



**Privacy and Security in IoT**  
**J-Component**  
**Review-1**

**Smart door locking system**

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## **Abstract:**

As we know, security is a defense practice against the threats. In order to keep our valuable items safe, we use security. We also use various levels of security in our devices to protect the confidential data. Similarly, our houses, offices, hospitals also need security. A multi factor security solution is proposed which can authenticate, authorize and validate the user and open the door for the user after verification. The door will be unlocked when the user passes RFID identification, filling correct passcode. The main aim of proposing this solution is using the current available technology and providing a security which can really maintain the confidentiality and integrity.

## **Introduction:**

In this project we're going to do the hardware implementation of Smart door locking system. This paper consists of a detailed literature survey comparing various existing implementations of the above mentioned topic along with their advantages and disadvantages and finally our proposed method to implement the smart door locking system.

## Literature Survey:

### [ Door-automation system using Bluetooth-based android for mobile phone - Lia Kamelia, Alfin Noorhassan S.R, Mada Sanjaya and W.S., Edi Mulyana ]

It has been proposed and prototyped to automate door locks using a Bluetooth-enabled Android smartphone. In the hardware design for the door-lock system, an Android smart phone acts as the task master, and a Bluetooth module serves as the command agent. The solenoid output of the door lock serves as the controller/data processing centre, and the controller/data processing centre is an Arduino microcontroller. Depending on the functions required, this technology can be used to monitor, inform, or execute. Instead of a key, it employs a digital command delivered through Bluetooth from a smartphone or other mobile device.

**Advantages:** It provides Android phone/tablet users with security and convenience. Arduino and Android are used in this project. the implementation is low-cost and simple to use for the general population. The implementation rate is low and affordable to the average individual.

**Disadvantages:** Bluetooth is not a reliable solution.

### [IoT-Enabled Door Lock System - Trio Adiono, Syifaul Fuada ,Sinantya Feranti Anindya, Irfan Gani Purwanda,Maulana Yusuf Fathany]

The purpose of this research is to create a prototype of a location-based smart door lock system. The goal of this study is to create a secure door lock system that does not require the user's physical input. The system's main components are a microcontroller and a ZigBee module for connecting with the smart home's host and receiving information about the user's GPS position. According to the test results, the gadget will operate depending on GPS coordinate data received, drawing 42.3 mA and 587 mA in idle and active modes, respectively.

It has the capacity to remotely lock and unlock itself.

**Advantages:** Automatic unlocking of door based on user's location.

**Disadvantages:** This system may be inefficient, inaccurate, and insecure.

### [Smart door system - Siddhesh Raorane, Abhishek Hanchate, Umar Gigani, Prof. Surekha Khot ]

Image processing and mobile application telegraph technologies are used in this system. When a stranger approaches the door, the alarm goes off, and a photograph is taken, which is then sent to the owner. The Wi-Fi module, which is connected to the Arduino Wi-Fi module esp8266, will collect data from the mobile phone through cellular data/wi-fi.

The method for authorisation is carried out using instructions from an authorised device and a wireless protocol with a cryptographic key. It keeps track of who has signed in and sends out alerts when certain events occur.

**Advantages:** Using Raspberry Pi for facial recognition system may result in a smaller, lighter, and more effective system with less control utilisation, culminating in a computer-based face identification system.

**Disadvantages:** Internet is not available at every place which can be hurdle for this system to be implemented in rural or remote areas.

### **[SMARTPHONE ACTIVATED DOOR LOCK USING WIFI - N. Hashim<sup>1</sup>, N. F. A. M. Azmi<sup>1</sup>, F. Idris<sup>2</sup> and N. Rahim<sup>1</sup> ]**

This article presents the design and functioning of a smartphone-based door locking system that uses Wireless Fidelity (Wi-Fi) technology. When the Android-programmed smartphone is within WiFi range, it may lock and unlock the door. The Peripheral Interface Controller is the primary controller in the design (PIC). This design has an operating range of 40 to 150 metres. The suggested design is also user-friendly, since it has an interior reset button that allows the user to evacuate the door in the event of an emergency.

The door will unlock if the correct password is entered or the exit button is pressed. When the magnetic switch makes contact, the door automatically locks. Users can enter the IP address and port number connected with the WiFi's IP address using the Android application interface.

This proposal employs WiFi technology to lock and unlock the door through a smartphone.

**Advantages:** The device's range is fantastic, and it's also a user-friendly system with no complexity.

**Disadvantages:** Because application protocol encryption is not enabled, the effectiveness of security policies suffers.

### **[Smart Digital Door Lock for the Home Automation (ZigBee) - Yong Tae Park-Pranesh Sthapit -Jae-Young Pyun]**

The proposed system is based on a wireless sensor network; it is a low-cost, customizable, and easy-to-install system that does not need precise design, wiring, or construction. The smart digital door lock system communicates in two ways: centralised and emergency. In the event of an emergency, the door lock sends an SMS to the user, reporting the incidence.

Once the user has been authenticated through password or RFID tag, the door lock is opened and the LCD displays the status of different household devices. The user can either change the current condition of the appliances or leave them alone. For the convenience of the end user, our system may operate in two modes: manual and automatic. A smart digital door lock system can detect three events: a person entering the house, a person leaving the house, and an emergency situation.

**Advantages:** It is a low-cost, adaptable, and simple-to-install system with an emergency option. This also gives you control over all of your household equipment.

**Disadvantages:** Because of the large number of devices in the network, the possibilities of being attacked rise, because there may be some device that allows the attacker to attack and interfere with the network.

### **Automated Door Lock System Using Arduino -Chinedu Reginald Okpara - Ononiwu, Gordon Chigozie**

The motivation behind this paper stems from the unavoidable distractions which occur during academic lectures in tertiary institutions owing to the arbitrary entrance and exit of students into and from the lecture halls. Hence, the aim of this project is to assist the lecturer in establishing some form of control over the lecture hall throughout the duration of a lecture period. As a result, the lecturer gets to allow students into and out of the lecture hall at his / her own discretion.

**Advantages:** The use of the Arduino uno microcontroller in this project allows for design simplicity, hence, the project can be achieved in lesser time compared to other techniques previously employed.

**Disadvantages:** The major limitation of this system is its inability to automatically detect the presence of students outside the lecture hall when the door is closed.

### **Smart door security using Arduino and Bluetooth Application- Ketan Rathod - Prof. Rambabu vatti**

This paper is based on embedded system where microcontroller is used for home security. This project describes a security system that can control home door. This is a useful and simple security system here, our application uses Arduino as its controller and detects whether the door is unlocked or locked using ultrasonic sensor & LDR values. The Ultrasonic sensor measures the distance of door and LDR detects the intensity of laser light falling on it and based on it decides if it's locked or unlocked.

**Advantages:** It helps people feel safe about their home whether they are away from or in the house. The overall cost is low and can be easily operated.

**Disadvantages:** In order to increase the range and to monitor and control the security from anywhere in the world, modules required are costlier.

### **Secure Smart Door Lock System based on Arduino and Smartphone App - Khaoula Karimi -Maustapha Kabrane**

The main purpose of this paper is to present two methods of locking the door of a smart home; 1) using voice commands (lock and unlock the door, and 2) control the lock by facial recognition using an Android app. The proposed system has a speech recognition section that uses speech recognition Google API and an Android application developed to take a face photo of the user using the camera on the

mobile phone. Through a face recognition algorithm, the system will compare the taken photo with the faces stored in the database.

**Advantages:** The proposed system allows the homeowner to control the entrance/exit door to keep the home safe and secure.

**Disadvantages:** More locking door systems, like a password or PIN using a Keypad Keyboard or locking the door with a Fingerprint Sensor can be added.

### **RFID-Based Digital Door Locking System - Shubham Soni, Rajni Soni, Akhilesh A. Waoo**

This is an IoT-enabled RFID-based door locking gadget. This door lock system will know how long the door is open and in this door lock system, only those people who register will be able to enter using their card. It uses a servo motor that operates with the help of Arduino. The Arduino board runs with complete programming that is stored inside it. By using this gadget, an owner can track his office and the place where he wants to let the specific people in.

**Advantages:** Because the Arduino UNO microcontroller is used in this project, the design is simple, and the project may be completed in less time than with other technologies. This door lock mechanism is also incredibly secure, storing information about who comes and goes.

**Disadvantages:** The major limitation of this system is it requires a constant power source. A 12-volt power adapter is used for the power supply.

### **Unique Authentication for Door Lock system through Bio Scanning-Finger Print Security System -Dilshad Mahjabeen, Moshiur Rahman Tarafder**

The main function of this paper is to call attention to one of the bio scanning security systems-finger print door lock system. This security mechanism aims to put a stop to the threat in the event of stealing and fraud . Human fingerprints door lock system is incredibly unique with various key advantages such as non-repudiation, not transferable, not guessable.

**Advantages:** The key issues that are considered for a smart bio scanning door lock security system are- Best for security, keyless touch screen entry, Budget connectivity, Economical

**Disadvantages:** Mobile biometrics and cloud biometrics in finger print door lock system can be added to prove fingerprint technology as one of the prominent biometric recognition methods.

## **Proposed Framework:**

Our proposed project is a hardware solution to Smart door locking system. The system implements a two-factor authentication. It validates the UID of the person and upon verification only the person is able to enter the passcode. There will be maximum 3 attempts to fill the passcode correctly after that the UID tag needs to be verified again. If the passcode is correctly entered under 3 attempts the door will open. No action will be taken if there is an invalid UID but a Log is created registering the invalid UID. Led will be used to show whether the UID has been accepted or not (green being UID is valid and has been accepted and red being UID is invalid). Furthermore, buzzer will make noise if the password is incorrectly entered more than 3 times. Cloud technology will be integrated in our project using AWS cloud platform and all the data regarding the system will be logged there.

## References:

1. [ Door-automation system using Bluetooth-based android for mobile phone - Lia Kamelia, Alfin Noorhassan S.R, Mada Sanjaya and W.S., Edi Mulyana ]
2. [IoT-Enabled Door Lock System - Trio Adiono, Syifaul Fuada ,Sinantya Feranti Anindya, Irfan Gani Purwanda,Maulana Yusuf Fathany]
3. [Smart door system - Siddhesh Raorane, Abhishek Hanchate, Umar Gigani, Prof. Surekha Khot ]
4. [SMARTPHONE ACTIVATED DOOR LOCK USING WIFI - N. Hashim<sup>1</sup>, N. F. A. M. Azmi<sup>1</sup>, F. Idris<sup>2</sup> and N. Rahim<sup>1</sup> ]
5. [Smart Digital Door Lock for the Home Automation (ZigBee) - Yong Tae Park-Pranesh Sthapit -Jae-Young Pyun]
6. Automated Door Lock System Using Arduino -Chinedu Reginald Okpara - Ononiwu, Gordon Chigozie
7. Smart door security using Arduino and Bluetooth Application- Ketan Rathod - Prof. Rambabu vatti
8. Secure Smart Door Lock System based on Arduino and Smartphone App - Khaoula Karimi -Maustapha Kabrane
9. RFID-Based Digital Door Locking System - Shubham Soni, Rajni Soni, Akhilesh A. Wao
10. Unique Authentication for Door Lock system through Bio Scanning-Finger Print Security System -Dilshad Mahjabeen, Moshiur Rahman Tarafder