Review of Live Streaming for Surveillance: Application of sensing, controlling and monitoring

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Abstract—In today's world people are concerned about their security. This caused people have started to surveillance systems. Majority of the people are doing local network, IP based surveillance. IP based surveillance being accessible from anywhere. Earlier day's programmer selected as microprocessor AVR, PIC controller but now a days choose Arduino and Rapberry pi. It is also possible to set up private cloud using Open Stack that provides Infrastructure as a Service (Iaas). The collected data are stored in a cloud server which could be viewed and controlled through Smart Mobile phone, computer, and tablet. That stored data can be used for future reference.

Keywords—*surveillance, local network, ip based, smart cloud.*

I. INTRODUCTION

In today's technology, security and monitoring are very important. They are important in any organizations, firms and military purposes. In Military Surveillance of border areas is very difficult. The army is patrolling the border. They are getting help from surveillance cameras but fix mounted camera cover limited areas. The cameras at a fixed position we can't change the camera view in real time. With the popularity and wide use of internet, it becomes an easy task for anyone to control and monitor from internet.

The historical evolution of surveillance system originated from track n surveillance robot controlled via remote controller. With wide melioration of technology smart cloud made surveillance system more real-time. This paper presents a new way to live video streaming using smart cloud and 4G Wi-Fi Dongle or satellite. First part presents brief information of local network system. Second presents introduction of IP based system. Then we shall go through quick view of smart cloud.

II. LOCAL NETWORK SURVEILLANCE SYSTEM

Local network surveillance system provides low cost surveillance system compared to other systems. Raspberry pi or Arduino is core part of such system. Servos are connected to Raspberry pi via switching circuit. This switching circuit consist of relays which are activated by web GUI(Graphical User Interface).

Fig1 shows the block diagram of Pibot[1] by Ikhanker, kuthe, Balpande, Ulabhaje and Dhadwe[1].
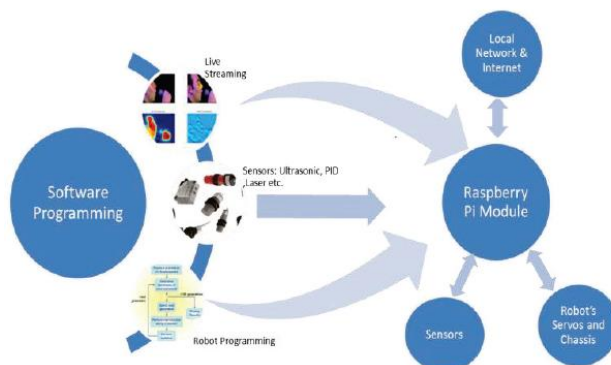

Fig1.: The Raspberry pi controlled Multienvironment robot for Surveillance and Live Streaming.[1]

From the figure it is clear that surveillance system is controlled via controller. Local network is created using Nano Wi-Fi adaptor. Live streaming is done by MJPEG streamer which takes photograph at some periodic interval and overwrites one over to make it look like real-time video streaming.

This system can cover large area for surveillance and low cost solution. But it can be connected via local network only cannot be connected via internet. Also only one location at a time can be surveillance.

III. IP BASED SURVEILLANCE SYSTEM

One most drawback of local network surveillance system is that it cannot be controlled via internet. IP based surveillance system provides the solution for it as it can be controlled from anywhere, anytime.

In this system Raspberry pi or Arduino is connected to internet using LAN. PC is connected to internet via LAN. Once connection is established IPV4 address of system is checked. IP address is dynamic. It can be maid static IP by changing interface file in system. Once IP is found it can be accessed by entering the IP address in browser.

Video can be viewed by entering IP address of system in address bar of client browser. Communication between PC and pi over the internet using IP address is done by server-client model. Web server contains HTML (Hyper Text Markup Language) documents. When we enter the IP address in address bar of browser (client side) it requests the web server via HTTP (Hyper Text Transfer Protocol) protocol.

Once web server accepts the request, connection is established between them. Now both can communicate with each other.

IP based video surveillance system provides good quality of picture and good scalability and flexibility. Apart from this IP based surveillance system needs some networking knowledge. Cost is still the major problem for low budget industries and firms.

IV. SMART CLOUD SYSTEM

In general way cloud is service provider to store and access the data and program over the internet. Infrastructure as a Service (IaaS) cloud is used for surveillance system using OpenStack. OpenStack is an open source platform to manage resources and network of virtual machines.

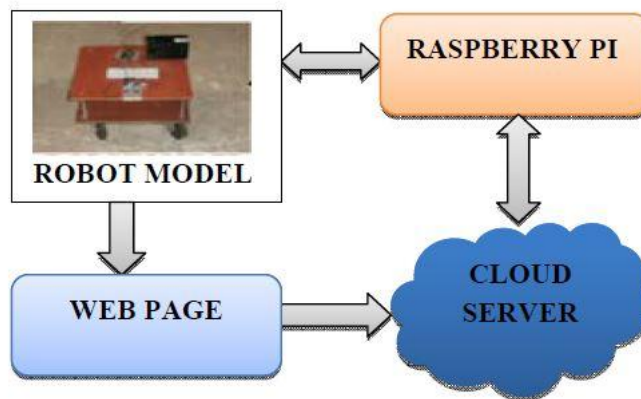Fig2 shows basic schematic for cloud based surveillance [3].

Fig2 Smart cloud robot using Raspberry pi [1]

When IP address of system is entered into the address bar of browser it communicates with OpenStack cloud dashboard which is graphical interface between user and administrator [3].

Then keystone is used to identify the authorized user. Authorized user will log in to the web page. Now user can read the data from various sensors. Graphical data can also be displayed in web page.

Smart cloud proposed a new way to control the resource from anywhere over the internet. This approach can be utilized in video surveillance system.

V. LIVE STREAMING USING SMART CLOUD

As we have seen that smart cloud is utilized to read the sensed data from sensor. Local area network system cannot be controlled via internet. IP based system needs networking knowledge and have dynamic IP. To change it to static we need to change interface. From all this new way to live streaming for surveillance system can be implemented.

We proposed new way to surveillance system using smart cloud and 4g dongle or satellite. Fig3 shows the basic block diagram for proposed system.
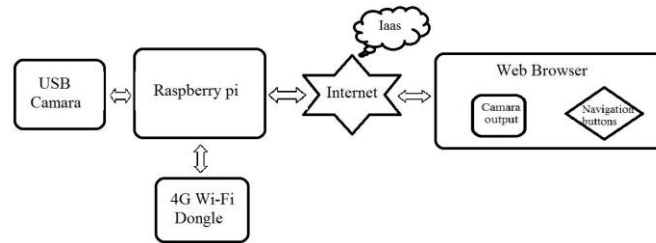
Fig3 Proposed system schematic diagram

USB camera is attached to Raspberry Pi module. When user wants to control the system he just presses navigation bar on browser. When navigation bar is clicked in browser, browser communicates to module over the internet via cloud. Cloud checks for authentication. After authentication it checks whether pi is connected to internet or not. As pi is connected to 4G Wi-Fi dongle it is always connected to internet. Then cloud communicates to pi for controlling the system.

VI. CONCLUSION

Surveillance system found its application in various sector. Depending upon application and other attributes like cost and coverage area particular surveillance system can be used. We proposed the combination of existing system to provide better quality of video and surveillance system. Use of smart cloud and 4g dongle made it more efficacious.

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