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Alert Me: A Real Time Video Surveillance System Implementing IoT

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Abstract: We have entered the era of internet of things. The number of devices connected to the Internet is increasing at a rapid pace and consequently. In this implementation of security systems ,when a person enters a monitored area, at the same time system will detect the motion then it will send an alert to the host via wireless communication. The concerned people can understand that an eventuality has happened in the host section. At the same time camera keeps on capturing what is going on there at the host place and saves it into the computer and sends a message to the admin if any kind of motion detects.

Keywords: wireless communication, Internet Of Things(IoT), Monitored area.

I. INTRODUCTION

The increasing need for real time video surveillance in public, commercial and home applications makes automated video surveillance systems one of the main current application domains in computer vision. Real time video surveillance systems deal with the realtime monitoring of motion of object within a specific environment.

Video surveillance has been evolving significantly over the years and is becoming a vital tool for many organizations for safety and security applications. Initially, it was dominated by analog cameras connected using coax cables. For cost and performance reasons, there was a switch to digital switching systems and now IP-based delivery of data.

Video cameras are now being installed at an unprecedented pace in applications that require the coverage of large areas. In order for these systems to be effective, the cost and difficulty of deployment must be reduced. Though frequently discussed, there has been little success in term s of adding advanced machine interpretation of video. Continuous watching of multiple video streams by human operators and manual browsing of thousands of video frames for crime scene and forensic analysis are neither reliable nor scalable

This has brought about the need for a collaborative effort from the systems and vision research communities to develop a surveillance system that is low-cost, reliable, easy-to-manage, Easy-to-deploy and can process video data for automated real-time alerts and effective retrieval of archived footage

In this paper, we describe A Real time video surveillance system. This system is comprised of smart camera units which is deployed or placed in no entry or restricted area for continuous video capturing. In this implementation of security systems, when a person enters a monitored area, at the same time system will detect the motion then it will send an alert to the host via wireless communication. The concerned people can understand that an eventuality has happened in the host section.

At the same time camera keeps on capturing what is going on there at the host place and saves it into the computer and camera sends a message to the admin if any kind of motion detects.

II. RELATED WORK

[1] Multi-tasking Smart Cameras for Intelligent Video Surveillance Systems Wiktor Starzyk Faculty of Science University of Ontario Institute of Technology Oshawa, demonstrate a video surveillance system comprising passive and active pan/tilt/zoom (PTZ) cameras that intelligently responds to scene complexity, automatically capturing higher resolution video when there are fewer people in the scene and capturing lower resolution video as the number of pedestrians present in the scene increases. To this end, they have developed behaviour based-controllers for passive and active cameras, enabling these cameras to carry out multiple observation tasks simultaneously.

The research presented herein is a step towards video surveillance systems consisting of a heterogeneous set of sensors that provide persistent coverage of large spaces, while optimizing surveillance data collection by tuning the sensing parameters of individual sensors (in a distributed manner) in response to scene activity.

[2] A Domestic Robot for Security Systems by Video Surveillance Using Zigbee Technology Md Athiq UR Raza Ahamed M., Wajid Ahamed , When someone enters secured places, immediately it will send an indication to the control room section through wireless communication and is indicated to the control room through alarm.

[3] Unattended Object Intelligent Analyzer for Consumer Video Surveillance Thi Thi Zin, Member, IEEE, Pyke Tin, Hiromitsu Hama, Member, IEEE, and Takashi Toriu, Member, IEEE They propose an intelligent vision based

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analyzer for semantic analysis of objects left unattended relation with human behaviours from a monocular surveillance video, captured by a consumer camera through cluttered environments. Our analyzer employs visual cues to robustly and efficiently detect unattended objects which are usually considered as potential security breach in public safety from terrorist explosive attacks.

III.ARCHITECTURAL OVERVIEW

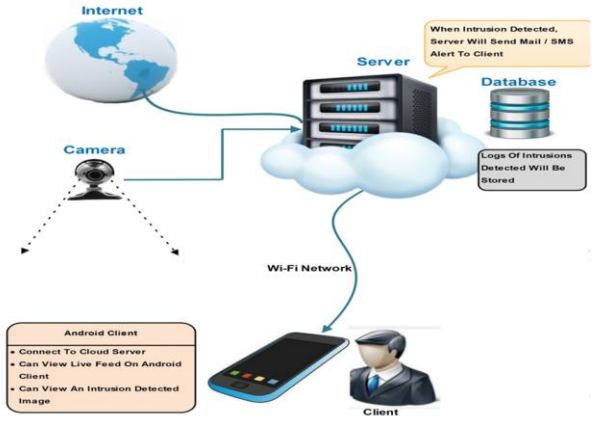

Fig1. Architecture

An architectural overview is illustrated in Fig. 1, Capturing the live video feed into the camera is the first step in video surveillance. It is not possible to process the video directly. So video sequence is composed of series of frames. Analyzing images we compare the current frame captured with reference frame to detect the motion.
When someone enters secured places, immediately it will send an indication to the server through wireless communication and is indicated to the client through message or mail. The client can understand that an eventuality has happened in the monitored. At the same time camera connected to the system keeps on capturing what is going on there at the monitored area and saves it into the server database.

IV.MODULES

A. Login Module
In this module, we take username and password from user to authenticate login through application.

B. Frame Extraction Module
In this module, we extract the frame from video frame .

C. Blur Module
This module, blurs the sharpness of image and make image smooth Gaussian blur algorithm is use to blur image.

D. Thresholding Module
In this module, we convert the greyscale image in black and white image.

E. Greyscale Module
In this module, colour image is converted into grey scale image.

F. Blob detection Module
This module takes care of detecting the region in which human or motion is taking place, this module is done after thresholding module.

G. Motion Detection Module
This module is use to check whether the detected thing or human is in motion or not, this checked by comparing continues frames after blob detection.

H. Indication Module
This module includes sending indication to server after human is detected in monitoring room.

I. Backup/Database Module
These module stores logs of human detections on server database and all images of human detected.

J. Alert Module
In this module we use to send alert and continues images frames after motion detection in host room on clients mobile from server .

V. ALGORITHMS

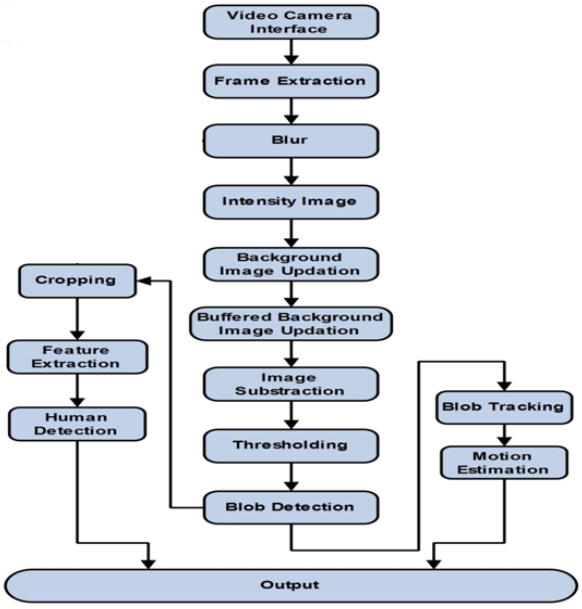

Fig.2 Algorithms

A. Frame Extraction :
Frame extraction is method to extract the frame from video frames. Java library can be used to extract the frame. Different library like JMyron, opencv can be used.

B. Blurring
Blurring is method to blur a sharpness of image. Gaussian blur is used to blur the image. In Gaussian blur 3*3,5*5,7*7 matrix used .

$$G(x) = \frac{1}{\sqrt{2\pi\sigma^2}} e^{-\frac{x^2}{2\sigma^2}}$$

C. Intensity Image
Intensity images that colour images in converted into gray scale image. Colour image has its colour due to RGB values this RGB values are replace by mean of RGB values to get a gray scale image.

Mean(RGB)=(R+G+B)/3

D. Thresholding
Thresholding can be used to create binary images i.e. image with only black or white colours from gray scale image. As gray scale image has 8bit value for each pixel

from 0 to 255 where 0 indicates black and 255 indicates white and middle value are shades from black to white.
to convert gray scale to black and white image each pixel value is replace with '0' or '1'
if (pixel value <128)
change it to '0'
else
change bit to '1'

E. Blob Detection
Blob detection method is use to detect a region in image which differs in properties, such as colour, compared to surrounding regions.

Steps:
1. Check colour of pixel 'x'.
2. Check colour of surrounding pixels of 'x' i.e. left, right, up, down.
3. If it gets continues pixel of same colour it is considered as a Blob or region of same properties.

VI.CONCLUSION

Implementing Internet of Things(IoT) in real time video Surveillance system for motion detection using mobile ability to get alert. The system can be deployed for emergency work and can be a useful supplement of traditional monitoring system.

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