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Computer Vision Based Traffic Controlling

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Abstract: Computer vision is technique which automatically analyzing, extract objects from 2-D or 3-D images. This new technique most widely used for video system. This this paper vehicles detection, counting and controlling is main part. For performing these technique Gaussians mixture model(GMM) and BLOB analysis method is implemented. Main aim is road which has huge traffic time period for that road is more as compared to other roads. The analyzing traffic on each road four cameras is mounted on each of the four roads.

Keywords: Computer vision, Gaussians mixture model, BLOB analysis.

Introduction: as per economic survey of any city the vehicles are increased day by day. Because of increasing number of vehicles traffic congestion problem occurs on road.to minimize this problem the system is implemented which is based on new technique i.e. computer vision. Computer vision is a technique which automatically characterizes; interpret the visual images from videos. Using this system implementation is done without supervised workers, complex set-ups etc. In this system four cameras are mounted on each road of traffic at certain height. The camera captures the videos of 20 sec on each road. After this further processing is implemented this is vehicles detection and counting.

Fig1: Traffic congestion on road

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I. Vehicles detection

Detection is nothing but detecting the certain data from certain system. Here vehicles are detected from road. For detection of vehicles Gaussians mixture model is used.

1. **Gaussians mixture model (GMM)**: This model is also called as adaptive background subtraction model [1]. Object segmentation is nothing but the GMM. In this foreground and background is subtracted out. Foreground is moving object and background is static object. In GMM for accurate output performance the videos are converted into grey scale images which produce the output in between 0-255. GMM is multimodal model. It works on mean and variance. Here pixel by pixel operation is performed. Gaussian model is created for each pixel and updated with new frame some of the Gaussians are matched to the current value for them mean and variance is updated.

   There are some parameters are considered
   1) Number of Gaussians
   2) Mean and variance
   3) Number of training frames
   4) Subtraction ratio

1) Number of Gaussians or number of components: this is nothing but the value of K. K means number of Gaussians. This value is less for the indoor applications which is 1 or 2. For outdoor applications like vehicles detection from traffic system, object detection from certain area, the value of Gaussians is in between 3 to 5. Maximum value of K produced better output for outdoor surveillance system.
2) Mean and variance: two values are essential for the GMM i.e. mean and variance. Mean value is updated pixel by pixel or frame by frame. GMM is created for each pixel and updated with each new frame. At every new frame some of the Gaussians matches the current value, for them, mean and variance is updated by the running average. There are some parameters are considered which are updated pixels by pixels and frame by frame. Here mean is one. Variance is considered in between 0.7-1.
3) Number of training frames: To train the model, numbers of Gaussians are used. 150 Gaussians are considered.
4) Subtraction ratio: This is same as the thresholding. If thresholding is greater than the desired output value then it is considered as a foreground other is considered as background.

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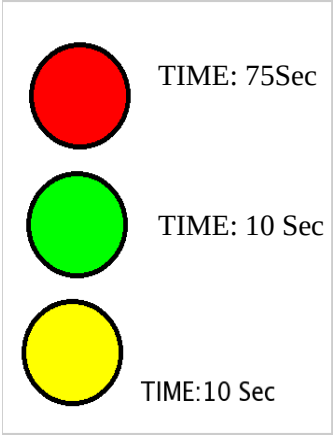
II. Vehicles counting

In vehicles counting vehicles are counted on each road. Count is displayed.

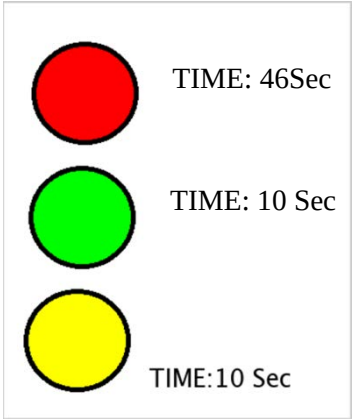
1. **BLOB analysis**: Blob analysis is a method which produces the bounding boxes around the vehicles and count is shown. In this method some parameters are used such as minimum number of area, maximum number of area, centroid area etc.

III. RESULT

Road 1
Number of vehicles=7



Road:2
Number of vehicles:6



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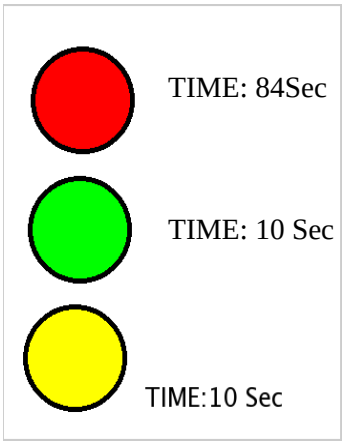
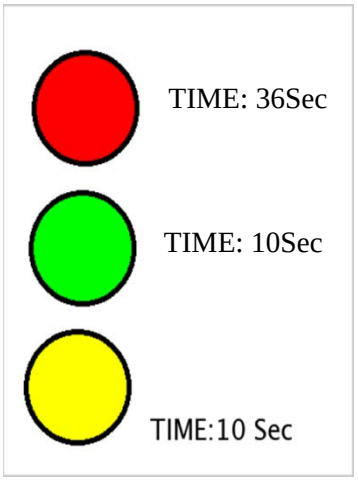
Road:3
Number of vehicles:8



Road 4
Number of vehicles:5



IV. Conclusion

First vehicles on each road are calculated using camera. The roads which have the maximum number of traffic time period is more to that road. The road which has the less traffic time period is less for that road. According to the road weight time period is calculated very accurately using GMM and BLOB analysis method.

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