



IMPLEMENTATION OF BACKGROUND SUBTRACTION ALGORITHM FOR MOVING OBJECT DETECTION AND TRACKING FOR SURVEILLANCE USING OPENCV

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Abstract — Visual surveillance is an active research topic in computer vision that tries to detect, recognize and track objects over a sequence of images and it also makes an attempt to understand and describe the object by replacing the aging old traditional method of monitoring cameras by human operators. A computer vision system, and hence alerts the human operator for deeper investigation of the event. The video surveillance system can be manual, semi-automatic, or fully-automatic depending on the human intervention, in manual video surveillance system; human operator responsible for monitoring does the entire task while watching the visual information coming from the different cameras. It's a tedious and arduous job of an operator to watch the multiple screen and at the same time to be vigilant from any unfortunate event, so we are going to make system that prove to be ineffective for busy large places as the number of cameras exceeds the capability of human experts. Here we are going to implement the background subtraction algorithm and going to get moving object detected and tracked.

Keywords- Moving object detection; Moving object tracking; Motion detection; Opencv; Background subtraction algorithm; Moving object detection ; Video surveillance; Image processing; Video processing

I. INTRODUCTION

Image processing is a term which indicates the processing on image or video frame which is taken as an input and the result set of processing is may be a set of related parameters of an image. The purpose of image processing is visualization which is to observe the objects that are not visible. Analysis of object motion is one of the most recent and popular research topics in digital image processing. Visual surveillance is the most active research topic in computer vision for security. Our aim is to develop an intelligent visual surveillance system by replacing the age old tradition method of monitoring by human operators. Our motivation in doing is to design a visual surveillance system for motion detection, and if there is motion there is any moving object so we are going to track object too. The aim is to detect the motions of object from the background image in a video sequence. It also includes detection, tracking from video frame. Object detection is performed to check existence of objects in video frame and to detect that object. The process of object tracking is segmenting a region of interest from a video frames and keeping track of its motion and position. Object detection is the process of detecting if there is any moving object is present or not.



Figure 1. Detection of moving object

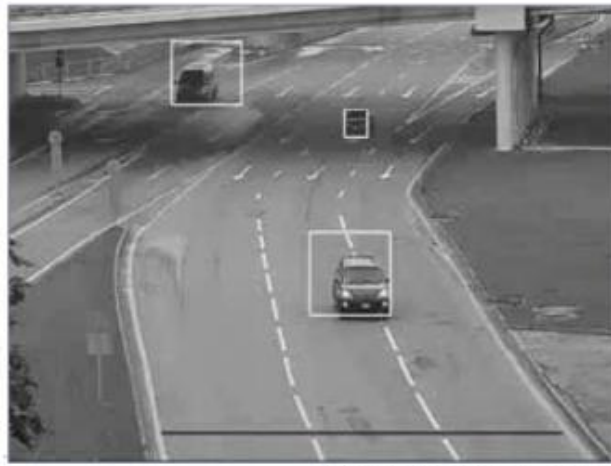


Figure 2. Tracking of moving object

Tracking means to track an object over a sequence of images, following an object through successive image frames to determine its relative movement with respect to other object.

II. IMPLEMENTATION OF BACKGROUND SUBTRACTION ALGORITHM

A general framework for moving object detection and tracking is proposed in this section. The block diagram for the proposed framework is shown in figure 3. We have created code in python language with help of opencv, opencv is library which is widely used for computer vision based application, for python code we created environment linux and flavor of linux is Ubuntu.

The algorithm for the framework is given as follows:

The objective of the approach (frame difference method) is to detect the moving objects from the difference between the existing frame and the reference frame. The frame difference method is the common method of motion detection. This method adopts pixel-based difference to find the moving object. In implementation the step by step process is Difference of Two Frames, Transformation of absolute differential image to Gray Image, Filtering and Binarizing Transformed Gray Image.

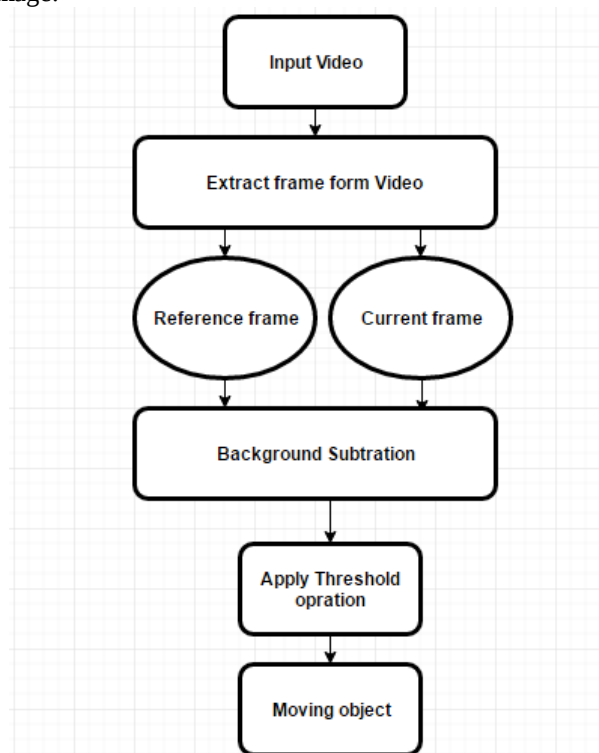


Figure 3. General framework of moving object detection
III. EXPERIMENTAL RESULTS

Implementation of algorithm leads us to results.

First, we take Reference frame = First frame of video sequences and applied to stored video



Figure 4. Result of implementation on stored video

The algorithm is perfectly works as it shows moving object occupied and object is tracked (Figure 4). When we take Reference frame = First frame of video sequences but any if non living object is replaced anywhere in coverage then It shows moving object. It is only applicable when location for coverage is fixed, means no changes occurred in coverage area.

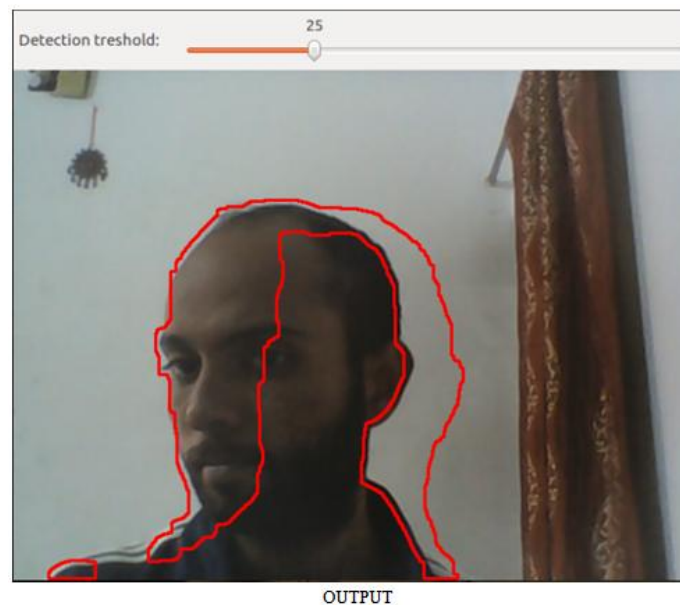


Figure 5 Result of implementation from live video

Now taking Reference frame = Previous frame of video sequences so many nonliving object is replaced anywhere in coverage then after It will not make any threshold difference, so limit is overcome here (Figure 5).

IV. CONCLUSION

Visual surveillance is an active research topic in computer vision that tries to detect and track objects over a sequence of images and it also makes an attempt to understand and describe the object by replacing the aging old traditional method of monitoring cameras by human operators. by applying the background algorithm and considering the results Efficient and convenient motion detection surveillance is proposed in this work. From result we can see the background subtraction algorithm successfully applied, and the moving object is detected and tracked.

V. FUTURE WORK

Possible area to examine in the future might include Challenges for further development are to utilize multiple webcam or input for wider surveillance area and object categorization or classification of detected objects in surveillance area. Object categorization will make the motion detection application more reliable because it can distinguish whether the motion occurred in the surveillance area is a threat or not, in short to identify the object with computer vision.

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