



# Design and Implementation of Secured Contactless Doorbell

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## To Cite this Article

P Susmitha Vadana, Srilakshmi.R, Phaniswathi.K, Mahendhra.D, Raja.D, Design and Implementation of Secured Contactless Doorbell, International Journal for Modern Trends in Science and Technology, 2024, 10(02), pages. 627-631. <https://doi.org/10.46501/IJMTST1002090>

## Article Info

Received: 28 January 2024; Accepted: 19 February 2024; Published: 25 February 2024.

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## ABSTRACT

*The "Design and Implementation of Secured Contactless Doorbell using IoT" is a smart and secure solution designed to enhance the traditional doorbell system. This project incorporates Internet of Things (IoT) technology, integrating an IR sensor to detect proximity and a buzzer for audio alerting. When someone approaches the door, the IR sensor detects their presence, activating the buzzer inside the house. This contactless doorbell improves security and provides a modern, hands-free alternative for visitors.*

**Keywords:** IR sensor, Buzzer, Secure and contact less, Adjustable Sensitivity

## 1. INTRODUCTION

In the contemporary era, where the emphasis on health, security, and convenience has never been more pronounced, the advent of advanced technological solutions to everyday problems has become a cornerstone of modern living. Among these innovations, the development of a secured contactless doorbell system represents a significant leap forward in enhancing the safety and efficacy of residential and commercial entry systems. This paper delves into the design and implementation of a secured contactless doorbell, a system that amalgamates the latest in communication technology, security protocols, and user convenience to offer a comprehensive solution to traditional doorbell and entry systems.

### Existing System

Conventional doorbell systems may lack the ability to alert residents without physical interaction, potentially compromising security. A contactless doorbell system can address concerns related to physical contact and enhance convenience for both residents and visitors.

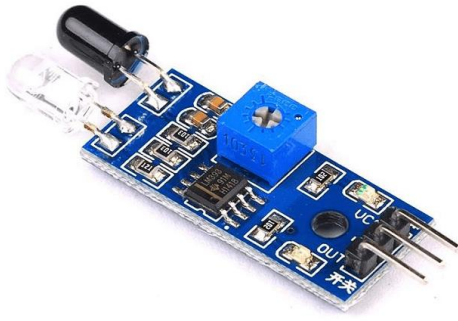
### Proposed System

The proposed Secured Contactless Doorbell uses an IR sensor to detect the presence of someone near the door. When the sensor is triggered, indicating someone is in proximity, a buzzer inside the house is activated to alert the residents. This contactless system provides a secure and convenient way for visitors to announce their presence without physical contact with the doorbell.

### Key Features

**1. IR Sensor:**

- Detects proximity of individuals near the door.



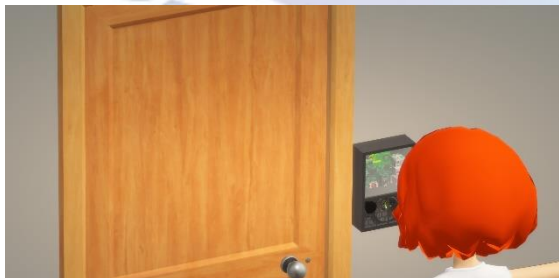
**2. Buzzer:**

- Activates to produce an audible alert inside the house.



**3. Secure and Contactless:**

- Enhances security and eliminates the need for physical contact.



**4. Adjustable Sensitivity:**

- Allows customization of sensor sensitivity for different door environments.

**Hardware Tools:**

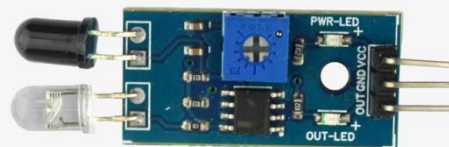
**Microcontroller (e.g., Arduino):**

A microcontroller (MCU) is a small computer on a single integrated circuit that is designed to control specific tasks within electronic systems. It combines the functions of a central processing



**IR Sensor:**

An IR (Infrared) sensor is a device that emits and/or detects infrared radiation to sense its surroundings. The basic principle behind an IR sensor involves infrared light, which is part of the electromagnetic spectrum that humans cannot see but can sometimes feel as heat. IR sensors are widely used in various applications due to their ability to detect and measure heat and motion, as well as to transmit information. There are several types of IR sensors, including passive IR sensors, active IR sensors, and IR distance sensors.



### **Buzzer:**

An audio signalling device like a beeper or buzzer may be electromechanical or mechanical type. The main function of this is to convert the signal from audio to sound. Generally, it is powered through DC voltage and used in timers, alarm devices, printers, alarms, computers, etc. Based on the various designs, it can generate different sounds like alarm, music, bell & siren.



### **Working Principle of Contact less door bell:**

The working principle of a contactless doorbell, especially one that uses an infrared (IR) sensor, involves several key components and steps in its operation. The goal of such a system is to detect the presence of a person without requiring any physical contact. Here's a detailed breakdown of how it works.

### **Future Scope and Advancements:**

Moving forward, there are several potential advancements and future scopes for this project:

### **Integration with smart home ecosystems:**

The doorbell system can be integrated with existing smart home platforms such as Google Home or Amazon Alexa for enhanced functionality and interoperability.

### **Facial recognition technology:**

Incorporating facial recognition algorithms can further enhance security by allowing only authorized individuals to access the premises.

### **Mobile app integration:**

Developing a companion mobile application can provide users with remote access and control over the doorbell system, including notifications and settings adjustments.

### **Cloud connectivity:**

Implementing cloud connectivity enables data storage, remote monitoring, and analytics, enhancing the overall functionality and usability of the system.

### **Voice activation:**

Integrating voice recognition technology allows users to interact with the doorbell system using voice commands, adding another layer of convenience and accessibility.

**Contactless operation:** Utilizes proximity sensors to detect individuals' presence without requiring physical contact.

**Security measures:** Implements encryption protocols and authentication mechanisms to prevent unauthorized access.

**Arduino-based:** Utilizes Arduino microcontrollers for flexibility, ease of programming, and affordability.

**Customizable notifications:** Offers customizable alert mechanisms, such as sound notifications, LED indicators, or mobile notifications.

**Hygiene-conscious design:** Addresses hygiene concerns by eliminating the need for physical interaction with the doorbell.

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### **Conclusion**

In conclusion, the design and implementation of a secured contactless doorbell using Arduino technology offer significant advantages over traditional doorbell systems. By eliminating physical contact, the system addresses hygiene concerns and enhances user safety, particularly in the current global health landscape. Moreover, the integration of security features ensures protection against unauthorized access, enhancing overall security measures. As contactless technologies continue to evolve, this project serves as a foundation for

future advancements in smart home automation and IoT applications.

### Conflict of interest statement

Authors declare that they do not have any conflict of interest.

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