ATS: A New Way To Deal With Security of Public Places

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Abstract: ***With the rising concern of the security at public places it is essential to find a solution to this issue.CCTV cameras only captures the movement and we need to monitor that continuously. Therefore it is necessary to design a system which can invigilate and traced out the suspicious object in real time without any human efforts. This paper is proposing an idea to develop a system which could find a threatening object and alert the security agencies about it. The proposed system will also have provision of IoT with an effective cryptographic technique to ensure the authenticity. A technologically improved system will surely boost up the security at public places over the traditional system.***

Index Terms: public place security, Image processing, IoT, Cryptography.

I. INTRODUCTION

The present world is very badly facing the problem of terrorism. And it is important to come up with a solution that could crush these terrorist activity before it happened actually. To prevent such a brutal action CCTV cameras are playing vital role in today's scenario .CCTV cameras are widely used at public places for video surveillance of the surrounding area[15]. This surveillance system is not that much effective as it is required to monitor the image captured by the system with an active human participation. But there might be a chance of human error which could cause a serious loophole while providing a security. So it is required to design a system with less human involvement. Abandoned object detection is currently one of the most promising research topic for security in public places. One of the prime action in detection abandoned objects, is to localize deserted object items and then to classify that[14][3].

The mechanism of detecting the abandoned objects can be divided into two types: one is based on the tracking approach and another is based on the background-subtraction method[1].The tracking based systems proposed in[5],[12] usually encounter the problem of splitting, occlusion, and identity correspondence and to detect it. On the other hand, Background-subtraction technique implemented in[16] can work well in these highly-crowded areas. The background subtraction technique is classified into two categories according to their use of background subtraction models. And for each model, it is further divided into two classes: first is frame-to-frame analysis and the another is based on a sub-sampled analysis.[16] This paper gives a design idea to develop an abandoned object tracking system with the implementation of IoT along with a strong cryptographic technique. The rest of the paper is divided as follow; the objective of this system is described in II.The methodology of the proposed system is highlighted in section III. Section IV gives the future scope of this paper.

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II. OBJECTIVE

This paper introduces a robust way to overcome an error in a traditional surveillance system. This paper is based on SVM classifier to recognize the left-objects. Two backgrounds are constructed one is short term and other is long term. Mean-ratio and Log Ratio operators can be used for change detection. To achieve higher accuracy fuzzy clustering can be applied on both outputs. For detection of static and moving object the motion based criteria is described in this paper. The introduction of IoT in addition with a strong cryptography technique will surely boost up the efficiency of proposed system [1][5][12][15]

III. METHODOLOGY

A. Proposed System Design

The work flow diagram of proposed system is shown in fig.1. The CCTV camera will captures the live footage which is used for its processing using MATLAB. For detection of static and moving object, SVM classifier is used in this paper as described in[1][9][10].The proposed system could be effectively developed using MATLAB as it has some built-in toolboxes viz.

B. Image Aqusiotion Toolbox:

It provides a Simulink block that enables to capture an image & video data directly from any device. It provides a complete environment for developing a customized imaging solutions[5]. In this application a pixel-to-pixel comparison is done in pairs of incoming image frames that detects the movements in frame. The pixel value will change only when some movement happened in that frame[4].

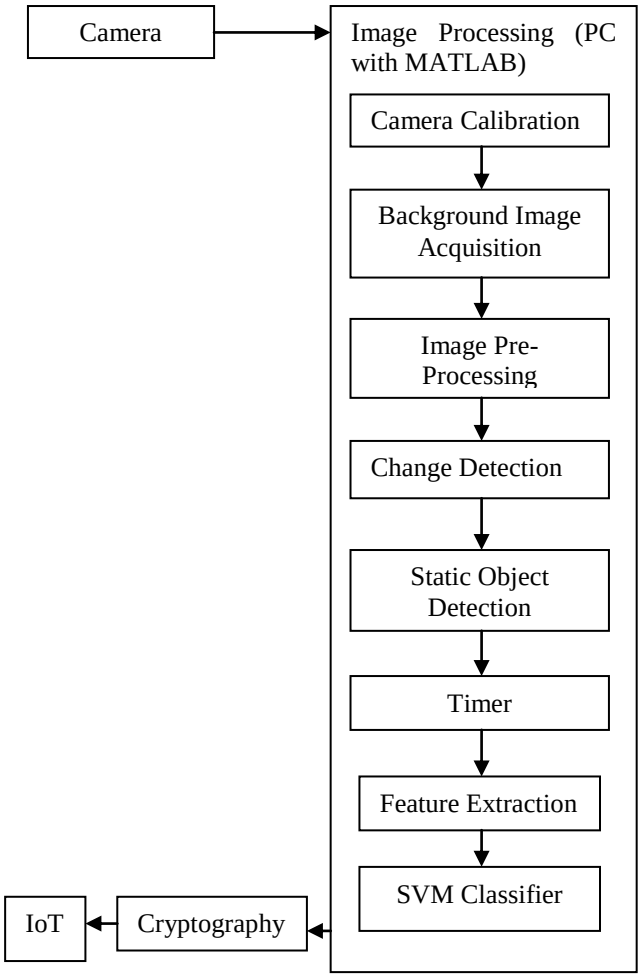

Fig. 1. Proposed Methodology Flowchart

C. Background Detection:

Background substraction is widely used approach for detection of moving objects after analysing a frames.To detect an object a comparative analysis between current frame and referenace frame is to be done[7][14].

D. Image Pre-Processing:

Image Pre-processing is the technique of enhancing data image prior to computational processing. The low frequency background noise can be removed by pre-proccessing technique.

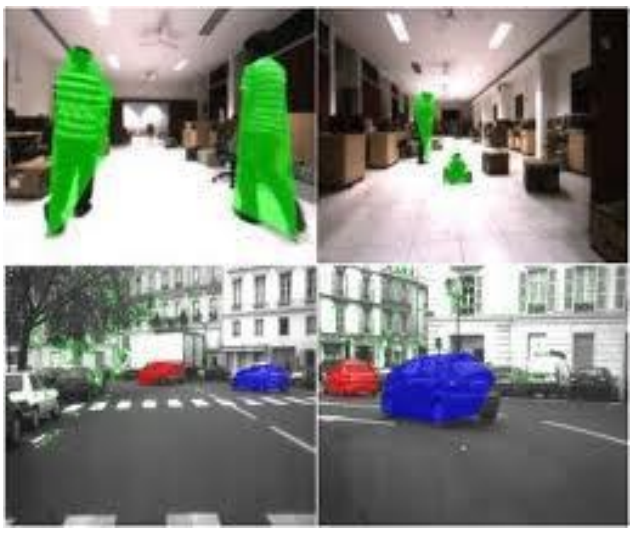

Fig. 2. Proposed work [2]

E. Change Detection

If there are any changes in captured area of CCTV that could be detected in change detection.After that,there is classification between static and moving objects[13].

F. SVM Classifier:

The change detection block detects only static and moving objects but SVM (Support Vector Machine) classifier classifies the object is human or abandoned.

G. Security Provision :

The wireless channnel is vulnerable to various security threats therefore it is important to apply a strong security provision to proposed sysetm [18][6].Since the captured image or video is to be be send to receiver via air channel it is required to provide an effective security protocol to the data. As a range of communication is large, Public key cryptography is more superior over private key cryptography.The concept of Binary ECC-XOR-PRNG collaborative security protocol proposed in [17] will be suitable in this case as per the literature survey.So it is proposed to apply a concept of XOR –PRNG that sending the captured result to server or authorized person.

H. IoT:

The Internet of Things is the widely used technology.This technique can communicate with each other and often collect sensor data which is store in the cloud. As it allows objects to be sensed or controlled remotely across existing network infrastructure.In this paper monitoring and controlling is done at central server using IoT. If the abandoned object is detected then this message directly sends to higher authority persons.

I. Pseudo Code.

1. Start.
2. Image Acquisition.
3. Background Detection.
4. Incoming object detection.
5. Classification between moving and static object detection.
6. If static object detected initialize timer.
7. If object is present till timeout,
8. Then extract Features of object.
9. Object Classification between Human and Abandoned Object.
10. If Object found as Abandoned, then,
11. Object Tracing on video Preview.
12. Repeat step 2 to 9 continuously.
13. Integrating the designed system with **IoT** to carry out the real time handling.
14. Store the time to time updates of that place to the cloud.
15. Stop.

IV. FUTURE SCOPE

The future work of this paper is actual implementation of the proposed system on hardware the proposed design is need to be integrating with a strong central server that would

handle the entire real time working.

It is expected that the proposed design concept could be useful to implement a robust security system at PAN India.

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