



International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijircce.com

Vol. 6, Issue 4, April 2018

IoT and GSM Based Smart Security Systems

Hareeta Malani¹, Santosh Yadav²

Associate Professor, Department of Electronics & Communication Engineering, Manikya Lal Verma Textile & Engineering College, Rajasthan India¹

U.G. Student, Department of Electronics & Communication Engineering, Manikya Lal Verma Textile & Engineering College, Rajasthan India²

ABSTRACT: As of late, advanced entryway locks and CCTV cameras have been generally utilized as a feature of security frameworks. Nonetheless, the media has detailed computerized entryway locks being opened by invalid clients to attack homes and workplaces and CCTV can be defenseless and use for later survey as it were. In this examination, an advanced entryway bolt framework that can work with the IoT condition, biometric and CCTV is proposed. It is composed and executed to improve security and comfort. The proposed framework gives security works that can exchange caught pictures to a client's cell phone and it can likewise convey caution data to the cell phone of the administrator when the entryway bolt is physically harmed when an invalid client endeavors an unlawful activity. The proposed framework empowers a client to check the entrance data and remotely work the entryway bolt to improve accommodation.

KEYWORDS: Internet of Things, Biometric, Digital Door Lock, Embedded Systems, CCTV securities.

I. INTRODUCTION

The venture intends to give protection and security to a specific Home or office from remote areas from a focal Server framework. Having a full control over the spots where we live and work has dependably been an intriguing subject to fantasize regardless of at what age! As the innovation enhanced in late decades, individual increased more power on controlling different gadgets inside.

The Internet of Things (IoT) can be characterized as a worldwide framework which consolidates canny administrations with situational mindfulness and permits common correspondence between a certain something and an-other and amongst individuals and astute things over a system [1] [2]. Machine to Machine (M2M) correspondence is unique in relation to IoT in light of the fact that a man does not straightforwardly control the gear or shrewd instruments; they are in charge of conveying in the interest of individuals [3]. These frameworks help in recognizing interruption at ongoing and informing the client about the same [14]. Utilization of sensors, for example, PIR (Passive Infrared Sensor) is made in distinguishing security rupture [15].

The Project entitled IOT and GSM based Smart Security Systems features the previously mentioned issue and others approaches to conquer this need by utilizing two of the most generally utilized highlights of the present innovation SMS to be connected as a scaffold in the middle of human and completely computerized structures, GSM and IoT condition which guarantees idealize similarity amongst systems and cell phones or in any area. In this venture, the framework permits the property holder or organization proprietor to screen and control the house security like Whose entered, Door bolt or entryway opened, which can be exchanged on or by means of the cell phone set by sending summons as SMS and furthermore the mortgage holder can get the machines status. The proposed framework comprises of a computerized entryway bolt, two Atmega-8 control board that is mounted in the bolt, and the end client's cell phone. The controller distinguishes physical effects connected by a guest and recognizes if an invalid unique mark mistake happens in excess of a specific number of times, and uses the camera to catch a picture of the guest at that point exchanges the picture to the client's cell phone. The majority of the entrance records are put away in the controller's database, which can be questioned by means of the client's cell phone compose. On the off chance that a

International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijircce.com

Vol. 6, Issue 4, April 2018

guest is obscure his picture is caught and exchanged to the administrator cell phone the administrator would then be able to control the entryway bolt remotely in the wake of confirming whether the guest is legitimate or not.

Another critical capacity of the controller is consequently opening or shutting the entryway when a substantial client draws close. At the point when a legitimate client gets to the entryway holding a protest, since it is hard to work the entryway bolt, the controller speaks with the administrator cell phone by means of remote and opens the entryway bolt consequently. The cell phone obtains the effect identification data and the invalid guest picture data from the controller and after that the client can make fitting move. Further, if the client gains picture data for a substantial guest, it is conceivable to open or close the entryway bolt remotely. It is additionally conceivable to inquiry the approaching and active.

II. RELATED WORK

Research has been conducted in regards to automated home monitoring using Web camera [4] and accordingly information delivered to user's phone via GSM. In addition, there has also been research [5] conducted in securing the homes using Sensor, Atmega Microcontroller, buzzer and relay to control the appliance.

Seo et al. [6] examined helpful advanced entryway bolt works, for example, remote control by means of the incorporation of cell phones and key sharing. Lee et al. [7] proposed a method for perceiving a getting the opportunity to challenge and transmitting the inquiry picture. Potts et al. [8] proposed a security structure that interfaces with an Android mobile phone. Studies of Park et al. [9] and Verma et al. [10] are related to security applications for home automation. Study of Khiyal et al. [11] and Ogri et al. [12], are starting examinations [13] for remotely controlling an entryway bolt, which can't be arranged likewise into the use of the entire IoT.

III. BLOCK DIAGRAM

Figure 1 shows complete block diagram of proposed system. There are two sections in our task. They are the security framework and the heap controlling framework. In the security framework we utilize a few sensors, for example, Biometric sensor, Webcam, movement sensor. In the heap controlling.

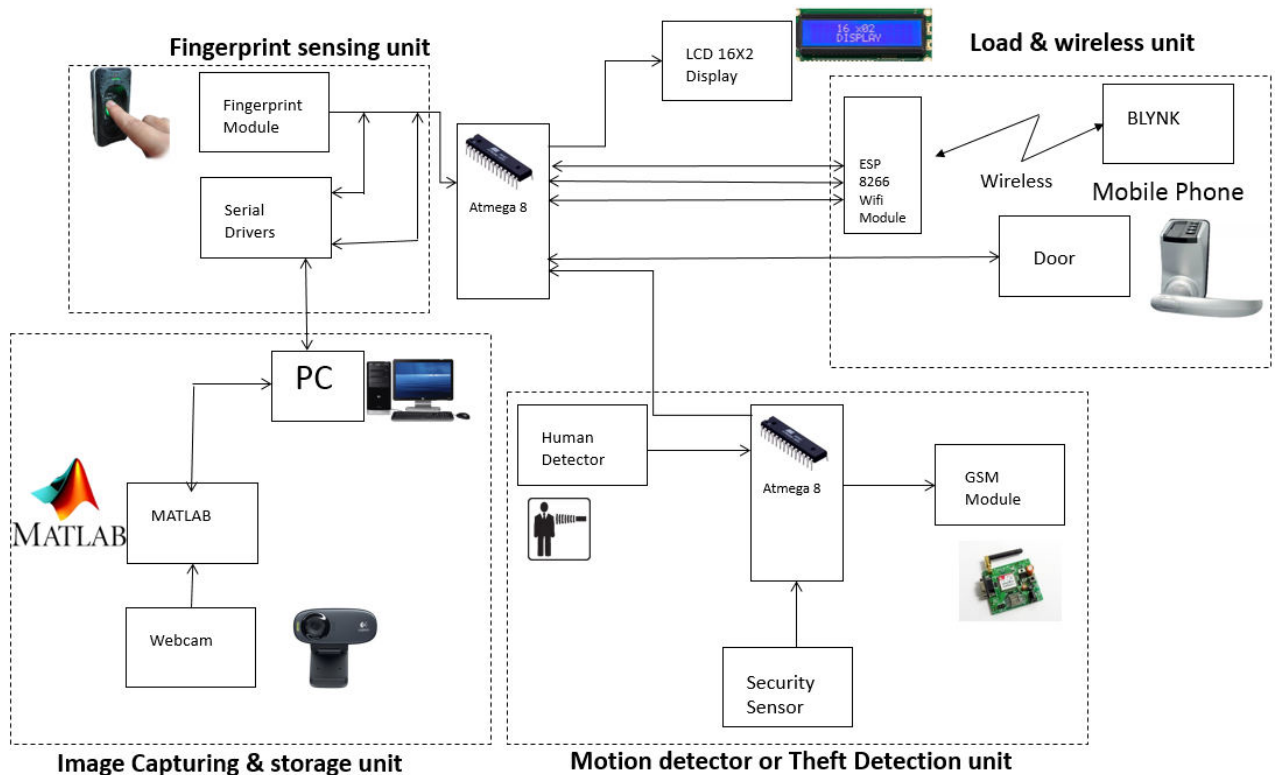


Figure 1-Block Diagram



International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijircce.com

Vol. 6, Issue 4, April 2018

Framework we utilize hand-off to on or off the heap. We have utilized GSM module to send message to a supporter distinguishing proof number about security reason. We have additionally utilized this GSM module to control stack from remote region.

A. Load controlling section:

Protection of home main door is the important part of this security system which can be done in this system by using an electromagnetic lock in conjunction with fingerprint module. The admin using this biometric for the valid user which is display on LCD and if the fingerprint matched is correct then the electromagnetic will going to open.

B. Motion detector or Theft Detection unit:

The motion sensor gives digital output to the microcontrollers and when any motion has been detected motion detector gives logical one or High to the microcontroller and then microcontroller takes necessary decision. For motion detection we have used PIR sensor which allow us to sense motion can be used to detect whether a human has moved in or out of the sensor's range.

C. Fingerprint sensing unit:

This unit screens constant unique mark check information from entryways and it has its setting restricted trials. Over this constrained trials microcontroller sends a message to the administrator cell phone that somebody attempted to get to the entryway and crossed its restricted trial. On the off chance that if the client is confirmed then a yield will send through the microcontroller to the heap for open the entryway. We have utilized RS305 as unique mark sensor.

D. Image Capturing & storage unit:

In this unit CCTV camera is interfaced through coding part and then implemented 'Activate Motion Detection' through this mode we give instruction for whenever any invalid user tried to access then application starts capturing the images and stored into a folder at the same time a wireless signal is transmitted to the receiver through ESP8266 module using blynk application and wait for the desired action taken from the owner side.

IV. PROPOSED ALGORITHM

A. Flowchart:

Figure 2 shows flowchart of proposed system. In this flowchart two cases are discussed in which one is for the valid user and another one is for the invalid user all the activity of these users will be captured and can be stored and also there is limited no of trials for each. Besides, various sensors for proximity and intrusion detection are connected to the system. A camera sensor for photographing an image of invalid users is installed, an impact sensor is attached for detecting a physical shock by an invalid user, and an ultrasonic sensor is attached to recognize the proximity of valid users.

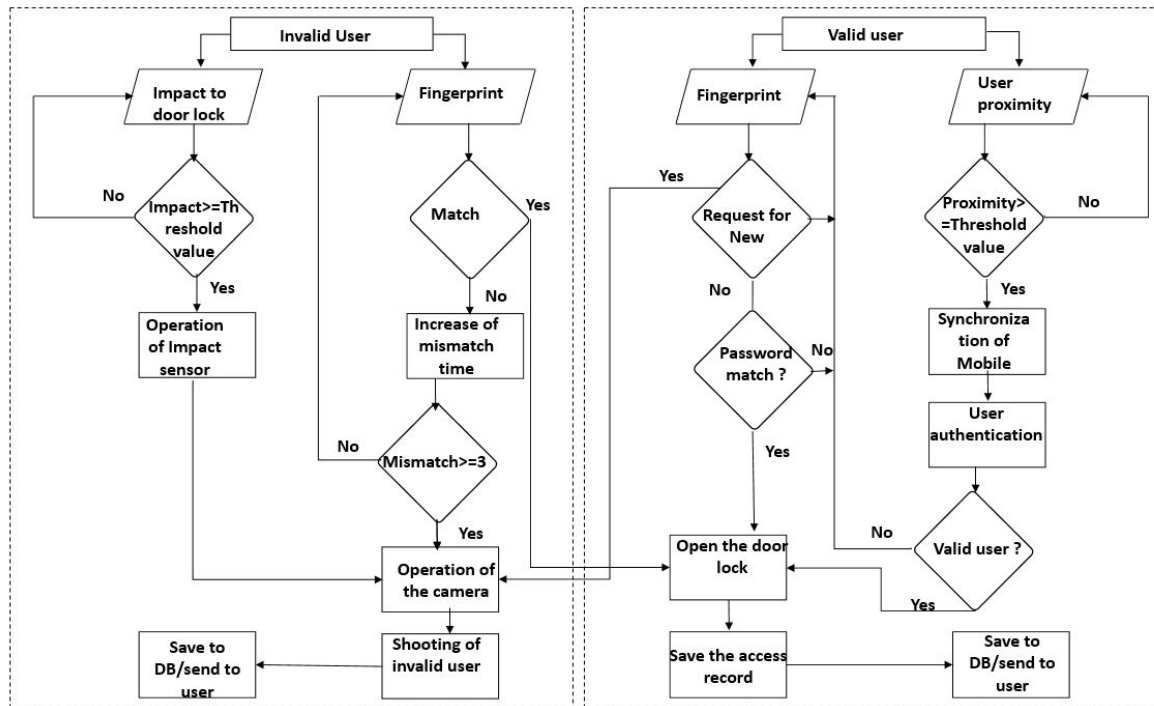


Figure 2- Flowchart

B. Description of the Proposed Algorithm:

There are two sections in our task. They are the security framework and the heap controlling framework. In the security framework we utilize a few sensors, for example, Biometric sensor, Webcam, movement sensor. In the heap controlling framework we utilize hand-off to on or off the heap. We have utilized GSM module to send message to a supporter distinguishing proof number about security reason. We have additionally utilized this GSM module to control stack from remote region.

Step 1: Demonstration Model:

For the purpose of a real-time demonstration of locking and unlocking of door lock we constructed a scaled model of a house with three walls and roof (Fig 5). The door was made by a DVD drive sliding portion for demonstration which is coupled by a DC Motor. The dimension of the demo house was 36 cm x 20 cm x 20 cm. In this demo house we have installed our GSM section in back side of the demo house and this can be installed anywhere user wants to install.

Step 2: GSM module section:

Figure 3 shows GSM Section of proposed system. In this section of the project we are using a GSM module to communicate with admin during emergencies through message in this section we have also used PIR sensor as Motion detector or Light detector and also used a noise detector.

International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijirccce.com

Vol. 6, Issue 4, April 2018



Figure 3-GSM Section

Step 3: IOT section:

Figure 4 shows IoT section of system. In this section, we have used ESP8266 module for access door lock control from the internet. With the help of Blynk android app we have interfaced our ESP8266 module and with this app, we can now control the door for the valid and invalid user. All the notifications like who entered can be seen by this app. To access the internet through the ESP8266 module we are using our android phone Samsung J7.



Figure 4-IOT Section

V. PSEUDO CODE

```
STEP 1 : START
STEP 2 : FOR each user
STEP 3 : INPUT Action
STEP 4 : SWITCH Action
STEP 5 : CASE "fingerprint"
STEP 6 : IF fingerprint does not match THEN take and send image
STEP 7 : ELSE IF fingerprint is valid THEN open the door
STEP 8 : ELSE IF number of mismatch greater then 3 THEN take and send image
STEP 9 : ELSE go to STEP 2
STEP 10 : CASE "impact"
STEP 11 : Impact Sensor operation
STEP 12 : IF impact value greater then threshold valu THEN camera sensor operation
STEP 13 : ELSE go to STEP 2
STEP 14 : CASE "proximity"
STEP 15 : IF distance greater then threshold value THEN mobile device synchronization
STEP 16 : IF valid user THEN open the door
STEP 17 : ELSE go to STEP 2
```

International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijircce.com

Vol. 6, Issue 4, April 2018

STEP 18 : ELSE go to STEP 2

STEP 19 : END

VI. RESULTS AND ANALYSIS

The prototype of the IOT and GSM Based Smart Security System was designed and implemented successfully. A detailed analysis was done on the working and stability of the system. Our findings were:

A. Analysis for Valid User:

For the initial startup of the system it took 10 second to start. After the fingerprint verification it took 2 second to unlock the door and notify the user with its name on blynk app door automatically closed after 10 second. Figure 5 shows the unlocked position of door when a valid user enters.

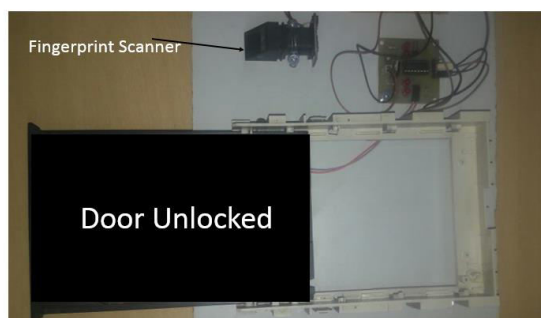


Figure 5-When Valid User Entered

B. Analysis for Invalid User:

In this analysis of the project we have divided it into two case one for if user is known and another one is for if user is unknown.

- 1) Case 1st (Invalid user is known)- In this case of the project it took 5 second to notify the admin with captured picture (Figure 6) of the user with the help of webcam and MATLAB process and validity alert will be set to the HIGH. Now admin will take the decision that user is valid or not and if user press the valid user button then it will take 2 second to unlock the door.
- 2) Case 2nd (Invalid User is Unknown) – In this case of the project it will take 2 second to notify the admin with the captured image (Figure 6) and after pressing invalid user button on the blynk app door will be remain locked and no one can enter in the house.

International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijircce.com

Vol. 6, Issue 4, April 2018



Figure 6-Image Captured During Invalid User Entered

Figure 7 shows blynk app interface during a user try to enter in house which is not valid for system. During both these cases webcam will record video continuously which can be store and seen for further use and all the logs with the captured picture can also be saved for later use. Captured images and recorded video can be send to the remote location by an email attachment.

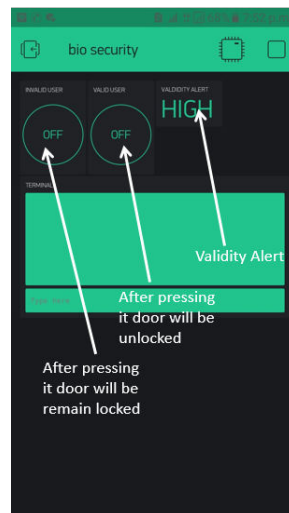


Figure 7-Blynk App Notification When a Invalid User enter

C. Analysis of Motion or Light Detection unit:

In this section of the project we have used GSM module to notify the with a alert message if any one entered in the house without permission and it will take 10 second to deliver message to user. Here PIR sensor is used as motion detector or light detector and we have also used noise detector. Figure 8 shows alert message received on the user phone.



International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijirccce.com

Vol. 6, Issue 4, April 2018

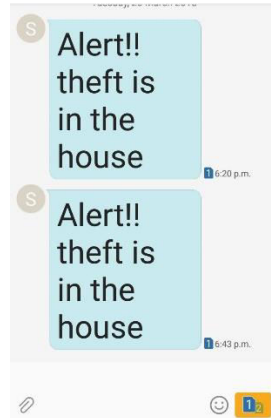


Figure 8-Alert Message Received on Admin Phone

D. Trials:

An assortment of trials was finished with various cases. A geographic zone with great GSM gathering brought about the conveyance of the notification message in no time flat. It was likewise noticed that the devoted power supply helped the framework to give a fluctuation-free benefit.

VII. CONCLUSION AND FUTURE WORK

The IoT and GSM based Smart Security System was planned and actualized effectively. On premise of point by point examination and trials, we could infer that the framework was steady and can be a rising item in the field of security frameworks for both private and business applications. We recommend the accompanying changes later on improvement of framework:-

- 1) Incorporating with 3D holographic password input console.
- 2) Integrating with multiple locks on multiple doors inside a facility.

REFERENCES

1. Ilkyu Ha, "Security and Usability Improvement on a Digital Door Lock System based on Internet of Things", International Journal of Security and its Applications · Vol.9, No.8 (2015), pp.45-54, August 2015.
2. C. Pyo, H. Gang, N. Kim and H. Bang, "Technology trends and prospects of development of IoT (M2M)", OSIA Standards & Technology Review, vol. 26, no. 2, pp. 8-17, 2013.
3. Y. Ko, "Study of Policies of Major Countries on Internet of Things and Market Forecast", International Commerce and Information Review, vol. 16, no. 5, pp. 27-47, 2014.
4. Bangali, J, Shaligram, "A. Design and Implementation of Security Systems for Smart Home based on GSM Technology", International Journal of Smart Home, vol. 7(6), pp-201- 208, November 2013.
5. Singh, A, Yadav, A, Singh, H.P, Dubey, S.K, "GSM Based Security System", International Journal of Advanced Technology in Engineering and Science, vol. 2(4), 81-84, April 2014.
6. D. Seo, H. Ko and Y. Noh, "Design and Implementation of Digital Door Lock by IoT", KIISE Transactions on Computing Practices (KTCP), vol. 21, no. 3, pp. 215-222, 2015.
7. S. Lee, J. Park, B. Woo and H. Choi, "Video Digital Doorlock System for Recognition and Transmission of Approaching Objects", KIPS Transaction: Software and Data Engineering, vol. 3, no. 6, pp. 237-242, 2014.
8. J. Potts and S. Sukitanon, "Exploiting Bluetooth on Android Mobile Devices for Home Security Application", in Proceedings of IEEE Southeastcon Orlango, pp. 1-4, 2012.
9. Y. Park, P. Sthapit, and J. Pyun, "Smart Digital Door Lock for the Home Automation", in Proceedings of TENCON 2009, pp. 1-5, 2009.
10. G. Verma and P. Tripathi, "A Digital Security System with Door Lock System Using RFID Technology", International Journal of Computer Applications, vol. 5, no. 11, pp. 6-8, 2012.
11. M. Khiyal, A. Khan and E. Shehzadi, "SMS Based Wireless Home Appliance Control System (HACS) for Automating Appliances and Security", Issues in Informing Science and Information Technology, vol. 6, pp. 887-894, 2009.



ISSN(Online): 2320-9801
ISSN (Print) : 2320-9798

International Journal of Innovative Research in Computer and Communication Engineering

(A High Impact Factor, Monthly, Peer Reviewed Journal)

Website: www.ijircce.com

Vol. 6, Issue 4, April 2018

12. U. Ogri, D. Okwong, and A. Etim, "Design and Construction of Door Locking Security System using GSMY", International Journal Of Engineering And Computer Science, vol. 2,no. 7, pp. 2235- 2257,2013.
13. M. Roy, F. Hemmert, and R. Wettach, "Living Interfaces: The Intimate Door Lock," in Proceedings of the Third International Conference on Tangible and Embedded Interaction (TEI'09), pp. 45-46,2009.
14. A. Daramas, S. Pattarakitsophon, K. Eiumtrakul, T. Tantidham, N. Tamkittikhun "HIVE: Home Automation System for Intrusion Detection 2016", Fifth ICT International Student Project Conference (ICT-ISPC),2016.
15. Ravi Kishore Kodali, Vishal Jain, Suvadeep Bose, Lakshmi Boppana "IoT based smart security and home automation system 2016", International Conference on Computing, Communication and Automation (ICCCA),2016