A NOVEL METHOD TO IMPLEMENT REAL TIME VIDEO SURVEILLANCE SECURITY SYSTEM

G. JAYASRI[1], D. MANIKANTA[2], G. RAMYA CHAITANYA[3], G. PREETHI[4]

[1,2,3,4]LENDI INSTITUTE OF ENGINEERING AND TECHNOLOGY, JONNADA, VIZAINAGARAM

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Abstract - In order to provide peace and security nowadays CCTVs are installed at many places like banks, shops etc. But the CCTV cameras continuously record the situations but we cannot get to know, while occurring the robbery. 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 if there is some movement happening in front of the camera and send alerts to the manager. The objective of Real Time Security System using Motion Detection is to develop a system that monitors the area in which it is being deployed. In this System, initially the motion will be detected if the detected object is human then a notification is sent to the authenticated user or if the detected object is a human with suspicious objects then an alarm will be produced and notification is also sent to the authenticated user. 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. In this way the system will provide the security against any misdeed.*

Key Words: Video surveillance system, motion detection, objects detection, CCTV, Surveillance.

1. INTRODUCTION

Surveillance is the monitoring of behavior, activities, or information for the purpose of influencing, managing or directing. This can include observation from a distance by means of electronic equipment, such as Closed-Circuit Television (CCTV) Video surveillance has been developed significantly over the years and is becoming important tool for many organizations for safety and security purpose. This system mostly used for social security. It is also used in public security, bank and home security purpose. The Video surveillance system continuously stores the data which are recorded. In general, most security footage is stored for 30 to 90 days. The continues recording of footage need large storage. If we catch the robber while doing of the robbery there is no need of storage of data. We can catch the robber by using real time video surveillance security system. This system can be processed by using the raspberry pi. The identification of the robber can be done by using the Open CV. After identification of robber the remaining process can be done in raspberry pi. By using the raspberry pi we can send the robber information to the authenticated persons.

1.1 RELATED WORKS

Now a days the CCTV are installed at every place where we need security. The CCTV surveillance are just for recording of the data which are happened in front of the cameras. There are many approaches for the producing the security. The Internet of Things is a concept to make every system connected with the Internet. Developed IOT enabled system to send security alert to user/owner of the home and registered members through email whenever human intrusion detection. IOT enable security system consists of raspberry pi-3, pi-camera, PIR sensor, Microphone, Ultrasonic sensor, buzzer, doorbell button, LED/LCD screen and internet connection. This suggests two operating modes for home security. In the first mode, whenever any person motion is detected and that person presses doorbell button, then system will capture an image and decide the person is familiar or unfamiliar with the help of stored database. If the person is not familiar then system will alert through e-mail notification to the user and registered members by sending captured image, video and audio clip of that person. If the person is familiar then system will capture an image of that person and stored in the system. In the second mode, whenever any suspicious movement of person is detected in front of door by system, it will send email notification alert and also activates security warning alarm system installed at the door. The designed system provides security against intruder, using IOT platform.

1.2 PROPOSED SYSTEM

Real time video surveillance security uses the different algorithms for image processing. In Real time video surveillance security system the images are downloaded from the various websites which are useful for image processing. The images are modeled or trained by using the yolov3 method. In yolov3 the images are trained according to their category and names are given for the images for reorganization. The training of images takes a important role in image processing. The first image and

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the second image difference and recognition of a moving object can be recognized by using the back ground subtraction algorithm. The background subtraction algorithms take the difference between the side frames. The difference of the frames is more there is a moving object in front of security system. The Real time video surveillance security system process can be processed in the raspberry pi system. The raspberry pi contains a memory card in which we include the software of the image recognition runs, the raspbian software installed in raspberry for the running of the raspberry pi. The emails send to the authorized person by using the raspberry pi system.
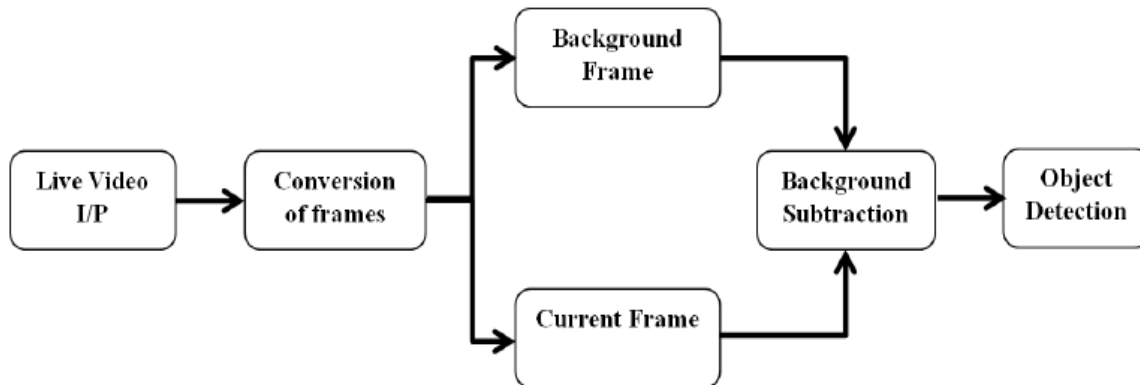

Fig Back ground subtraction algorithm

2. WORKING OF THE PROPOSED SYSTEM

Capturing the live video nourish into the webcam is the initial step in the video surveillance. The images are captured from the camera. Now in the raspberry pi the remaining process takes place that means the frames are extracted from the images. By analyzing those images we must identify the motion. In order to detect whether there is a motion in the images or not we used an algorithm known as background subtraction algorithm. The algorithm is used for the purpose of object tracking. We are extracting the frames for detection of moving object. If any motion is detected in the current frame and the previous frame then the object identification process occurs in the server. If it does not detect then again the previous process takes place and if detects any motion then it sends a captured image to the authenticated person. The notification is sent to the person whether he/she is a human/robber. But when it is a robber then it executes the alarm in the nearby place of the robber according to the user settings.

Hence our system provides an accurate methodology for the Human Motion Detection. It is easier than the earlier systems, time saving and eradicates some human errors.
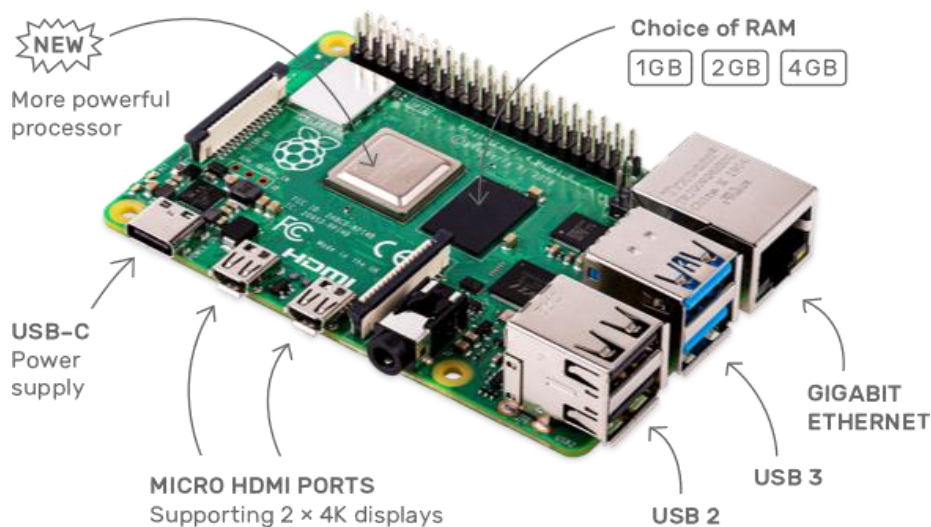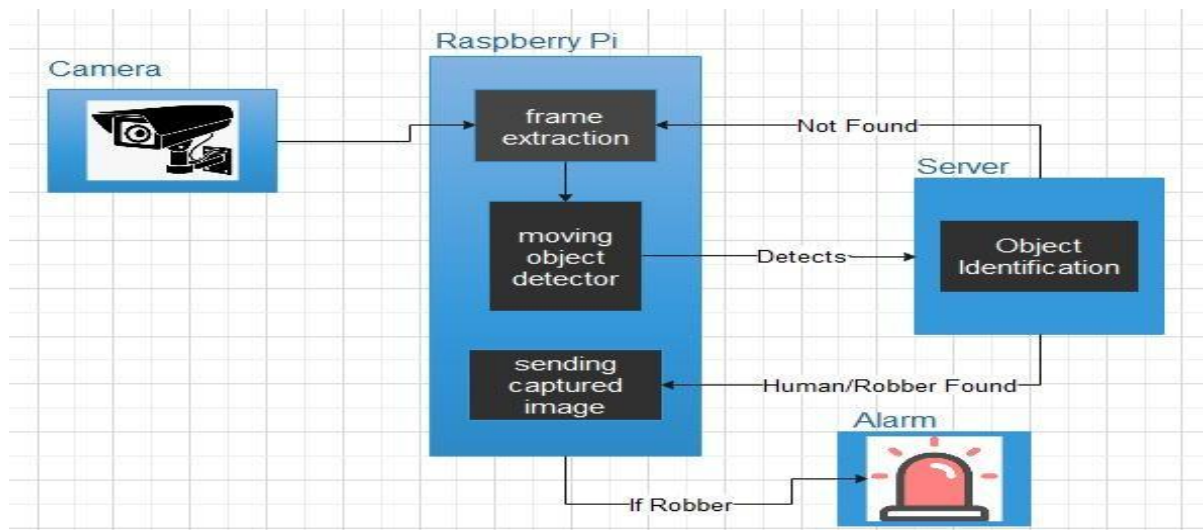

Fig: Raspberry pi

Fig: System Architecture of Real time video surveillance security system.

2.1 METHODOLOGY

Step 1: Extract frame to frame from the live video stream and check for the moving object detection in that frame.

Step 2: Background Subtraction estimate the Background at time T -> b(x,y,t)

Step 3: Subtract the estimated background from the input frame

Frame difference

$|frames\ i - frames\ i-1| > th$, where th is the threshold value.

step 4: Background is estimated to be the previous frame. Background subtraction equation then becomes:

$B(x,y,t) = I(x,y,t-1) \Longrightarrow |I(x,y,t) - I(x,y,t-1)| > th$

Step 5: At each iteration Gaussians are evaluated using a simple heuristic to determine which ones are mostly likely to correspond to background.

Step 6: Pixels that do not match with the "background Gaussians" are classified as foreground.

Step 7: Foreground pixels are grouped using 2D connected component analysis.

Step 8: If any moving object was found after background subtraction then immediately save the current frame and sent through smtp mail server to the registered email addresses and pass it to the Yolo detection network.

Step 9: If nothing was found then repeat step 1.

Step 10: YOLO divides up the image into a grid of S x S cells, where S is based on computing power of the system.

Step 11: Each of these cells is responsible for predicting B bounding boxes. A bounding box describes the rectangle that encloses an object.

Step 12: YOLO outputs a confidence score for each object that tells us how certain it is that the predicted bounding box actually encloses some object.

$Pr\ (Classi|Object)* pr\ (Object)*IOU\ (truth,pred) = pr(classi)*IOU(truth,pred)$

Step 13: The bounding boxes whose confidence score is greater than the threshold value is selected and remaining bounding boxes are not considered.

Step 14: In those selected bounding boxes, the bounding box with highest confidence score is taken

Step 15: The selected bounding box with highest confidence score performs IOU with the remaining bounding boxes, the bounding box which matches with selected bounding box with probability greater than the expected are removed

Step 16: Perform step 15 until all the bounding boxes those match with the selected bounding boxes are removed and finally we end up with one bounding box.

Step 17: if the object is a robber then the system directly buzzers the alarm , otherwise it waits until other frame has to come.

3. PROJECT IMPLEMENTATION

OpenCV (Open Source Computer Vision Database) is an open-source computer vision and machine learning applications platform. OpenCV was developed to include a shared platform for computer vision applications and to promote the usage of machine perception in consumer goods. It has a number of advanced algorithms that can quickly be used to execute our tasks. This paper focuses on studying Python for the purpose of image processing. We presume that the reader has any understanding of simple syntaxes. However we tend not to infer some previous exposure to computer technology, although any of that experience will definitely be useful. Python is a popular option for image processing, because we can rapidly compose code, check it easily, and its syntax easy to write the code. By learning Python, you can also know a main resource utilized by several web developers.
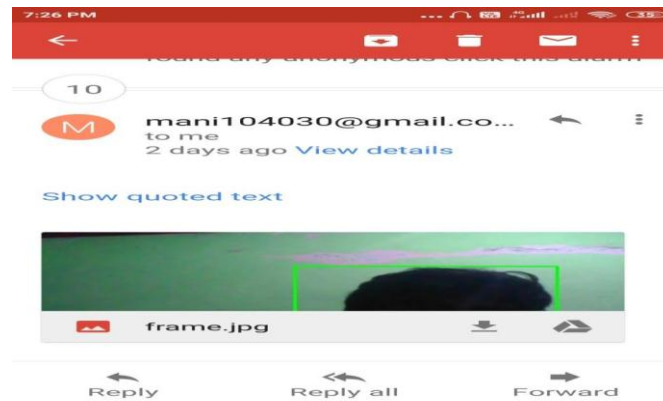
4. EXPERIMENTAL RESULTS

Test case No.	Test Condition	Output
1	Detection of trained images	SUCCESS
2	Alarm producing	SUCCESS
3	Sending an email	SUCCESS

Fig: Representation of Test cases and status

TEST CASE-1:
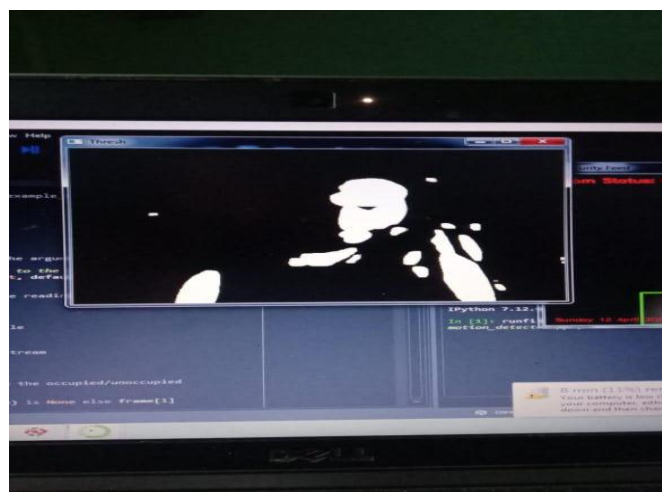
TEST CASE-2 :

5. CONCLUSION

A variety of motion detection algorithms for video surveillance systems are developed. But most of the systems do not 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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