

## Raspberry Pi Based Smart Doorbell

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**Abstract** - This project presents a real time smart door system for home security. Most of the proposed smart home systems try to bring solutions for this security problem, but many of those systems use numerous sensor devices. With the increasing security issues, it is necessary to use new technologies. Video based smart home security systems have recently become an efficient approach with the development of video technology and Raspberry Pi is a strong and reliable embedded system device for the complex and challenging tasks. Using these technologies in the proposed system will bring several advantages in providing safety and security in terms of visualizing and identifying people who visit the home. In the overall proposed system, there will be two different significant techniques to provide home security. One is to use video technology to see the front door in real time even if the home is empty and another is to provide communication between the door system and smart phone device. By connecting the smart door system with the mobile phone through the cellular network, the owner of the house may have several opportunities such as controlling the house, getting instant video streaming, receiving and sending message, talking to the visitor and starting the alarm system. The experimental results indicate that the proposed system may provide a consistent support and assistance for safe and secure life.

**Key Words:** IMEI(International Mobile and Equipment Identity),RS-232,SIM (Subscriber Identity Module), GSM (Global System for Mobile Communications), Raspberry PI - 3,Internet of things (IoT).

### 1.INTRODUCTION

Over the world, IOT (Internet of Things) and M2M(Machine Interpersonal Communication) technologies which were developed for smart home system are becoming well known. The system is developed by using Supported Mobile Communication and Safety Powered

Multifunctional Smart Door System The proposed system will allow to communicate between visitors and owners of the house. Video camera system (the photo of visitors will be sent to the owner of the house), instant message notification, SMS / MMS notification and dual audio / single sided process will be provided with videophone. In addition, cloud storage of image data with a high resolution will be provided using the system With

increasing safety and security is-sues, the use of smart door system increased consistently with the advent of security related electronics, such as digital door locks, advanced video conversation devices, and wire-less home security networks . There are many smart systems proposed to provide safety and security at home and offices. The system is integrated to the gate for recognition people.

In this project, we are going to build an IOT doorbell using Raspberry Pi with the help of AWS IOT platform. Once the visitor pressed the doorbell, it will publish and as alert will be sent using AWS SNS service by Email or SMS, so we know someone is knocking our door no matter where we are. Visitors no longer need to call us and simply let the IOT doorbell to do the job, deaf people also benefit using it so they can alert from vibration of their phone.

To make it more advanced, Pi Camera is added so our IOT doorbell will take a picture of visitor, upload it using FTP (or you can use AWS service for storing the image) and attach the link in the email or SMS message sent.

If you want you can add voice/video call capability on Raspberry Pi so you can talk to your visitor over the phone, or you can add sensor to get alert when someone try to break into your house. It can also interact with other IOT appliance inside home to pretend someone is here!

### 2. HARDWARE DESCRIPTION

The hardware of the proposed system is basically consists of Raspberry pi and GSM module.

#### Raspberry pi board

Raspberry pi has been used as a tool to promote the code for accepting the input from the door bell and sending the message and picture of the stranger at the door to the registered mobile no and mail. This is the major hardware tool used for this project.

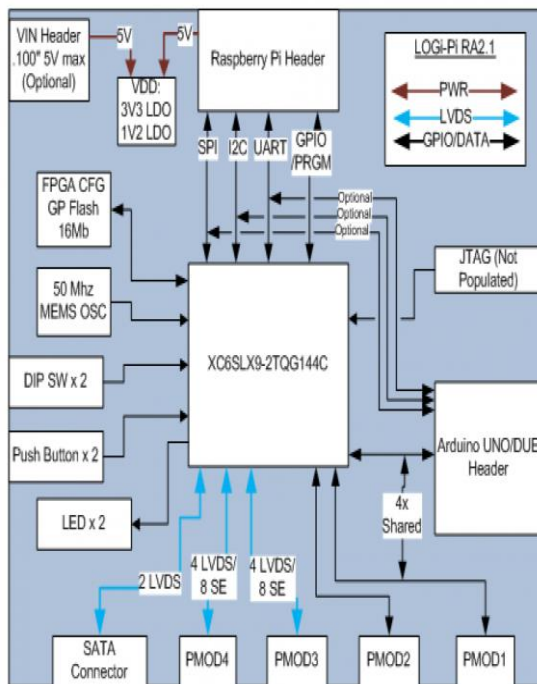


Fig 1:Raspberry pi Board

**GSM module**

GSM/GPRS module is used to establish communication between a computer and a GSM-GPRS system. Global System for Mobile communication (GSM) is an architecture used for mobile communication in most of the countries. Global Packet Radio Service (GPRS) is an extension of GSM that enables higher data transmission rate. GSM/GPRS module consists of a GSM/GPRS modem assembled together with power supply circuit and communication interfaces (like RS-232, USB, etc) for computer. GSM/GPRS MODEM is a class of wireless MODEM devices that are designed for communication of a computer with the GSM and GPRS network. It requires aSIM (Subscriber Identity Module) card just like mobile phones to activate communication with the network. Also they have IMEI (International Mobile Equipment Identity) number similar to mobile phones for their identification.

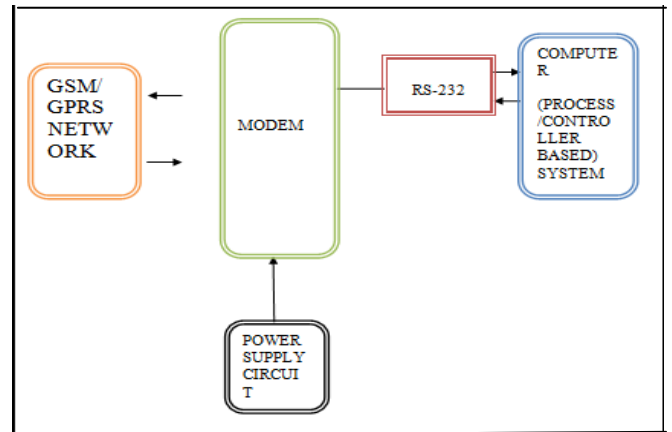


Fig 2:GSM/GPRS Module

**3. SOFTWARE DESCRIPTION**

- Raspbian OS([www.raspberrypi.org](http://www.raspberrypi.org)),
- Win 32 discimager([www.sourceforge.net](http://www.sourceforge.net)),
- Putty([www.putty.org](http://www.putty.org)),
- Real VNC viewer([www.realvnc.com](http://www.realvnc.com)),
- SD card formatter([www.sdcard.org](http://www.sdcard.org))

**3.1 Steps to install OS:**

- 1.Use “Win32 disc imager” to write the raspberry pi OS image file to the micro Insert micro SD card and format it using SD card Formatter
- 2.Extract Raspbian OS file to get image file
- 3.SD card
- 4.Remove the SD card and insert into the raspberry pi.

**3.2 Steps for raspberry pi:**

- 1.Connect micro USB cable to the raspberry pi for power to the raspberry pi
- 2.Connect Ethernet cable to the raspberry pi from router which has an active internet connection
- 3.Wait for one to two minutes ,as raspberry will be booting after that move onto next steps

**3.3 Steps for setting putty:**

- 1.Open command prompt by typing CMD in RUN window
- 2.Type “ping-4 raspberry pi.local”, and Note down the IP address which is mentioned in the command prompt
- 3.Open “putty”

4. In IP address type "raspberrypi.local"
5. Click open
6. Login as : pi@raspberrypi.local ,
- Password : raspberrypi (can be anything)
7. Type – sudo apt-get install tigervnc-server
8. Type – y
9. Type – vncserver:1
10. Close putty
11. Open putty again
12. In IP address type raspberrypi.local.
13. Go to SSH-tunnels
- In source port type 5901
- In destination port type IP address 14. from step 2:5901
15. Click add
16. Click open
17. Repeat step 6.

### 3.4 Setting up real VNC viewer

1. Go to File - new connection
2. Type VNC server:- "Ip address from step 2" :5901
3. Click ok
4. Right click the icon with the name "anything" and click connect.
5. Type in the password
6. You are inside the raspbian.

### 4. CONCLUSIONS

This project comprises a raspberry pi iot based smart doorbell. . The experimental results of the system proposed indicate that it may provide a consistent support and assistance for safe and secure life with minimum cost of the system. Raspberry Pi is a strong and reliable embedded system device for the complex and challenging tasks. Using these technologies in the proposed system will bring several advantages in providing safety and security for the owner and also comfortable for the visitors.

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