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Research Article

ESTIMATION OF REAL TIME SPEED OF OBJECT USING COMPUTER VISION IN MATLAB

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ABSTRACT

To detect and tracking the objects, for detecting and tracking of real time object is important application of computer vision. In order to detect the object first take the necessary and relevant step to gather information form the many computer vision applications. This methodology is also used in Defense monitoring the army, traffic monitoring and specific object detection. We have used background subtraction technique in our algorithm. In this project, when the object is detected, displacement of the object is calculated in every frame and the length of car must be given as input, thus using Frames per seconds of the video we can calculate the speed of object.

INTRODUCTION

The Estimating the motion of a moving object in an unknown environment is essential for a number of applications such as autonomous vehicles, driver assistance systems and Defence. Many technologies typically use computer vision for tracking and detecting speed of objects. A vision-based method for estimating the position and orientation of the object with respect to the environment provides flexible and cost effective solutions. With the system that improved in this project, moving objects and moving objects speed difference and distance can be detecting and in this way important contributions.

The major part is object detection and MATLAB platform is used. As in most of the cases backgrounds are constant or don't change, we have used backgrounds subtraction in this project. In every frame, we are subtracting the background from each frame through which we only get object in each frame. In every frame, centroid is calculated of object and thus we get the displacement of object in each frame. When object is detected, we have to input the length of object by this we get a relation between pixels and real distance. Since we have the details of videos like FPS, we could calculate the

Speed in terms of pixels. We can calculate the speed by distance and time.

In This project, we determine the region on interest (ROI) of the moving object by background subtraction and thus the object is tracked. The uniqueness of paper is that the background subtraction technique which is can be used for identifying the most features that belongs to a moving objects and using for tracking it.

Related Work

There are many paper publish on Speed Estimation using Optical Flow, but this paper has Background Subtraction and many other operations. However, existing object tracking methods usually depend on certain features that belong to tracked objects. This project is only a computer vision module for a constant background project.

System Operation

Techniques used in this project

Extracting Input frames: From the camera, each frame is taken by the camera and preprocessed by the MATLAB libraries. Each camera has its own distinct feature of capturing frames and depends upon capturing rates and frames per second

Subtracting background from object: it is particularly a commonly used technique for motion segmentation in static images. It will detect moving object by subtracting the every frame from the background image that is created by averaging

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pixels of images. The background subtraction method starts with initializing a background frame and images is subtracted with background to detect moving object. This method is simple and easy to realize, and accurately extracts the characteristics of target data, but it is sensitive to the change of external environment, so it is applicable to the condition that the background is known

***Noise Elimination**:* Noise elimination is performed to filter noises caused by reflections or motion blurs. For noise elimination is performed by median filtering operation.

***Opening and closing**:* Morphological operations were used to remove noise and imp4rove the quality of detected images for recognition.

***Centroid detection**:* After detection of the moving object by background subtraction, displacement between consecutive frames must be calculated. This is done by Blob. Analysis command in MATLAB. It calculates the mean locations white pixels in the blob, thus providing centroid of the object. Position of object in each frame is stored.

***Relation between real distance and pixels**:* One the object is detected; we have the length of the object in pixel. If we have the original length of object we can have a direct relationship between pixels and real distance, which will help us to calculate various parameters.

Speed Detection: We have the relationship between pixels and length of the object. The average displacement of centroid is calculated and we get the speed by the formula

Speed is computed using the equation $speed = n{*}d\ {*}FPs$.
Where d = Average displacement of centroid of object
And n = Relationship factor between pixels and length.

B: System Description (Flowchart and Operation in brief)

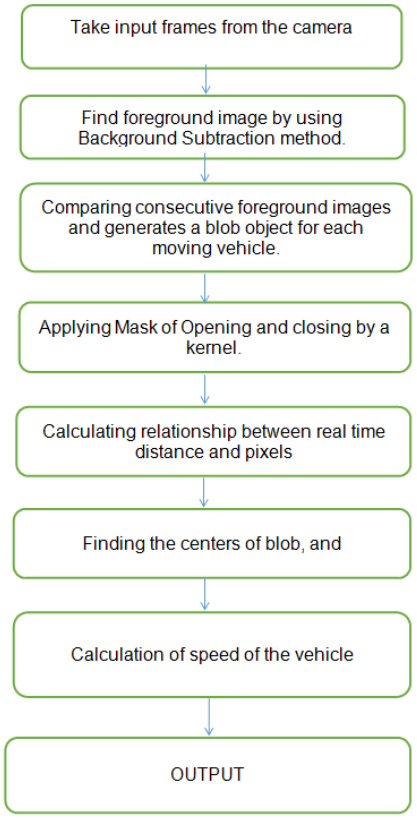
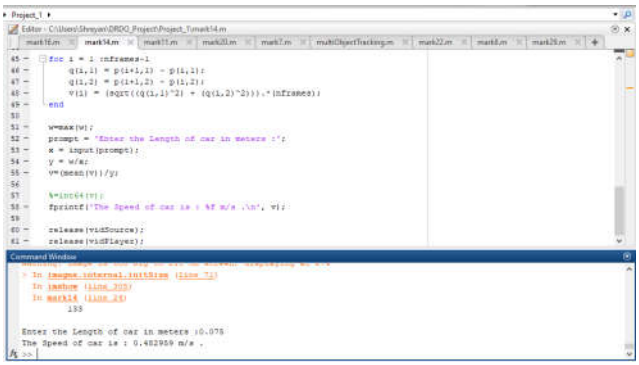


Photo of Operation

a. Frame of the input video

b. Detection of blob after background subtraction



c. Output i.e Speed of Object

Performance and experiments

The desired color object is identified background subtraction, and can be easily detected. According to the displacement of center coordinates of the detected object, the average speed is calculated. For different trials, the errors are given as follows.

Trials	Speed Calculated	Actual Speed	Error
1	0.7543 m/s	0.8 m/s	5.7%
2	0.4835 m/s	0.5 m/s	3.3%
3	0.5752 m/s	0.6 m/s	9.5%

CONCLUSION

We found out that the Background Subtraction works well in detecting and estimation of speed of moving objects. We have noticed that we need to properly threshold, in which a blob area can lie as there can be lot of unwanted movements in the video like shadows etc. which may create errors. The accuracy of speed detection depends on how the moving objects are tracked across frames and how clear is the blob. This project was able

to estimate the speed of object with a constant background video which can may use in many computer vision applications.

References

1. Background Segmentation with Feedback: The Pixel-Based Adaptive Segmented - Martin, Philipp, and Gerhard
2. Vehicle speed detection system - C. Pornpanomchai
3. Vehicle Detection, Tracking and Counting - Andrews Sobral
4. K. Wang, Z. Li, Q. Yao, W. Huang, and F. Wang, “An automated vehicle counting system for traffic surveillance,” IEEE Int. Conf.
5. Cucchiara, R. Grana, C. Piccardi, M. Prati, A. “Statistic and Knowledge-Based Moving Object Detection in Traffic Scenes” Intelligent Transportation Systems, 2000. Proceedings 2000 IEEE.
6. M. Piccardi. "Background Subtraction Techniques: a Review". In SMC04, volume 4, pages 3099–3104, 2004.
7. Zhen Tang, Zhenjiang Miao, and Yanli Wan, "Background Subtraction Using Running Gaussian Average and Frame Difference", Entertainment Computing - ICEC 2007, 6th International Conference, Shanghai, China, September 15-17, 2007, Proceedings 2007
8. Zhen Tang, Zhenjiang Miao, and Yanli Wan, "Background Subtraction Using Running Gaussian Average and Frame Difference", Entertainment Computing - ICEC 2007, 6th International Conference, Shanghai, China, September 15-17, 2007, Proceedings 2007
9. Coheni, Medionig G: Computer Vision and Pattern Recognition. Fort Collins CO: IEEE, (1999), p. 678-682.
10. A. Elgammal, R. Duraiswami, D. Harwood, and L. S. Davis, “Background and foreground modeling using nonparametric kernel density estimation for visual surveillance,” Proc. IEEE, vol. 90, no. 7, pp. 1151–1163, Jul. 2002

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