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Abandoned Object Detection via Visual Surveillance

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Abstract: In this paper we are processing the live feed of the CCTV camera with the image processing. If a person is dropping off some bag or any such suspicious thing and leaving it running away, 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. Minimum the time span probability stays 50-50, but as time span increases the probability of that thing being abandon or hazardous increases. We introduce a framework to identify static foreground regions based on the transition of code patterns and to verify whether the candidate regions content abandoned objects by analyzing the back-traced trajectories of luggage owners. Hence the incident can be avoided in that case.

Keywords: Abandoned luggage detection, abandoned object detection, object detection and tracking.

I. INTRODUCTION

Security of public places in a considerably burning issue. Though the CCTV have installed at the places but the footage is only used after incident had taken place. Those CCTV cameras can be used to prevent such incidents from happening. Hence we are proposing a better way in this project. we are processing the live feed of the CCTV camera with the image processing. If a person is dropping off some bag or any such suspicious thing and leaving it running away, the camera will catch this activity. And if such bag is untouched for some time span decided by analyser then 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.

To address this problem, foreground/background techniques are suitable for identifying static foreground regions (i.e. object that remain static for a long time) as a left-luggage candidates. We combine short-long term background models to extract foreground objects, where each pixel in an input image is classified as a 2-bit code [1].

II. RELATED WORK

A. Literature survey

Shuai Zhang have proposed framework for achieving object detection and tracking are two fundamental tasks in multiple camera surveillance. A object detection algorithm using color based MS segmentation and depth information is first proposed for improving background modeling and segmentation of occluded objects [2].

Amit Satpathy has proposed two sets of novel edge-texture features discriminative robust local binary pattern and ternary pattern for object recognition. The limitations of existing texture features, local binary pattern, local ternary pattern and robust LBP for object recognition are analyzed, BP and LTP separate a bright object against a dark background and vice-versa [3]. This differentiation makes the object intra-class variation larger [3].

J. Jiang has proposed MPEG-4 is a global standard for digital multimedia services. In this paper they proposed a contour-based technique to extract video objects for MPEG-4.For this they used contour extraction, contour blocking, block classification, pixel based parity check filling algorithm techniques [4].

Wu-Chih Hu, Chao-Ho Chen have proposed an effective method for detection and tracking of multiple moving objects from a video sequence captured by moving camera without additional sensors. Moving object detection is getting difficult for video capturing by a moving camera since camera motion and object motion are mixed [5].

B. Our approach

We proposed an approach for detecting abandoned object in surveillance videos. For this we divide the image in short term and long term modules and find out the foreground objects, where each pixel in an input image is classified as a 2-bit code [1].

The algorithm for identify the static foreground regions involves a specialized mixture of Gaussian (MOG) background model. In previous researches [6]–[7], three Gaussian mixtures were used to classify foreground objects as moving foreground, abandoned objects, and removed objects by performing background subtraction. In addition, the approach proposed in [7] uses visual attributes and a ranking function to characterize various types of alarm events.

The methods proposed in [8] and [9] involved localizing the static foreground based on the pixels with the maximal accumulated values, which were subsequently considered the candidate regions of stationary objects. However, this category of methods fails in complex scenes.

III. PROPOSED WORK

A. SYSTEM INTRODUCTION

We are processing the live feed of the CCTV camera with the image processing. If a person is dropping off some bag or any such suspicious thing and leaving it running away,

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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. 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.

I. System Modules:

The system contains following modules:

1. Background segmentation-

In this module we are processing a live feed of the camera in which if we detect any abandoned object then the system set it as a background object for further processing.

2. Blob detection-

In this module, system will set specific portion surrounding to that object and system will focus on that portion.

3. Tracking-

In this module the systems focus on area which select in blob detection and track the persons which are close to that abandoned object.

4. Occlusion Detection and Tracking-

In this module system set specific time period and observe that whether the person come back to take his/her luggage or not.

5. Alarm and Display –

In this module if person does not come back within that specified time period then alarm event get triggered and this shows that abandoned object detected.

II. System Features:

- This system recognizes Suspicious Activity at public places.
- The system will work in real time.
- The CCTV operator should modify region of interest.
- Activity is tracked under occlusion more accurately.

B. SYSTEM ARCHITECTURE

System analyzing video content from surveillance cameras that raise an alarm should a potentially dangerous situation be detected are of great help to the human CCTV operator and security staff in general[10].

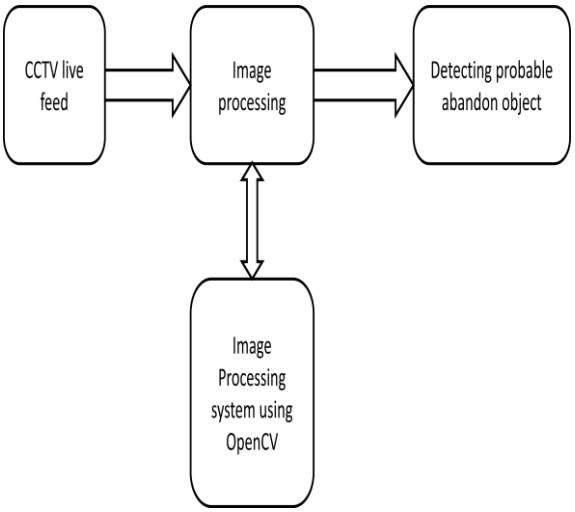


Fig. System Architecture

In this architecture system will take the input from live CCTV camera. For detecting the abandoned object detection system perform the image processing operation on the input data. For this we are using OpenCV libraries. After performing the operations of image processing it will detect the abandoned object through alarm.

C. ALGORITHM

Pseudo-Steps of a Blob Detection Algorithm:

Step1: Filter your image using cvBlur or cvSmooth. Use Gaussian filter.

Step2: Segment your image with the color your want.

Step3: From the segmented image, connect all 4/8-connected image pixels. For every pixel, check the value of its pixel at its all directions. If it is also segmented include it in your blob. In this way, all disjointed patches can be detected as blobs.

Step4: Use some filter like area/roundness/compact or the blob detected to get the blob you are looking for.

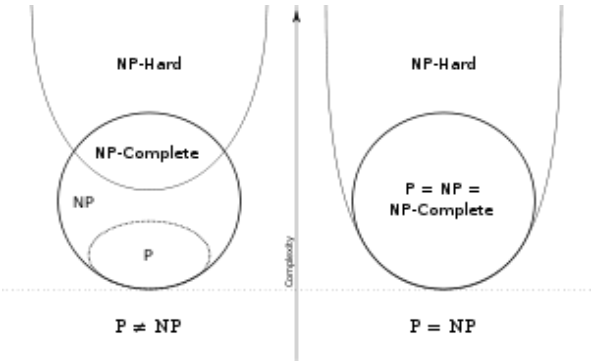
Step5: If you are detecting blobs in video, try to track blobs from one frame to the next, this will ensure robustness. A simple way is to detect mean of the current blob and in the next image search for the mean near the current mean.

This algorithm is used for detecting the abandoned object. And the output of this algorithm will given to the further processing which is triggering the alarm.

D. FEASIBILITY ANALYSIS

This is considered with specifying equipment and software that will successfully satisfy the user requirement the, technical needs of the system may vary considerably but it include-

- The facility to produce outputs in a given time.
- Response time under certain conditions.
- Ability to process a certain column of transaction at a particular speed.



Our goal is to divide the data D (e.g., the safe combination) into pieces D1, D2…, Dn in such a way that:

1. The Knowledge of any k or more Di pieces makes D easily computable and undetermined (in the sense that all its possible values are equally same).

This technique is called (k,n) threshold scheme. If k=n then all participants are required to again construct the secret original data.

The idea of Adi Shamir's threshold scheme is that 2 points are sufficient to define a line, 3 points are sufficient to

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define a parabola, 4 points to define a cubic curve and so forth.
That is, it takes K points to define a polynomial of degreee^{K-1} . Suppose we want to use a$^{(K,n)}$ threshold scheme to share our secret S, without loss of generality assumed to be an element in a finite field F.
The image processing algorithms are NP type. Because we can get & verify the solution set. Hence the problem statement involving it is NP Complete.

E. MATHEMATICAL MODEL
a. Let 'S' be the System
S = {……
b. Identify the inputs as C, P and M
S = {I, P, Y, R, W …
1. Let I is the set of Templates
I = {I1, I2, …. In}
2. Let P is the set of Video frames
P= {P1, P2, …. Pn}
3. Let 'Y' is the set of user
Y = {Y1, Y2, … , Yn}
c. Identify the outputs as O
S = {I, P, Y, R, W, O, D …
O = {O1, O2, O3, On | 'O' gives Matched Objects}
D = {D1, D2, D3, Dn | 'D' givesalert}
d. Identify the functions as 'F'
F = {Object Definition (), Object Matching (), Alert ()}
Object Definition (I, P) =R':: takes Images(U), Video(I).
Object Matching (I, P) = OD':: Verifies the Object
Alert (D, P) = OD':: Give alert to system.

IV. SYSTEM ADVANTAGES

1. System provides security at public places.
2. Detection of abandoned luggage.

V. CONCLUSION AND FUTURE SCOPE

This paper presents a temporal consistency model combining a blob detection algorithm for abandoned object detection.
Characteristics of the proposed approach are summarized as follows:

1. The temporal consistency model is described the temporal transition pattern generated by short- and long-term background models, which can accurately verify static foreground objects.
2. Our blob detection algorithm iteratively tracks the luggage owner and efficiently verifies left-luggage events.

In the future, we can extend our method for handling more challenging situations such as sudden changes in lighting and overly crowded scenes.

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BIOGRAPHIES

Ms. Aishwarya Khaire is currently a student at RMD SSOE College pursuing her BE Degree in the field of Computer Engineering. She is working on Graphical user interface of this system. As well as contribute in documentation of this system.

Ms. Rajashree Ladkat is currently a student at RMD SSOE College pursuing her BE Degree in the field of Computer Engineering. She is working on algorithm and coding part of the system. As well as documentation of this system.

Ms. Arati Shelar is currently a student at RMD SSOE College pursuing her BE Degree in the field of Computer Engineering. She is working on developing mathematical model as well as the overall architecture and flow of abandoned object detection.

Ms. Mrunal Wansale is currently a student at RMD SSOE College pursuing her BE Degree in the field of Computer Engineering. She is working on testing part of this software and finding how the test suite can be improved so that it can achieve code coverage and can fine as many bugs as possible with less number of test cases.