

## UNATTENDED OBJECT DETECTION

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### ABSTRACT

Metropolitan cities are finding more problems to keeping the life secured from attacks even cities having security systems like number plate recognition and automatic traffic management, CCTV cameras installed etc. on roads. Many such bad incidences can be avoided by detecting some unattended objects placed on roads. Video surveillance system should be a sufficiently fast enabling a real-time performance. Thus, a prime goal of automated visual surveillance is to obtain a live description of what is happening in a monitored area and trigger appropriate action. Compounding the problem is that usually public areas under surveillance often have fluctuating and variable lighting conditions, people are frequently occluded by other people or structures, and people may temporarily leave a monitored area, etc. Variation in the light in scene area, size of the object, shadow in scene, distance of camera of system all these can add tremendous difficulty and delay. Here the proposed system described with basic description, Algorithm ideas for system operation. And it is verified with output results.

**Key words:** Background subtraction, brightness adjustment, classification of objects and humans, MATLAB, real-time video processing.

### 1. INTRODUCTION:

Metropolitan cities are finding more problems to keeping the life secured from attacks even they having security systems like number plate recognition and automatic traffic management, CCTV cameras installed etc. on roads. Many such bad incidences can be avoided by detecting some unattended objects placed on roads. It is possible to design video surveillance systems which can contribute to the safety of people in the home and in public places. Terrorist attacks have become a critical threat of public safety; especially, explosive attacks with unattended packages are repeatedly concentrated on such public places. A key function in such a surveillance system is the understanding of human behavior in relation with objects left unattended. In this context, visual surveillance for human-behavior understanding has been investigated worldwide as an active research topic. Such a system should be a sufficiently fast enabling a real-time performance. Thus, a prime goal of automated visual surveillance is to obtain a live description of what is happening in a monitored area and trigger appropriate

action. The computational effort and complexity involved in simply “following” someone through an extended video sequence is enormous, and a truly robust and reliable tracker is under research. Compounding the problem is that usually public areas under surveillance often have fluctuating and variable lighting conditions, people are frequently occluded by other people or structures, and people may temporarily leave a monitored area, etc. Each of these factors can add tremendous difficulty and delay. Here we were motivated to take these as a task for work. For example, in a system the unattended object which may be steady till last and the unattended objects which may be removed before getting trigger to system to be detected, with steady human detection.

### 2. LITURETURE SURVEY:

The performance of this method could strongly depend on the technique used to update the background and, moreover, they could fail in presence of non-uniform objects. The existing methods can also be divided into two categories according to their use of one or more

background subtraction models. And for each category, it can further be subdivided into two classes: one based on frame-to-frame analysis [7], [5] The core contribution of this approach is the integration of a powerful set of filter operators within a linear prediction model towards the detection of events using measures that are adaptive to the complexity of the scene. [5] And the other method based on a sub-sampled analysis [6].

For example, a statistical model of the background is used to detect foreground regions and to eliminate object shadows [10]. Two background models system is discussed in [8], [3] for detection of stationary objects. Adaptive Kernel density estimation is used in [12] for a motion-based back-ground subtraction algorithm, the detection of moving objects to handle complex background, but the computational costs is relatively high. Their method seems to work well in the presence of both static and dynamic backgrounds.

Few papers can be found in the literature for foreground analysis [16], [14]. Reference [20] analyzed the foreground as moving object, shadow, and ghost by combining the motion information. In [14] the authors described a background subtraction system to detect moving objects in a wide variety of conditions, and a second system to detect objects moving in front of moving back-grounds. In their work, a gradient-based method is applied to the static foreground regions to detect the type of the static regions as unattended or

removed objects (ghosts). It does this by analyzing the change in the amount of edge energy associated with the boundaries of the static foreground region between the current frame and the background image. Developing a system which can eliminate a variation environmental condition problem is topic under research. From above literature review it can be concluded that system needs are

1. Give high speed performance to a system.
2. Detecting object must be possible for low light areas, long distance area etc.
3. Video frames with low resolution can be used for system as input.

**3. UNATTENDED OBJECT:**

It is nothing but an elements area that hides some part of current video scene area. So to get analysis of the unattended object here system can use background subtraction method. In this the current video scene frame is subtracted from background Image scene.

**4. PROPOSED SYSTEM:**

It is showing basic block diagram for Unattended Object Detection system. [fig.1] it represents and shows a detailed overview of system. Broadly it is classified as follows.

- 4.1 Input
- 4.2 Pre-setting
- 4.3 Processing

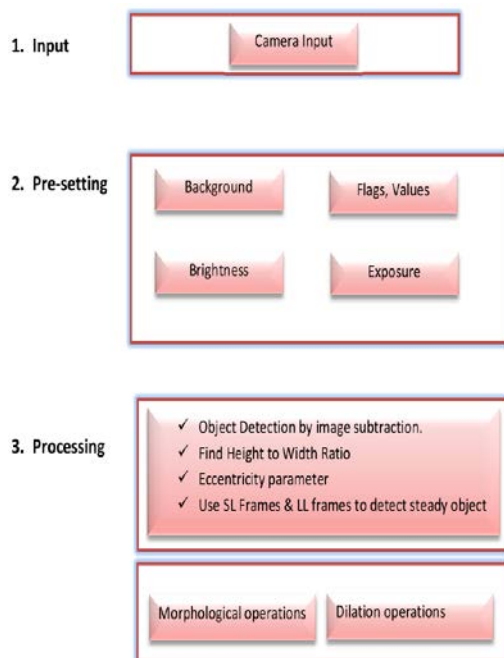


Figure 1: Basic block of system operation

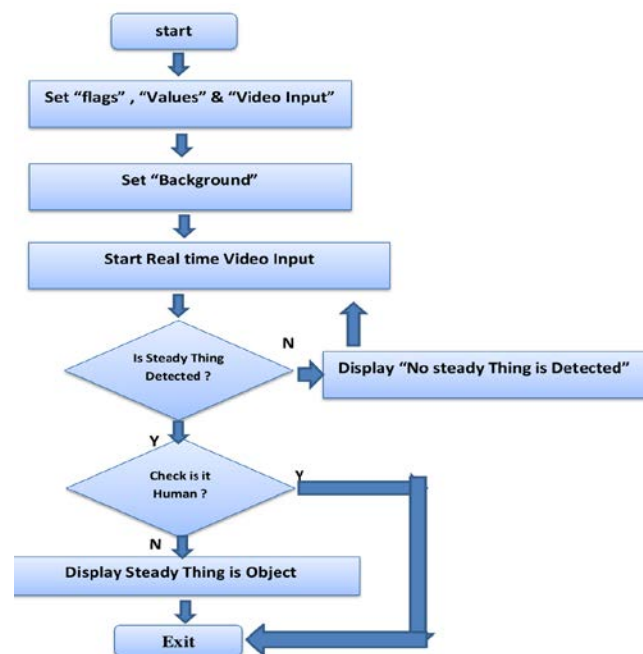


figure 2: Flow Chart for System operation

**4.1 Input:**

It represents the camera as a video input device. Camera (i-ball company) used to capture a Background Image and show the current video input frames. Facility of selecting inbuilt laptop camera is also provided. So as per choice we can take input video through camera.

**4.2 Pre-setting:**

Before using the system here it need some flags, background image, adjustment of Brightness and Exposure values. Background image button will help to set a background image. This image is consider as a background image and going to use it for background subtraction purpose. Brightness and Exposure buttons are created to set the parameters if necessary in low lightning areas of scene.

**4.3 Processing :**

As the tracking is starts then the various operations are performed in program like Object detection by Background subtraction method, as well as it uses slow length(SL) frames , Long length(LL) frames to determine the object is steady or not. Because the steady object will have difference in 3 frames is equals to more number of

pixels than threshold level in current scene. So it is detecting object is “steady” or “not steady.” Detection of this steady object causes to timer value to increase one by one. And after timer value equals to 11 it gives detection of steady object. If timer value is less than 11 and any moving activity is detected then timer will be 0. After detection of steady object morphological and dilation operations are performed. This will help to calculate maximum area of object. Based on calculated area the object is highlighted with square or rectangle.

**5. ALGORITHM FOR SYSTEM OPERATION:**

**5.1 To setting up parameters means “Flags” & “value”:**

- a) Set background image (Adjust Brightness and Exposure values if required.)
- b) Set tracking and RRC radio buttons to “1”
- c) Give input value from 0 to 9 in blank Tp and Tb spaces.

**5.2 To detect new thing in binary output:**

- a) Press button “Start tracking.” and take video input from camera.
- b) Subtract “Background image”& “Current image” and store difference image (Current image is snap shot taken by camera)

**BACKGROUND SUBTRACTION RESULTS**

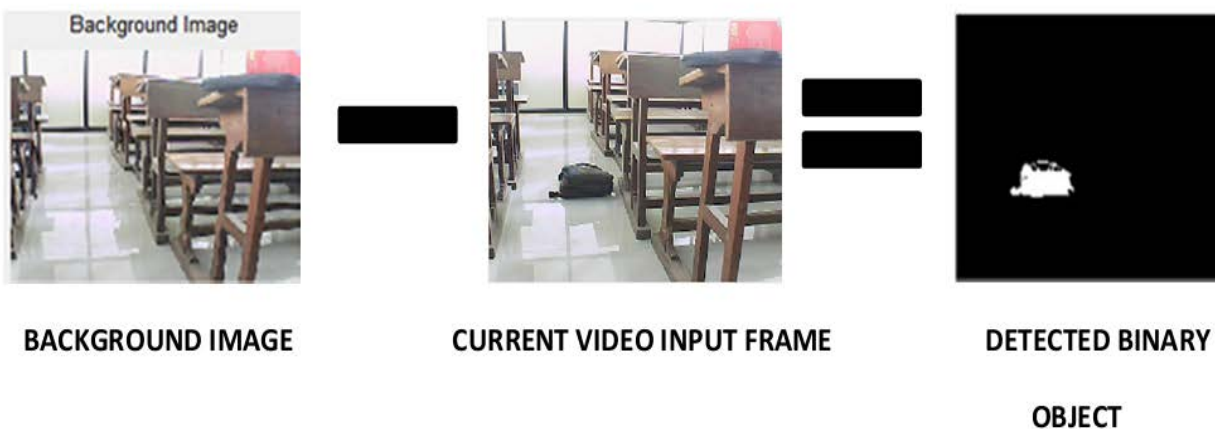


Figure 3: background subtraction

c) Now it will create black & White image of difference image. If object is present then it will displayed as a white area. For background subtraction many methods are present. Here it uses averaging-division method for pixels. In this method a images are converted to intensity images and then process for creating a object with different valued pixels than the background pixels. This method will create image with a scale value of background pixel less than threshold value. The threshold value is decided by object pixel value and it is used to make object area as a white pixel area as shown in fig. 3.

**5.3 To check for thing is steady or not?**

- a) To make decisions that the anything coming into video is steady or not, we have stored 3 continuous images (frames) of current video input (input frame).
- b) Taking the difference of the first frame with second frame and difference of second frame and third frame will help us to know object is steady or not.(based on the total number of pixels common within three frames which is compared with threshold value and it is decided that object is steady or not.)



Figure 4: Steady object detected.

**5.4 To provide trigger for a system:**

a) If the anything is steady detected then start timer from “0” & increment it by one by one. At timer will equal to “5” the trigger to the system is done and alarm will start ringing. After timer equals “5” object will be processed to check for whether it is Human. It is taking decision based on the height to width ratio of detected thing.

b) If it is found detected thing is not human then it will Display unattended object detected. If object moves before timer reach to 5 then timer will be reset.

**5.5 To Highlighting objects with square:**

a) Detected black and white image is used to collect information (area, position on the image) of square use to highlight the steady object.

b) In this operation a morphological, dilation, region filling operations are performed to increase a little more area of pixel of steady detected object. These operations will help to get the accurate area and position of steady object.



Figure 5: final output

**6. RESULTS:**

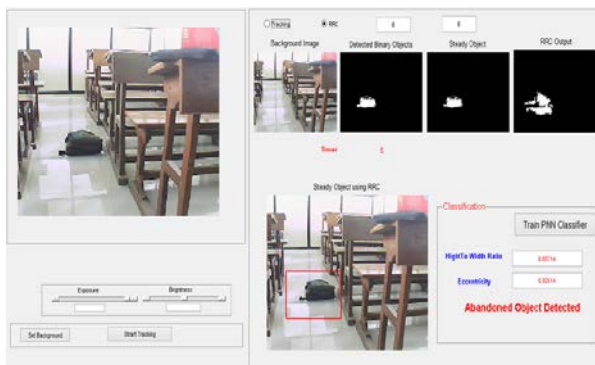
Note: DISTANCE IS MEASURED FROM THE POINT WHICH IS BELOW CAMERA PERPENTICULAR POSITION ON GROUND.

GUI 1: Object placed at distance of 4 meter.

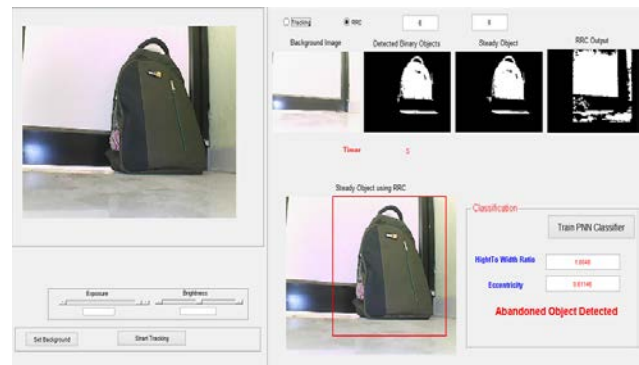
GUI 2: Object placed at distance of 12 meter.

GUI 3: Object placed at 2 meter with large size object.

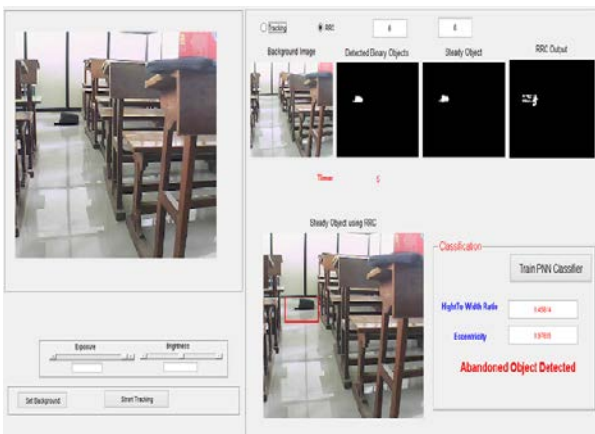
GUI 4: steady human detected.



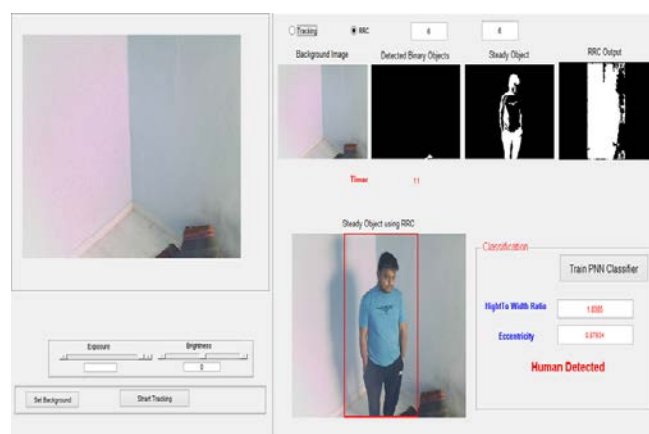
GUI 1



GUI 3



GUI 2



GUI 4

## 7. CONCLUSION AND FUTURE WORK:

This method will eliminate shadow problems from the video surveillance system. This system is demonstrated and verified for various real-time conditions like at long distance, for short distance, for low light conditions, normal day light conditions. Objects parameter i.e. height to width ratio for human detection purpose can be used to separate steady object from steady human and it is shown in output result in GUI 4. The future work for this system is adding triggering hardware like (GSM, GPS) to increase security level and tracking of suspicious person. Hope this information will help to new researchers in video processing technic to develop more methods.

## 8. REFERENCES:

1. Thi Thi Zin, Member, IEEE, Pyke Tin, Hiromitsu Hama, Member, IEEE, and Takashi Toriu, Member, IEEE, "Unattended Object Intelligent Analyzer for Consumer Video Surveillance," IEEE Transactions on Consumer Electronics, Vol. 57, No. 2, May 2011.
2. L. Li and M. K. H. Leung, "Fusion of two different motion cues for intelligent video surveillance," Electrical and Electronic Technology, TENCON., vol. 1, pp. 19-22 Aug. 2001.
3. W. E. L. Grimson, C. Stauffer, R. Romano, and L. Lee, "Using adaptive tracking to classify and monitoring activities in a site," Proc. of CVPR 98, Santa Barbara, CA, USA, pp. 22-29, Jun.1998.
4. C. Stauffer and W. E. L. Grimson, "Learning patterns of activity using real-time tracking," IEEE Trans. Pattern Analysis and Machine Intelligence, vol. 22 no. 8, pp. 747-757, Aug. 2000.
5. Q-Z. Wu and B-S. Jeng, "Background subtraction based on logarithmic intensities," Patter Recognition Letters, vol. 23, no. 13, pp. 1529-1536, Nov. 2002.
6. A. Monnet, A. Mittal, N. Paragios, and V. Ramesh, "Background Modeling and Subtraction of Dynamic Scenes," Proc. of IEEE Int. Conf. on Computer Vision (ICCV), Nice, France, pp. 1305-1312, Oct. 2003.
7. A. Mittal, N. Paragios, "Motion-based Background Subtraction using adaptive kernel Density Estimation," Proc. of CVPR, pp 302- 309, 2004.
8. L. Li, W. Huang, I. Y. H.Gu, Q. Tian, "Statistical Modeling of Complex Backgrounds for Foreground Object Detection,"IEEE Trans. on Image Processing, vol. 13, no. 11, pp. 1459-1472, Nov. 2004.
9. R. Cucchiara, C. Grana, M. Piccardi, A.Prati, "Detecting Moving Objects, Ghosts, and Shadows in Video Streams," IEEE Trans. on Pattern Analysis and Machine Intelligence, vol. 25, no. 10, pp. 1337-1342, Oct. 2003.
10. J. Connell, A.W. Senior, A. Hampapur, Y.-L. Tian, L. Brown, and S. Pankanti, "Detection and Tracking in the IBM People Vision System," IEEE Intl. Conf. on Multimedia-Expo. (ICME04), Jun. 2004.
11. S.M. Smith, "A new class of corner finder," Proc. of 3<sup>rd</sup> British Machine Vision Conf., pp. 139-148, 1992.
12. S. Cheng, X. Luo, and S. M.Bhandarkar, "A multiscale parametric background model for stationary foreground object detection," in IEEE Workshop on Motion and Video Computing, 2007.
13. F. Porikli, Y. Ivanov, and T. Haga, "Robust abandoned objectdetection using dual foregrounds," EURASIP Journal on Advances in Signal Processing, vol. 2008, no. 1, pp. 1-11, 2008.
14. R. Mieziańko and D. Pokrajac, "Detecting and recognizing abandoned objects in crowded environments," Proc. of Computer Vision System, pp. 241-250, 2008.
15. P. Spagnolo, A. Caroppo, M. Leo, T. Martiriggiano, T. D'Orazio, "An Abandoned/Removed Objects Detection Algorithm and Its Evaluation on PETS Datasets", Proc. of IEEE Conf. on Video and Signal Based Surveillance (AVSS'06), pp. 17-21, 2006
16. F. Porikli, "Detection of temporarily static regions by processing video at different frame rates", Proc. of IEEE Conf. on Advanced Video and Signal Based Surveillance(AVSS'07), pp. 236-241, 2007.
17. W. Lao, J. Han, P.H.N. de With, "Automatic surveillance analyzer using trajectory and body-based modeling," Digest of Technical Papers: Intl. Conf. on Consumer Electronics(ICCE), Las Vegas, NV, USA, Jan. 10-14, pp. 1-2, 2009
18. W. Lao, J. Han, P.H.N. de With, "Automatic video-based human motion analyzer for consumer surveillance system," IEEE Trans. on Consumer Electronics, vol. 55, no. :2, pp. 591-598, May 2009.
19. J. Han, D. Farin, P.H.N. de With, W. Lao, "Real-time video content analysis tool for consumer media storage system," IEEE Transactions on Consumer Electronics, vol. 52, no. 3, pp. 870-878, Aug. 2006.
20. Y. Cho, S.O. Lim, H.S. Yang, "Collaborative occupancy reasoning in visual sensor network for scalable smart video surveillance," IEEE Trans. on Consumer Electronics, vol. 56, no. 3, pp. 1997-2003, Aug. 2010.