# A Survey On Suspicious Object Detection

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## ABSTRACT

*Object detection is the process of finding specific object from real-world such as moving and nonmoving objects in CCTV videos. Where all the videos extracted from the CCTV surveillance camera is identify as foreground image and compare continuously in real time. Then it performs background subtraction method. Motion based criteria needs to be applied for static and moving objects detection. Proposed method can detect suspicious objects within surveillance videos, and it is also robust to the varying illuminations and dynamic background. This system is basically proposed for making the public places safe and secure from terrorist attack where suspicious object may have luggage, package and many other harmful equipment.*

**KEYWORDS**: *Image Acquisition, Blob Detection, Background Subtraction, Preprocessing, Suspicious Object Detection.*

### I. INTRODUCTION

In recent years, the field of computer vision demand of research on the topic of video surveillance has been increasing day by day. In video surveillance, our main focus is on the objects of our interest i.e. detect objects. As crime rate is increasing day by day, video surveillance has become the need of the human. It provides security at public as well as private places. Suspicious Object Detection is an important part of video surveillances [4]. A suspicious object could be any unachievable object for a specific time period. This suspicious object could be left intentionally or forgotten by someone. If someone forgot to take their object with them, then the system which are developing could be of great help for the owner. And in case if someone intentionally left the object then our system will be a great help for the security. Incidents of bomb blasts by terrorists at busy public places like malls, temple, airports, railway stations, bus stations etc. are among the prime concerns to security agencies across the globe.

A huge amount of loss to the society in terms of property and life happens in the case of a bomb blast. all of these places are well equipped with CCTV's are not able to make the best use of these cameras and the recorded video footages. [2] In existing devices cameras are used only for storing recordings with imprinted time and date. Again person need to monitor all these recordings. And if there is no person for monitoring then the only help the device provides is just some clues to identify the involved person. The existing device is not a proactive and is not efficient to alarm the security personnel who immediately can check the incident. So, a system is being presented which is smart enough to detect a suspicious object and requires no manual monitoring. In this paper, a unique label has been assigned to objects for identifying them. These labels are used with an array to store the area of objects. The area of an object is used to detect split of an object (i.e. when the owner left his bag). Then an object is declared suspicious on the basis of local and temporal rules.

## II. OBJECTIVES

1. Project Object an automatic method to find the suspicious object for video surveillance system.
2. Security concern for the area like airport railway station, bus stop.
3. To achieve a higher accuracy in the crowd area.

## III. AIM

To develop intelligent visual surveillance to replace the traditional passive video surveillance that is proving ineffective as the number of cameras exceeds the capability of human operators to monitor them. In short, the goal

of visual surveillance is not only to put cameras in the place of human eyes, but also to accomplish the entire surveillance task as automatically as possible.

## IV. RELATED WORK

**1. Evaluating Color Descriptors for Object and Scene Recognition[1].**

In this paper, the invariance properties of color descriptors are studied using a taxonomy of invariance with respect to photometric transformations. These invariance properties were validated using a data set with known photometric changes[1]. In addition, the distinctiveness of color descriptors is assessed experimentally using two benchmarks from the image domain and the video domain. On these benchmarks, the addition of color descriptors over SIFT improves category recognition by 8 percent and 7 percent, respectively. From the theoretical and experimental results, it can be derived that invariance to light intensity changes and light color changes affects object and scene category recognition[1]. The results further reveal that, for light intensity shifts, the usefulness of invariance is category-specific. Therefore, a color descriptor with an appropriate level of invariance should be selected for automated recognition of individual object and scene categories. Overall, when choosing a single descriptor and no prior knowledge about the data set and object and scene categories is available, the Opponent SIFT is recommended. Finally, a proper combination of color descriptors improves over the individual descriptors[1].

**2. Abandoned Object Detection in Public Areas[2].**

This system introduces a general framework to detect the abandoned objects in public areas. The main features of this algorithm are simplicity & it is easily understood. It can detect abandoned objects easily in presence of occlusion, noise & distortion[2]. This system can also be applied for detecting special events such as recording a theft, robbery or monitoring school zone safety problems, for school children, there by contributing to the safety of people in the home and schools. Due to its simplicity the computational effort is kept low and no training steps are required. In this project a new approach for unattended object detection is presented[2]. The considered video surveillance system aims at supporting a human operator in guarding indoor environments, such waiting rooms of railing stations or metro stations, by providing him with an alarm signal whenever a dangerous situation is detected. There is tremendous scope for refinement & experimentation of current system. This system is a step towards the effective and efficient monitoring of objects in public areas. The fire detection algorithm can be added to this system which is based on an existing method but contains novel extensions[2].

**3. QuickFind: Fast and Contact-free Object Detection Using a Depth Sensor[3].**

This paper presented a contact free, lightweight and fast object detection algorithm called QuickFind. It is particularly tailored for resource constrained embedded platforms such as smartphones and wearable cameras which are equipped with depth sensors[3]. QuickFind exclusively uses depth data for segmentation, feature extraction and incorporates a number of optimisations for fast operation. We have performed extensive empirical evaluations on a variety of platforms (PC, Raspberry Pi and Intel Edison) and presented detection accuracy, speed and power consumption[3]. Mathematical analysis of time complexity revealed that the worst-case performance of QuickFind is linear in complexity. The wide applicability of QuickFind was demonstrated by implementing two conceptual pervasive computing applications. As depth sensors see wider integration in next generation embedded devices, we expect that the speed and accuracy of QuickFind will make it an attractive choice for emerging contact free sensing applications[3].

**4. Suspicious Object Detection[4].**

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person need to monitor all these recordings [4]. And if there is no person for monitoring then the only help the device provides is just some clues to identify the involved person. The existing device is not a proactive and is not efficient to alarm the security personnel who immediately can check the incident[4].

**5. An abandoned object detection system based on dual background segmentation[5].**

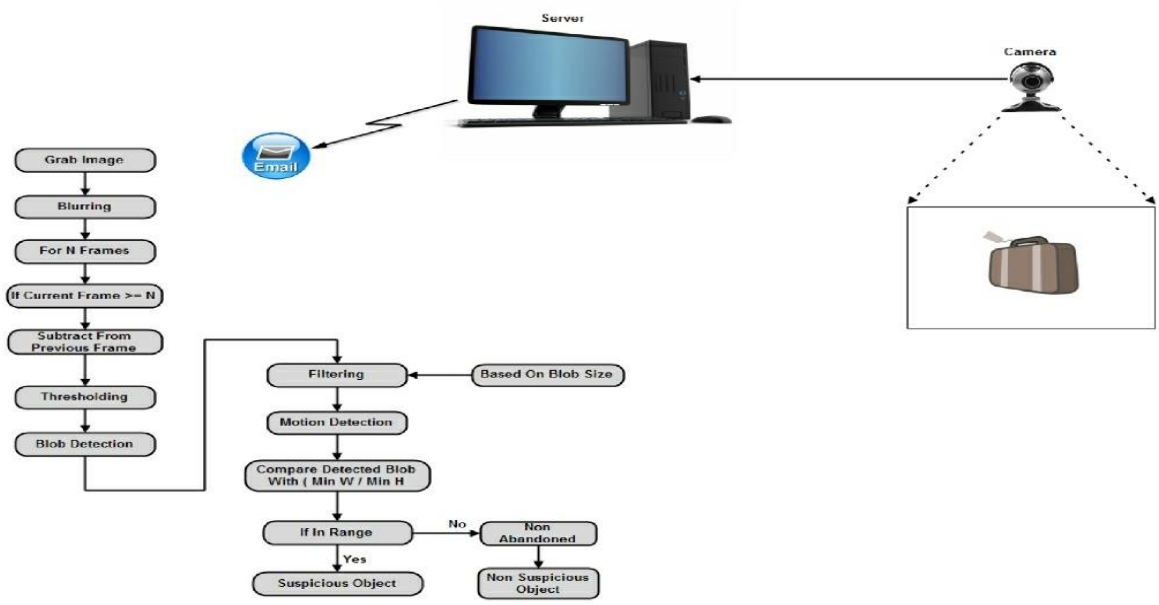
This paper presented an abandoned object detection system based on a dual background segmentation. The background segmentation is adaptive in nature and based on the Approximate Median Model. It consists of two types of reference backgrounds, Current and Buffered background, each with a different time interval[5]. Blob analysis is done on the segmented background and a dynamic tracking algorithm is prepare for tracking the blobs even under occlusion. Detection results show that the system is robust to variations in lighting conditions and the number of people in the scene[5]. In addition, the system is simple and computationally less intensive as it avoids the use of expensive filters while achieving better detection results[5].

**6. Approach for Object Detection in Android Device[6].**

Object detection is achieved using OpenCv and Java language and implemented on android device by using image processing algorithms. Larger objects got detected and indicated by marking their boundary. The extracted objects are stored in array list which can be used for further processing[6]. It is observed that if opening and closing operators are successively used on binary images, then an image is obtained showing only the major objects in the scene. Contours drawn on the objects included all the major objects present in the scene or preview. It can be seen that complexity of the images is not the matter. Objects are efficiently identified and extracted in any situation. Foreground and background objects are effectively detected[6].

## V. SYSTEM ARCHITECTURE

This System processing the Live feed of the CCTV with the image processing. If a person is dropping off some bag or any such suspicious thing and leaving it, the camera will catch this activity and if such bag is untouched for some time span decided by analyzer then it will give notification to authority by sending emails. The Minimum time span probability stays, but time span increases the probability of that thing being suspicious . Hence the incident can be avoided in that case.



First System will take input from live video feed that is capture by any camera. This live video feed is composition of many frames. And we do the different preprocessing techniques on these frames like blurring. By applying various techniques like thresholding, Blob Detection, Filtering, Motion Detection in background subtraction technique, the desired suspicious object is detected. When the object is detected as suspicious the system will raise an alarm and send mail.

## VI. REFERENCES

[1] Koen E.A. van de Sande, Theo Gevers, and Cees G.M. Snoek, Member IEEE, *"Evaluating Color Descriptors For Object and Scene Recognition",* IEEE Trans 2010.

[2] Vrushali R. Patil, M. M. Sardeshmukh, *"Abandoned Object Detection in Public Areas",* IJSRE 2016.

[3] Henry Zhong, Salil S. Kanhere, and Chun Tung Chou, "*QuickFind: Fast and Contact-free Object Detection Using a Depth Sensor*", IEEE 2016 Australia.

[4] Tarushikha Joshi, Harsh Aarya, Prashant Kumar *, "Suspicious Object Detection",* IEEE 2016.

[5] A. Singh, S. Sawan, M. Hanmandlu I.I.T. Delhi, Delhi, India.V.K. Madasu, B.C. Lovell The University of Queensland, Brisbane, Australia, *" An abandoned object detection system based on dual background segmentation"* IEEE 2015.

[6] Savitha G Venugopal P S Dr. Sarojadevi Dr. Niranjan Chiplunkar*," Approach for Object Detection in Android Device",*IEEE 2014.

[7] Aniket Bhondave, Bhagyawant Biradar, Vishal Suryavanshi, Harshal Nakil*,,"Suspicious Object Detection Using Back-Tracing Technique",* IJARCCE 2016.

[8] Mrunalinee Patole, Abhishek Charwad, Akshay Mengade, Naresh Choudhary, Vrushali Chondhe*," Suspicious Object Detection System",* IRJET 2017.

[9] Bhumika Gupta, Ashish Chaube, Ashish Negi, Umang Goel*," Study on Object Detection using Open CV – Python",* International Journal of Computer Applications 2017.

[10] Ismail Haritaoglu, David Harwood, Larry S. Davis *,"Real-Time Surveillance of People and Their Activities",* IEEE 2000.