it very well may be seen in. Besides, a few investigations have built up an assortment of boosting calculations for object recognition utilizing AI strategies which can identify and characterize moving items by both kind and shading.

PROPOSED WORK

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A couple of computations have been introduced for the conditions; some of them are executed in OpenCV, for instance, Background Subtraction MOG background modelling will be done using Gaussian method. The background subtraction uses 2 to 4 distributions in clearing small artefact's. Other method for removing separating foreground and background is Background Subtract or GMG in OpenCV which relies upon and unites the establishment picture estimation methodology with Bayesian division.

The count used in the use of proposed structure is called establishment Subtractor MOG2. It relies upon two assessments and by Zikovic. One of the huge features of this count is that not under any condition like where amount of disseminations for the modelling of establishment methods are portrayed, Background Subtractor MOG2 uses a robotized prospect and picks a relevant amount of the Gaussian mixes for pixel.

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Thus, this methodology is good, if there are any issues with contrast and brightness in any frame. This method also provides good visibility on the shadow of the objects, ability in defining the shadow and also helps weather shadow to be detected or not in particular scene.

FUTURE SCOPE

There is several other future improvements should be possible to the system, for example, detection, tracking, counting and classification of moving vehicle should be possible on ongoing live videos. So that we can implement it on the live videos capturing directly from the traffic to track, count and classification. And another addition to it can be done as speed detection of vehicles in the traffic so that it may help to reduc e the accidents and other safety measures can be taken to it by alarming. This may help to traffic improvement and for safety for passengers who travel on vehicles. Region of interest (RIO) it can be added to the proposed system so that can improve the sys tem by selecting the region manually from this we can select the lane which is needed. From that region only we can calculate the vehicles passing through the tracker line so that high volume of vehicles on that lane can be diverted to other part of roads. Through this video it will be helpful to check the vehicle dens ity and accidents occurred on that lane this system is helpful in all measures of the traffic improvement.

CONCLUSION

The proposed system is actualized with java, utilizing the computer vision platform. The recordings with assortment source from traffic camcorders were taken for analysing. All the videos can be considered as pre-recorded videos which can be obtained from the traffic department on request for research purpose. The basic method is produced to choose the locale important to be broke down and afterward picture preparing strategies are applied to figure vehicle tally

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