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REVIEW ON DETECTION AND TRACKING OF IMAGE AND VIDEO BY USING MOTION ANALYSIS

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Abstract- *Object detection and tracking is important and challenging tasks in many computer vision applications such as surveillance, vehicle navigation, and autonomous robot navigation. This paper is focused on five existing object detection and tracking techniques. Also this paper presents the moving object detection and tracking using reference Background Subtraction. In proposed method, first frame of video is directly consider as Reference Background Frame and this frame is subtract from current frame to detect moving object and then set threshold T value. If the pixel difference is greater than the set threshold T, then it determines that the pixels from moving object, otherwise, as the background pixels. But this fixed threshold suitable only for an ideal condition is not suitable for complex environment with lighting changes. So, this paper used dynamic optimization threshold method to obtain a more complete moving objects.*

Keywords: *Background subtraction, expectation maximization, object detection, tracking, urban tracker.*

I. INTRODUCTION

Object detection and tracking is important and challenging tasks in many computer vision applications such as surveillance, vehicle navigation and autonomous robot navigation. Video surveillance in a dynamic environment, especially for humans and vehicles, is one of the current challenging research topics in computer vision. Image processing and computer vision has a wide range of applications in autonomous vehicle guidance, traffic flow, traffic data collection and road traffic monitoring. Kalman filter is one of the most widely used tracking algorithms. Prior knowledge of initial state, process noise covariance, measurement noise covariance as well as initial state error covariance give enhanced performance [1]. Urban tracker is used for tracking road traffic and it uses the simple background subtraction method for object detection [2].V-J algorithm is also achieved impressive performance but V-J method is sensitive to object orientations; therefore, it can only work when the orientations of vehicles are known [3]. Hough forest random field is based on tracking-by-detection approach for multitarget tracking [4].An Expectation Maximization (EM) framework for registering a vector road network to a WAMI aerial image frame using vehicle detections.The wide area motion imagery (WAMI) sensor, which records high-resolution, full-motion video over multiple square kilometers from an airborne platform. WAMI's level of detail is such that all individual vehicles are clearly visible [5].

II. BACKGROUND

Automatic tracking is one of the critical issues in real-time traffic flow monitoring traffic analysis system. Therefore, vehicle behavior analysis is an important aspect in traffic monitoring. Kalman filter is one of the most widely used tracking algorithms .Fractional order gain Kalman filter (FOGKF). The main novelty of FOGKF is the gain is modified by adding fractional derivative of previous Kalman gain to the Kalman gain. A feedback loop is inserted in FOGKF and it uses fractional derivative of previous kalman gain as feedback [1]. A fully automatic multiple object tracker, called as Urban Tracker, that is adapted to track various a priori unknown road users. The propose method is based on tracking the resulting foreground blobs of pixels. Each blob is modeled by a collection of key points. Data association is performed from frame to frame, and a finite state machine (FSM) corrects the associations by handling blob merging, splitting and fragmenting [2]. V-J scheme to improve the original V-J scheme so that the enhanced one will be insensitive to on-road vehicles' in-plane rotation and achieve better accuracy and efficiency. The basic idea is to directly detect the orientation of the road and rotate the road according to the detected orientation only once [3]. A novel tracking-by-detection framework for multi-target tracking .A multi-target tracking scheme consisting of HFRF-based data association step, followed by an auxiliary visual tracking method. The data association problem is formulated as one of inference in the HFRF model, in which the CRF learning and inference are unified within the HF computational framework. The modified RJMCMC algorithm is used to handle the mutual-occlusion [4]. An Expectation Maximization (EM) framework for registering a vector road network to a WAMI aerial image frame using vehicle detections.The wide area motion imagery (WAMI) sensor, which records high-resolution, full-motion video over multiple square kilometers from an airborne platform. WAMI's level of detail is such that all individual vehicles are clearly visible [5].

III. PREVIOUS WORK DONE

In research literature HarpreetKaur et.al.(2016)[1] proposed a Fractional order gain Kalman filter (FOGKF) to avoid divergence of extended Kalman filter. It uses fractional derivative based method to improve performance by modifying the Kalman gain so that the sensitivity for large perturbations can be increased.The fractional order gain Kalman filter performs better even in the presence of for abrupt variations in the inputs. The gain value will never be too large due to the feedback loop.

Jean-Philippe Jodoin et.al.(2016)[2]proposed an Urban tracker to track various a priori unknown road users. The method is based on tracking the resulting foreground blobs of pixels. Each blob is modeled by a collection of key points. Data association is performed from frame to frame, and a finite state machine (FSM) corrects the associations by handling blob merging, splitting and fragmenting.

YongzhengXu et.al.(2016)[3]proposes an enhanced V-J scheme to improve the accuracy, computational time of original V-J scheme. It reduces false detection rates and it significantly saves computational time.The basic idea is to directly detect the orientation of the road and rotate the road according to the detected orientation only once. The proposed road orientation adjustment method then can be incorporated with the original V-J scheme to achieve better vehicle detection.

Jun Xiang *et.al.*(2016)[4]proposes a multi-target tracking framework that combines HFRF-based data association and a modified RJMCMC algorithm for trajectory estimation. In the data association step, author adopted the HFRF framework, which has seen success in the joint object recognition and segmentation task.

Ahmed Elliethy *et.al.*(2016)[5]proposes an Expectation Maximization (EM) framework for registering a vector road network to a WAMI aerial image frame using vehicle detections. The method is based on the intuitive synergy between the problems of registering of a (vector) roadmap to an image frame and the detection of on road vehicles in an image. The detection of on-road vehicles in an image allows us to register the image to a vector road map by aligning the detection locations with the roads.

IV. PROPOSED WORK

A very simple method for representing the form and position of an object in an image consists in coding the edge information of the same object. The most widespread method for memorizing a list of points (with position but no colour information) is commonly known as “chain code". The basic idea is to go along the object contour and to code progressively the direction to be followed. Once identified the coordinates of a point in the object contour (generally the highest and the left-most), the successive point is identified only on the basis of the direction to be followed which links the barycentre of the pixels. The directions allowed are usually limited, so as to improve coding efficiency. Some of the most frequently observed conventions are shown in Figures 1 and 2.

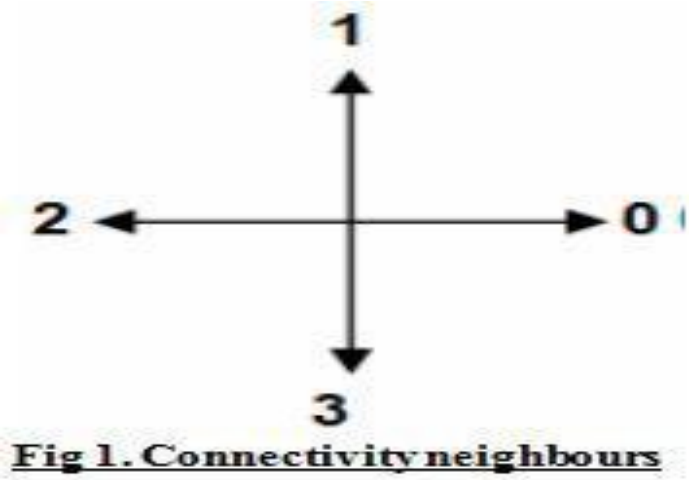

Fig 1. Connectivity neighbours

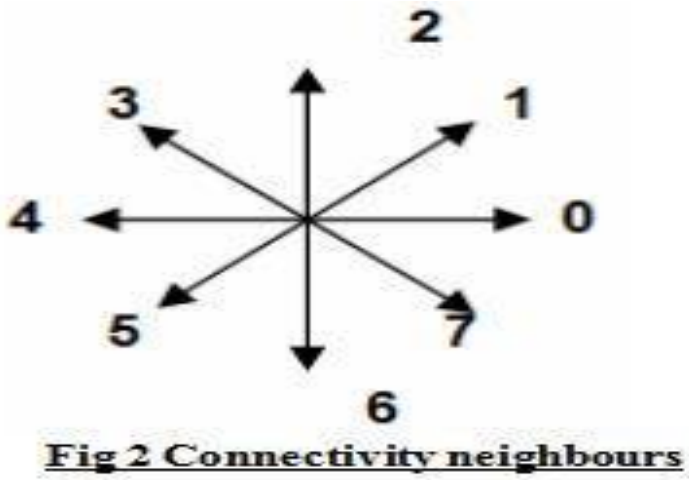

Fig 2 Connectivity neighbours

a) in case of 4-connectivity it is possible to proceed only horizontally or vertically;
b) in case of 8-connectivity it is possible to proceed diagonally, horizontally and vertically. In the background subtraction method, consider that the whole scene from two parts, the background, the foreground.

The background is a static scene and which can be seen, foreground is the moving objects which are interested in the video surveillance, such as vehicles, pedestrians etc. however due to the scene of the monitor changes over time, the foreground stagnation in the picture for a long time could be treated as part of the background, so updating of the reference image periodically is essential for moving object detection. Updating of reference image can be achieved through the frame difference method.The first step is to take input video from static cameras. For processing the video files, convert video into frames and from frames to images. Next step is take first frame as a Background frame and next is current frame and then apply subtraction operation. Background frame is subtracted from current frame. Then Threshold operation is performed and foreground object is detected. After object detected last step is track object in video.

V. ALGORITHM ON OBJECT DETECTION AND TRACKING IN VIDEO AND LABELLING ON MOVING OBJECT

Step 1: First convert an input signal or video into video sequences**.**
Step 2: Convert input video into frames and the apply the background subtraction method to extract the foreground object.
Step3: Apply the proper threshold operation to finding the object in the frame.
Step 4: Once an moving object detected by background subtraction method apply an chain code method to labelled on moving object**.**
Step 5: After detecting and labelling the object next task is to track that object. Tracking can be done by using any object tracking technique (i.e. Kalman filter, Urban tracker, V-J algorithm).
Step 6: Labelling method on moving object will help in many applications, it will labelled on moving object in video with their estimate speed and direction on which object is moving**.**

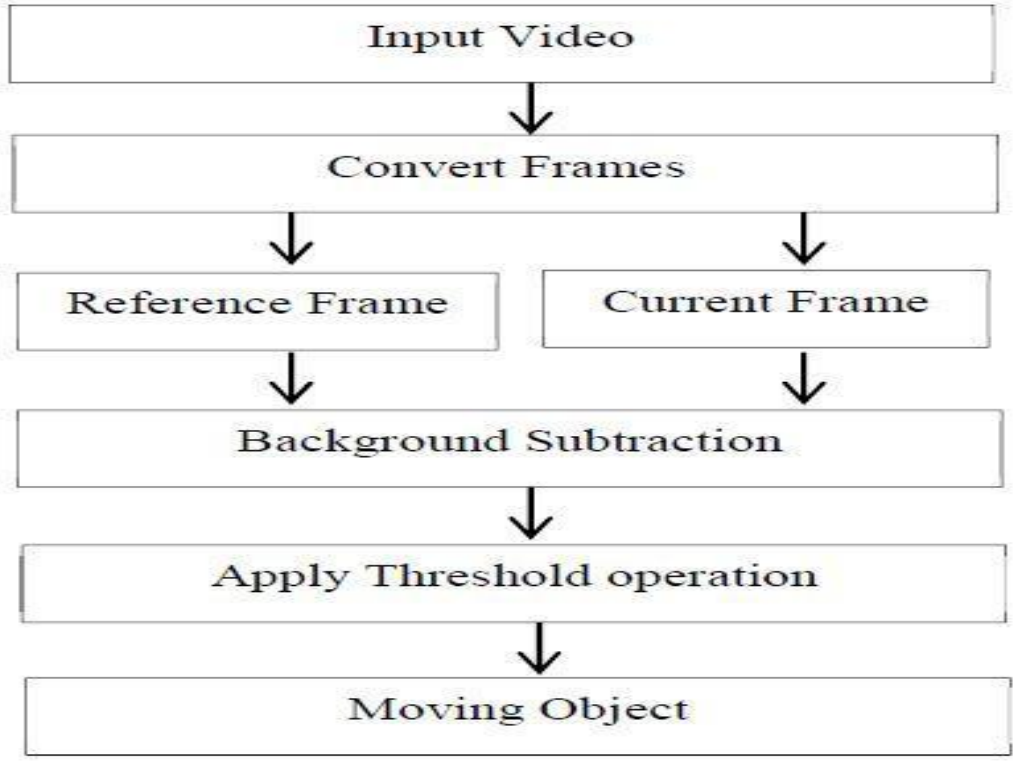

Fig 3.Flow Chart of Background Subtraction Method

VI. POSSIBLE OUTCOME AND RESULTS

To track moving objects labeling becomes as essential process. Object labeling becomes important because each object should be represented by a unique label with a condition that the object must preserve its label without any change. From the moment object enters the scene at frame F0 that is the starting frame till it leaves the scene at the end frame. The propose method will have successfully labeled on moving object that are detected by different motion analysis techniques and achieve satisfactory results.

VII. CONCLUSION

This paper focused on the study of different moving object detection and tracking techniques i.e. Fractional order gain Kalman filter, Urban Tracker, V-J algorithm, Expectation Maximization (EM) framework. The performance of the different algorithms over the set of Video Sequences and Images can be extrapolated to the results obtained over real ones. However, the outputs of these methods can be detection of moving object in video sequences and labeled on the moving object, which provide the best performance according to the simplicity of the algorithm and the accuracy of the results. This paper proposed an algorithm which improves performance and accuracy of different object detection techniques by labeling on moving object that links in video. To track moving objects labeling becomes as essential process. Object labeling becomes important because each object should be represented by a unique label with a condition that the object must preserve its label without any change. From the moment object enters the scene at frame F0 that is the starting frame till it leaves the scene at the end frame. Object detection in video sequences has several important applications such as object tracking, visual surveillance systems and dynamic three-dimensional scene analysis.

VIII.FUTURE SCOPE

In this paper the proposed methodology only considers the ideal environmental conditions. Future study tries to overcome this issue.

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