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IOT Based Smart Home Security System

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Abstract: Security has become an important issue everywhere. Nowadays home security is necessary as the possibilities of intrusion are increasing day by day. This system is a low cost, flexible home control and monitoring system using an embedded server with IP connectivity and remotely using Android based smart phone application. This system provides essential security to our home and other control applications. The system captures information and transmits the live video streams via Wi-Fi module to a Smart phone personal application by using web. This system operates and controls motion detectors, live video streams and records it for future playback. It can also find the number of persons located with the help of the sensor. The main aim is to provide better security system than the present level of security in the home.
Keywords: Raspberry Pi, Raspberry, pi camera, PIR sensor, EW-7711UAN, Personal mobile application.

I. INTRODUCTION

Monitoring facilities will be necessary and useful for our daily life, because it is very important for us to think about our security. This work developed system, which is organized with an integrated web server, highly secured cameras, Wi-Fi devices are connected to the internet. A specific server is located in the center of our system, which is called *Integrated Server* ,which periodically obtains videos from some security cameras through the private network. Such videos are transmitted from the cameras to the server. The Integrated Server requires network cameras to transmit video at a sampling rate and compresses the video to MPEG then accumulates a series of them in the storage. The system captures information and transmits the live video streams via Wi-Fi wireless transceiver for IoT module to a Smart phone personal application by using the web.

II. PROPOSED HARDWARE SYSTEM

Figure 1 shows the block diagram of the raspberry pi. The system consists of

A. Raspberry Pi board
B. Raspberry pi camera
C. PIR sensor
D. EW-7711UAN

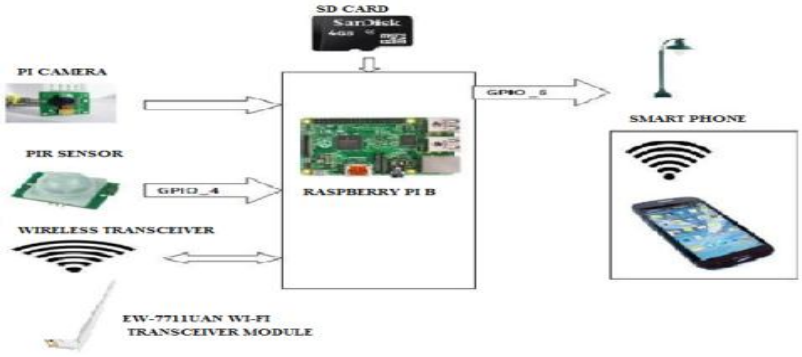

Figure 1 block diagram of proposed system

Raspberry pi operates and controls motion detectors, live video streams and records it for future playback. It can also find the number of persons located with the help of the PIR sensor. When the Motion is detected, the pi camera automatically initiates recording and the Raspberry pi device alerts the owner of the possible intrusion having a smart phone personal application.

A. Raspberry Pi

Raspberry pi is a small credit-card sized computer capable of performing in surveillance systems, military applications, etc. The raspberry pi requires a supply voltage in the range of 4V-5V. Its operating frequency is 700MHz. It has 8 pipeline stages with branch prediction. It consists of a dual core video core 1V multimedia co-processor. It has built in 512MB SDRAM. Raspberry Pi is a palm-sized computer with enough power to run servers or media centers.

B. Raspberry Pi Camera

The Raspberry Pi camera board contains a 5 Mega Pixel sensor, and connects via a ribbon cable to the CSI connector on the Raspberry Pi.The video and still image quality is better than a USB webcam of similar price.

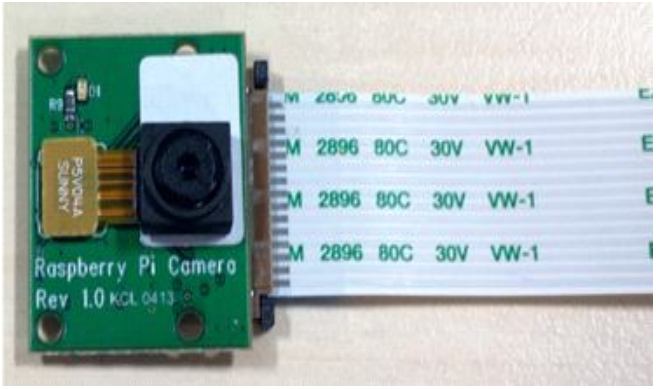

Figure 2 Raspberry pi cameras

It has the same sensor with the IR filter removed, and a black PCB. With no IR filter, it can see near-IR wavelengths (700 - 1000 NM) like a security camera. It uses the software as the normal Pi camera.

C. Pir Sensor

A passive infrared sensor (PIR sensor) senses the IR light radiating from objects in its field of view. They are most often used in PIR-based motion detectors. 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.

Figure 3 PIR Sensor

D. Ew-7711uan

EW-7711UAN is a Wi-Fi Wireless Transceiver module for IOT. Complies with wireless 802.11b/g standards. EW-7711UAn is a high-gain wireless USB adapter which provides a simple and easy way to add or upgrade wireless connectivity to your Raspberry pi. It can be plugged into computer's USB port and high-speed wireless network is accessed. The included 16 languages EZ max setup wizard and friendly UI will walk you through configuring EW-7711UAN to your wireless network.

Figure 4 EW-7711UAN

III. SOFTWARE DESCRIPTION

A. Raspbian Os

Raspbian is a free operating system based on Debian optimized for the Raspberry Pi hardware. An operating system is the set of basic programs and utilities that make your Raspberry Pi run. However, Raspbian provides more than a pure OS: it comes with 35,000 packages; pre-compiled software bundled in a nice format for easy installation on your Raspberry Pi.

B. Putty

Putty is a network file transfer application. It supports the network protocols like SSH, Telnet, rlogin, and raw socket connection. It can also connect to a serial port (since version 0.59). The name "PUTTY" has no definitive meaning, though "putty" is the name for a terminal in the UNIX tradition, usually held to be short for Teletype. PUTTY was originally written for Microsoft Window. There are ports for some Unix-like platforms, with work-in-progress ports to Classic Mac OS and Mac OS X, and unofficial ports have been contributed to platforms such as Symbian and Windows Mobile. PUTTY was written and is maintained primarily by Simon python and is currently beta software

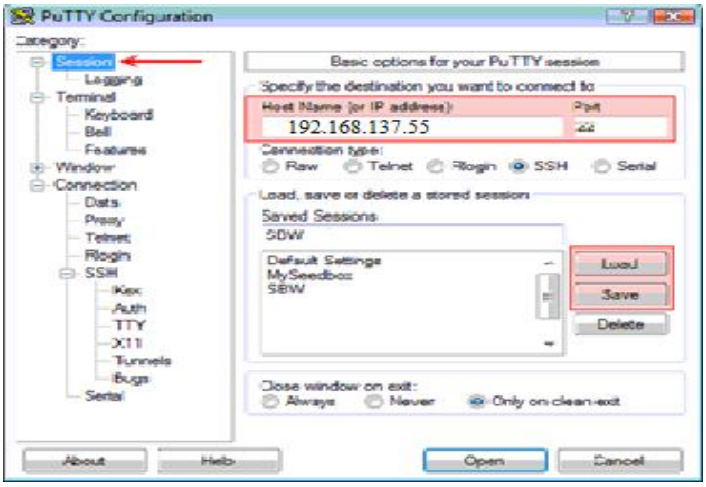

Figure 5 PUTTY Configuration

C. Mit App Inventor

App inventor is an open source web application originally provided by Google, and now maintained by M.I.T, United States. It allows to create Software applications for the android operating system (OS).In this app inventor used to create own personal mobile app in android mobile .This is shown as.

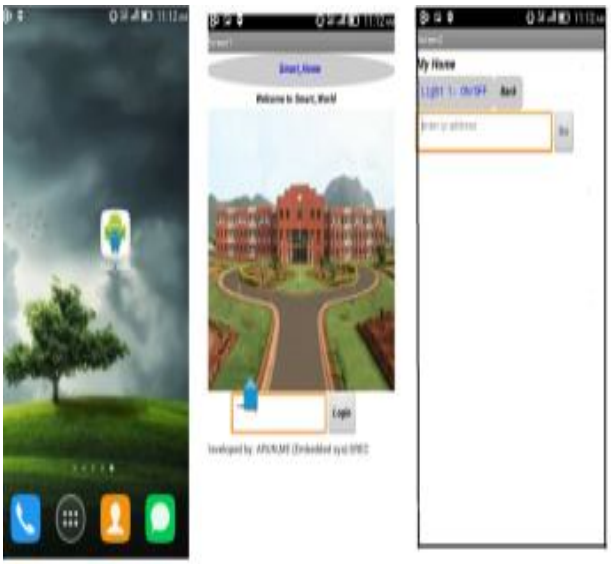

Figure 6 Personal mobile applications

IV. RESULTS

The proposed system is interfaced with Raspberry Pi and Raspberry camera and EW-7711UAN Wi-Fi module as shown in figure 7.

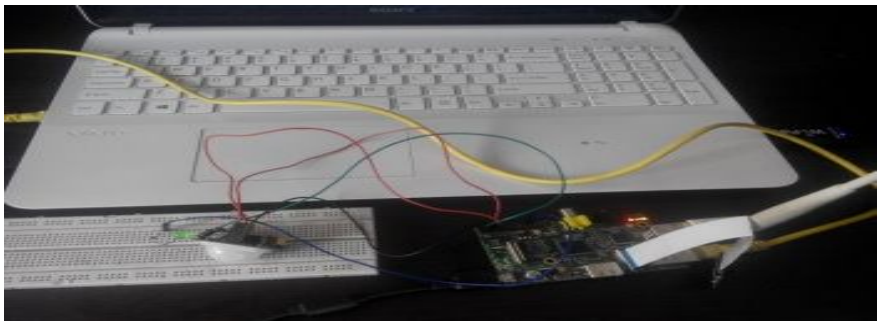

Figure 7 Interfaced Raspberry Pi with camera and EW-7711UANWi-Fi module.

Figure 8 shows the raspberry pi camera with the red color light indicating that the streaming is started in the camera.

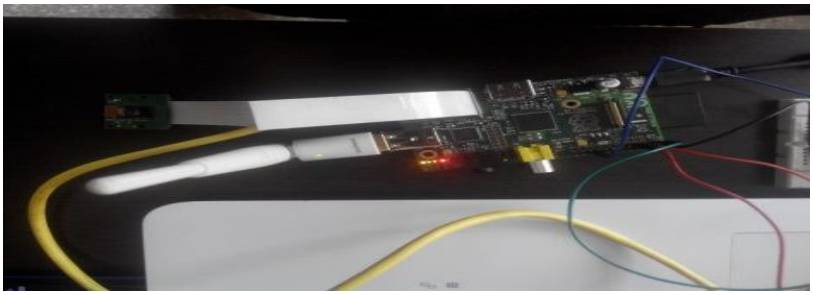

Figure 8 Pi camera connected with raspberry pi.

Figure 9 shows a personal mobile application systems where the live video streamed are received by windows

Figure 9 live stream via windows

Figure 10 now access the live stream from a personal mobile application.

Figure 10 live stream via personal mobile app

V. CONCLUSION

The proposed system is highly customizable and very useful tool for present times. The development of this project is done on the Raspberry pi as it offers customizable GPIO ports which help in an easy interface. The smart security system is capable of recording/capturing video/image and transmitting to a smart phone. It is advantageous as it offers reliability and privacy on transmitter and receiver sides. It is authenticated and encrypted on the receiver side; hence it offers only the concerned person to view the details .Necessary action can be taken in a short span of time in the case of emergency conditions such as an elderly person falling sick, military areas, smart homes, offices, industries, etc.

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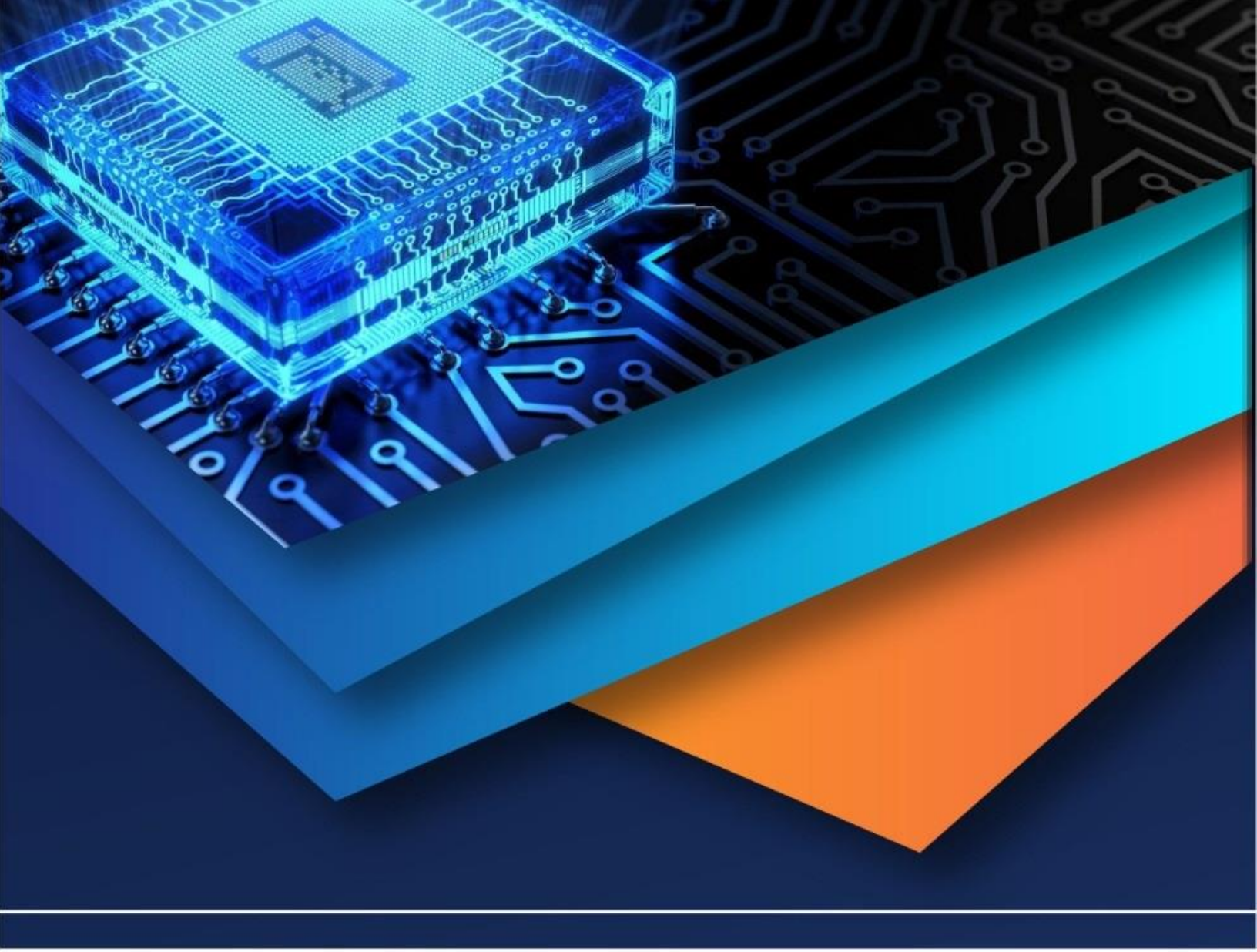

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