



Synoptic Study of Abandoned Object Detection

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Abstract:

Security of public places is a considerably burning issue. Many public or open areas are facilitated with cameras at the multiple angles to monitor the security of that area for keeping citizens safe. This is known as the surveillance system. Abandoned object detection is most crucial task in video surveillance system. For detecting abandon object in video, there are many techniques which are mentioned in this paper and an efficient approach is proposed which is based on image segmentation. With the image segmentation all left objects in video can be detected whether they are moving or not by using mean ration background image subtraction method. The system uses image processing techniques using MATLAB and Support Vector Machine (SVM) as classifier for classification of static and left objects. This approach definitely provides security and detects the moving object in live video streaming.

Keywords: abandoned object, background subtraction, left object detection, security, video surveillance.

I. INTRODUCTION

Recent years have seen there is rise in terrorist attacks on crowded public places such as train stations, airports, markets and shopping malls, etc. Many surveillance tools have been installed in the fight against terror. Although video surveillance systems have been in operation from the past two decades, the continuous monitoring of CCTV footage is out of the hands of human operators. The system proposed in this paper provides continuous monitoring of CCTV footage. Nowadays, terrorists come to crowded public places such as railway stations, airports, bus stations and leave the luggage bomb for explosive attacks. It is very challenging to watch over the public places with crowds by security guards and identify the abandoned object which is left by a terrorist. To prevent luggage bomb attacks, a fully automatic efficient and effective intelligent surveillance system is required. Hence this paper presents a better way to detect left baggage or object. In this paper, live streaming of video from CCTV is processed by image processing. If a person is dropping off some bag or any suspicious thing and leaving then it running away, the camera will catch this activity. And if such a bag is untouched for some time span decided by analyzer after it will give notification to authority. Minimum the time span probability stays 50-50, but as time span increases the probability of that thing being abandon or hazardous increases. Hence the incident can be avoided in that case.

II. RELATED WORK

A. Robust abandoned object detection using dual foregrounds

Fatih Porikli, Yuri Ivanov and Tetsuji Haga, author presented a robust method that uses dual foregrounds to find abandoned items, stopped objects, and illegally parked vehicles in static camera setups. At every frame, author adapt the dual background models using Bayesian update, and aggregate evidence obtained from dual foregrounds to achieve temporal consistency. This

method does not depend on object initialization and tracking of every single object, hence its performance is not much efficient to these error prone tasks that is usually fail for crowded scenes. Still it accurately outlines the boundary of items even if they are fully blocked. Since it will execute pixel wise operations, it can be implemented on parallel processors. [1]

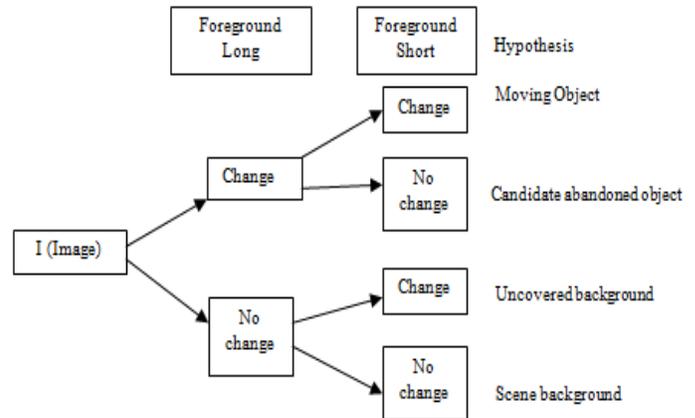


Figure.1. Hypothesis on Long- and Short-term foreground [1]

B. A framework for abandoned object detection from video surveillance

Rajesh Kumar Tripathi, Anand Singh Jalal, authors proposed a framework for abandoned object detection in real-time from surveillance video. Author utilized running average method for background modeling which is more suitable for real-time surveillance video. Proposed contour features are more sensitive to the changes, to distinguish the static objects and moving objects. An edge based object recognition method applied to classify human and non-human static objects either it is full or partial visible. Experimental results demonstrate that proposed approach detect abandoned object even in bad light, crowd scene, occlusion and effective to detect object of different size. False detection has been handled through the generated score. [2]

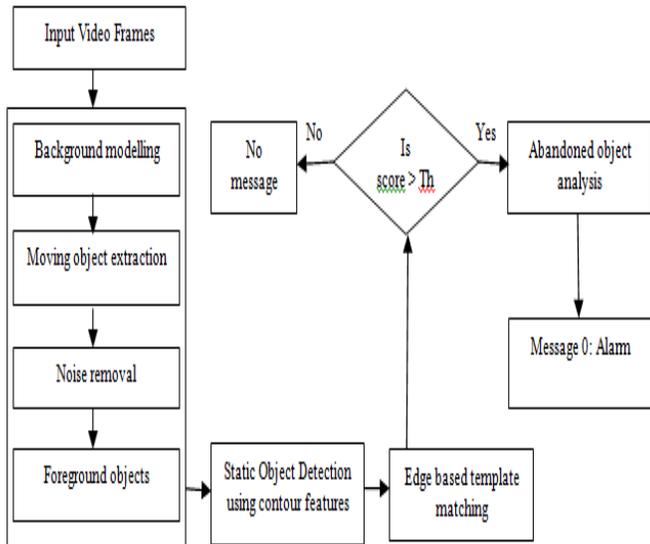


Figure.2. Framework for abandoned object detection using contour features [2]

C. An abandoned object detection system based on dual background segmentation

A.Singh, S. Sawan, M. Hanmandlu, author presented an abandoned object detection system based on a dual background segmentation scheme. The background segmentation is adaptive in the nature and based on the Approximate Median Model. It consists of two types of the reference backgrounds, Current and Buffered background, each with the different time interval. Blob analysis is done on the segmented background and a dynamic tracking algorithm is devised for tracking the blobs even under the occlusion. Detection results show that the system is robust to variations in lighting conditions and the numbers of people are in the scene. In addition, the system is simple and computationally less intensive as it avoids the use of expensive filters while achieving better detection results. But the main disadvantage of median based approach is that its computation requires buffer with the recent pixel values. Moreover, the median filter does not accommodate for statistical description and does not provide a deviation measure for adapting the subtraction threshold. [3]

III. DIFFERENT ABANDONED OBJECT DETECTION METHODS/ TECHNIQUES

Table.1. Different abandoned object detection techniques

Authors	Methods	Description
F. Porikli, Y. Ivanov, and T. Haga [1]	Dual Background Subtraction, Bayesian update	Each pixel as layers of 3D multivariate Gaussians. Each layer corresponds to a different appearance of the pixel. Using Bayesian approach, they are not estimating the mean and variance of the layer, but the probability distributions of mean and variance.
Rajesh Kumar Tripathi, Anand Singh Jalal [2]	Countour features, Edge based object recognition	Extract two consecutive binary foreground frames and find the contours of both the frames. The area and length of a contour from both frames are calculated and then, area ratio, length ratio and center position of the contour is calculated to determine static object into the frame. Identification of human and non-human static objects is performed by using edge-based object recognition, which is robust in similarity measure when the object is partially visible due to occlusion. Edge-based object recognition algorithm uses edge information of an object into a human edge based template.
A. Singh, S. Sawan, M. Hanmandlu [3]	Dual background segmentation, Blob detection	Technique requires two reference background images, namely, 'Current Background' and 'Buffered Background'. This technique of storing two backgrounds can be considered as a dual background method. The Blob analysis takes as an input a binary image, applies an algorithm and returns various properties of the detected blobs like bounding box, area, centroid position etc.

IV. CONTRIBUTION AND DISCUSSION

The results for various abandoned object detection techniques are discussed above. But the object detection using mean ration background image subtraction and SVM classifier is the best and efficient one. Support Vector Machine is a powerful classifier. SVM model represents examples as a point in space and the examples of different classes are divided by clear gap. New examples mapped in same space and predict belongs to category. Thus, it separates the set of training images into different

classes. SVM finds the best separating line. Even in large data, it has fast learning speed. So, the proposed system can classify appropriate stable abandon object with fast response. Also, compared to other background subtraction methods on the basis of speed, memory requirement and accuracy the technique mean ration background image subtraction is best.

V. CONCLUSION

This paper explored related research efforts that focused on Abandoned Object Detection System. We have presented various

methods such as dual background subtraction, contour search, and blob detection, mean ration background image subtraction using SVM classifier etc that used to detect Suspicious/ Abandoned object in different environment.

VI. REFERENCES

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