

# Three Tier Home Security using GSM Technology - Embedded

N Bharath Kumar<sup>1</sup>, SH Manoj<sup>2</sup>, C Dharanendran<sup>3</sup>, E Janaki<sup>4</sup>

<sup>1,2,3</sup> B.E., Under Graduate, Department of Computer Science and Engineering, Misrimal Navajee Munoth Jain Engineering College(Affiliated to Anna University), Chennai, Tamil Nadu, India.

<sup>4</sup> B.E., Under Graduate, Department of Computer Science and Engineering, Sri Muthukumaran Institute of Technology (Affiliated to Anna University), Chennai, Tamil Nadu, India.

**Abstract – Security and automation is a prime concern in our day-to-day life. Home security system is needed for convenience and safety. This system invented to keep home safe from intruders and hazardous situations. We have proposed the design and implementation of a microcontroller based home security system with GSM technology. The designed program is applied in Arduino for simulation. Security has becoming an important issue everywhere. Home security is becoming necessary nowadays as the possibilities of intrusion are increasing day by day. Safety from theft, leaking of raw gas and fire are the most important requirements of home security system for people. A traditional home security system gives the signals in terms of alarm. However, the GSM (Global System for Mobile communications) based security systems provides enhanced security as whenever a signal from sensor occurs, a text message is sent to a desired number to take necessary actions. Although advanced biometric authentication methods such as fingerprints and iris identification can further identify the user who is requesting authorization, they incur high system costs and access privileges cannot be transferred among trusted users. We have tried to increase these standards by combining new design techniques and developed a low cost home and industrial automated security system.**

## 1. INTRODUCTION

### 1.1 GENERAL

Home security has changed a lot from the last century and will be changing in coming years. Security is an important aspect or feature in the smart home applications. The new and emerging concept of smart homes offers a comfortable, convenient, and safe environment for occupants. Conventional security systems keep homeowners, and their property, safe from intruders by giving the indication in terms of alarm.

However, a smart home security system offers many more benefits. Several modules like GSM, magnetic door sensors, RFID module, odor sensor, IR sensor, Bluetooth etc. The goal of this project is to utilize the after-market parts and build an integrated home security system. Consequently, the proposed system provides reliable security within reasonable cost and also removes the circuit complexity.

### 1.2 AUTHENTICATION METHODS

In this proposed model, we propose three-tier layer of security measures for any home or office situations. We consider three tiers, the tier 1 security concentrates in authenticating the genuine user to enter his/her house. The authentication is done using RFID tag where it is connected to an Servo motor for locking purpose and family members are given each a unique RFID card where there is an 16-bit key code each distinct from one other and still suffers from problems such as access RFID card losses. There is one master card for the main family person and remaining are all RFID tags, which are portable and used along with vehicle keychain. In case, of a guest user or loss of RFID tag we implemented a new tier, which authenticates genuine users.

In Tier 2, we developed an Android App (Three Tier Security) where guests can register their data in our database and the owner receives this information and grants permissions to their guests in case the owner is out of town or our relatives need to stay in our house while owner is away. This is done by Bluetooth module and where guest pair with the Bluetooth module and access the door unlock button he/she gains access to the house. Same goes for owner losing his/her RFID tag or master card can access his/her home by Android App for Admin (TTS Admin) this is used only by Owner and it connects with Bluetooth module of Arduino and authenticates access.

In Tier 3, this is worst-case scenario detection of intruders via odor sensor, this is experimental and has been implemented as way to find gas leakage or fire accidents in the house. Also used to find owner using unique smell stored on the module.

## 2. LITERATURE SURVEY

[1]Abhishek S. Parab (2015), 'Implementation of Home Security System using GSM module and Microcontroller'

This system invented to keep home safe from intruder. In this work, we present the design and implementation of a GSM based wireless home security system. which take a very less power. The system is a wireless home network which contains a GSM modem and magnet with relay which are door security

nodes. The system can response rapidly as intruder detect and GSM module will do alert home owner. This security system for alerting a house owner wherever he will.

### 3. SYSTEM ANALYSIS

#### 3.1 EXISTING SYSTEM

- Most of the existing systems are not user friendly and are expensive too.
- False alarms are an extremely common problem of home security cameras. It is annoying to constantly receive alarms just because trees move in the wind or birds fly past your window.
- These security system needs proper installation and maintenance is necessary to keep the system functioning properly. (it should be done with their respective service engineers).
- Although advanced biometric authentication methods such as fingerprint and iris identification can further identify the user who is requesting authorization, they incur high system costs and access privileges cannot be transferred among trusted users.

#### 3.2 PROPOSED SYSTEM

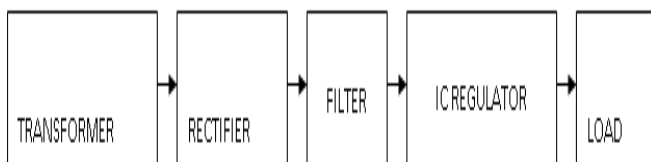
- It consists of three tiers (MAGNETIC DOOR/WINDOW SENSOR, MOTION TRACKING, and Odour SENSOR). This enhance the security and also accuracy rate. The alarm will be triggered only on the basis of appropriate constraints in its context.
- Since it consists of magnetic sensors, accuracy is improved, whereas traditional IR sensors may trigger false alarms based on naive intrusions.
- The proposed system can be easily accessible via mobile application (with/without INTERNET), with the live streaming of Motion Tracking Camera facilities.
- The proposed system is also power efficient.

### 4. HARDWARE / SOFTWARE DESCRIPTION

#### 4.1 HARDWARE DESCRIPTION

##### 4.1.1 Power Supply

Block diagram:



Working principle:

Transformer:

The potential transformer will step down the power supply voltage (0-230v) to (0-6v) level. Then the secondary of the potential transformer will be connected to the precision rectifier, which is constructed with the help of op-amp. The advantages of using precision rectifier are it will give peak voltage output as dc, rest of the circuits will give only rms output.

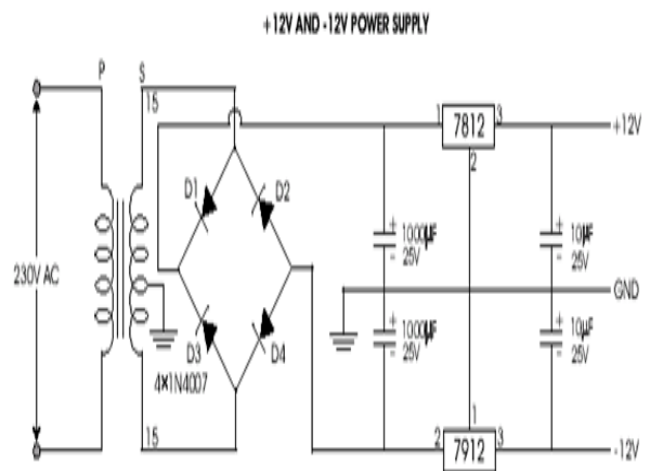
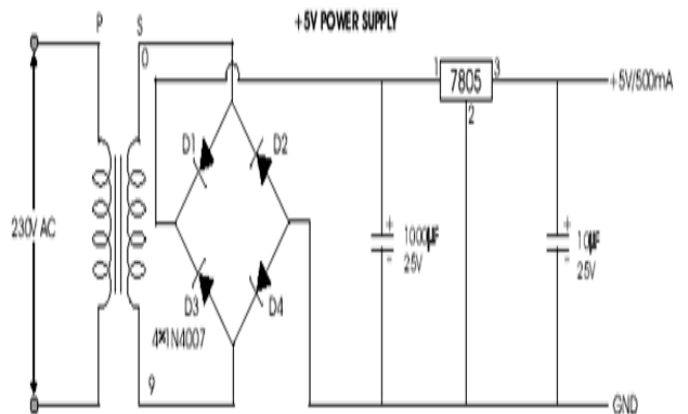


Figure.4.1.1.1: +5/+12V CIRCUIT DIAGRAM (Power Supply)

Bridge rectifier:

When four diodes are connected as shown in figure, the circuit is called as bridge rectifier. The input to the circuit is applied to the diagonally opposite corners of the network, and the output is taken from the remaining two corners.



5.3 MODULES

- RFID and Servo Motors Implementation
- Precautions in-case of Breach Access
- Odor Sensor Implementation

5.3.1 RFID and Servo Motors Implementation

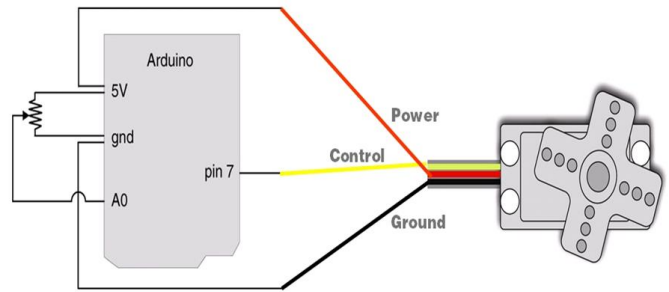


Figure 5.3.1.2 SERVO DIAGRAM

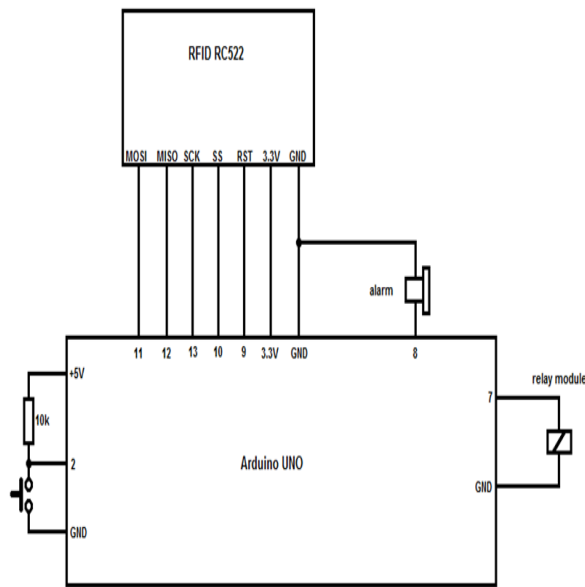


Figure 5.3.1 AUTHENTICATION AND DOOR LOCK

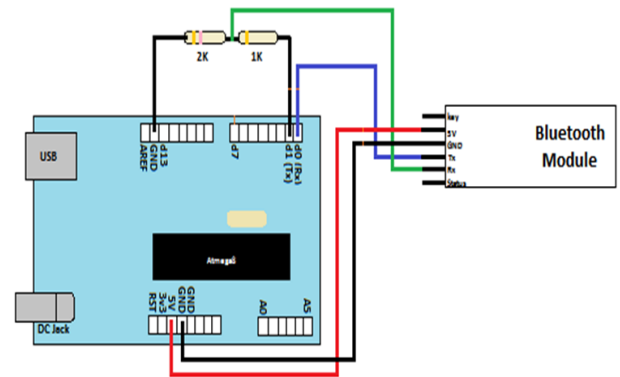


Figure 5.3.1.3 BLUETOOTH MODEL WORKING

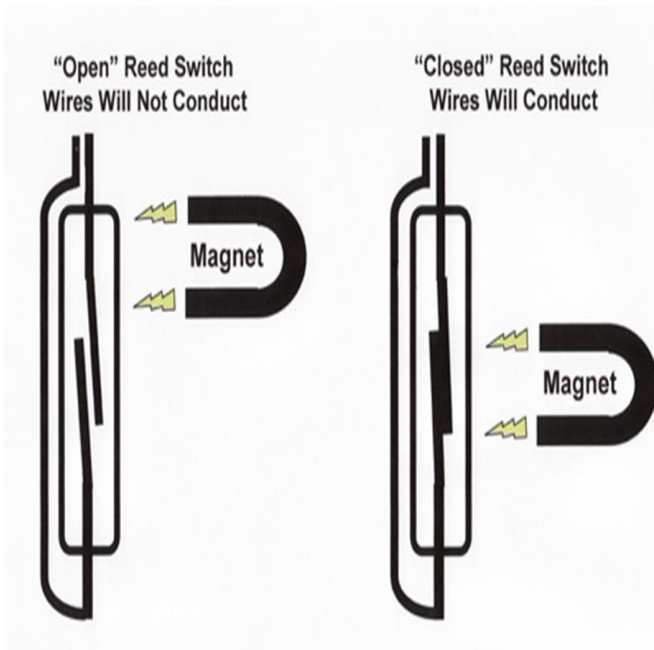


Figure 5.3.1.1 WORKING OF REED SWITCH

5.3.2 Precautions In Case of Breach Access

In this phase in case of intruders, entering the home without authentication is considered as a breach. Therefore, with the help of IR sensor, Non-fatal dose of Carbon Monoxide or Tear gas is sprayed to evade the intruder out of the place. Simultaneously IR Camera module is used to capture photos of the intruder for the purpose of evidence.

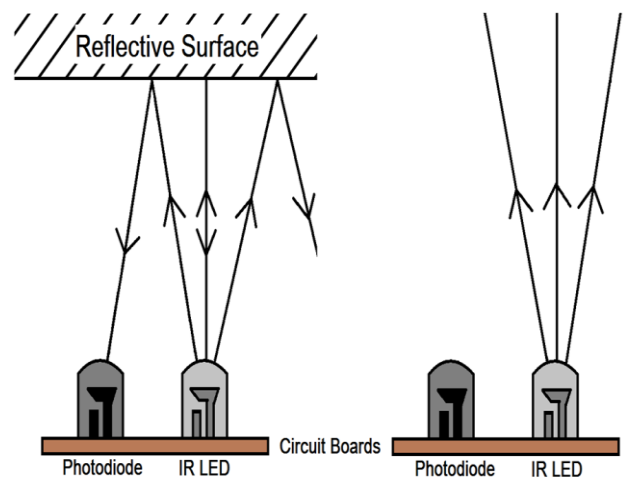


Figure 5.3.2 IR-SENSOR-ILLUSTRATION

5.3.3 Odor Sensor Implementation

In this phase the home is monitored for LPG leakage on detection of leakage or intrusion. The alarm is triggered on the user's phone with aid of GSM. In case of LPG gas leakage the main door of the house is automatically unlocked for emergency exit.

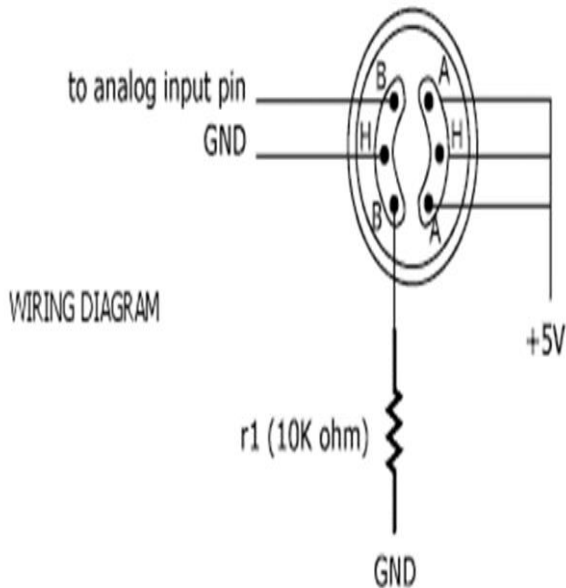


Figure 5.3.3 MQ2 AND MQ3 DIAGRAM

5.4 DATAFLOW DIAGRAM

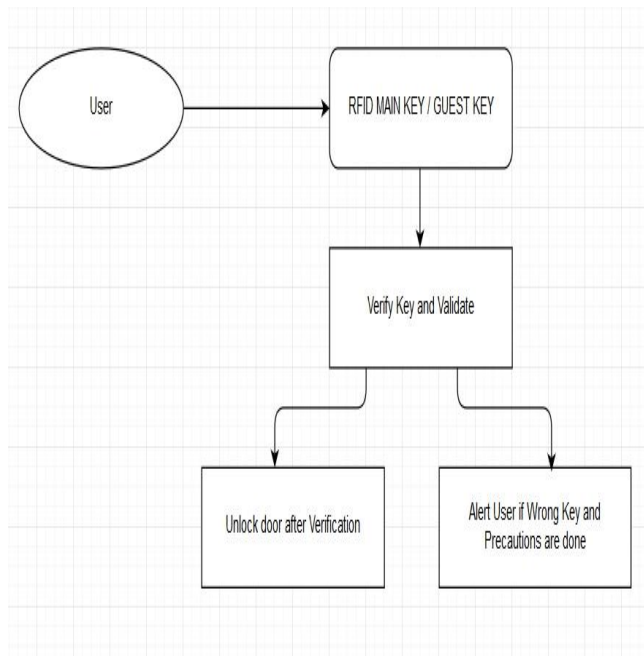


Figure 5.4.1 LEVEL 0 DATA FLOW DIAGRAM

b) Level 1

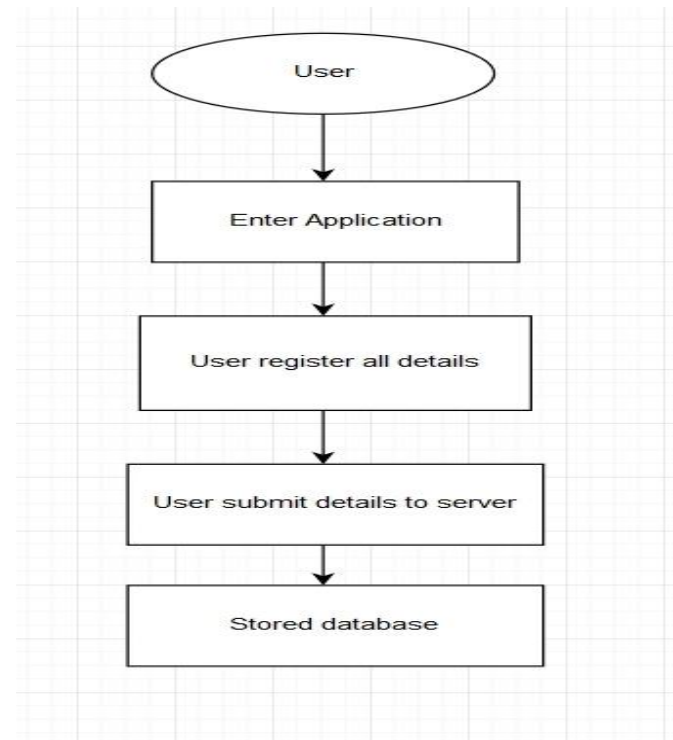


Figure 5.4.2 LEVEL 1 DATA FLOW DIAGRAM

c) Level 2

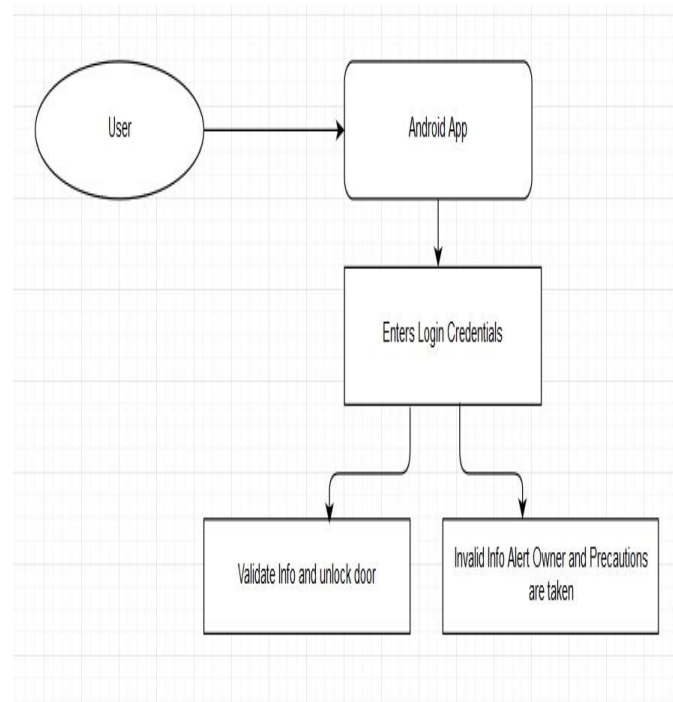


Figure 5.4.3 LEVEL 2 DATA FLOW DIAGRAM

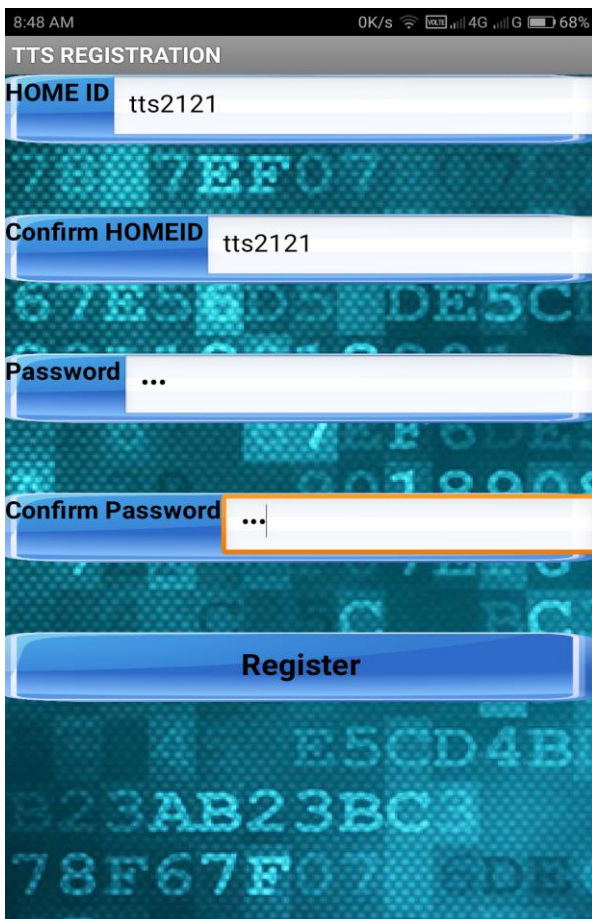
## 6. CONCLUSION

In this paper, we propose a dynamic proposed system presents design and implementation of a smart home security system based on microcontroller along with GSM for user-friendly application. The system is intelligent enough to monitor the secure environment. In addition, the user is informed about the security breach through GSM network that provides a special opportunity whenever the user stays at far away from home. However, Android application is the most stunning feature in order to control the system through a wireless device. Moreover, the system provides the reliable operation within reasonable cost and removes the system complexity. In this work, traditional burglar alarm mode, LED lights and are the promising features used to ensure reliability. The whole system is implemented on a practical home security system, which requires considerable effort to install it. Consequently, the system is also applicable for commercial purposes due to versatile ways of security and controllability.

## 7. SAMPLES

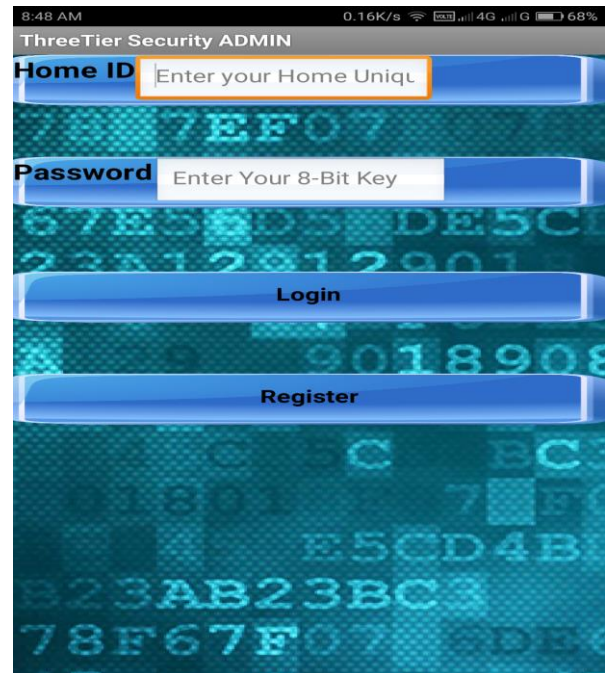
### 1. Registration

The initial registration procedure is shown.



### 2. Login

The login page is displayed. This allows initial login.



### 3. Bluetooth Pairing

This allows a list of devices which pairs with the Bluetooth module.





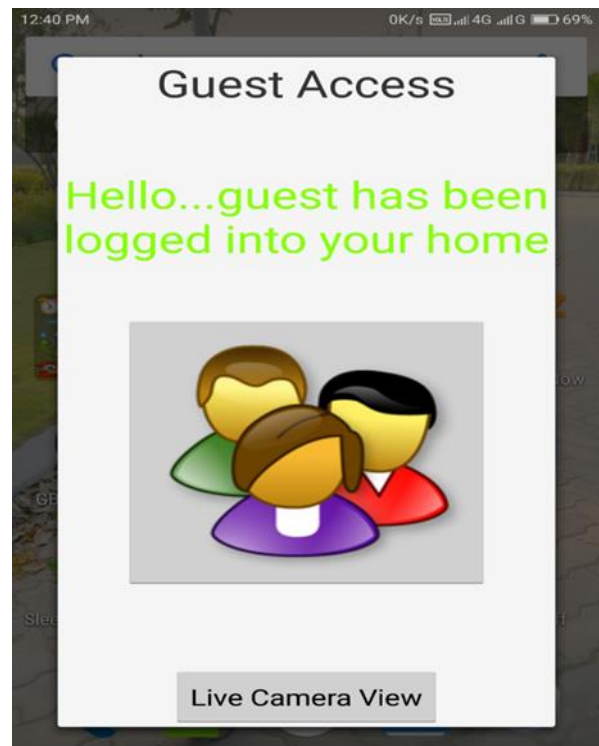
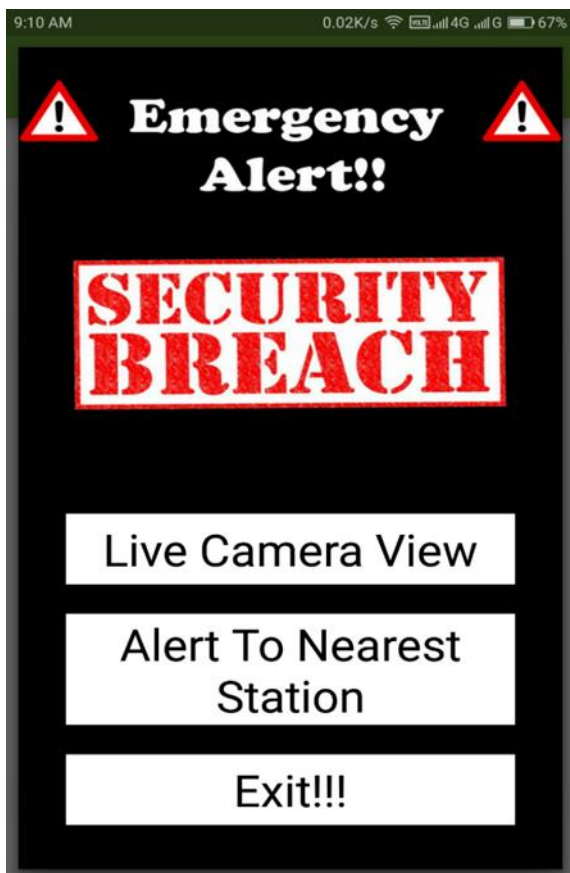
#### 4. Alert Messages

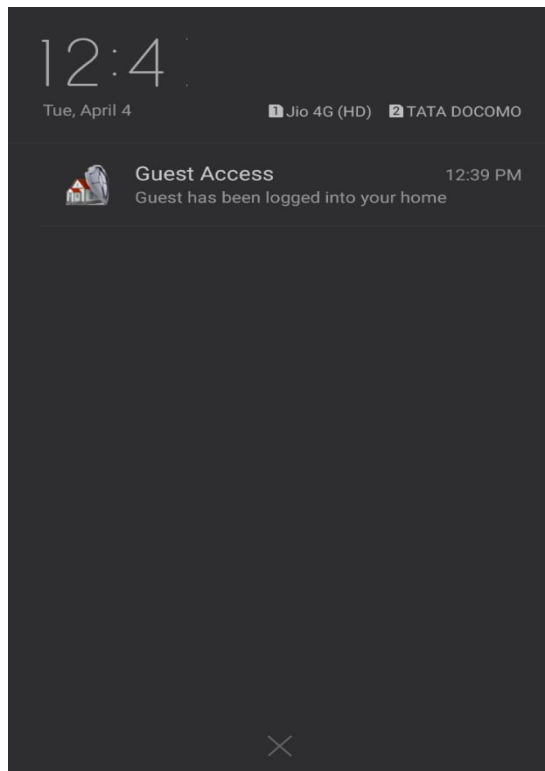
This shows alert messages received to the user when a breach attempt or in case of fire accident.



#### 5. Guest User Login

This shows what happens when a guest logs in and the user receiver's notification message.





## REFERENCES

- [1] Abhishek S. Parab (2015), 'Implementation of Home Security System using GSM module and Microcontroller', International Journal of Computer Science and Information Technologies, Vol. 6 (3), 2950-2953.
- [2] Anandan R, Karthik B, Kiran Kumar Dr.T.V.U (2015), 'Wireless Home And Industrial Automation Security System Using Gsm', Journal of Global Research in Computer Science, Vol. 4 (4), 55-59.
- [3] Chintaiyah N, Rajasekhar K, Dhanraj V (2011), 'Automated Advanced Industrial and Home Security Using GSM and FPGA', International Journal of Computer Science and Information Technologies, Vol.2 (4), 1598-1602.
- [4] Jayashri Bangali and Arvind Shaligram (2013), 'Design and Implementation of Security Systems for Smart Home based on GSM technology', International Journal of Smart Home, Vol. 7 (6), 201-208.
- [5] Raqibull Hasan, Mohammad Monirujjaman Khan, Asaduzzaman Ashek, Israt Jahan Rumpa (2015), 'Microcontroller Based Home Security System with GSM Technology', Open Journal of Safety Science and Technology, Vol. 5, 55-62.
- [6] <https://create.arduino.cc/projecthub/Aritro/security-access-using-rfid-reader>
- [7] <http://www.instructables.com/id/Magnetic-Door-Sensor-and-Arduino>
- [8] <https://create.arduino.cc/projecthub/Aritro/smoke-detection-using-mq-2-gas-sensor-79c54a>
- [9] <http://www.instructables.com/id/Arduin-Adroid-USB-Serial-Communication/>

## 6. Live Camera Feed

This shows live camera feed to user device via internet.

