Multiple Object Detection From Real-Time Video Sequence

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Abstract:-

Object detection is an important basis for tracking and recognition in visual observation systems via fixed cameras. This paper presents a novel moving object detection approach.And the advances in the development of these algorithm would lead to breakthroughs in applications that use visual surveillance [4] which gives recent development in human motion analysis, [10], [11], [12] which gives detection and tracking of people and their activities, [13], [14] gives detection of people carrying objects, [15], [16] gives tracking of people in occlusions, [17], [18], [19] gives real-time surveillance of people. The proposed work aims at the problems such as background modeling, background disturb, shadows, illumination changes etc and provide an effective multiple moving objects detection method for stationary background.

Keywords: **Moving objects detection, Background subtraction, Motion detection ,visual surveillance , real-time surveillance.**

1. Introduction

Detection of moving objects in video streams is the first relevant step of information extraction in many computer vision applications, including traffic monitoring, automated remote video surveillance, and people tracking. The detection of movingobject is important in many tasks, such as video surveillance and movingobject tracking. . Although there are some methods for the movingobjectdetection, it is still a challenging area now a days. Background subtraction [1][2][3][4][5] is a method which is commonly used.This method basically compares the two images,the one is observed and the other is background , if the difference between two pixels exceeds a threshold, then considers the pixel belonging to a moving object, after threshold operation, gets information of position, size and shape of the moving objects. But there are some problems that must be considered when using background subtraction method are as fallows:

a) This method mostly store the first frame as background ,but for wide area, it's hard to satisfy this kind of condition. b)Some objects moving slightly in the scene, such as branches and leaves,which may disturb the background .these parts should not be judged as moving objects.c) Illumination changing and weather changing of a day, that may affect the detection result. d)Background object changes, such as a car leaves,the region that the object changes may be estimated as a moving object, but should not always be looked as foreground object. e)Shadows of moving objects are commonly looked as part of moving objects, but that will decrease the veracity of the detection results. This paper aims at these problems, proposed an effective moving objects detection method for it.

2. Multiple Object Detection

2.1 Morphology Fundamentals:

Morphology is a broad set of image processing operations that process images basedon shapes. Morphological operations apply a structuring element to an input image,creating an output image of the same size. In a morphological operation, the value ofeach pixel in the output image is based on a comparison of the corresponding pixel inthe input image with its neighbors. By choosing the size and shape of the neighborhood, we can construct a morphological operation that is sensitive to specific shapes in the input image.

2.2 Background subtraction algorithms

The four different methods for detecting moving objects are:
- Frame differencing [2], [7].
- Running Gaussian average [8].
- Temporal median filter [8].
- Non-parametric method using Kernel Density estimation [9].

We will see in brief about frame differencing.

3.Multiple Object Detection by Temporal Frame Differencing Algorithm

In the proposed method moving object detection is handled by the use of frame difference method which reliably works in indoor and outdoor environments. This algorithm presents an effective method to obtain background model, at thecircumstance that there are moving objects in the scene. It is based on the hypothesis that during the background modeling process, foreground objects may move in the scene, but will not stay in a place for a long time. The block diagram in Figure 3.1 shows block diagram of the main stages in thedetection system.

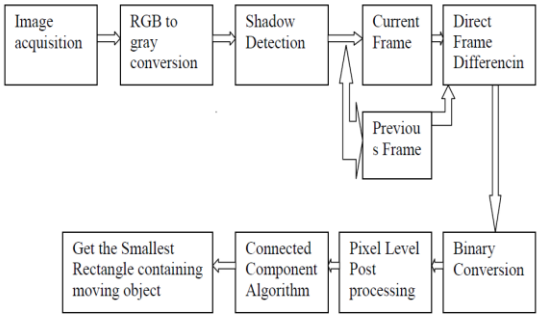

Fig 3.1 Process Flow of Modified Frame Differencing Algorithm

It include following steps:-1.Image Acquisition.2.Shadow Suppression.3. Direct Frame Difference.4. Gray Level to Binary Conversion.5. Pixel-Level Post Processing.6 .Blob Labeling.

4.1 Experimental Result

This section demonstrates some of the tested image sequences that are able to highlight the effectiveness of the proposed detection system. These experimental results are obtained using the proposed detection algorithm. The proposed algorithm includes detection of moving vehicles, pedestrians. It has been tested with many on-line image sequences containing a moving vehicle.
These experiments were carried out on
1] Traffic scenes, taken on highways.
2] Indoor scenes for illumination changes.
This algorithm gives good result for different conditions such as illumination changes, background disturb, shadows and multiple objects.

4.1.1 Traffic Scenes Taken On Highways

In order to test the performance of the object detection we used sample outdoor videoclip of traffic scene taken by stationary camera.

Object Type	Total No. of Frames	Total No. of Boxes Corresponding to Detected Object	Overlapped Boxes	Left Objects	Detection Rate
Vehicles	28	111	7	1	99.10%

Table 4.1 Performance Analysis of Highway Scene

(a)Original RGB image (Frame 17)

(b) Its Output
4.1 Multiple Object Detection (a) Original RGB image (b) Its Output

4.1.2 Indoor scenes for illumination changes

A sample video of indoor scene is taken particularly for checking illumination changing condition. In this video first all lights in the room are turned on. Then illumination condition is changed by turning lights off one by one. For this condition also our algorithm gives good detection rate.

Object Type	Total No. of Frames	Total No. of Boxes Corresponding to Detected Object	Overlapped Objects	Left Objects	Detection Rate
Human	67	63	55	12	87.30%

Table 4.3 Performance Analysis of Indoor Scene

a)Original image

(b) Its Output
Fig 4.4 Result of Indoor Scene

4.2 CONCLUSION AND FUTURE WORK:

The approach is meant to be general purpose and can be implemented for real-time applications. It is used to overcome fundamental shortcomings of conventional motion detection algorithms.
We have tested this algorithm with several videos accounting for cases elaborated in the thesis like background disturb, illumination changes etc.
1. Tracking of objects.
2. Object classification.
3.Improve result by applying jitter filter to the frames.
4. Object detection can be done for dynamic background.

5. Acknowledgements

In this context, I would like to thank my dissertation guide who have been an incessant source of inspiration and help. Not only did they inspire me to undertake this study, they also advised throughout its course and helped out during times of trouble .Finally I would like to thank my family-my inspiration our biggest asset, our colleagues who helped us and gave suggestions.

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