

## Smart door lock system using fingerprint sensor

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### Abstract

In this paper, the smart door lock system using fingerprint sensor is presented. Security is a vital concern in modern society, and this study focuses on using a combination of fingerprint sensors, GSM modules, and Arduino microcontrollers to provide an effective and affordable security solution. The system stores authorized users' fingerprints in the microcontroller and uses a matching algorithm to determine whether they are allowed access. If the person is authorized, a one-time password (OTP) is sent to their registered mobile number using GSM. If an unauthorized person attempts to access the door, the buzzer sounds to alert the owner. This system can be applied in various settings, such as banks, offices, and other areas that require high levels of security. With the rise of smart buildings and the Internet of Things (IoT), security concerns are becoming even more critical. The proposed approach addresses security concerns in smart home technologies, specifically in the door lock system. This system enables the owner to monitor and control the buildings with a Smartphone-connected, Bluetooth-enabled system using an Arduino UNO microcontroller. The system can be accessed using an Android application, and if invalid login credentials are provided, the buzzer rings, and an SMS alert is sent to the owner. This approach has the potential to be implemented in other commercial sectors, such as ATMs and vending machines, using wireless communication. The work done & presented in this paper is the result of the mini-project work that has been done by the first sem engineering students of the college and as such there is little novelty in it and the references are being taken from various sources from the internet, the paper is being written by the students to test their writing skills in the starting of their engineering career and also to test the presentation skills during their mini-project presentation. The work done & presented in this paper is the report of the assignment / alternate assessment tool as a part and parcel of the academic assignment of the first year subject on nanotechnology & IoT.

**Keywords:**IoT, Nano, Technology, Android.

### 1. Introduction

In an increasingly connected world, the security of our homes and personal spaces is of paramount importance. Traditional door lock systems have their limitations, often relying on keys that can be lost or duplicated [1]. To address these concerns, smart door lock systems utilizing fingerprint sensor technology have emerged as a promising solution. This paper introduces the concept of a smart door lock system using a fingerprint sensor and explores its potential benefits and applications [2].

A smart door lock system using a fingerprint sensor incorporates advanced biometric technology to provide secure access control. The fingerprint sensor serves as a keyless entry mechanism, allowing

authorized individuals to unlock doors by simply placing their finger on the sensor. This innovative approach offers several advantages over conventional lock systems, which is shown in the Fig. 1 [3]. First and foremost, the use of a fingerprint sensor ensures enhanced security. Each individual's fingerprint is unique, making it an excellent biometric identifier for authentication purposes [4]. This eliminates the risk of unauthorized access due to lost or stolen keys. Moreover, fingerprint recognition technology is difficult to deceive, providing a higher level of protection against intruders [5].

## 2. Design process

Additionally, the convenience and ease of use provided by a smart door lock system using a fingerprint sensor are noteworthy. Users no longer need to carry physical keys or remember complex codes. With a simple touch, the fingerprint sensor quickly verifies the authorized person's identity and unlocks the door, streamlining the entry process and eliminating the inconvenience associated with traditional locks [6].

Furthermore, smart door lock systems offer additional features and functionalities to enhance security and convenience [10]. Many systems can be integrated with smartphones or home automation systems, allowing remote access control and monitoring. This enables homeowners to grant temporary access to guests or service providers even when they are not physically present. Additionally, some systems provide activity logs and notifications, enabling users to keep track of door access events in real-time [7].

The applications of smart door lock systems using fingerprint sensors extend beyond residential settings [9]. They are also suitable for commercial establishments, offices, and other spaces where access control and security are critical. The ability to manage and monitor access in a seamless and efficient manner makes these systems valuable for a wide range of environments, which is shown in the Fig. 2 [8]

## 3. Conclusions

In conclusion, a smart door lock system using a fingerprint sensor represents a significant advancement in security and access control. By leveraging the unique biometric characteristics of fingerprints, these systems provide robust authentication and eliminate the need for physical keys. The convenience, enhanced security, and additional features offered by smart door lock systems make them an appealing choice for both residential and commercial applications. Continued research and development in this field will further refine the technology and contribute to the widespread adoption of smart door lock systems as a reliable and efficient security solution, which is shown in the Fig. 3.



Fig. 1 : Pictorial representation of the system

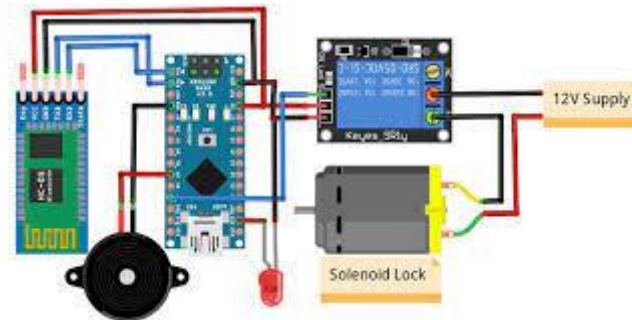


Fig. 2 : Circuit diagram for the finger print sensor

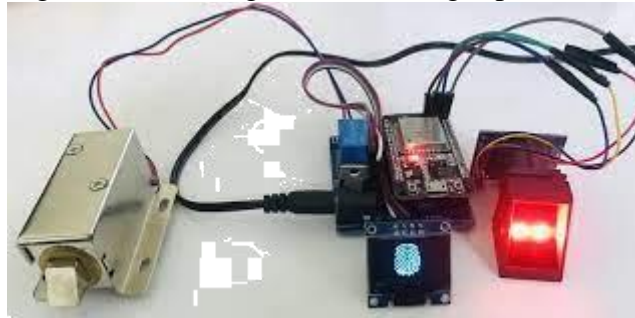


Fig. 3 : Demo model

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