

Smart Home Security Surveillance System Using Motion Detection and IOT

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Abstract: These days, wireless Monitoring for home security only using motion detection is among the cutting-edge technology in the field of IOT. To implement real-time surveillance of the home security, the intelligent remote monitoring system was developed for home security based on motion detection technique and GSM / GPRS network. In some image conversion method, the system can send images to the cell phone connected to it by using GPRS technology after confirming an intruder. The introduction of a variety of sensors and the enhancement of system's reliability guaranteed that the intelligent remote monitoring system can be responsible for home security. The hardware and software design and system performance are expounded in details. A number of surveillance devices in wireless network will be connected. The experimental result shows that the system can attain remote surveillance of home safety with high availability and reliability even in darkness.

Keywords: Intrusion, Motion Detection, Surveillance, GPRS

I. Introduction

Although people are successful in detecting and gaining evidence against the crimes, We have to find a way of preventing them too. Stopping thefts and crimes while they are in progress is the main motivation of our paper. Our system basically consists of the webcam which is in-built on the computer system. The webcam on detection of any kind of activity in front of or near the door or any window of the house, system will capture the image immediately and send notification to the administrator in the form of image after comparing and converting using GPRS/Internet. Also at the same time the alarm will be set off signaling the occurrence of the ongoing illegal activity, which can also have benefit of causing instantaneous panic among the intruders and alert the concern authorities via Sms /e-mail service.

II. Proposed Method

In our project we have aimed to build such a surveillance system, which will not only detect motion, but will also create an alarm for an instantaneous action.

The flow of the work carried as follows

- i) Detects the motion near door or window using motion sensors
- ii) Captures the face from the place the motion was detected
- iii) Compares with database images
- iv) Notifies user about the intrusion by setting up the notification on the cell phone
- v) Send the captured image via GPRS on the mobile phone of the user using IOT
- vi) Initiates the action process

System architecture:

The system architecture is going to function in following step:

2.1 Capturing phase :

To detect motion we first have to capture live images of the area to be monitored and kept under surveillance. this is done by using a web cam which continuously provides a sequence of images.

2.2 Converting Phase:

The color image captured will be converted to black and white image for fast processing and transferring to user cell.

2.3 Comparing Phase:

The current images will be compared with stored images to check for similarities, especially cases of family members.

2.3 Intimating Phase:

Soon after comparing with the stored images (family members), If the data never match any of the stored images of family members. The image will be sent to user cell phone for required action.

2.4: Action Phase :

If the user confirms the face, action not necessary to be taken. But if the user declines to recognize the face, He can initiate the alarm process from his end.

2.5: Storing Phase :

The image captured during the first phase will be stored in the database for future iterations if needed.

III. Implementation

As the part of implementation, each step will be presented in detail along with its techniques and process.

3.1 Capturing the image:

In this step the web cam connected to the system which is working actively and continuously will capture the motion at the door, The ROI (region of interest) will be processed to cut the face from the image and discard the remaining content of the image as shown in the figure.



Figure 3.1 Selecting face from body

3.2 Converting the color image to gray scale image:

In this phase the image will be converted from color to gray for the purpose of easy comparison of stored image features and current image features as shown in the figure 3.2.



Figure 3.2 Conversion of Color image to gray scale

3.3 Comparing current image with stored image :

In this phase currently taken image will be compared with stored image, the purpose of this phase to check whether the image is of any family person or a relative. If the image matches the stored image then it is not necessary to send it, by this the additional computational task will be saved. The mat-lab algorithm for feature comparison has been used in this system.

3.4 Action taking phase :

In this phase if the user confirms the face, action not necessary to be taken. But if the user declines to recognize the face, He can initiate the alarm process from his end as shown in the figure 3.3.



Figure 3.3 Image on user cell.

3.5: Storing Phase :

In this phase the image captured during the first phase will be stored in the database for future iterations if needed. Even all the family members' images will be stored by the user so that the new image can be compared with each of the existing image.

IV. Block Diagram Of Home Security System

This part of the paper displays the connectivity of all the components in the working model of the system as shown in the figure 4.1.

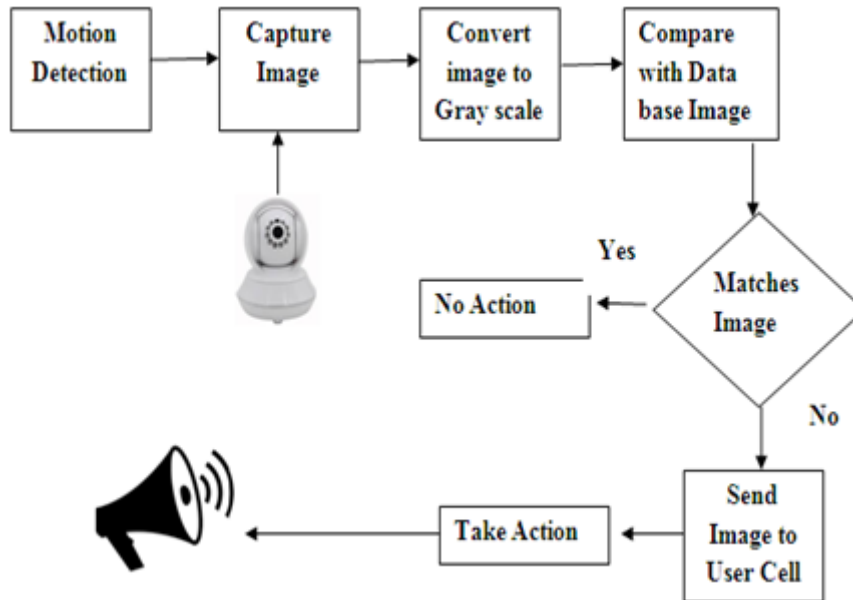


Figure 4.1 Model of the system

V. Advantages And Limitations

The Home Security Surveillance System Using Motion Detection has various advantages and limitations

5.1 Advantages :

There are various advantages of the proposed system as it is very speed and has very less computational overhead.

The advantages of the system are as follows

- Continue Supervision for 24/7 of all the doors and windows
- Web-came support night vision mode hence takes best quality pictures even in darkness.
- Less cost due to web-cam based technology.
- Automated remote reporting system and
- Mechanism for action taking from cell phone.
- A single click will initiate alarm process.

5.2 Limitations :

The system even has few limitations as follow

- The user has to be always in reachable area (These days this problem can overcome).
- The motion sensor even detects the motion of domestic animals like cat, dog etc.
- The system has a challenge of detecting face in cases of hided/masked intruder.

VI. Result

The system has been tested with various background conditions and poor light conditions, It gives best results for all the possible variations whenever the motion detected and Face extracted. The entire process of the system is very fast that it does all its operation in less than 03 seconds from Capturing, Comparing, Sending notification, and signaling alarm system.

VII. Conclusion

The “Smart Home Security Surveillance System using Motion Detection” is a Home/Office based security system which can be of great where security is a matter of concern. The Motion Detector patches up for the need of a cheap and small security system in day-to-day life. Computerized Home-based security can develop a lot with the coming future. Future is promising and easier with IOT.

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