Implementation of Motion based Video Clipping Algorithm for Monitoring Surveillance Video Streams

Bhuvan Jain.K [1]
[2]UG Scholor
Department of CSE AIeMS, Bidadi

Pavan. B[3]
[3]UG Scholar
Department of CSE AIeMS,Bidadi

Kumar. R[2]
[1]UG Scholor
Department of CSE AIeMS, Bidadi

Nagaveni B Nimbal [4]
[3]Assistant Professor
Department of CSE AIeMS,,Bidadi

***Abstract*— Communication mainly is the transfer of whatever thing or exchanging of data, so that the Internet of things is naught but the transferring or exchanging of anything with several other things. The using of internet authorized system or devices roughly calculated as that by 2020 there will be nearly about billions.**

The purpose of the project is to define a safekeeping alert device spending little handling power by Internet of things which help to observer plus alerts when gestures or else motion are there then send images to a cloud server. Besides, internet of things centered use can be used tenuously to observe the action as well as acquire warning when gestures or else indication are there.

The images are showed straight to a cloud attendant, when the cloud attendant is not accessible at that time the records are put in storage close by on a Raspberry Pi. A credit card size Raspberry Pi with a advantage of Open Source Computer Vision (Open-CV) software knobs the image processing, control algorithms used for the attentiveness then shows taken images to concern persons email by the use of Wi- Fi module. The system uses ordinary webcam.

Keywords- Raspberry Pi, Pir motion detection sensor, peizo buzzer, web cam.

I. INTRODUCTION

Recent world events have created a shift in the security paradigm from "investigation of incidents" to "prevention of potentially catastrophic incidents". Existing digital video surveillance systems provide the infrastructure only to capture, store and distribute video, while leaving the task of threat detection exclusively to human operators. Human monitoring of surveillance video is a very labor-intensive task. It is generally agreed that watching video feeds requires a higher level of visual attention than most everyday tasks. Specifically vigilance, the ability to hold attention and to react to rarely occurring events, is extremely demanding and prone to error due to lapses in attention. One of the conclusions of a recent study by the US National Institute of Justice [6], into the effectiveness of human monitoring of surveillance video, is as follows "These studies demonstrated that such a task [manually detecting events in surveillance video], even when assigned to a person who is dedicated and well-intentioned, will not support an effective security system. After only 20 minutes of watching and evaluating monitor screens, the attention of most individuals has degenerated to well below acceptable levels. . Smart Surveillance Systems provide a number of advantages over traditional video surveillance systems.

II. LITERATURE APPROACH

Sean Dieter Tebje Kelly, Nagender Kumar Suryadevara, and Subhas Chandra Mukhopadhyay, "Towards the Implementation of IoT for Environmental Condition Monitoring in Homes"

In this paper, the author has reported an effective implementation for Internet of Things used for monitoring regular domestic conditions by means of low cost ubiquitous sensing system. The description about the integrated network architecture and the interconnecting mechanisms for the reliable measurement of parameters by smart sensors and transmission of data via internet is being presented. The longitudinal learning system was able to provide a self-control mechanism for better operation of the devices in monitoring stage. The framework of the monitoring system is based on a combination of pervasive distributed sensing units, information system for data aggregation, and reasoning and context awareness

D. Surie, O. Laguionie, and T. Pederson, "Wireless sensor networking of everyday objects in a smart home environment"

In this paper,the authors have presented a ZigBee communication protocol based wireless sensor networking of 42 everyday objects (embedded with 81 simple state change sensors of 8 sensor types) in a living laboratory smart home environment.

N. Bui, A. P. Castellani, P. Casari, and M. Zorzi, "The internet of energy: A web-enabled smart grid system"

In this paper, the author discuss various key scenarios for the SmartGrid, and briefly introduce some of its key requirements. Authors then provided an analysis of how current and future standard solutions in the areas of communications and networking can be engineered into a system that fulfills the needs of the SmartGrid vision. Authors advocate the use of small, cheap, and resource-constrained devices with pervasive computing capabilities as the key component to deploy a ubiquitous energy control system

M. Mahadi Abdul Jamil, M. ShukriAhmad, "A pilot study: Development of home automation system via Raspberry Pi"

These authors have focused on the needs of the handicapped and the elderly. This niche group of people has different needs than other type of user. Similar to other home automation system, it is able to control electrical appliances remotely from a Smartphone, laptop or any Wi-Fi enabled device, but it can be configured to do specific task depending on the user needs

III. PROPOSED WORK

The purpose of the project is to define a safekeeping alert device spending little handling power by Internet of things which help to observer plus alerts when gestures or else motion are there then send images to a cloud server. Besides, internet of things centered use can be used tenuously to observe the action as well as acquire warning when gestures or else indication are there. Web camera will capture the video when there is a motion.

Advantages

- Efficient storage of surveillance data.
- MQTT(Message Queuing Telemetry Transport) protocol
- Solves Burglary and theft issues.
- Ensures a secured environment.

IV. SYSTEM ARCHITECTURE

A System Architecture is the conceptual model that defines the structure, behavior, and more view of the system. There will be two layers i.e, Application layer and Raspberry pi layer. Application layer will configure software and Raspberry pi will configure hardware components. Application layer is again differentiated in to User Interface Layer and Application layer User Interface Layer consists of Client layer and web layer client layer will interact with users collects the data and send it to the web layer. Web layer will send the data to the server. Raspberry Pi layer will interact with the hardware components using Python scripts and send the data to the server.

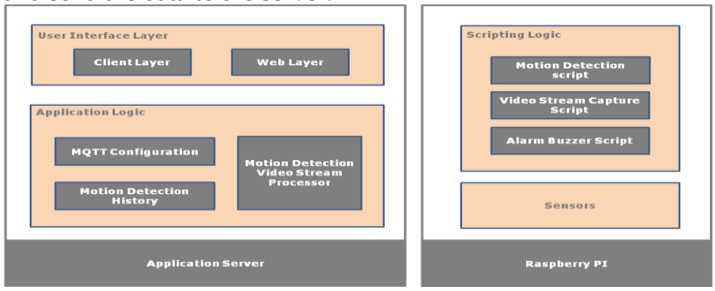

Figure 1: System Architecture

V. MOTION DETECTION

There are several methods and techniques that have been used to track motion activities and detect them such as calculate move, get centre of gravity, find centre of gravity as follow:

5.1 Calculate Move: Calculate move refers to the calculation of motion. It takes new frame as input. It checks if current image is not equal to empty, it stores the data from current image into previous image, new frame captured in the calculate movement will be stored in the current image. Then it compares previous image with current image. If there are any similarities it would be trimmed out. If there are any dissimilarities between them then it would be stored in different image.

diff = (prev_COG_point.x - current_COG_point.x)
+ (prev_COG_point.y - current_COG_point.y)

In the obtained diff image the cog would be pointed.

5.2 Find centre of gravity (cog): Centre of gravity is obtained by calculating the motion. If number of pixels is greater than threshold, then major motion will be captured. If it is less than threshold it captures minor motion.

```
xcenter = FIND_CENTER_X(diffImage);
ycenter = FIND_CENTER_Y(diffImage);
return new Point(xcenter, ycenter);
```

5.2 Get centre of gravity (cog): It gives multiples cog points.

If length of cog points is zero, then it returns empty. Else it calculate the sum of x and y axis point by giving new point.

```
sum_x = sum_x + cogPoints[i].x;
sum_y = sum_y + cogPoints[i].y;
return new Point(sum_x/pointIndex, sum_y/pointIndex);
```

VI. TAXONOMY

6.1 MQTT: An MQTT system consists of clients communicating with a server often called a "broker". A client may be either a publisher of information or a subscriber. Each client can connect to the broker. Information is organized in a hierarchy of topics. When a publisher has a new item of data to distribute, it sends a control message with the data to the connected broker. The broker then distributes the information to any clients that have subscribed to that topic. The publisher does not need to have any data on the number or locations of subscribers, and subscribers in turn do not have to be configured with any data about the publishers. If a broker receives a topic for which there are no current subscribers, it will discard the topic unless the publisher indicates that the topic is to be retained. This allows new subscribers to a topic to receive the most current value rather than waiting for the next update from a publisher.

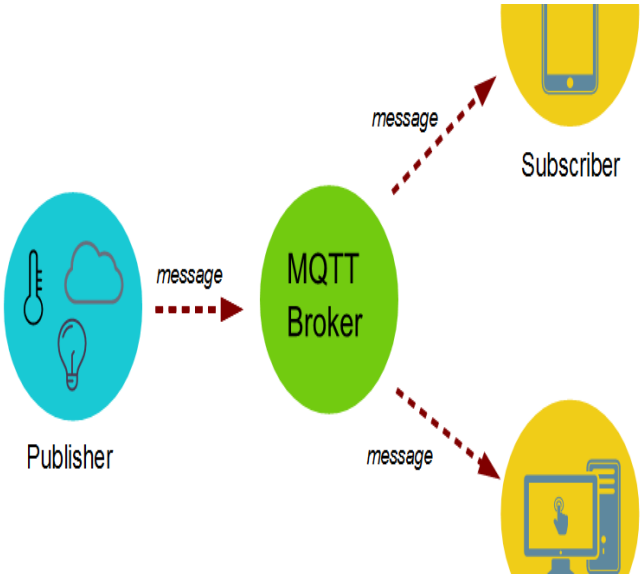

Figure 2: General diagram of MQTT

When a publishing client first connects to the broker, it can set up a default message to be sent to subscribers if the broker detects that the publishing client has unexpectedly disconnected from the broker. Clients only interact with a broker, but a system may contain several broker servers that exchange data based on their current subscribers' topics. A minimal MQTT control message can be as little as two bytes of data. A control message can carry nearly 256 megabytes of data if needed. There are fourteen defined message types used to connect and disconnect a client from a broker, to publish data, to acknowledge receipt of data, and to supervise the connection between client and server. MQTT relies on the TCP protocol for data transmission. A variant, MQTT-SN, is used over other transports such as UDP or Bluetooth. MQTT sends connection credentials in plain text format and does not include any measures for security or authentication. This can be provided by the underlying TCP transport using measures to protect the integrity of transferred information from interception or duplication.

6.2 Raspberry Pi: The Raspberry Pi is a low cost, credit-card sized computer that plugs into a computer monitor or TV, and uses a standard keyboard and mouse. It is a capable little device that enables people of all ages to explore computing.. It's capable of doing everything you'd expect a desktop computer to do, from browsing the internet and playing high-definition video, to making spreadsheets, word-processing, and playing games. The Raspberry Pi has the ability to interact with the outside world, and has been used in a wide.

6.3 PIR Motion Detection Sensor: An individual PIR sensor detects changes in the amount of infrared radiation impinging upon it, which varies depending on the temperature and surface characteristics of the objects in front of the sensor. When an object, such as a human, passes in front of the background, such as a wall, the temperature at that point in the sensor's field of view will rise from room temperature to body temperature, and then back again. The sensor converts the resulting change in the incoming infrared radiation into a change in the output voltage, and this triggers the detection. Objects of similar temperature but different surface characteristics may also have a different infrared emission pattern, and thus moving them with respect to the background may trigger the detector as well.

6.4 Piezo Buzzer: The piezo buzzer produces sound based on reverse of the piezoelectric effect. The generation of pressure variation or strain by the application of electric potential across a piezoelectric material is the underlying principle. These buzzers can be used alert a user of an event corresponding to a switching action, counter signal or sensor input. The buzzer produces a same noisy sound irrespective of the voltage variation applied to it. It consists of piezo crystals between two conductors. When a potential is applied across these crystals, they push on one conductor and pull on the other. This, push and pull action, results in a sound wave. Most buzzers produce sound in the range of 2 to 4 kHz.

VII. EXPERIMENTAL SETUP

Motion detection all of it on the base of frame differencing meaning comparing how pixels change location after each frame. The method appearance for an object variation in the image. The problematic with these motion detection methods is that neither detects slow moving objects, determined by the sensitivity of that verge, nonetheless uncertainty the verge is also delicate, that one shall notice belongings similar to gumshoes as well as modifications daylight.

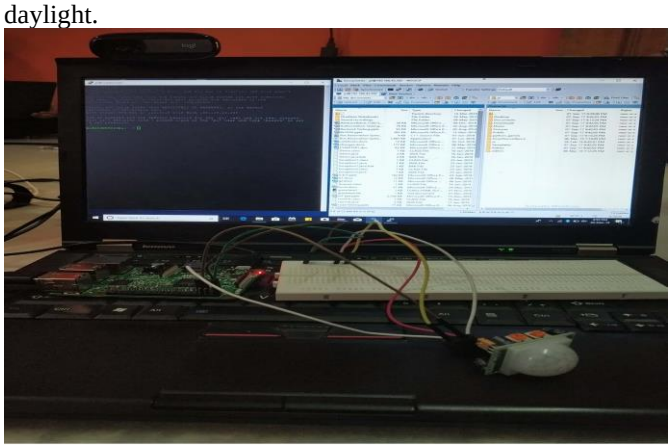

Figure 3: Experimental setup

VIII. CONCLUSION AND FUTURE SCOPE

The monitoring system using the Raspberry Pi as well as the webcam had been completed and tested. Not only the Raspberry Pi applied as a server but also the webcam applied as a motion detection sensor. The capturing and sending notification would be done if there was a motion. The result of the testing illustrates that the monitoring system works well. As the future scope this system can be extended further by adding additional infrared emitting system to detect the people face if they wore the mask on his/her face. By adding this additional system we can easily

identify the person even though the person covered his/her face. Apart from this we can interface sensors like Gas sensors, Smoke sensors, and Fire sensors to give alerts respectively. Additional use of security system is a keen control device which is thermostat, whichever could be disciplined through a cyberspace. The thermostat or control device could be control the warming arrangement within the house also regulate that one towards the wanted climate. We are going to make available a wireless relay connection also wireless sensor which can be movable as well as can be operated and which can be used in company and appoints for Security to the whole building with one single system.

REFERENCES

[1] Neha Patil, Shrikant Ambatkar and Sandeep Kakde "Iot based Smart Surveillance Security System using Raspberry pi" International Conference on Communication and Signal Processing, April 6-8, 2017, India.

[2] Sean Dieter Tebje Kelly, Nagender Kumar Suryadevara, and Subhas Chandra Mukhopadhyay, "Towards the Implementation of IoT for Environmental Condition Monitoring in Homes", IEEE Journal, Vol.13, No. 10, October 2013.

[3] D. Surie, O. Laguionie, and T. Pederson, "Wireless sensor networking of everyday objects in a smart home environment," in Proc. Int. Conf. Intell. Sensors, Sensor Netw. Inf. Process., 2008, pp. 189–194. 0347

[4] N. Bui, A. P. Castellani, P. Casari, and M. Zorzi, "The internet of energy: A web-enabled smart grid system," IEEE Netw., vol. 26, no. 4, pp. 39–45, Jul.–Aug. 2012.

[5] M. Mahadi Abdul Jamil, M. ShukriAhmad, "A pilot study: Development of home automation system via Raspberry Pi" 2015 2nd International Conference on Biomedical Engineering (ICoBE), 30-31 March 2015, Penang .