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VISUAL SURVEILLANCE APPLICATION: DETECTION AND TRACKING OF MOVING OBJECTSIN MATLAB

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Abstract
Surveillance is the observation of behaviour, a variety of activities, or information with the goal of acquiring information, influencing, managing, or guiding it.This can include remote observation using electronic equipment such as closed-circuit television (CCTV) or intercepting electronically transmitted data such as Internet traffic. Simple technical methods such as human intelligence collection and postal interception can also be included.
The observation of people's behaviour, actions, or other changing information for the aim of influencing, managing, guiding, or safeguarding from a video sequence is known as visual surveillance.It is an important technology in the battle against terrorism, crime, and public safety, among other things. Surveillance cameras that are available only react "after the event."The goal of this Paper is to create a visual surveillance system that can replace standard passive video surveillance.There is a requirement for continuous surveillance video monitoring 24 hours a day, seven days a week.To notify the system when there is still time to prevent a crime from occurring.It will consist of two steps: object detection and tracking.It will entail extracting moving objects from video in real time and tracking them over time.Object detection in movies will entail determining whether or not an object is present in video sequences.Item tracking will be used to follow the spatial and temporal changes of an object throughout a video sequence.Because tracking normally begins with the detection of an object, these two processes are inextricably linked. Object detection in subsequent video sequences is frequently required to aid and confirm tracking.
Keywords: Surveillance, Closed-Circuit Television (CCTV), Internet traffic

I. INTRODUCTION

The observation of people's behaviour, actions, or other changing information for the aim of influencing, managing, guiding, or safeguarding from a video sequence is known as visual surveillance. It is an important technology in the battle against terrorism, crime, and public safety, among other things. Surveillance cameras that are available only react "after the event."The goal is to create a visual surveillance system that can replace standard passive video surveillance.There is a requirement for continuous surveillance video monitoring 24 hours a day, seven days a week.To notify the system when there is still time to prevent a crime from occurring.It consists of two steps: object detection and tracking.It involves real time extraction of moving objects from video and continuous tracking overtime. Detection of Objects: Object detection in movies entails determining whether or not an object is present in video sequences.Object tracking is used to follow an object's spatial and temporal changes throughout the course of a video sequence.Because tracking normally begins with the detection of an object, these two processes are inextricably linked.Object detection in subsequent video sequences is frequently required to aid and confirm tracking.

2.SURVEILLANCE (FULLY-AUTONOMOUS)

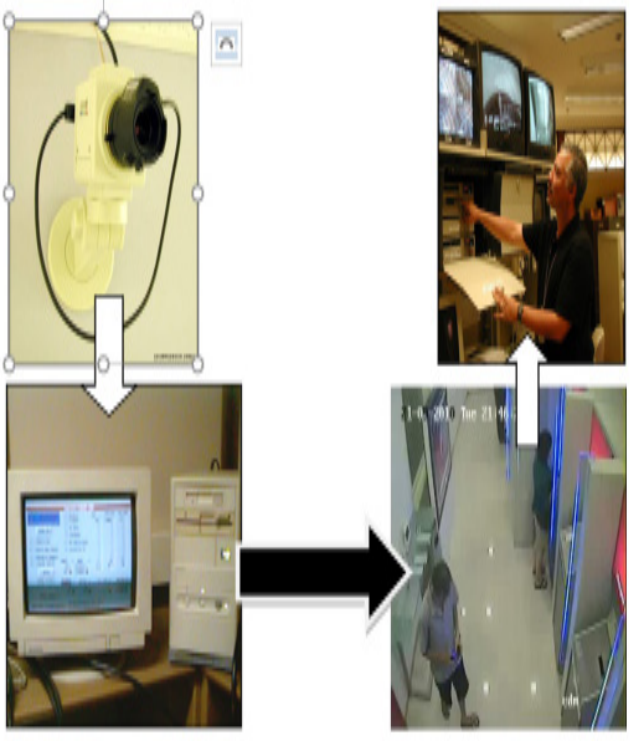
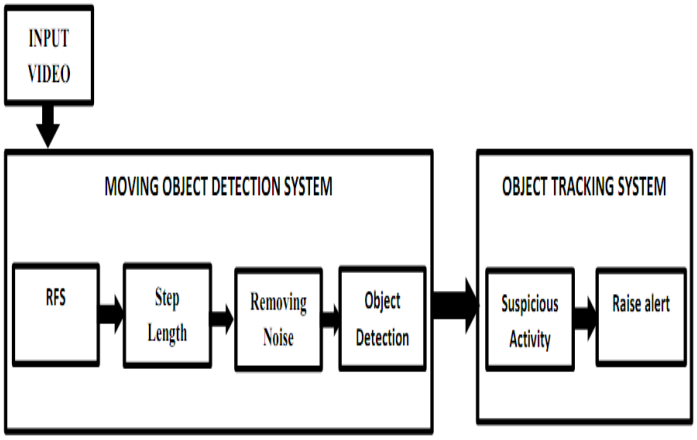


Fig.1Fix Camera to Input Video to Suspicious Activity to AutomaticAlarm Generation

3. PROPOSED METHODOLOGY



3.1 INPUT VIDEO

The video input format used in this paper is AVI.Audio and video data are stored adjacent to each other in AVI files, allowing for synchronous audio and video playback at 29 frames per second (tested on ten test videos).

3.2 REFERENCE FRAMESELECTION(RFS)

Many of the proposed basic background subtraction approaches, such as frame difference, approximate median, and running average, necessitate the selection of an initial reference frame before it can be updated in the next sequence.To choose the RF, a frame differencing approach was used.To avoid overlapping or information loss, careful selection is essential.It simplifies the procedure.

3.3 STEP LENGTH SELECTION

To improve the system's performance, the right step length must be chosen.The step length was chosen using a frame differencing approach.The computational time will be increased if the step length is too short.The processing time will be reduced by increasing the step length, but we will lose some critical information.

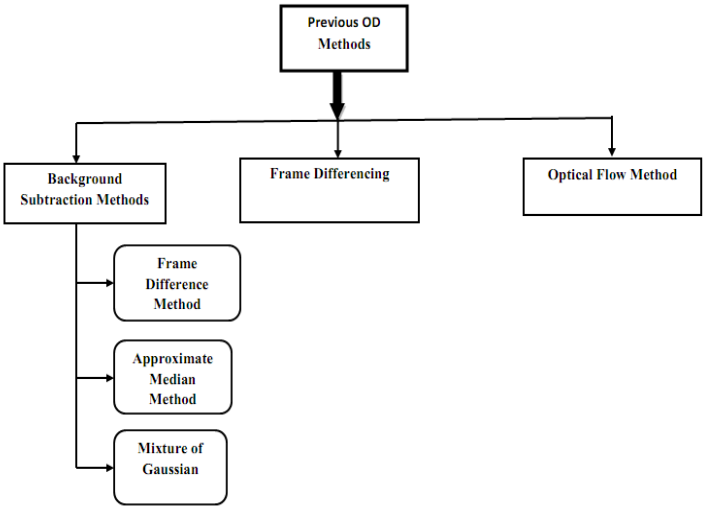
3.4 REMOVING NOISE

Extracting image components that are useful in the representation and description of region shape is done using mathematical morphological techniques. The performance of object detection is harmed by noises caused by factors such as light fluctuation and airborne effects.These noises are harming the system's performance and precision, so they must be eliminated.Noise is removed using erode and dilate procedures.

3.5 RAISE ALER

When there is any movement in the system is being tracked then the sound is to be generated.The music input to the system is in wav format.Using the beep sound to generate alarm takes less computational time than generating any other sound.

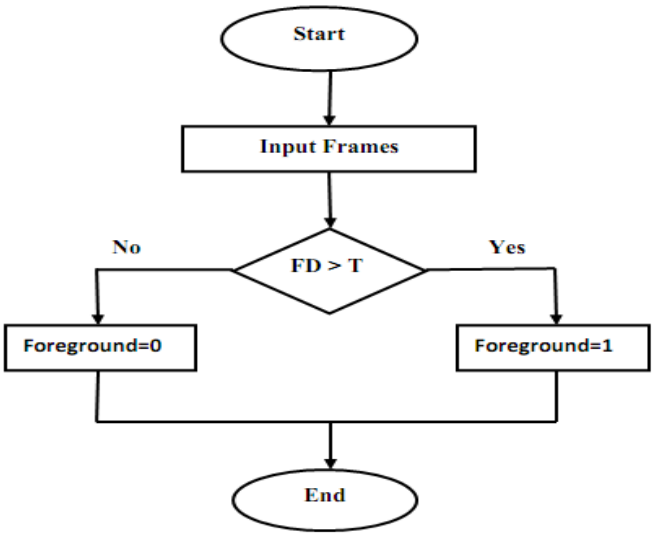
3.6PREVIOUS METHODS



3.7PROPOSED ODM (MODM)

Because of its computational speed, clear identification, and ease of use, the Modified Frame Difference Method is a better fit for the suggested technique.Because it solves the difficulty of the frame difference approach, it is the simplest way to study the differences between frames in a video series.The similarity of frames in video sequences at different step lengths was used to investigate the change.

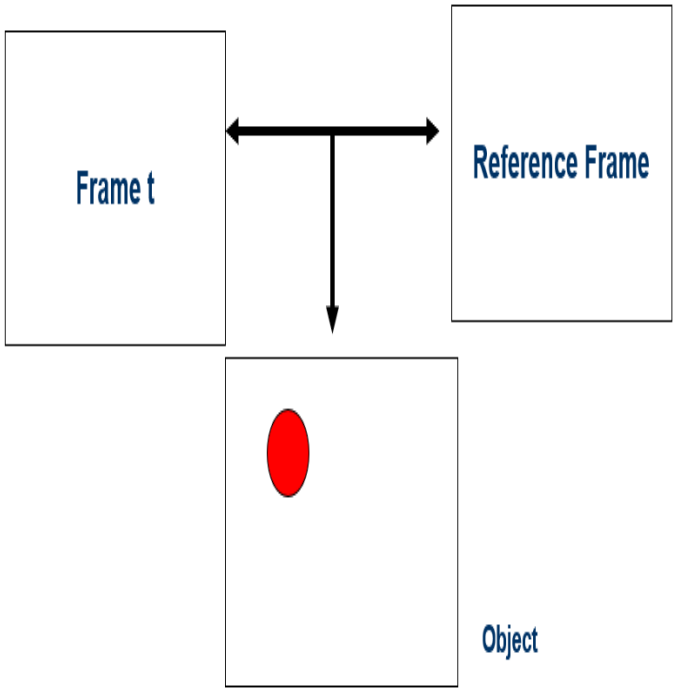
3.8FLOW CHART OF PROPOSED METHOD



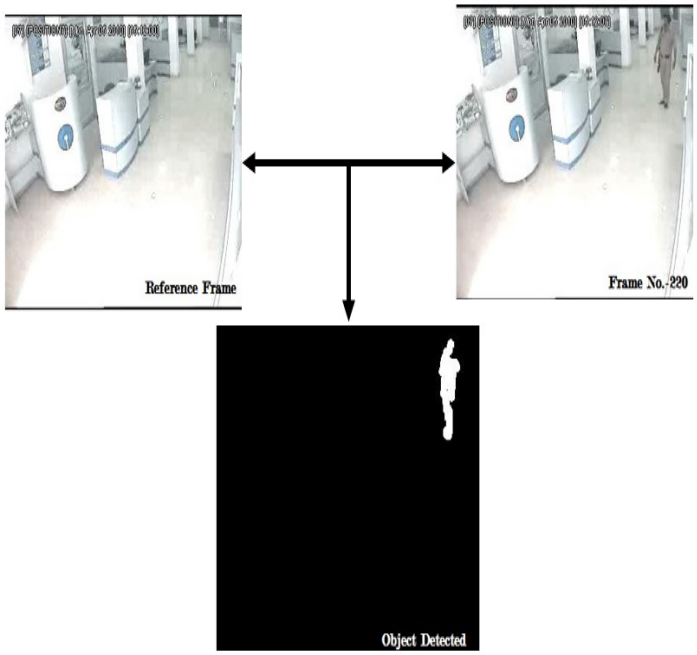
MFDM ALGORITHM

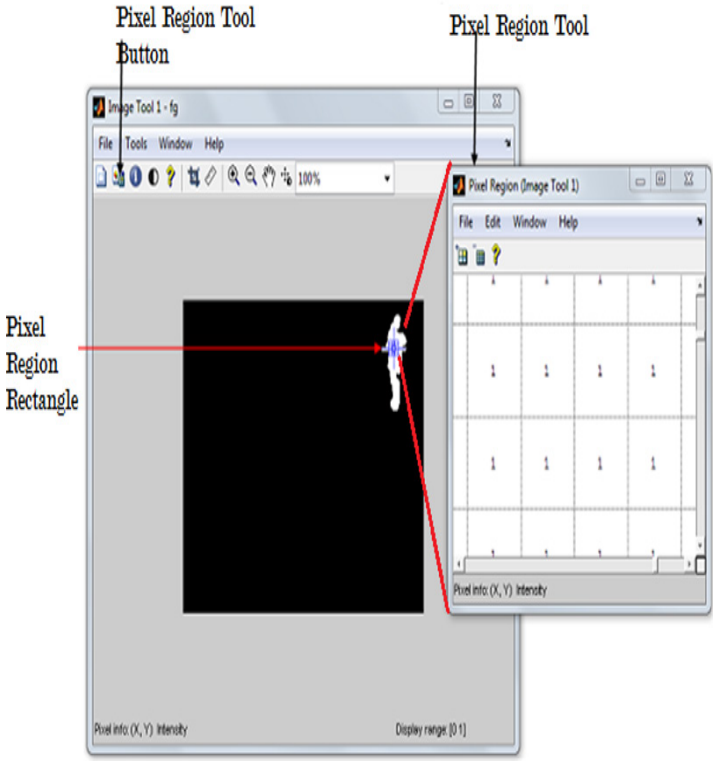
- The algorithm for the modified frame difference method is given below:
- $If\ (frame_{diff} > Threshold)$
- $fg(k,j) = 1;$
- $else$
- $fg(k,j) = 0;$
- end

4. OBJECT DETECTION

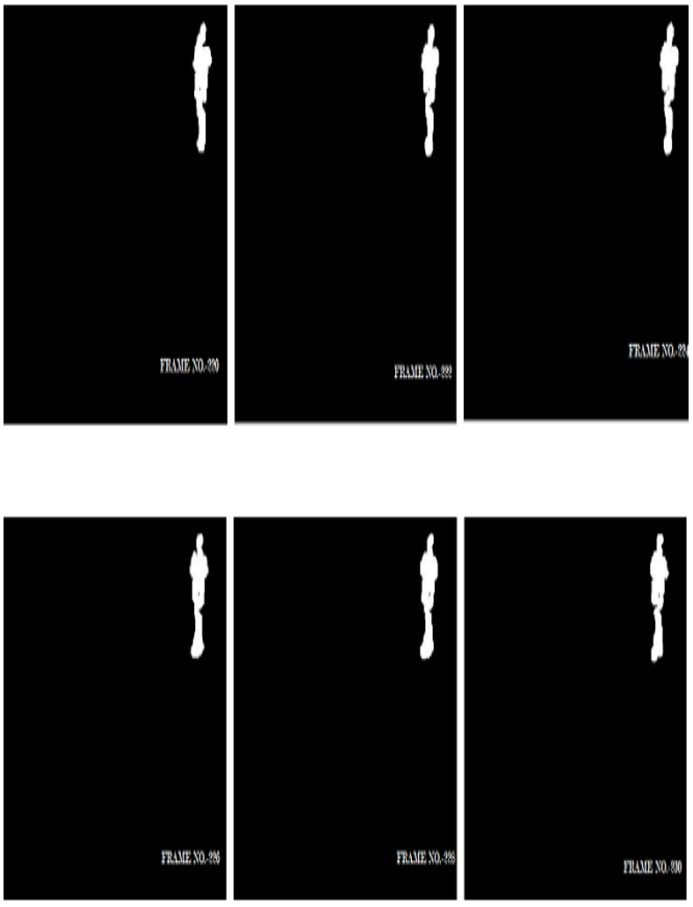


OBJECT DETECTION (Video1)



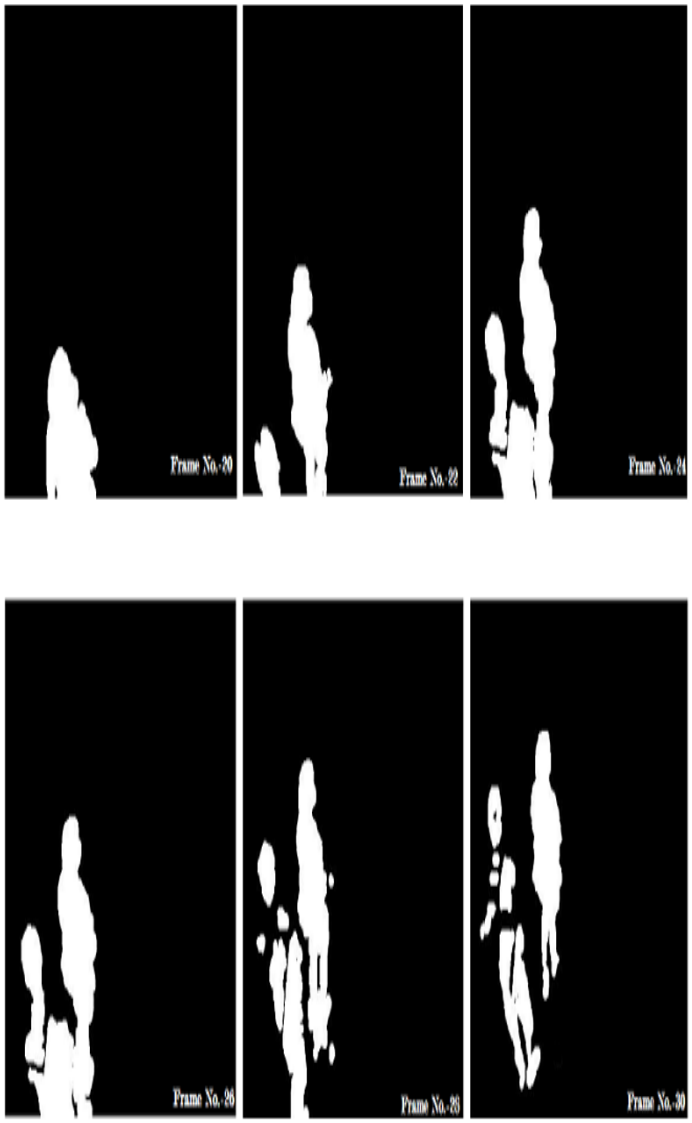


5. RESULT



(Video1-OD)

(Video2-OD)



Tracking of object is based on moving regions

- Object level tracking algorithm is used in our system.
- Information extracted by this level of tracking is adequate for most of the surveillance applications
- System to monitor activity in a place over an extended period of time.

5.1 EXISTING METHOD

Advantage of proposed algorithm over basic methods

- Region-Based Approaches includes optical flow method which is slightly more costly to compute very attractive in detecting and tracking objects in video with moving background or shot by a moving camera.
- As fixed camera is used here hence we are using simple bounding box based method for tracking moving object

5.2 PROPOSED Method

- Bounding box is constructed to isolate the area of interest in the video sequence and is similar to key region processing.
- The rectangular shape bounding box is constructed
- Area of moving object is labeled inside the rectangle with dotted line style of red edge color in the output
- Object is tracked step by step according to its movements continuously.

EXPERIMENTAL RESULT 1(Final)

5.3 EXPERIMENTAL RESULTS 2

6. COMPARATIVE ANALYSIS

From the comparative analysis it can be concluded that, the proposed methodology gives fast computational speed in terms of elapsed time.Less prominent

to noise as static background it taken

7.CONCLUSION

The proposed methodology extracts the foreground from the input video effectively and tracks the moving object. Methodology provides the flexibility of choosing the threshold value. To begin testing the system, load the collected video into the software. The camera was used to collect test videos while it was in a static posture.Ten videos are sent into the system one by one during the testing.To test the system's accuracy, video was collected in a variety of circumstances.In terms of elapsed time, it provides faster computing. Different movies collected from a single fixed camera have been used as examples to assess the method's performance, as indicated in the tables. The proposed method produced excellent results in terms of detecting and tracking moving objects, as well as triggering an alarm.Testing the system, first begin with loading the acquired video to the software. Test videos have been captured with the camera by putting it in static position.During the testing, ten videos are input to the system one by one. Video has been captured in different conditions, to check the accuracy of the system. It gives more computational speed in terms of Elapsed time.Different video has been videos captured from the single fix camera are taken as an example to check the performance of the method which is shown in given tables. The proposed method gave a very satisfactory output in detecting and tracking the moving object then raising an alarm.

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