A Review on Door Lock/Unlock System Using Internet of Things

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ABSTRACT: *The importance of in-home security doors cannot be overstated. In today's world, digital door locks security systems based on the Internet of Things are extensively employed to safeguard homes against theft. This research paper proposes an application called Door Security System, which is based on wireless mobile using Internet of Things (IoT) technology to monitor the status of the door over time and control the door remotely with the help of GSM module, plurality of sensor, and digital key pad door lock system. It also measures the temperature of the visitor body, which helps the family to protect themselves. The Window and Door Security Contact System is a reliable security system that is simple to install. While an unfamiliar individual opens any window or door when the security system is installed, it will sound an alert or send a brief SMS to the wireless systems to which it is linked. The security system is placed on all of the house or office's doors and windows.*

KEYWORDS: *Sensor, IOT, Security, GSM, Android phone*

1. INTRODUCTION

In a society where people live, a security system addresses the issue of home security. Thousands of rupees are spent on preserving one's social reputation in society, and today's youth and adolescents spend thousands of rupees in clubs and on costly clothing [1]. When it comes to our security, however, we refuse to spend a single rupee on our family and loved ones because we believe that our family is safe inside our house and in our society, but this is not the case; we are not safe even in our homes because of some masterminds and smart criminals who sometimes cost us our lives as well as our money[2].

The goal of this project is to provide you remote access to your door lock system [3]. The apparent reason for allowing remote access to door locks is to make houses more safe by allowing us to open or lock doors for visitors or other purposes [4]. This work also guarantees that the user does not have to worry about whether the door is locked or not, giving them piece of mind [5]. There are three major kinds of door lock systems, which are classified in the Table 1 below.

Table 1: Comparison between different types of Door security system

Category	Physical Key System	Digital Door Lock System	Advance Door Lock System
Convenience	All relevant people required to hold key	Unnecessary to hold Key	Use of personal smart phone
Scalability	None	None	USB, Bluetooth, OTP
Security	Key copying	Password leakage	Minimize risk through security authentication

Authors Vedala Sharath and Ashok Kumar R proposed a digital door locking system in which the door has two locking positions, each of which is controlled by the owner using an Android mobile phone and sends an SMS when someone tries to open the lock manually, but it did not sense the temperature of the visitor or measure the force applied to the door.[6] [7]

The Internet of Things (IoT) is used to connect wireless electronic items such as mobile phones, laptops, and other gadgets to the internet. The internet of things plays an essential role in today's wireless communication age. Many studies are now being conducted on the creation of the Internet of Things, and the development of home automation is becoming more popular.

When a visitor presses the door security button to open the door, a thermal sensor attached to that press button senses the visitor's body temperature. If the temperature is higher than a preset value, an optical camera mounted on the door captures the image of the visitor and sends a notification to the user's mobile phone.

Many technological equipment and gadgets are managed and monitored in order to help people. Furthermore, numerous wireless technologies are utilized to communicate from various locations, and they play a significant part in the development of a house's surrounding region. USB, audio signal, Bluetooth connection, and wireless communication through GSM modem are the four methods that a door locking device and a wireless phone device interact with each other.

1. USB Communication:

When the door's lock is linked to a phone via USB cords [8]. The smart phone then acts as a USB host, while the door lock acts as a target device. An analog to digital converter (ADC) is used to convert USB communication to general communication so that data may be sent from USB to mobile without interruption [9].

2. Communication through audio:

When digital data is transmitted from a wireless mobile device to a door lock, the digital signal is first modulated into an analog signal, which is then sent to the door lock. The analog signal is received by the door lock, and the door lock system demodulates the analog signal received by the door lock into the original digital signal [10]. When a digital signal is transmitted from a door lock to a wireless smart phone, it is first converted into an analog signal before being sent via an audio connection to the phone. The smart phone's locking device release software then demodulates the analog sound signal to extract data [11].

3. Bluetooth Communication:

To make communication between door lock system and wireless mobile through Bluetooth a Bluetooth module is installed in door lock for pairing with smart phone in order to transmit signals with smart phone [11].

4. GSM Module Communication:

GSM Module Communication is an electronic device used to communicate remotely from anywhere with wireless mobile communication. GSM modem is attached with a microcontroller which provides an interface between the door security system and the Android phone [12].

2. DISCUSSION

The impact detection sensor detects the impact of force applied to the door. If the force applied to the door exceeds the threshold value or if someone attempts to break the door, the owner is notified [13]. The microcontroller gathers data from several sensors, such as the picture of the user captured by an optical camera and the presence of a guest at the door detected by an ultrasonic sensor. The force applied information and the invalid visitor image information are collected by the Android mobile device from the controller, and the user may then take necessary action. It is also feasible to open or shut the door lock remotely if the user has picture information for a legitimate guest.

Android phones are used to establish a communication link between digital door lock security systems through Bluetooth, USB, audio, and GSM module communication. Through a GSM modem, Android phones communicate with the server of the digital door lock system. The mobile application establishes a link between the digital door and Android, allowing the user to manage and monitor the operation by issuing precise commands.

The efficiency of the GSM spectrum has a number of advantages. Improved, It provides for low-cost international roaming wireless phones and base stations, as well as high-quality voice that may be adjusted using Digital Network Integrated Services and other wireless telephony business services. It also supports certain new services, such as GSM SMS Services, which enables for the sending and receiving of text messages.

The Microcontroller detects physical impacts with the aid of an impact sensor applied by a visitor and sends information about the force exerted by the visitor on the door to the owner's mobile device via GSM modem. The visitor's security password and temperature are gathered by the security system, after which all acquired data is analyzed by the microcontroller and the decision is transmitted to the owner's mobile phone via GSM modem. If a password mistake happens more than a particular number of times, the controller recognizes it and utilizes the camera to record a picture of the visitor. The picture is subsequently transferred to the owner's mobile device. The microcontroller database stores all of the access records, which may be queried via the owner's mobile device.

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By utilizing a digital keypad to input passwords, this article simplifies the problem of door security systems. Many sensors are utilized to perform different tasks, such as measuring body temperature and the strength of force exerted to doors. All of these electronics sensors and devices are interfaced with microcontrollers and send vital data to user mobile phones through IOT. With the assistance of sophisticated digital lock security systems, users may remotely monitor their door and safeguard their home and business.

3. CONCLUSION

The Internet of Things was used to create a digital door lock with an enhanced security mechanism in this study. When a visitor presses the door security system button, a notice is delivered to the owner's mobile device via GSM modem. If a visitor enters an incorrect password more than a certain number of times. The lock security system captures the image of the visitor and sends a notification to the owner's mobile number with the captured image, allowing the owner to identify the visitor and take appropriate action based on the situation. A thermal sensor is attached to the keypad to sense the visitor's temperature, allowing the owner to identify the visitor and take appropriate action based on the situation.

The suggested advanced digital lock security system uses an optical camera to capture a person's picture, verifies the image of the visitor, and remotely opens and shuts the advanced digital door lock system using a GSM modem. When eligible guests arrive at the entrance and press the digital door lock system, the system automatically unlocks or shuts the door. The issue of door security systems is simplified in this article, and remote access to door security systems is provided.

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