IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

SMART VIDEO DOOR BELL DEVICE WITH TWO WAY AUDIO USING RASPBERRY PI

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Abstract: - In today's scenario we totally depend on internet that helps us. Present paper aims as to discuss the IOT based doorbell with enhanced security features at a small cost with the help of Raspberry pi toolkit. This new concept includes the security concerned issue in an effective manner. Our paper aims as to connect any door system with internet and to make it more secure with help of MAC scheme. Person from home or any other location can see visitor from web through camera from anywhere and system will take snap of visitor and keep a track of sound of bell attachment through visitor via Gmail, if authorized person wants to give a message to the visitor, it can be sent easily through internet and it will appear in a screen on front face of door. However, we are taking advantages of the internet to capture and to record data via Gmail such that it will helpful for users in security system. and for security purpose we using MAC Encryption scheme so that we Keep a track of person with help of Gmail and use security features such that any unauthorized person cannot break it security scheme

Keywords - Raspberry pi, IOT, VOIP, MTQQ, Sensor

I. INTRODUCTION

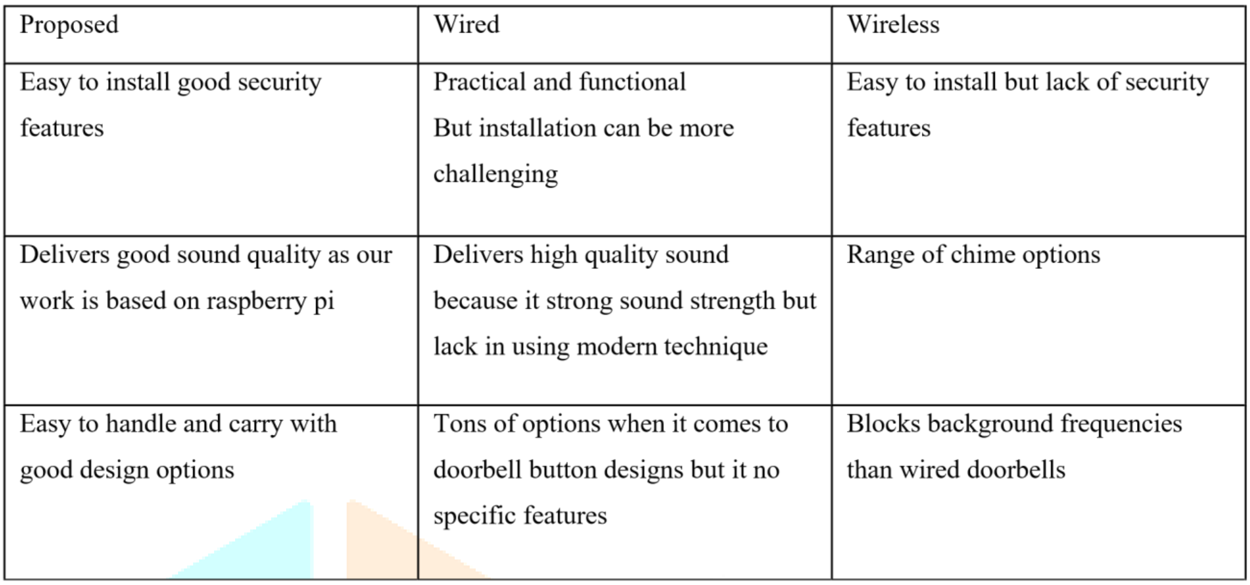
A traditional doorbell system is commonly wired into the electrical system of the house. It depends on internal wiring to ring the chime box when a visitor presses the doorbell, a loud voice generated. It was very difficult to carry wires and also doorbell Nowadays, the security doorbell has no internal wiring and could be installed with minimal tools. Since it relies on wireless technology, the chime box should be placed within the range of the doorbell transmitter to ring.

When the doorbell is pressed, the app begins a VOIP video call to connected smartphones, so that the owner can see and speak with whoever is at the door. The Ring app has integrated Lockton support, so that the door may also be remotely unlocked when the doorbell is rung. Whether you want a chime or an efficient front door camera system, the idea is to expose you to a whole world of wireless video security systems for your home or office When you click the doorbell, the following form of notifications can be sent to the user's mobile app.

It is a communication between outside and inside user when a phone call enables. The call will be activated using the GSM module connected to the Raspberry Pi. A speaker and microphone interfaced with the system enables the voice communication between the two persons at both ends. A snapshot of the person at the door. A script written in python is used to capture the image using the compatible webcam interfaced with the pi and to attach and send it to the user through mail. A text message with current time will be sent to the user using the GSM module.

II. LITERATURE SURVEY

An analysis was performed to compare earlier system to proposed one. Firstly we will discuss between wired and wireless then compare our wireless doorbell with our proposed scheme.



Proposed	Wired	Wireless
Easy to install good security features	Practical and functional But installation can be more challenging	Easy to install but lack of security features
Delivers good sound quality as our work is based on raspberry pi	Delivers high quality sound because it strong sound strength but lack in using modern technique	Range of chime options
Easy to handle and carry with good design options	Tons of options when it comes to doorbell button designs but it no specific features	Blocks background frequencies than wired doorbells

2.1 SPECIFICATION:

Basically, doorbell video camera system are wireless video intercom doorbells. That allow you to speak and authenticate as you answer the ring bell, It is very helpful for both the parties while connecting and speaking. So we have two service doorbell and intercom with wireless technology. It has more specification with a night vision feature. user can see a person in a low sight.

This is a feature that most people choose if they are working at night or want proper supervision in low light too. Wireless doorbell system Every time you have a visitor, there is a notification on your phone. This takes a few seconds, and the notification light also turns on if there is any movement around the door, even if the guest does not ring the bell. When you choose from the Video Doorbells, you will find that many users prefer this feature over any other video intercom system The motion sensors in your Ring Video Doorbell are designed to detect motion up to 155 degrees horizontally and from five to 25 feet outward from the fixture. A controller + intercom station are two components of the 8028 IP door phone. The controller provides the network connection and the relay for door / gate access control. As the controller is generally located inside the premise, the 8028 is a secure solution in the event there is tampering of the public-facing intercom station. The relay and network connection are in no way exposed, and unauthorized entry to the building or access to the network is prevented. The access control relay can connect to any type of industry standard door strike, gate activation system or access / security control panel. A 30V 1A normally open or normally closed relay is available from the 8028 controllers for this purpose. A door strike is not included with the door phone. It has more specification with a night vision feature. user can see a person in a low sight. This is a feature that most people choose if they are working at night or want proper supervision in low light too. Wireless doorbell system Every time you have a visitor, there is a notification on your phone

3.1 BLOCK DIAGRAM

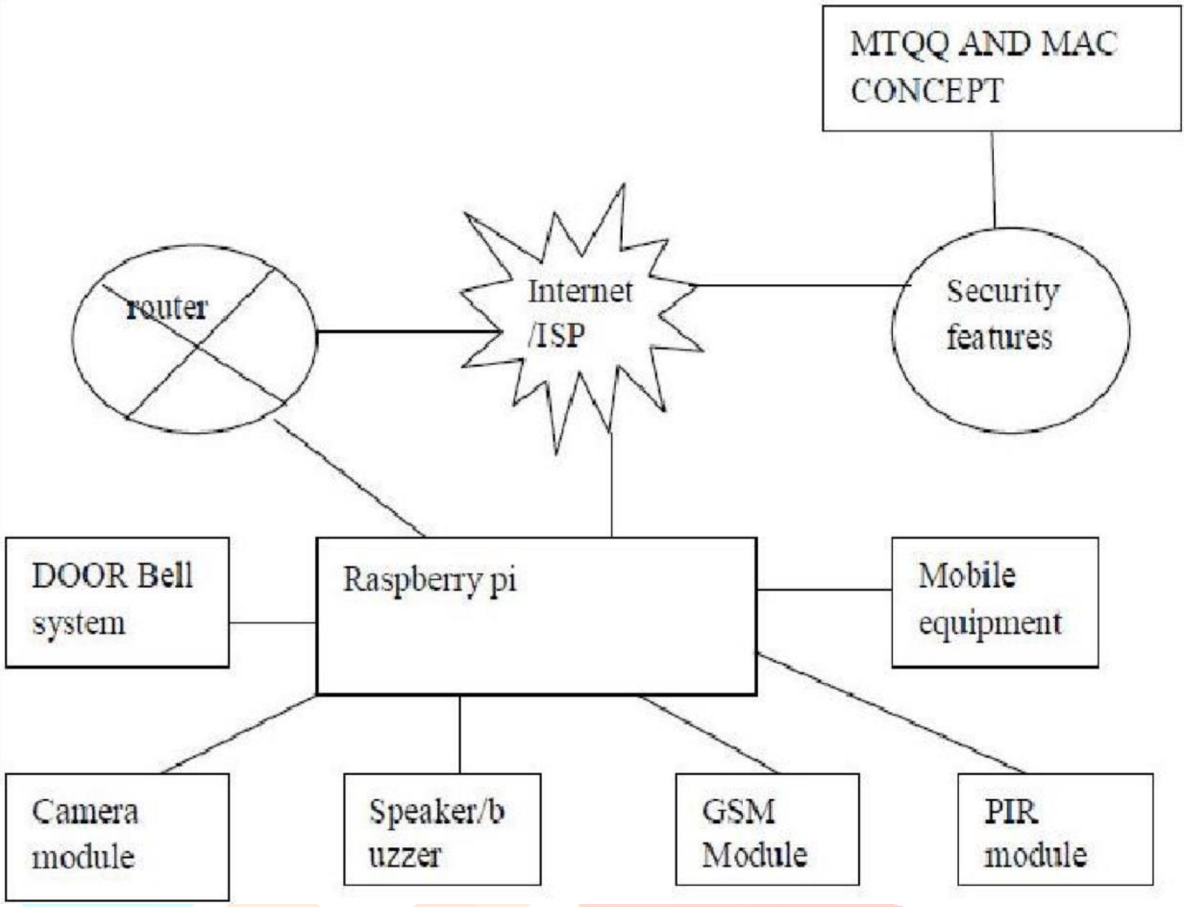


Figure 1: block diagram of raspberry pi based door bell

3.2 S/W REQUIREMENTS: OS

H/w Requirements: Raspberry Pi 2, Wires, SD Card, PIR Sensor camera module, Door Number - a number (1-15) that you will use in the code 4GB SD Card pre-loaded with Raspbian, Ethernet Cable Micro USB Cable Push button Switch.

3.3 PROCESS INVOLVED:

Basic process of Linux kernel customization which makes the kernel faster and compatible for hardware and other application. Linux distribution provides the kernel source code but not exact as per our requirements. It supports a wide range of hardware system and programming languages like python. Linux kernel is a open source, most flexible operating system that has been ever created. Linux supports various features such as portability, scalability, exhaustive networking support, security, reliability etc. The Role of Linux kernel to manage all hardware and software requirement. Basic process involves customization of Linux OS the kernel is an important component of Linux OS and requires several libraries and applications to support end user's requirements. Linux supports various features such as portability, hardware support, scalability, exhaustive networking support, security, stability and reliability etc. Role of Linux OS is to manage all hardware and software resources and provide a set of APIs to support various hardware and applications. For example, arch/arm/ for the Broadcom bcm2709 Raspberry pi. Our main focus is on doorbell device that will have a push button switch to simulate the doorbell. This device will also respond to its own doorbell or when another Raspberry Pi's doorbell is pressed by playing a sound. This device will also pay attention to when the security system is placed in different modes (away, stay or disarmed) and the ring will change depending on this mode.

3.4 WORKING MODULE:

The raspberry pi module based system was built using Adafruit, camera module, Wi-Fi module, PIR module, internet connection. For security system purpose we add a LCD plate. Alarm can be activated for a certain period. Upon activating alarm audio output is sent to 3.5 mm audio jack of raspberry pi and then "system is alarmed" sound can be heard by audio speaker. All devices will become active. Now once it will activated we connect it to the GSM module. When a person moves within the range of PIR sensor, a signal is sent to controller board, which initiates the webcam. Webcam takes a photo which is stored onto memory card of Raspberry Pi. The stored photo is then forwarded via email to the owner with the title "Motion notification" as shown

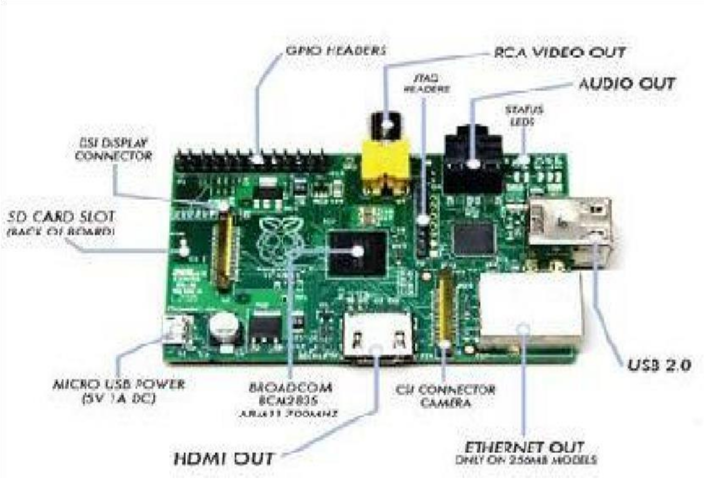

GPIO HEADERS
RCA VIDEO OUT
JTAG HEADERS
AUDIO OUT
STATUS LEDS
DSI DISPLAY CONNECTOR
SD CARD SLOT (BACK OF BOARD)
USB 2.0
MICRO USB POWER (5V 1A DC)
BROADCOM BCM2835 ARM11 700MHZ
CSI CONNECTOR CAMERA
HDMI OUT
ETHERNET OUT ONLY ON 256MB MODELS

Figure2 : raspberry pi

Our main focus is on doorbell device that will have a push button switch to simulate the doorbell. This device will also respond to its own doorbell or when another Raspberry Pi's doorbell is pressed by playing a sound. This device will also pay attention to when the security system is placed in different modes (away, stay or disarmed) and the ring will change depending on this mode.

Figure 3: raspberry pi kit with other components

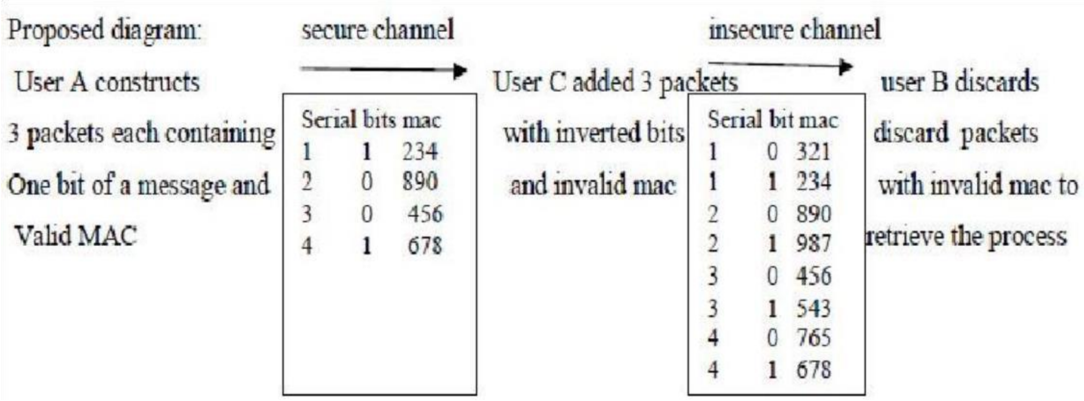
III. PROPOSED DESIGN

Now when you send a message from sender to receiver part then as we already discuss about firstly it takes snap from camera module and for motion, we detect it part then it sends a message to receiver. But when we are sending message to receiver then it is not fully authenticated sometime intruder can crash it. So, to overcome this problem we do a encryption technique to make doorbell system more strong and powerful. We are using concept of message authentication code so when the sender is sending message via some algorithm which is explains later: Consider user A wants to send a message to the receiver User B, User A enumerates the symbols (usually bits) in her message and sends out each in a separate packet.

In general, the method requires each symbol to arrive in- order and to be authenticated by the receiver.

When implemented over networks that may change the order of packets, the sender places the symbol's serial number in the packet, the symbol itself (both unencrypted), and a message authentication code (MAC). Many MACs use a secret key User A share with user B, but it is sufficient that the receiver has a method to authenticate the packets. there is third user C who transmits user 'A packets to user B, interleaves the packets with corresponding bogus packets (called "chaff") with corresponding serial numbers, arbitrary symbols, and a random number in place of the MAC. Third user C does not need to know the key to do that (real MAC are large enough that it is extremely unlikely to generate a valid one by chance, unlike in the example). User B uses the MAC to find the authentic messages and drops the "chaff" messages. This process is called "winnowing". An eavesdropper located between User A and can easily read Alice's message. But when an eavesdropper between User C and User B would have to tell which packets are bogus and which are real (i.e., to winnow, or "separate the wheat from the chaff"). That is infeasible if the MAC used is secure and Charles does not leak any information on packet authenticity (e.g., via timing).

If a fourth party, Dave, (anyone other than User A, User C, or User B) requires User A to disclose her secret key, she can defend with the argument that User A used the key merely for authentication and did not intend to make the message confidential. If another User cannot force User A to disclose an authentication key (the knowledge of which would enable him to forge messages from User a), then her messages will remain confidential. On the other hand, User C' does not even possess any secret keys that he could be ordered to disclose. Second steps: Our Second steps involve: Generation of MQTT for Sensor Networks as we are discussing wireless security on raspberry pi. Our aim depends on embedded devices on non-TCP/IP networks, such as Zigbee. MQTT-SN is a publish/subscribe messaging protocol for wireless sensor networks (WSN), with the aim of extending the MQTT protocol beyond the reach of TCP/IP infrastructure for Sensor and Actuator solutions



Serial	bits	mac
1	1	234
2	0	890
3	0	456
4	1	678

Serial	bit	mac
1	0	321
1	1	234
2	0	890
2	1	987
3	0	456
3	1	543
4	0	765
4	1	678

Figure 4: communication design

IV. PROPOSED DESIGN WITH SECURITY FEATURES:

1. Authentication of Clients by the Server

The CONNECT Packet contains Username and Password fields. Implementations can choose how to make use of the content of these fields. They may provide their own authentication mechanism, use external authentication system such as LDAP [RFC4511] tokens, or leverage operating system authentication mechanisms. Implementations passing authentication data in clear text, requiring authentication data should be aware this can give rise to Man-in-the-Middle and replay attacks. Introduces approaches to ensure data privacy. A Virtual Private Network (VPN) between the Clients and Servers can provide confidence that data is only being received from authorized Clients. Where TLS [RFC5246] is used, SSL Certificates sent from the Client can be used by the Server to authenticate the Client. An implementation might allow for authentication where the credentials are sent in an Application Message from the Client to the Server.

2. Authorization of Clients by the Server

An implementation may restrict access to Server resources based on information provided by the Client 1550 such as User Name, Client Identifier, the hostname/IP address of the Client, or the outcome of 1551 authentication mechanisms.
Of the authorize server.

3. Authentication of server by the client

The MQTT protocol is not trust symmetrical: it provides no mechanism for the Client to authenticate the Server. Where TLS [RFC5246] is used, SSL Certificates sent from the Server can be used by the Client to authenticate the Server. Implementations providing MQTT service for multiple hostnames from a single IP address should be aware of the Server Name Indication extension to TLS defined in section 3 of RFC 1559 This allows a Client to tell the Server the hostname of the Server it is trying to connect.

An implementation might allow for authentication where the credentials are sent in an Application Message from the Server to the Client. A VPN between Clients and Servers can provide confidence that Clients are connecting to the intended Server.

4. Integrity of Application Messages and Control Packets.

Applications can independently include hash values in their Application Messages. This can provide integrity of the contents of Publish Control Packets across the network and at rest. TLS [RFC5246] provides hash algorithms to verify the integrity of data sent over the network. The use of VPNs to connect Clients and Servers can provide integrity of data across the section of the 1574 network covered by a VPN.

5.Privacy of Application Messages and Control Packets

TLS [RFC5246] can provide encryption of data sent over the network. There are valid TLS cipher suites that include a NULL encryption algorithm that does not encrypt data. To ensure privacy Clients and Servers should avoid these cipher suites.

An application might independently encrypt the contents of its Application Messages. This could provide 1581 privacy of the Application Message both over the network and at rest. This would not provide privacy for other properties of the Application Message such as Topic Name. Client and Server implementations can provide encrypted storage for data at rest such as Application Messages stored as part of a Session. The use of VPNs to connect Clients and Servers can provide privacy of data across the section of the 1588 network covered by a VPN. **6. Non-Repudiation of Message Transmission**

Application designers might need to consider appropriate strategies to achieve end to end non repudiation.

7. Detecting Compromise Of Clients And Servers

Client and Server implementations using TLS [RFC5246] should provide capabilities to ensure that any SSL certificates provided when initiating a TLS [RFC5246] connection are associated with the hostname of the Client connecting or Server.

V. CONCLUSION & FUTURE WORK

The Raspberry pi based door bell system is helpful for every types of user. Institutions according to their requirements. It is a paradigm for wireless door bell system based on new technologies.

Further, in the future, it will become more secure compare to our previous model. Here we are specifying more secure features with good design The proposed system is a suitable for low cost with more secure features MTQQ. Our next aim is to discuss about delay in between transmission of packet from sender to receiver part.

VI. ACKNOWLEDGMENT

We Would Like To Thank Department Of Electronics And Telecommunication. Also, We Would Like To Thank Our Guide MS. Suvarna Rohile Madam.

VII. REFERENCES

[1] Yanbo Zhao ; ZhaohuiYe "A low cost GSM/GPRS based wireless home security system" IEEE Transactions on Consumer Electronics, (Volume:54 , Issue: 2)

[2] Hassan ,H. ; Bakar,R.A. ; Mokhtar,A.T.F. " "Face recognition based on auto-switching magnetic door lock system using microcontroller" IEEE-International Conference on System Engineering and Technology (ICSET), 2012

[3] Assaf, M.H. ; Mootoo, R. ; Das, S.R. ; Petriu, E.M. ; Groza, V. ;Biswas, S. "Sensor based home automation and security system" Instrumenta-tion and Measurement Technology Conference (I2MTC), 2012 IEEE In-ternational [4] Ibrahim,

R. ; Zin, Z.M. "Study of automated face recognition system for office door access control application''IEEE 3rd International Confe-rence on Communication Software and Networks (ICCSN), 2011

[4] X. Fang et. Al. , " Smart grid- The new and improved power grid: A Survey", IEEE Communication Surveys & Tutorials, , 2012, Vol. 14, No.4, 944-980.

[5] H. Gharavi and R. Ghafurian, "Smart grid: The electric energy system of the future", Proceedings of the IEEE, 2011, Vol. 99, No. 6, 917 – 921. [7] A. Ipakchi and F. Albuyeh, "Grid of the future", IEEE Power & Energy Magazine, 2009, Vol. 7, No. 2, 52–62.

[6] Upton, E. Halfacree, G. 2014 Raspberry Pi User Guide, 3rd. Ed. Wiley.

[7] Richardson, M. Wallace, S. 2014 Getting Started with Raspberry Pi, 2nd. Ed. Maker Media Inc.

[8] Bradbury, A. Everard, B. 2014 Learning Python with Raspberry Pi. Wiley.