

# A Comparison of Popular Home Security Systems

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## ABSTRACT

Now a days, Home Security threat is the most challenging task in our life. To overcome this threat, our houses must be Smart. We can make our home Smart and secure. The technology gives us the opportunity to increase the connectivity of various devices hence we can get an overall security solution. Moreover, as the area of GSM Mobile is widening, we can remotely control and monitor the network enabled devices. The device can also send signal to the remote person whom we want to notify about the threat. The use of this system would be user-friendly, flexible and cost effective. GSM technology is simple, flexible and very reliable to use. Designed for global market, SIM800 is a quad-band GSM/GPRS module that works on frequencies GSM 850MHz, EGSM 900MHz, DCS 1800MHz and PCS 1900MHz. SIM800 features GPRS multi-slot class 12/ class 10 (optional) and supports the GPRS coding schemes CS-1, CS-2, CS-3 and CS-4. With a tiny configuration of 24\*24\*3mm, SIM800 can meet almost all the space requirements in users' applications, such as M2M, smart phone, PDA and other mobile device. It is broadly used transceiver standard.

**Keywords :** Home Security, GSM Module, Zigbee Technology, Arduino, MATLAB

## I. INTRODUCTION

Almost every day, we hear about the security issues in our surrounding. This issue might be of robbery, murder and all others by tempering the lock in a house. That means only a lock could not be the solution to check all these threats, our house will have some of the security features so that it could automatically detect the situation and work accordingly like a smart home. We could convert our houses into a Smart Home by using some of the sensors. These sensors will work as the eyes and ears of the house. Like as a human, there must also be a brain to look after the data received by the sensors, here this brain is Arduino Uno Board. This complex system will sense the data and will have the superior capability of decision making about the subject and its environment.

This system will use the GSM technology. GSM is a mobile communication modem. It is remains for worldwide framework for versatile correspondence (GSM). GSM is an open and computerized cell innovation utilized for transmitting portable voice and information administrations works at the 850MHz, 900MHz, 1800MHz and 1900MHz recurrence bands. We can also monitor and control the system remotely from any distinct locations. This security system required for Empty Homes Banks, Industries and Many more[4],[7].

Suppose, There is no one in the house or bank and someone came with bad intentions and try to temper the lock or try to break the door then this system will automatically came in action and lock the door permanently, cameras will start to take picture of the person standing outside the door and send these picture to the owner and will wait for the response of

the owner and then work accordingly. Smart home could also be called "Automated Home".

## II. METHODOLOGIES OF POPULAR SYSTEMS

A paper was presented by **Dongmei Yan et al**, In this paper the design uses the CC2430 chip as the ZigBee module basis part of the system. CC2430 System-on-chip functional integration of the CC2420 transceiver, enhanced industry-standard 8051MCU, 32/64/128KB Flash, 8KB SRAM, 21 general-purpose I/O pins, 2 support a variety of serial communication protocols USART, 8 input 8-14 bit ADC, AES-128 Co-processor, a programmable watchdog timer, DMA and high performance module, and built in Zigbee protocol stack. Coupled with ultra low power consumption, it is possible to built a Zigbee node at a very low cost, resulting in a strong market competitiveness. The function nodes in home network devices is the terminal nodes, mainly composed of terminal devices, smart sensors and CC2430 chip, and some other composition. Home gateway use the chip S3C2440 as the control chip, and ZigBee connected chip, GPRS and other mobile Internet access module, WIFI, etc. LAN access module, and connect to the internet.[5].

For the ZigBee network, IEEE 802.15.4 divides devices in the network into full-function device (FFD) and simplifies function device (RFD). FFD completely achieve the IEEE 802.15.4 protocol, complete agreement has 32k, but RFD is only achieved part of the IEEE 802.15.4 protocol, the agreement is only 4k. It can communicate between FFD and between the FFD and RFD, but RFD can only communicate with the FFD. In the home network, FFD is able to act any role, while the RFD can only act as a terminal node[16].

ZigBee Networking Methods mainly are three kinds which are star, tree and mesh. Each ZigBee network requires at least one FFD to achieve the network coordination and management functions. Mesh

network is recommended, because the functions of each node can be realized simply by change and improve corresponding application layer of the protocol stack. Supply each node with electronic power, the entire wireless network will be able to work properly[8].

In the paper of **Souvik Chatterjee et al**, An Arduino-based constant remote temperature estimation and lumberjack framework was exhibited. Remote transmission of the temperature information happens by means of a Bluetooth interface. A trial setup to accomplish solid yield was readied utilizing LM35 temperature sensor. The constant temperature data got was seen at MATLAB® Graphical User Interface and at cell phones by means of a fundamental half and half versatile application (Android, Windows, ios) structured. Test result and rate blunder bend support the dependability and attainability of the proposed framework. In addition, a Global System of Mobile (GSM) module is likewise utilized for sending ready messages to a pre-doled out portable number when an alert condition is accomplished[19].

In a paper presented by **Suresh S. et al**, The framework intended for Home observing and Security framework comprises of sensors which are utilized to gather the information that would be utilized by the proprietor to settle on shrewd choices. PIR sensor is utilized to distinguish the movement and the temperature sensor is utilized to recognize the temperature of the room. Different modules to be specific the PIR module, temperature module and the GSM module speak with one another to arrange and increment the security of the framework. In this, the PIR Sensor and the Temperature Sensor are associated with the Arduino board. The computerized flag is sent to the board. The GSM module is utilized to send and get motion from the Arduino board. The got flag is sent to the house proprietor through an instant message by means of GSM module's way. On the off chance that the proprietor needs to turn off

the caution, he sends a flag to the GSM module. The GSM module will send the flag to the Arduino board. The Arduino board changes over this flag into the sensor reasonable organization and sends it to the sensors. The sensors are turned off promptly. The principle segment is the Arduino board. The movement recognition, temperature sensor and GSM's code is singed in the Arduino chip. On enacting the framework, the SMS is promptly sent to the house proprietor. The coveted telephone number is installed in the GSM module[20].

In a paper presented by Aman Sharma et al, In the structuring of this framework different gear have been utilized. This hardware is Arduino Uno board, GSM Module, Solenoid bolt for the entryways, Relay board, Temperature sensor, Keypad and so forth. Subsequent to making fitting associations, the framework is prepared to perform task. In this framework, we are utilizing two abnormal state passwords to the validation of the proprietor. At the point when proprietor enters the two passwords with help of keypad, two circumstances may emerge-

1. If both the passwords are right in such circumstance Arduino will coordinate them with the secret phrase given in programming and instantly send signs to the solenoid bolt to get open. As solenoid bolt get the flag a 12V air conditioning current will go through the copper coin which incite megnetism to open the bolt. and after that the entryway bolt will get opened promptly and Owner can get into the house.

2. If any of the two passwords or both the passwords are wrong then the Arduino Uno board will send a flag to the GSM module. Presently GSM in the wake of getting signal from Arduino, will make an impression on the versatile number of proprietor given in the programming and asked him that "is it he or not"[3]. On the off chance that the appropriate

response is YES i.e. it is proprietor then the entryway will get open. On the off chance that he answered NO then framework will send him another message and ask him, regardless of whether to call the Police or not. What's more, will follow up on the guidance of the proprietor given by answering the message. In both the circumstances, Authorized individual won't get agitated and will have the capacity to open the entryway. It will obstruct the passage of unapproved hopeful.

In this framework, we are likewise utilizing temperature sensor which will recognize the variety in temperature and if the temperature esteem is in excess of a particular esteem then additionally the framework will tell the proprietor about it and ask him whether it ought to send the message to the fire office or not. At the point when the framework would send message to the any of the fire or police office. It will likewise send the deliver of the area to the division so that, in crisis circumstance help could be reach to the correct area as quickly as time permits[3].

### III. COMPARISON

Many papers have been presented in the field of Home Automation and Security, Some of the important papers have taken for comparing them and to find out the better one. This comparison is based on many dimensions such as devices used, accuracy etc. Here is a table comparing various systems.

**Table I :** Comparison of various systems

Work	[5]	[19]	[20]	[3]
Prevent unauthorized entry	Yes	No	No	Yes
Temperature sensing	No	Yes	Yes	Yes
Ask owner for any action	No	Yes	No	Yes
Call for help in severe situation(Fire, Robbery etc)	No	No	No	Yes

#### IV. CONCLUSION

We have studied some of the papers related to Home Automation and Security. All these papers have some uniqueness and some creative ideas. Hence each system is important in its own way. But Each paper have intended for some particular only whereas the paper [3] have included some of them in a single paper and designed a system which will keep connected with the owner and with the other departments (in case of emergency) also. In case of any severe situation, it will contact the owner and the emergency departments also.

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