# *Abandoned Object Detection using Image Processing*

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***ABSTRACT***

*In this paper, we introduce an efficacious way detecting abandoned object that is object that is deserted by any person. We carry out this detection process by using blob detection process, and foreground and background isolation. The system when experimented in real life scenario shows that the system successfully detects the abandoned object without any human intervention which surpasses the previous and existing methods.*

*General Terms: Abandoned object detection, Short and long-term background isolation, Blob detection, Un-manned surveillance.*

***Keywords: Keywords are your own designated keywords which can be used for easy location of the manuscript using any search engines.***

## 1. INTRODUCTION

The importance of video surveillance is growing day-by-day. As security is a burning issue nowadays. Though cameras and memory required for video surveillance is declining it is still impossible to deploy humans to keep an eye for abandoned object. As it is hectic task for human to surveil 24 x 7. Another approach is to give previous knowledge of how the object will look but this will restrict the efficiency of the detection system. Another similar problem with existing system is that if we have multiple cameras surveilling in an area then it is hard for a single person to monitor all cameras and these leads to employing of multiple persons for each cameras.

## 2. RELATED WORKS

There are few works that were carried out related to this topic. There are three methods or ways to detect the abandoned objects. The first method is creating a double-background as this will help in detecting a static foreground. The learning rates is developed using slow and fast rates. The flaw with this method is the high rate of false alarm, the main for this is the faulty. Another issue with this method is that it takes into account only the foreground image to track the regions of interest (ROIs) of abandoned-object. Because of this, most of consistent information that may help to assist in identifying sequential patterns of ROIs may be missed.

The other method to extract static foreground regions is called mixture of Gaussian (MOG) background model. In addition, the method put forth in [7] uses visual attributes and a ranking function to characterize different types of alerts.

The third method consists of concentrating a period of binary foreground images to detect a static foreground. It is proposed in [8] and [9] where the localization based on pixel with maximal concentration value. Which were declared as the region for detection for stationary object? But the problem with this method is that it fails to respond accurately in more complex scenario.

## 3. OUR APPROACH

In this paper, we introduce foreground and background subtraction. It also includes creation of short-term and long-term background. It also proposes a blob tracker to detect abandoned object. As we use the blob detection technique, we can decrease the impact of inaccurate foreground extraction in double-foreground method. Contribution of suggested method is briefly explained as follows.

- Video can be received from either single camera or multiple cameras.
- Initially the pixel details of the film are extracted.
- Then the blob detection method and the background and foreground subtraction is implied on the video.

### Review of Background Modeling and Learning Rates

Background subtraction is nothing but a crucial approach to detect the object in motion within the surveillance region. To implement this technique of background subtraction there is a need to give the previous knowledge. The previous knowledge is a pixel-based background model extracted from initial image. Once this previous knowledge is provided the

Frame(n) Frame(n+60) Frame(n+120)

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Frame(n) Frame(n+60) Frame(n+120)

change that arrives in the next consecutive images will be easily identified with the help of color changes in the updated image.

### 3.1 Pixel-based Finite state machine

Instead of referring to the status of each pixel by considering a single frame, we implement the temporal transition data to track the motionless object depending on sequential pattern of each pixel. Usually there are 24 frames per second and the each pixel in a frame is related with only one state at a moment. Based on the long term and short term model the state of the pixel I may vary from one state at a time t to another state at t+1. Based on the above theory we can build a Finite State Machine (FSM) model we can explain the characteristics of each model. Once the blob is tracked it is divided into two parts. The first one that is the human being is identified as owner blob. The second one is identified as one is nothing but stationary object. Accordingly, the pixel is represented using 2-bit binary code *Si* by merging the long-term and short-term foreground, as follows:

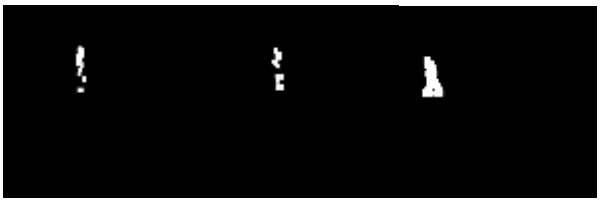
$$Si = FL(i)FS(i), \quad (1)$$

Therefore there are four states with the help of two-bit code:

- *Si* = 00 indicates that pixel *i* is a background pixel,
- *Si* = 01 implies that pixel I is an uncovered background pixel,

Frame(n+180) Frame(n+240) Frame(n+300)

Frame(n+180) Frame(n+240) Frame(n+300)



Frame(n+180) Frame(n+240) Frame(n+300)

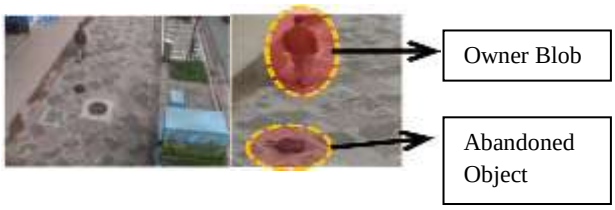



**Table 1**

| ***Si*** | **Hypotheses of pixel *i*** |
|---|---|
| 00 | Background |
| 01 | Uncovered Background |
| 10 | Static Foreground |
| 11 | Moving Foreground |

- *Si* = 10 indicates that pixel I is static foreground,
- *Si* = 11 indicates that pixel *i* is a moving object

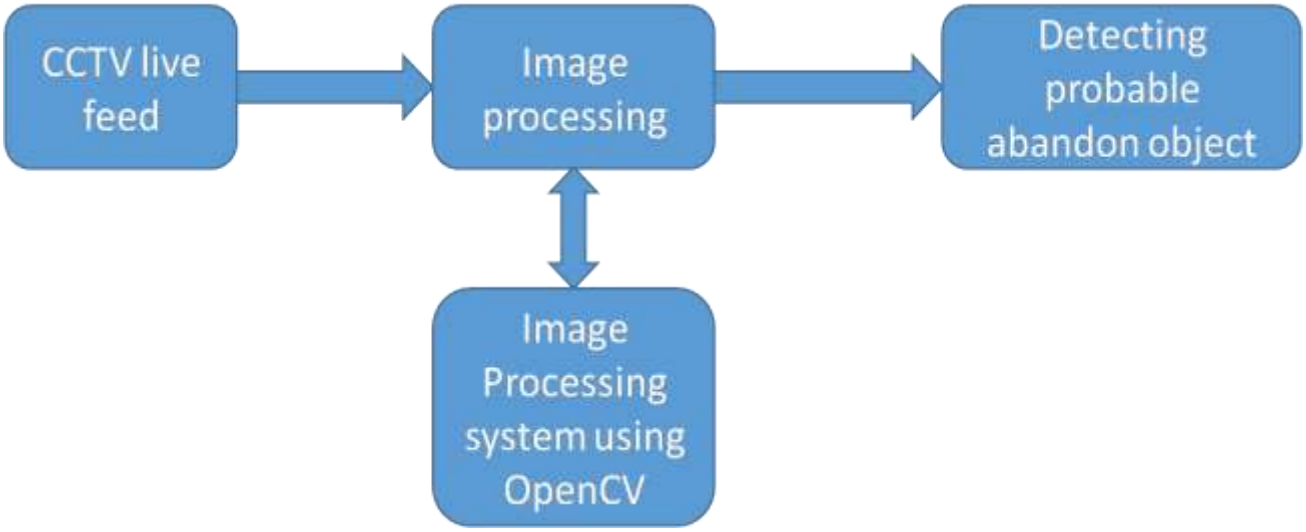



**Fig No. 1 block diagram of the system is as follows**

## 4. CONCLUSION

The paper presents the background and foreground subtraction and blob detection algorithm for abandoned object detection. These characteristics are briefly explained as follows:

1) The temporal consistency model can be represented using pixel-based finite state machine.

2) The experimental results show that the approach presented in our paper is better as compared to the previous approach.

## 5. ACKNOWLEDGMENTS

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## 6. REFERENCES

[1] J. Martínez-del-Rincón, J. E. Herrero-Jaraba, J. R. Gómez, and C. Orrite-Urunuela, "Automatic left luggage detection and tracking using multi-camera UKF," in Proc. IEEE 9th IEEE Int. Workshop PETS, Jun. 2006, pp. 59–66 .

[2] F. Porikli, Y. Ivanov, and T. Haga, "Robust abandoned object detection using dual foregrounds," EURASIP J. Adv. Signal Process., vol. 2008, Jan. 2008, Art. ID 30.

[3] Abandoned Object Detection via Temporal Consistency Modeling and Back-Tracing Verification for Visual Surveillance, Kevin Lin, Shen-Chi Chen, Chu-Song Chen, Daw-Tung Lin, Senior Member, IEEE, and Yi-Ping Hung.

[4] R. H. Evangelio, T. Senst, and T. Sikora, "Detection of static objects for the task of video surveillance," in Proc. IEEE WACV, Jan. 2011, pp. 534–540.

[5] Y. Tian, R. S. Feris, H. Liu, A. Hampapur, and M.-T. Sun, "Robust detection of abandoned and removed objects in complex surveillance videos," IEEE Trans. Syst., Man, Cybern. C, Appl. Rev., vol. 41, no. 5, pp. 565–576, Sep. 2011.

[6] Q. Fan and S. Pankanti, "Modeling of temporarily static objects for robust abandoned object detection in urban surveillance," in Proc. 8th IEEE Int. Conf. AVSS, Aug./Sep. 2011, pp. 36–41.

[7] Q. Fan, P. Gabbur, and S. Pankanti, "Relative attributes for largescale abandoned object detection," in Proc. IEEE ICCV, Dec. 2013, pp. 2736–2743.

[8] H.-H. Liao, J.-Y. Chang, and L.-G. Chen, "A localized approach to abandoned luggage detection with foreground-mask sampling," in Proc. IEEE 5th Int. Conf. AVSS, Sep. 2008, pp. 132–139.

[9] J. Pan, Q. Fan, and S. Pankanti, "Robust abandoned object detection using region-level analysis," in Proc. 18th IEEE ICIP, Sep. 2011, pp. 3597–3600.