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REVIEW ARTICLE

Real Time Security System using Human Motion Detection

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Abstract: Nowadays CCTVs are installed at many places like banks safe. But the CCTV cameras continuously record the situations. Hence there is an unnecessary memory wastage if there is nothing happening in front of the camera. Also the CCTV system does not provide alerts of burglary happening at particular time. So there is a need of a system which will record the situation only if there is some movement happening in front of the camera and send alerts to the manager as well as the police. By implementing the system in real time and testing the system on large number of long sequences, authenticated person can stop alert for fix time to enter into secured area by remote login. Human motion Detection System is developed from the security point of view. The objective of Real Time Security System using Human Motion Detection is to develop a system that monitors the area in which it is being deployed. In Human motion detection System, web camera is applicable in the area where no one is permissible to enter, also where we need to detect if any motion has been done. We can use camera for Human Motion Detection .The Camera is used to catch the live images of the area in which it is being implemented, if any object is moving. The captured images are stored for further work. If motion is found in this video, the computer will start recording, buzz an alarm and send SMS to people listed in its database. In this way the system will provide the security against any misdeed.

Keywords: Image Processing, Binarization, Threshold, Bluetooth Listener, CCTV, Surveillance.

INTRODUCTION

Capturing the live video nourish into the webcam is the first step in video surveillance. It is not feasible to process the video directly. Analyzing images, we can compare the current frame captured with previous frame to detect the motion. Activity Behavior of the human is analyzed in the background modeling module. Surveillance is the monitoring of the behavior, activities, or other changing information, usually of people for the purpose of influencing, managing, directing, or protecting them. This can include observation from a distance by means of electronic equipment or interception of electronically transmitted information and it can refer to methods such as human intelligence agents and postal interception. Video analysis involves object tracking. This problem can be formulated as a hidden state estimation problem given available observations. Another way to look at object tracking is the creation of temporal correspondence among detected object from frame to frame. Object tracking is an important component of many vision systems. It is used not only for visual surveillance, but also for augmented reality, traffic control, medical imaging, gesture recognition, etc. The final step of an intelligent visual surveillance

system is to analyze the content of the video and to identify important events in a scene. This step provides human operators with high level analyses to assist them by making their decisions more accurately, effectively, and efficiently. In this paper, we present an automated video surveillance system for real-time security system. Here we use a single camera for detecting the human motion and tracking it over time. The main goal is to detect the object efficiently using background subtraction techniques, which aims to reduce the cost and to increase efficiency. This Security system presents a novel and simple method for moving object detection. The human object is captured; a database about the pixel values is used to train the system. Video Camera is fixed at a required place where security is needed. Whenever human movement is captured by the camera it is immediately detected and the object is tracked by Frame difference method, finally the system is processed to make the alarm to produce sound.

Detection of moving object from a sequence of frames captured from a static camera is widely performed by frame difference method. The objective of the approach is to detect the moving objects from the difference between the existing frame and the reference frame. After determination of differences, in order to find an image which shows the rate of movement, motion point must be classified in categories. To do this, first define the moving points to be recognized in image. Motion point is the point for which the rate of its whitening in difference image is more than threshold rate. The inputs from camera are continuous. Initially a particular time interval is defined for generating frames called as frame interval.

LITERATURE SURVEY

Surveillance is very useful to governments and law enforcement to maintain social control, recognize and monitor threats, and prevent/investigate criminal activity. The final step of an intelligent visual surveillance system is to analyze the content of the video and to identify important events in a scene. The main goal is to detect the object efficiently using background subtraction techniques, aims to reduce the cost and to increase efficiency in the security systems [1,2]. Video encoder can improve the efficiency of compression algorithm and reduce the transmission rate. The video is compressed by JPEG lossless compression method. The compressed video is stored in the system memory as JPEG file [3,9]. The frame difference method is the common method of motion detection. This method adopts pixel-based difference to find the moving object [4]. The user can define the threshold according to the characteristics of the received images and objects that must be followed to have. It is clear that by reducing this threshold rate, obtained image will have more details and also more noises. After obtaining binary images arrays turn the white parts together and consider each of these categories as an object [5, 6]. Target images are generated by means of background subtraction based on standard intensities or logarithmic intensities [7]. It's an open-source physical computing platform based on a simple microcontroller board which consists of an ATmega328 micro-controller, and a development environment for writing software for the board. Arduino can be used to develop interactive objects, taking inputs from a variety of switches or sensors controlling a variety of lights, motors and other physical outputs. An Arduino microcontroller is also pre-programmed with about loader that simplifies uploading of programs to the on-chip flash memory, compared with other devices that typically need an external programmer [10].

EXISTING SYSTEM

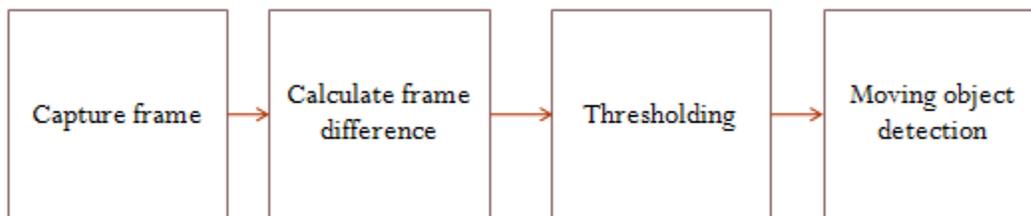


Fig 1: Traditional Motion detection

Existing system was simply based on frames or we can say objects. Simple approach was used in existing system like capturing photos or frames with CCTV camera. After capturing frame it will calculate the

difference between captured frames. Then it will calculate the threshold value by applying some algorithmic standards and it will detect the objects based on the motion of that object. There are some drawbacks in the existing system like:

- If authorized person entered then also motion is detected.
- No remote login.
- Slow frame difference calculation.

PROPOSED SYSTEM

The current security system, specifically, the well-known CCTV, consumes a lot of resources such as memory, due to nonstop recording. Verily, they are efficient but it takes a while before one gets back to locate the precise time where an event happened in the area under surveillance. One has to rewind and fast forward, going back and forth to search a particular scene and that takes a lot of time and effort. Furthermore, time is needed to keep watch on the activities going on via the screen. Something may be happening but due to negligence and human errors it may pass by without been noticed, until something happens. Then the search will begin without any idea of where to start searching with lots of videos to go through. As such, much attention and concentration is required to avoid missing important and significant activities.

Our idea is to develop a System to detect the human motion and give sms alert at the same time. We are developing this idea because earlier methodologies are not so accurate and expensive also. As well as previous techniques only give alert but do not send the sms to the authorized person. The prime motivation for developing this project is that, earlier methodologies only give alert but do not send the sms to the authorized person.

SYSTEM ARCHITECTURE

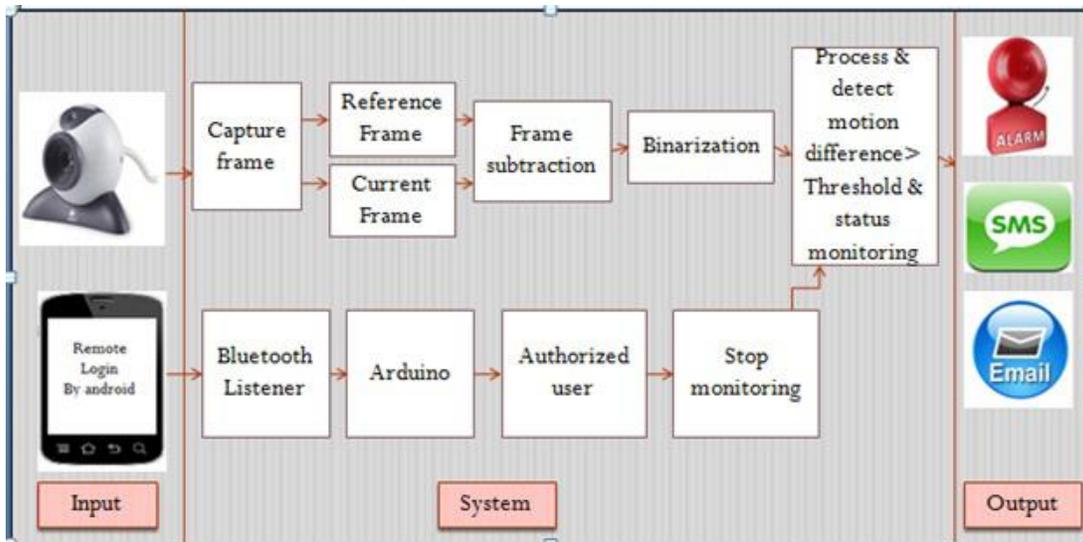


Fig 2: System Architecture

Proposed system for Human Motion Detection System:

Capturing the live video nourish into the webcam is the initial step in video surveillance. It is impossible to process the video openly, so video cycle is collected in series of frames.

By analyzing images, we can evaluate the existing frame captured with earlier frame to identify the motion.

MotionBehavior of the human is analyzed in front of the system. If the system found any movement in the picture, the system without human intervention takes the snap of the detected image and executes the alarm according to the user settings.

Hence, our system provides an accurate methodology for Human motionDetection. It is easier than the earlier systems, time saving and eradicates human errors. It can be used in Bank safe, jewelry shop, home night security.

Remote Login:

Bluetooth device is connected to Arduino board and it will receive commands from User. User can also send authentication parameter from android phone to Bluetooth listener. Authorized user can recognize it and System will stop monitoring.

ALGORITHMS

1. Algorithm for person alert

Step 1: Capture frame from camera in real time

Step 2: Convert the RGB image to Gray scale

Step 3: Get the current and the last frames.

Step 4: Find the difference between these two frames

Step 5: Threshold this image

Step 6: Check if the difference value between the two frames (i.e. rate of movement) is greater than the value set by the user.

Step 7: If yes buzz the alarm and send SMS to receivers

2. Gray Scale Algorithm

Input: *image Img*

Process:

1. For each row *r*,
2. For each column *c*,
3. Color $c = \text{Img}.\text{getpixel}(r, c)$;
4. Extract red, green, blue from color *c*;
5. Get average $= (\text{red} + \text{green} + \text{blue}) / 3$;
6. $\text{Img}.\text{setPixel}(r, c) = \text{new Color}(\text{avg})$;
7. End for
8. End for
9. $\text{GrayImg} = \text{img}$;
10. Return GrayImg

Output: *grayscale image GrayImg*

3. Motion detection Algorithm

Input: Frame *f* captured at time *t* and Frame *f* captured at time *t+1*, *Th* as Threshold

Output: SMS, Email, Alarm

Process:

1. Convert frames into grayscale
2. Calculate difference of Frames.

$$D(x, y, t+1) = \begin{cases} 1 & |f(x, y, t) - f(x, y, t+1)| > Th \\ 0 & \text{otherwise} \end{cases}$$

3. Th for decision to set foreground and background pixel
4. Get binarized image
5. Get moving object
6. If moving object motion > threshold2 then send Alert as SMS, Email, Alarm

FUTURE SCOPE

1. Implementing the system in real time and testing the system on large number of long sequences.
2. Determining the identity of a person who has entered in room. The system is capable of recognizing a number of interesting human actions.
3. The system can be applied for multiple cameras or a single camera also.
4. Alert send by sms to manager and police.
5. Authenticated person can stop alert for some time to entered into room by remote login

CONCLUSION

A variety of motion detection algorithms for video surveillance systems are developed. But most of the systems donot absolutely detect the moving object because it causes some darkness and it requires large memory to store the video. We are developing motion detection system that will be helpful for detecting the moving object without present of shadow. By using Human Motion Detection system banks safe will be more secured as it will send alerts regarding burglary happening. Moreover it will save memory and memory wastage would be avoided.

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