



# Automatic Safety Home Bell System with Message Enabled Features

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**Abstract:** The doorbell plays an important role in home security, an efficient and consistent system must be developed for better safety which could be accessed at a lower price. In today's world, there are many doorbells systems performing different operations. This paper focus on IOT related automatic doorbell systems which are designed to ring the bell automatically when a visitor approaches the door. If the visitor stands for more than a specified time span without the door being opened, an SMS will be sent to a registered mobile number of the house member and the response of the house member (i.e in the form of an SMS) will be displayed on an LCD screen placed beside the door so that the visitor can read the SMS and act accordingly. This system is intended to service old age people and also to identify the unauthorized persons, if any.

**Indexed Terms:** automatic, doorbell, IOT, low price, security, SMS

## I. INTRODUCTION

With the advancement of internet and technology, days have drastically changed. One of the most emerging technologies in today's world is IOT (Internet Of Things). IOT deals with the connection of objects which include different types of sensors and operating them from distant locations to make human life more comfortable, easy and efficient. The operating can be done by a simple Bluetooth enabled smartphone to a Wi-Fi enabled smartphones. This feature gave birth to the inventions like home automation in which all the appliances in the home like fans and lights can be controlled by a Bluetooth enabled smartphone. Not only in the field of home appliances, IOT has many applications in the field of medical too which include heartbeat sensors to measure the heartbeats of a person and fit bands to know the overall efficiency of an individual's body. There are many different applications in the field of robotics, smart grid, intelligent transportation and various industry specific systems. This paper concentrates on security of doorbell system through IOT.

Though there are many doorbell systems, providing security through doorbells is a challenging task. The present doorbell systems follow traditional approach, when a visitor presses the switch bell that rings inside the house. If someone is present in the house they open the door and if no one is present in the house the visitor waits for certain

time and leaves the place without any clue. This paper addresses this problem using Internet of Things (IOT)[1].

Over the past few years technology has taken over the society. Technology is vital today and makes everything easier. One such advancement in the field of doorbell is using "**The Automatic doorbell system**"(ADBS). Door bells have moved from historical switches to modern touch pads and now it is more sophisticated with the usage of sensors and IOT.

The proposed system emphasize more on security with low cost. A system which is consistent and efficient is developed using ultrasonic sensor, bell, GSM module, LCD screen and an Arduino Uno board which acts as a micro controller to ensure security. If the visitor stands for more than a specified time in front of the door without the door being opened, a message will be sent to a registered mobile device of the house owner and a response from the house member will be displayed on the screen that is placed outside such that the visitor can read the message and act accordingly. This increases the satisfaction level of the visitor as he receives a response from the house owner in the form of a text message which will be displayed on the LCD screen[2][3].

In the existing systems there are many doorbell systems with video connectivity the author concentrates on security with low cost. The basic doorbell system is shown in figure 1 below:

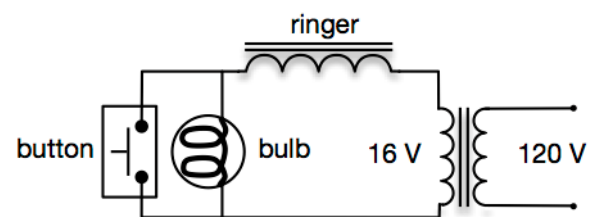


Figure 1 : Basic classical door bell

The basic function of a door bell is to notify the person inside the house that someone is there at the door if a visitor presses the switch. This kind of system doesn't focus on the absence of people in the house[4].

ADBS focusses on the visitor's satisfaction as well, it sends an SMS to the owner and the SMS sent by the owner is displayed on the LCD screen.

The following are the drawbacks of the existing manual System:

- searching for switch
- not functioning during power loss
- Some people may not reach the bell switch.
- Lack of security

### II. PROPOSED SYSTEM WITH ARCHTECTURE

The proposed system using **The Automatic doorbell system** overcomes the drawbacks of the existing system. The Automatic doorbell system will work based on sensor.so there is no need to find for switch as shown in figure 2.

Hardware components used in ADBS are Ultrasonic sensor to sense the distance from the visitor to the door, a bell which rings when the visitor is between the specified distance from the door, a GSM module (SIM800) to send an SMS to the registered mobile number of the house member, an LCD screen to display the SMS sent by the house member and an Arduino UNO board which acts like a microcontroller[5][6].

#### Hard Requirements:

- Arduino board
- Ultrasonic sensor
- Bell
- Gsm module
- LCD screen
- Bread board
- Jumper cables

#### Software Requirements:

- Arduino IDE
- Basic C-Programming knowledge

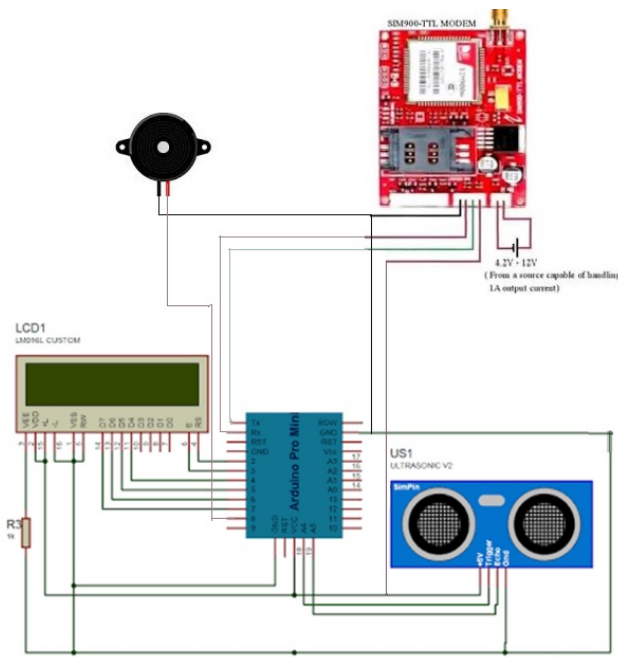


Figure 2 : Proposed Architecture

### III. IMPLEMENTATION

- Step 1:** Calculate the distance between the door and the visitor.
- Step 2:** If the distance between the door and the visitor is less than a specified distance
- Step 2.1:** put a time delay of 4 seconds
- Step 3:** Again calculate the distance between the door and the visitor to check whether he is standing within a specified range.
- Step 3.1:** Bell rings inside the house for some time
- Step 4:** Again calculate the distance between the door and the visitor to check whether he is standing within a specified range.
- Step 4.1:** send an SMS to the owner stating **“someone is waiting at your doorstep, please leave an SMS”** and wait for some time.
- Step 5:** If an SMS is received from the owner, that SMS will be displayed on the LCD screen.
- Step 6:** else a default SMS will be shown on the LCD screen

### IV. RESULTS AND DISCUSSION

When a visitor stands for more than 4 seconds in front of the door with distance less than the specified range from the door to the visitor, doorbell rings automatically without any mechanical or electronic switches as shown in figure 3.

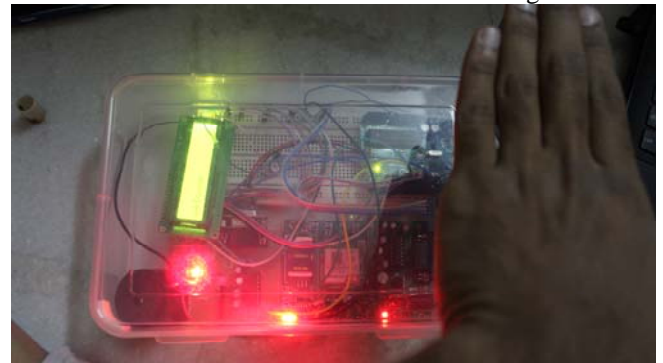


Figure 3 : System Initiation step

If someone opens the door, the circuit breaks. If the door is not opened for more than 30 seconds, an SMS will be sent to the registered mobile number stating

that “someone is waiting at your door step, please leave an SMS”

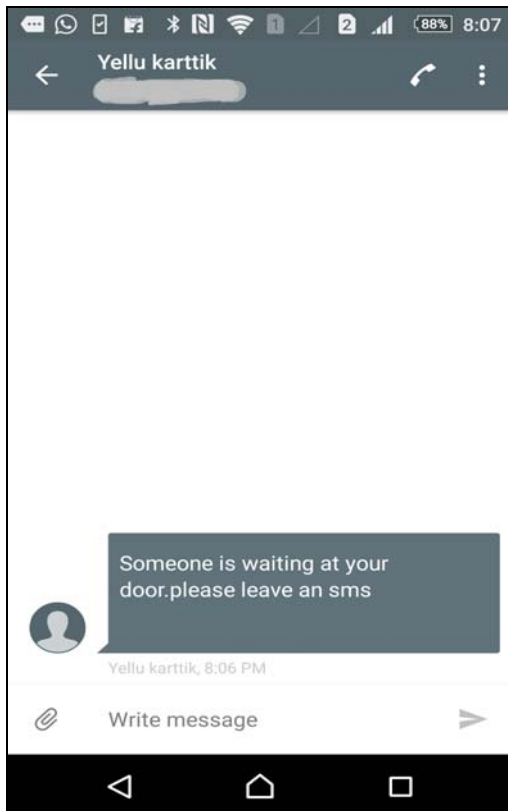


Figure 3a : System Enabled with Messaging

The reply in the form of an SMS from the registered mobile number will be shown on the LCD screen as shown in figure 3a and 3b.

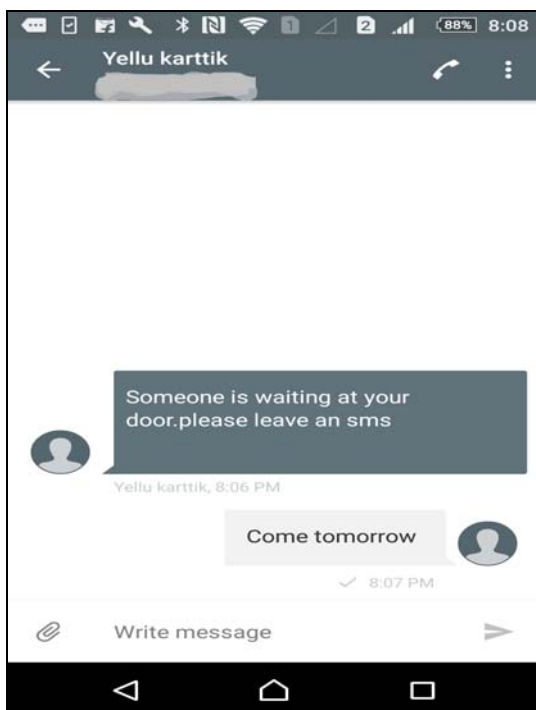


Figure 3b : System Enabled with Messaging

If the SMS is not received from the house owner a default message “owner is busy please come after some time” will be shown on the LCD screen. In this way the author provides security in doorbells at low cost.

#### V. ADVANTAGES OF THE PROPOSED SYSTEM

- No need for electric switches
  - Generally doorbells use electric switches to complete the circuit and ring the bell but this product reduces the use of switches
- Easy to use
  - Very convenient to the visitor to know what to do when there is no one at home as he gets information from the house member
- Secured
  - House members get the information if a person comes to their house at odd timings.
- Reduced time for searching doorbells (in some cases)
  - In some cases it so happens that a visitor spends time in search of finding the doorbell whereas in this case the bell rings if the visitor stands in front of the door
- Reliable
  - ADBS is developed using sensors which last for a longer period of time
- Low cost
  - The author focusses on cost of the machine to reduce it to as low as possible
- New technology
  - As technology is increasing day by day it is important to keep in pace with the new technology

#### VI. ENTIRE CIRCUIT:

The complete system as a snapshot is presented in figure 4.



Figure 4 : Snapshot of complete circuit

## VII. TESTING THE SYSTEM

The author has performed testing under various cases and the outcomes of test cases are recorded and listed below[7][8].

Scenario	Test type	Outcome
Under different lighting conditions	Sensor test	Works well under any lighting condition
Visitor standing in front of the door	ADBS test	Bell rings or SMS sending and receiving activity takes place
when the visitor does not stand for the specified time and roams around the place	Moving visitor test	Sensor doesn't detect the visitor
Multiple visitors visit throughout the day	Multiple visitor test	Bell rings or SMS sending and receiving activity takes place

## CONCLUSION

This paper is based on design and implementation of an automatic doorbell which rings the bell automatically when a visitor stands in front of the door. Doorbells provide information that someone is standing in front of your door so that the person present in the house can open the door. In case if there is no one house then ADBS sends an SMS to the registered mobile number stating that "someone is waiting at your door step, Please leave an SMS ". When the SMS is received from the house member, the message gets printed on the LCD screen placed beside the door. Visitor can read the displayed message on the screen and according to it. In this way ADBS provides information to the visitor. As every product has a vast scope of improvement and advancement, ADBS can also be improved and made as a more security provider product. As this system is equipped with SMS sending and receiving mechanism in future the SMS feature can be replaced with voice calling so that the visitor and the house owner could talk to each other and decide what to do. Some of the problems faced with this product are: as the system is not provided with face recognition techniques the doorbell rings even when the owner/house member comes to unlock the door. This problem can be rectified by using some face recognition algorithms like PCA (principle component analysis). Through this feature the registered member can receive an SMS along with the visitor's face so that the house member knows who the person is. Another improvement is to leave a voice recording in ADBS system so that the owner knows who had visited the house when house owner was busy. All these improvements can be implemented in the future versions of ADBS.

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