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IOT Based Visitor Monitoring System Using Raspberry PI

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ABSTRACT

Internet of Things is the web of physical objects that contain the embedded technology which is helping to develop man to machine or machine to machine communication. security system has become indispensable in daily life. face recognition is a very important for the purpose of surveillance and security. Hence there is a need for a cost effective system. Our goal is to explore the feasibility of implementing Raspberry Pi based face recognition system using conventional face detection. This paper aims at taking face recognition to high security systems and buildings. With the use of the Raspberry Pi kit, the system cost effective and easy to use, with high performance. Upon detecting the face, the controller enables the camera for capturing the event, and alerts the user by placing the live video of that event on webpage that is displayed in android mobile.The design and development of a visitors monitoring system, based on internet of things technology and image capturing technology, to confirm visitor identity and time as well as date has been reported in this paper. This paper describes about the implementation and deployment of IOT based security surveillance system in buildings using Raspberry Pi single board with Wi-Fi network connectivity. The recent technology in visitors monitoring system provides security, safety and comfortable life . That is why in the competitive environment and fast world, visitors monitoring system technology is required for every person. This purposed visitors monitoring system provides smart monitoring.

Keywords : IOT, Raspberry Pi, Pi camera, SD card, LCD 16*2, PIR Sensor, IR Sensor, LED, Buzzer, DC Motor.

I. INTRODUCTION

Visitors Monitoring System are a need of the modern day houses. It is possible to design a simple visitors security solution by using Raspberry Pi and utilizing the power of Internet Of Things. Raspberry Pi is an ARM cortex based popular development board designed for Electronic Engineers. With the processing speed and memory, Raspberry Pi can be used for performing different functions at a time, like a normal PC, and hence it is called Mini Computer in your palm. Here we are interfacing Pi camera with Raspberry Pi to capture the image of every visitor which has entered through the Gate or door. The visitors Monitoring System designed in this project is a simple and easily installable device built using Raspberry Pi, Camera,IR Sensor, PIR Sensor. In this project, whenever any person is arrived at the Gate, he has to press a button to open the Gate, and as soon as he/she press the button, his/her picture will be captured and saved in the system with the Date and time of the entry. This can be very useful for security and surveillance purpose. Captured image can be also sent to concerned person mobile through IOT app. This system is very useful in offices or factories where visitor entry record is maintained for visitors and attendance record is maintained for employees. This Monitoring system will digitize and automate the

whole visitor entries and attendances, and there will be no need to maintain them manually. This system can be either operated by the person himself or there can be operator for pressing the button for very visitor. The Visitors Monitoring System designed in this project, though being simple, is a powerful application.

II. LITERATURE SURVEY

Working of this Raspberry Pi Monitoring System is simple.In this,a Pi camera is used to capture the images of visitors, when a push button is pressed or triggered. A DC Motor is used as a gate. Whenever anyone wants to enter in the place then he/she need to push the button. After pushing the button,Raspberry Pi sends command to Pi camera to click the picture and save it. After it,the gate is opened for a while and then get closed again.The buzzer is used to generate sound when button pressed and LED is used for indicating that Raspberry Pi is ready to accept push button press,means when LED is ON, system is ready for operation.here the picture of visitor are saved in Raspberry Pi with the name which itself contained the time and date of entry. means there is no need to save date and time separately and same other placed as we have assigne the time and date as the name of capture picture, see the image below. We here taken the image opf a box as visitor,check its full demonstration in the Video at the end.

[1]. This paper describes an improved real time home security system using BeagleBoard and Zigbee Remote alert on fire and intruder detection are the main features of the system. It uses improved techniques such as camera, GSM, FTP server etc. But it is not utilizing the advantage of live streaming and alerting techniques such as phone calls, SMS and email etc.

[2]. this paper describes the Internet of Things approach for motion detection using Raspberry Pi. It utilizes FTP server for camera feeds and it alerts user through email. The system does not have SMS and phone call alerts and other sensor alerts such as detection of fire, gas etc.

[4]. this paper describes the surveillance technique using IP camera and Arduino board. In this paper, user can view remote desktop using team viewer application whenever he needs to monitor his home from outside. This system is not sending any notification to user whenever any event occurs in his home. User has to monitor his home continuously and also it lacks sensor based alerts.

[5]. this paper describes the security surveillance system using raspberry pi. It utilizes the advantage of live streaming. But we need to type the IP address every time to watch the live video which is placed in webpage.

Most of the previous papers are utilizing Zigbee based WSN. But it has limited range and bandwidth. Some of the papers describe sensor alerts and it lacks the video surveillance, web servers, live streaming etc.

[6]The device designed in this project can be installed at the main entrance of a house. It detects motion of any visitor with the help of PIR sensor and starts capturing the images with the help of a USB web cam. The images are temporarily stored on the Raspberry Pi and pushed to the Google Cloud from where they are sent as email alert to the house owner.

[7] The home security system designed in this project, though being simple, is a powerful application. The user can keep surveillance of his house from anywhere, any time and always by just installing this small device at the main entrance. Many such devices can also be installed to further add security layers. The entrance of any intruder can be detected and alerted by the Email on the smart phone, then the user is free to take appropriate action like calling police, informing law enforcement etc.

III. PROPOSED WORK

This is block diagram of IOT based visitor monitoring system using raspberry pi it consist of the Raspberry pi 3,Motor, Buzzer, LED,PIR Sensor , IR Sensor, LCD ,PI camera

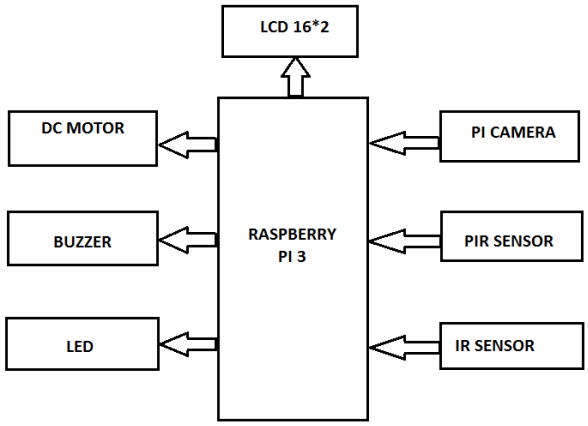

Fig-1: Block diagram of proposed work

In this fig, a Pi camera is used to capture the images of visitors, when a push button is pressed or triggered. A DC motor is used as a gate. Whenever anyone wants to enter in the place then he/she needs to push the button. After pushing the button, Raspberry Pi sends command to Pi Camera to click the picture and save it. It also send captured image to concerned person s mobile via IOT application. After it, the gate is opened for a while and then gets closed again. The buzzer is used to generate sound when button pressed and LED is used for indicating that Raspberry Pi is ready to accept Push Button press, means when LED is ON, system is ready for operation. 16X2 lcd display is used to display various status message like….Press Key, Capturing Image etc. It is required to develop and implement the affordable low cost surveillance system for remote security monitoring. Authorized user can access to their monitoring system remotely via internet with the use of mobile phone and monitor the situation on application. This entire work is done on raspberry pi with Raspbian as operating system. A Linux based Operating System (OS) called Raspbion OS is installed into SD card. Rip's desktop is accessed from laptop using ssh remote login. Then all the required libraries and software such as Open Source Computer Vision (Open CV), Python, streaming software (Motion), web server etc. were installed into it. We have used Open CV-python for writing application programs. Live streaming is done by executing the motion software.

When a person is detecting at the door, the camera will detect and capture the face of the person. The image is given to the Raspberry Pi through the USB port in the raspberry Pi. After receiving the image, that is given to the processor for further processing. Initially, the library files and the programs installed in the SD card. This SD card is paced in the SD card slot. The face recognition program will run while receiving that image.

The captured video is placed on the webpage that is created for the user by using the Real Time Streaming Protocol (RTSP). RTSP is responsible for transmitting the video to the webpage. It is the combination of both Real Time Transfer Protocol (RTP) and Real Time Control Protocol (RTCP). The RTP protocol is responsible for converting the video into RTP packets and transmitting them to webpage. RTCP does not involve in the transmission of RTP packets but it controls the operations.

The RTP protocol converts the captured video into RTP packets and sends the packets one by one to the webpage. The each packet consists of source address, destination address, packet length and video frame. Once the video placed at the webpage, the user will receive the notification of the event, which is placed on the webpage. Web page is a document that is suitable for www (World Wide Web) and web browsers. The web page is viewed on the android mobile with the help of web browsers such as Google chrome, Mozilla fire fox etc. To view the webpage in mobile phone, the web view application is used which is inbuilt in the android itself.

Web view can help if your application provides data to the user that always requires internet connection for retrieving the data. Usually the default web browser opens and loads the destination URL (Uniform Resource Locator). It is colloquially termed as web address. By using this web address the browser will check the corresponding web page is present in the web server or not. Finally the video in the web page is viewed in the android.

IV. RESULT OF IMPLEMENTATION

This figure shows the surveillance controller system implemented using Raspberry Pi. Raspberry Pi is powered by 5V adapter. The desktop of Raspberry Pi is accessed remotely from putty software which is installed on laptop.

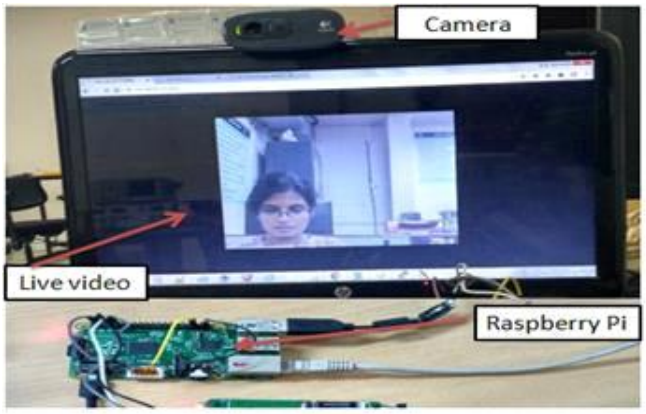

Fig-5: Surveillance controller system implemented using Raspberry Pi.

IP address. This system is useful for the owner to get a remote view of his home and to keep an eye on his valuables.

If the face is detected, it is recognized and then camera is activated, image is captured and sent to the user. After that, motion software is triggered, video is recorded and notification is send to user.

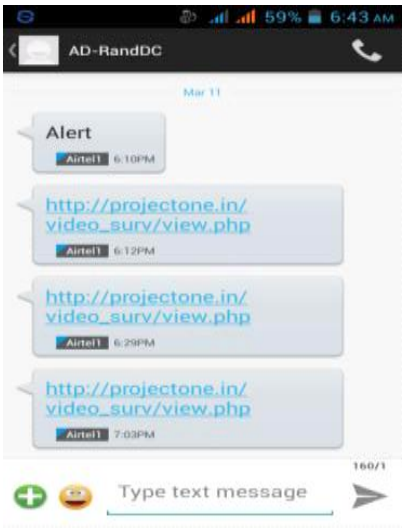

Fig-6: Shows the alert message with the webpage link in the mobile app.

V. CONCLUSION

The IOT Based Visitors Monitoring System designed in this project, though being simple.it is a powerful application. It detects motion of any visitors with the help of PIR Sensor and start capturing the image with camera. In this paper, we have designed and developed a real time surveillance system using IOT module and Raspberry Pi. It is an active surveillance system which will alert the user when the event happens. Live video streaming is an additional advantage of this system. we have created web server which helps the user to view the live video. The user can keep surveliance of this house from anywhere, any time and always by just installing this small device at the main entrance. The device designed in this project can be installed at the main entrance of a building or house. This system sends intruder's captured video to the owner by the android mobile. The IOT based smart surveillance system has been aimed to design in such a way that it can fulfil the needs of the user for particular surveillance area. It has countless applications and can be used in different environments and scenarios.

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