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Research Article

REAL TIME VISUAL TRACKING OF THE PEOPLE USING VIDEO CAMERA WITH REDUCED TIME COMPLEXITY

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ABSTRACT

People tracking are highly used in the surveillance applications. In this paper we introduced a system to track the person inoder to find the intruder and make the surveillance area more secure. Here the different aspects are taken for the input video that are conversion from color image to gray, binary and also the grayscale image and grayscale to binary are considering. And comparing the result with each other to find out the reduced time complexity of the video processing.

Keywords: Absolute Difference, Mask Matrix, Visual Saliency, Video Camera.

INTRODUCTION

Visual tracking of people is important nowadays as the number of people coming in and out from public and private buildings. It is essential to locate and count the people in crowd situation in real time. So the places like banks and the places where more security needed has to monitor all the time with any time delay. Similarly the business areas where statistical analysis needs to conduct need to monitor the customers coming and going. Hence the cameras can be placed infront of the security places, the entrance and exit doors of the buildings, departmental store aisles, hospital corridors, etc.

The technological innovations in the building will enable to the changing conditions and continuously respond which will increase the security of its occupants, efficient use of resources and fulfills the objectives of the owners. Researchers are working for the closing the gap between computer and human vision. The problem of the visual tracking is consisting of several challenges like reliability requirement, number of cameras used and the position of the cameras[1].

As reported[1] the tracking of people motion needs more than one camera for calibration which will distinguish human and object. In which the object height is taken is making the less efficient. Other systems based on optical barriers produced high error rate in terms of false negatives and false positives. The placement of the camera is another one of the challenge in the vision application. The overhead placement of more than one camera avoided the problems like occlusions, but the extracting the detailed information is not possible[2]. As discussed in visual salience[3] the processing of video frames used the foreground object extraction will lead to background subtraction. Visual saliency method cannot apply directly to the real world objects. Object detection is done by pixel variation of the image from one frame to another and the background subtracted by the training process in the recorded videos.

In this paper the detection and tracking involves the extraction of feature point from video and continuous tracking of object trajectories. Proposed a visual tracking for the purpose of security in the banks, jewellery shop, military purpose, etc .Mounting video camera is cheap, but the observing the intruder for 24 hour time in the real time without any time delay is essential in the case of security purpose. In order to reduce the time complexity of processing of this frame is taken into consideration. Processing time for different cases are calculated and are compared in the last section[4].

PROPOSED SYSTEM

For the visual security, the camera has to place in the required place. When if any change in the frame make the alert sound and log the information into the data logger. Most of the surveillance system collect videos and store and process it afterwards. In this paper in order to maintain real time security, the real time videos are used for processing and it is stored. Here the background subtraction of frames is extracted for identifying the intruder in the current frame. When the intruder is detected it is informed at the right time through the mail. As reported in[5] we are interested in both visual and

motion saliency of the video frames, and the special features of the frames like Visual saliency, shape, and foreground/background color models etc. By conditional random fields the integration features of foreground objects will identify the difference in the current frame. As in[6] visual tracking is done by pixel by pixel difference, we are using the absolute difference of the mask of the two consecutive frames. The time required for processing the live video are very high for the existing system, so the required output will not get, So here trying eliminate the latency in the processing of the frames by using the absolute difference of the mask of the matrix[6].

METHODOLOGY

Under the particular lighting of the area the camera has been placed in the proper place for the security. The video is captured while the same time it is processed using visual tracking technology so that the change in previous frame with the current frame can be detected. The first step for this method is to split the frames to single frames. Then find the feature point of the resultant frame which is the mask of the frame or it is called as mask matrix. According to[7] the pixel by pixel variation is created using the absolute difference of the two adjacent frames. The result of this operation is the difference the previous and current frame. The difference image detects the motion of the current video. If it is a full black image then there is no moving object in the live video. Even if there is no motion in the current frame then also frame differencing will not be empty because of the quality of the camera and the by automatic processing. But the difference will not be so big. Hence we are giving some threshold value to decide the existence of motion in the current frame. If the motion is prevailed then a alert sound will be produced and by using the internet connection the alert mail is send the concerned person so that they can take appropriate action can be taken by the owners if any unknown person is came[8].
The threshold can be done using two ways:

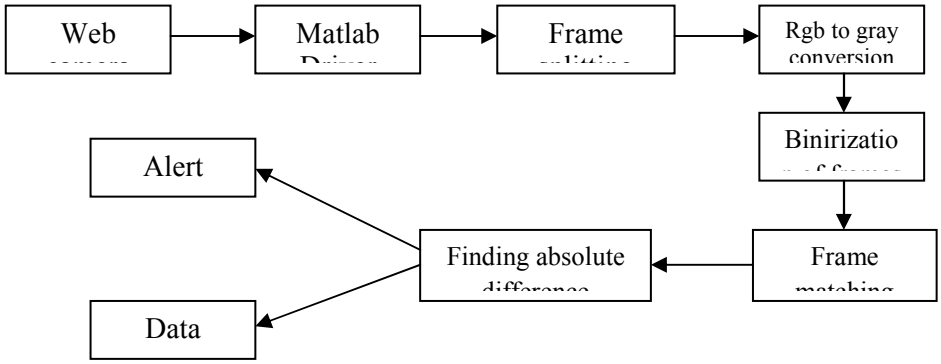

Figure 1: Block Diagram of the Proposed System

1) The difference of the full frames is given to certain threshold. If the full difference is smaller than a threshold that given by us then it is Considered as a black image or empty image or no motion.
2) The difference of the each pixel is given to certain threshold. If the difference of each pixel is not greater than the threshold that we had given then that resultant pixel variation is considered as null or black pixel.

The proposed system is connected with the network so that real time communication of the intruder in that proposed area. So that system should be connected with internet for all time. The mail from which the alert is sending is given, it will authenticate the mail so that intruder alert can be send to the owner so that they can check for the security when there is alert.

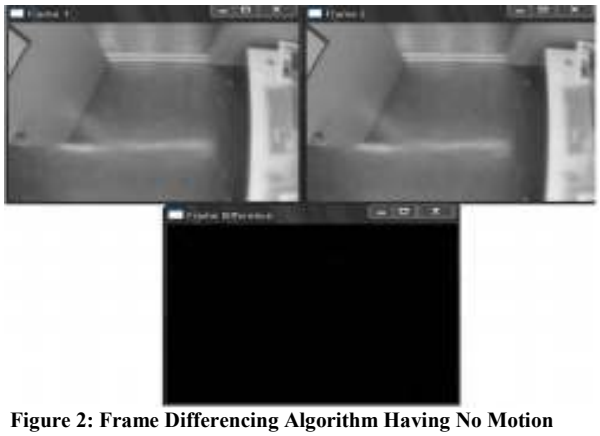

Figure 2: Frame Differencing Algorithm Having No Motion

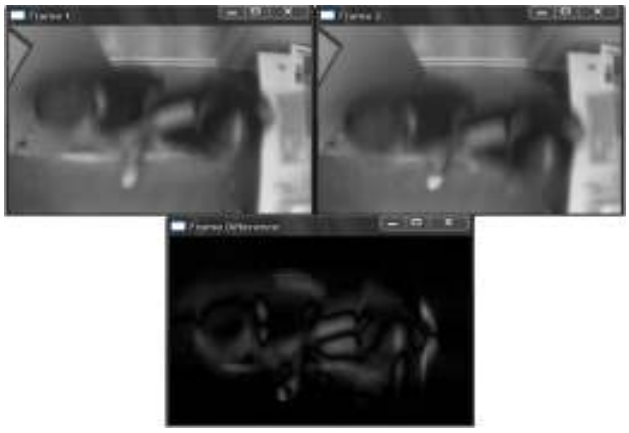

Figure 3: Frame Differencing Algorithm having Motion

RESULTS AND DISCUSSIONS

The proposed system is tested with real time video from the properly fixed camera. The video is taken and here the time complexity to processing the frames needs to reduce for that the color image acquired by the video camera is processing directly. So here the color image acquired is converted into binary image so that processing time is reduced than it is converted into the grayscale image. First of all the color image is displaying after that the binary difference of the image is calculated and the absolute difference with the previous frame and the current frame is calculated using the mask matrix. If there is any difference then intruder alert with frame is sending with a beep sound to the concerned person, so that they can take appropriate action for the security.

The system had tested in the indoor and outdoor situations with the both color and gray input the camera, and also it has been tested the time complexity of these different processing. Both color and grayscale images are converted into binary image will take less time for the processing[9].

Table I: Comparison between the times required for the different input from the camera for processing

	Time required for 10 frames for each type of input signals (in seconds)			
Camera placement	RGB to grayscale	RGB to binary	grayscale	gray to binary
Indoor	13	10	12	12.5
Outdoor	8.3	7	7.5	8

From this table it is clear that color image to binary converted image will take the less time for the processing. When compared to previous work this is very less time for the processing of the real time videos. Within the specified time the system will identify the intruder and will give the information to the concerned person by mail and will produce the alerting sound[10]. The advantage of the system is that the cost for this system is reduced and there is no use of the sensors. The power consumption is also less based on the clarity and range of the live video that monitored by the camera. There is no need of the high clarity camera it will work on any type of camera. The main applications of this system are military applications, jewellary shop security, banking security, Automatic power saving system etc.

CONCLUSION

In this paper introduced a proposal that will track the people using the camera and will give the intruder alert if there is any movement on the live video. So that the color image to binary image processing is used in order to reduce the time complexity of the system. Here the time required for processing is 7 seconds for 10 frames. So the frame rate has been reduced in the proposed system. Here the placement of camera and the resolution of the camera s not a matter for getting good result. It is only depend upon the processing of the video and the only needed is the internet connection for the working and on time information of the intruder alert.

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