



Abandoned Object Detection

Meenal Bargath¹, Monika Verma², Ritika³, Shalini Vishwakarma⁴, Ruchi Biswas⁵, Shailendra Singh⁶

^{1, 2, 3, 4, 5}UG Student Electronic and Telecommunication Department, RSR RCET, CSVTU, Bhilai, Chhattisgarh, India

⁶ Assistant Professor Electronic and Telecommunication Department, RSR RCET, CSVTU, Bhilai, Chhattisgarh, India

Abstract— A key technology to fight against terrorism and crime for public safety moving object detection and tracking is become very popular and one of the challenging research topic in various security areas of computer vision and video surveillance applications. To detect and track moving objects is implemented using MATLAB 2013a. In this method, we proposed static webcam for capturing live scene as well as stored database of segmented videos. Tracking requires location and shape of object in every segmented frame. An automatic abandoned object detection system typically uses a combination of background subtraction and object tracking to look for certain predefined patterns of activity that occur when an object is left behind by its owner.

Keywords— Segmented frame, Object detection, Object tracking, background subtraction, segmented videos

I. INTRODUCTION

Video surveillance systems have long been in use to monitor security sensitive areas. The making of video surveillance systems “smart” requires fast, reliable and robust algorithms for moving object detection, classification, tracking and activity analysis.

Surveillance system has become an important aspect in security and a necessity to keep proper check. There was a time when video surveillance was mostly used by the government and big companies. But now the scenario has changed. Presently the use of surveillance camera has increased and it is increasing more. Everywhere you look, whether it’s a restaurant, office, educational institution or station, presence of video surveillance is almost obvious. This is because of technology being much more inexpensive and the awareness of people to take precautions to a crime than a cure. But the criminals are as aware as everyone else. So, to guard from any unpredicted situations from occurring we need the surveillance system to be more advanced and accurate. That is how the idea of abandoned object detection through video surveillance came up. With the help of which we can detect if any suspicious package is left by anyone and then raises an alarm. It is challenging to detect an object when the colour of the object almost matches the colour of the background. Here, the object will still be successfully detected in our project. The outputs of these algorithms can be used both for providing the human operator with high level data to help him to make the decisions more accurately and in a shorter time and for online indexing and searching stored video data effectively. The advances in the development of these algorithms would lead to breakthroughs in applications that use visual surveillance. Below are some scenarios that smart surveillance systems and algorithms might handle[4].

II. DESIGN AND IMPLEMENTATION

Real time video has been captured using Asus X555L intel core processor 5 mega pixel web camera and it has been processed into frames. These frames have been used as input images for the system. Here, we have used Background Subtraction algorithm to track the abandoned object where we are recording the initial frame as the background. We have also assigned a region of interest (ROI) where the possibility of object abandonment is high.

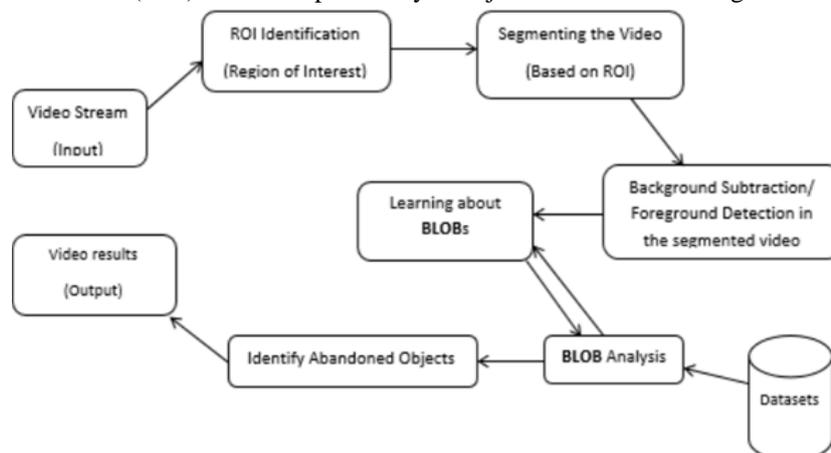


Fig.1.Flow chart of our Video Surveillance System

Setting a desired threshold value as a standard and converting a coloured image into values of 0 and 1 is called “binarization processing” (usually black is 0 and white is 1). The method of analyzing an image which has undergone binarization processing is called “blob analysis”.

Dilation and erosion are *dual* operations in that they have opposite effects. If a binary image is considered to be a collection of connected regions of pixels set to 1 on a background of pixels set to 0, then erosion is the fitting of a structuring element to these regions [2] and dilation is the fitting of a structuring element into the background [3].

III. METHODOLOGY

The algorithm has following stages:

- I. Object Detection with Background Subtraction.
- II. Assigning Region of Interest (ROI).
- III. Using Morphology to eliminate gaps between pixels of any detected object for more accuracy and smoothens of the object [1].

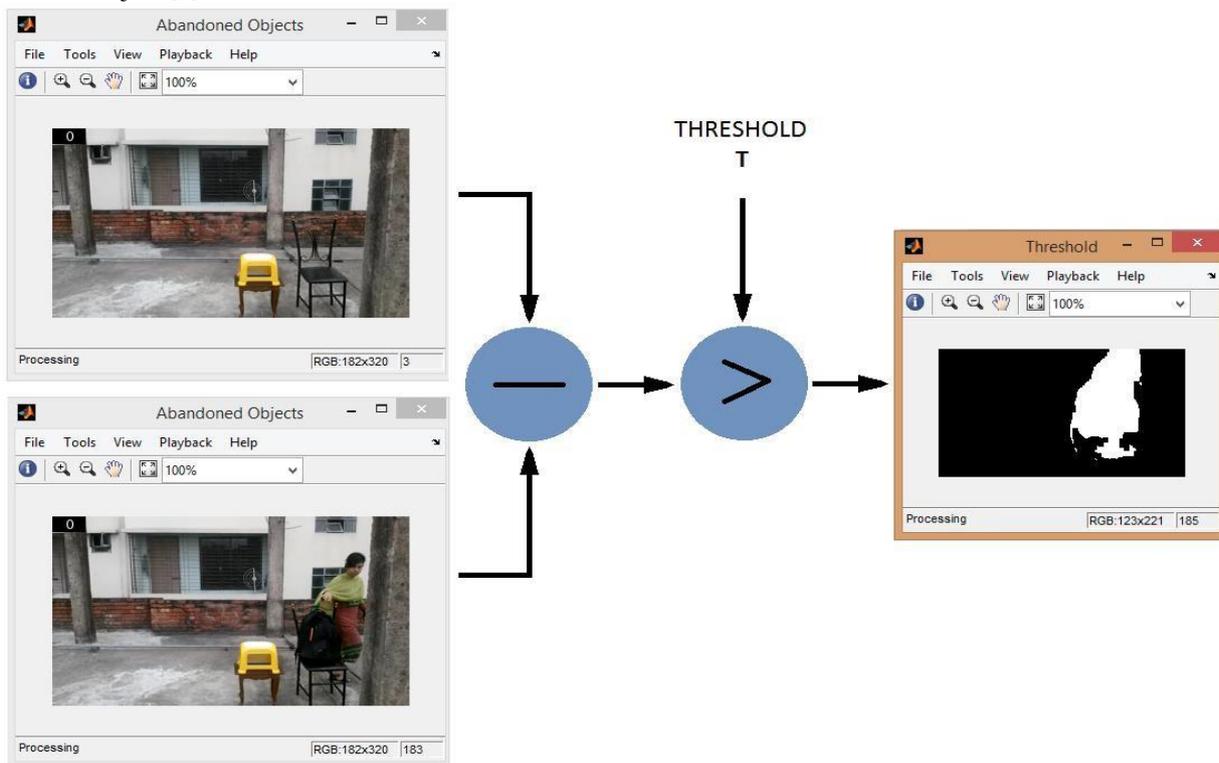


Fig.2.How Background Subtraction is working in our system

This research is basically aimed for implementing a smart surveillance system that is capable of detecting any abandoned object left by someone. It also identifies the owner by detecting the body. When the body is found to be missing in the region of interest, an automatic alarm is raised to aware the authority. The whole thesis is done in Matlab2013a where the object detection is done by Background subtraction and the body detection is done. The image of the object is brought into more accuracy with the help of Morphological Closing.

For many vision-based systems, it is important to detect a moving object automatically. Image processing, analysis, and machine vision represent an exciting and dynamic part of cognitive and computer science. Vision System included high resolution camera and hardware card (supported to camera), camera is interface to pc. From vision system pc should installed frame grabber card which is support to camera and it should has fast processor for capturing frame with snapshot.

A. Background Subtraction

In the field of object detection, background subtraction plays a vital role. Background subtraction (BS) is a common and widely used technique for generating a foreground mask (namely, a binary image containing the pixels belonging to moving objects in the scene) by using static cameras. BS calculates the foreground mask performing a subtraction between the current frame and a background model, containing the static part of the scene or, more in general, everything that can be considered as background given the characteristics of the observed scene [5].

B. ROI (Region Of Interest)

The ROI defines the borders of an object under consideration. A *region of interest* (ROI) is a portion of an image that one would want to filter or perform some other operation on. ROI is defined by creating a *binary mask*, which is a binary image that is the same size as the image to be processed with pixels that define the ROI set to 1 and all other pixels set to 0.

C. Erosion and dilation

Dilation and erosion are *dual* operations in that they have opposite effects. If a binary image is considered to be a collection of connected regions of pixels set to 1 on a background of pixels set to 0, then erosion is the fitting of a structuring element to these regions and dilation is the fitting of a structuring element into the background.

D. Thresholding

Thresholding is the simplest method of image segmentation. From a grayscale image, thresholding can be used to create binary images.

During the thresholding process, individual pixels in an image are marked as "object" pixels if their value is greater than some threshold value (assuming an object to be brighter than the background) and as "background" pixels otherwise.

Typically, an object pixel is given a value of "1" while a background pixel is given a value of "0." Finally, a binary image is created by coloring each pixel white or black, depending on a pixel's labels.

E. Blob Analysis

Setting a desired threshold value as a standard and converting a coloured image into values of 0 and 1 is called "binarization processing" (usually black is 0 and white is 1). The method of analysing an image which has undergone binarization processing is called "blob analysis". Blob analysis is image processing's most basic method for analysing the shape features of an object, such as the presence, number, area, position, length, and direction of lumps.

The final step of the smart video surveillance systems is to recognize the behavior of objects and create high-level semantic descriptions of their actions. It may simply be considered as a classification problem of the temporal activity signals of the objects according to pre-labeled reference signals representing typical human actions. The outputs of these algorithms can be used both for providing the human operator with high level data to help him to make the decisions more accurately and in a shorter time and for offline indexing and searching stored video data effectively. The advances in the development of these algorithms would lead to breakthroughs in applications that use visual surveillance.

IV. RESULT

Sequence of Output of our Video Surveillance System

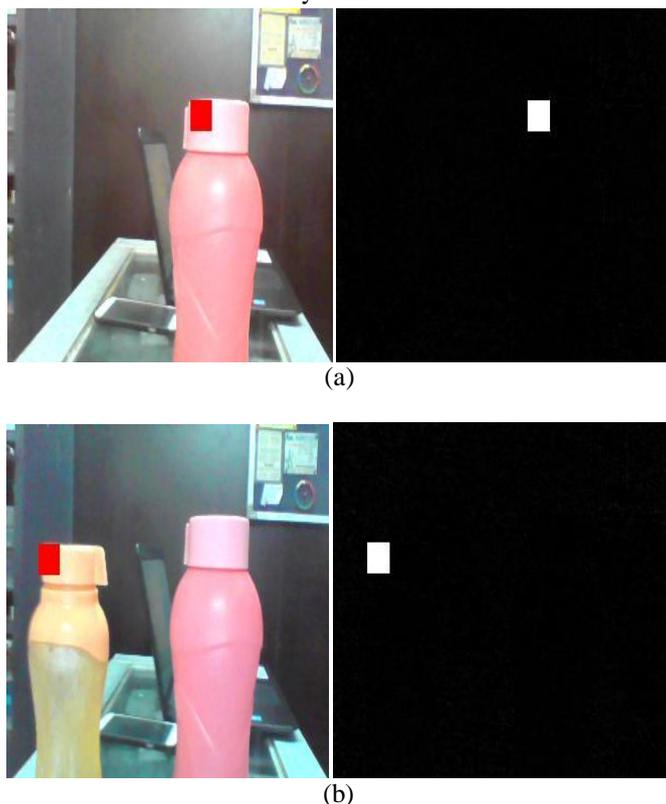


Fig.3.(a) Live Detection of stationary object (trial and error method) (b) Sequence of detecting overlapping objects .

V. CONCLUSION

This paper has presented a system for abandoned object detection and tracking in image sequences from stationary camera images. In our MATLAB based Real Time Unattended Moving Object Detection and Tracking system we have tracked single object through complex multiple scenarios from videos captured by a single dynamic as well as stationary cameras with stationary or complex moving backgrounds.

The methods we presented for "smart" visual surveillance show promising results and can be both used as part of a real-time surveillance system or utilized as a base for more advanced research such as activity analysis in video.

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