IOT AND BIOMETRIC BASED ELECTRONIC DOOR ACCESS SYSTEM

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ABSTRACT

Automation and security reasons, electronic doors have to be remotely controlled. By implementing IoT technology over an electronic door lock, this project aims to achieve the same goal and create a super advanced door opener/locking system. By connecting the project's web to an IoT application, automation and security are simultaneously accomplished. A microcontroller from the AT mega family powers the Internet of Things-based Fingerprint Electronic Door Opener project. Using a WiFi module, the project communicates online. No matter how far away the door is from them physically, the authorized user of the IOT application has immediate access to open and close it once they log in. Upon receiving an opening instruction from the web interface, the controller directs the appropriate drivers to initiate the door's motor in a certain direction until it fully opens, at which point it should stop. Similarly, when the controller receives an order to close the door, the system tells the motor drivers to rotate counter-clockwise until the door closes completely. By granting authorized individuals access to the door even while they are physically present in a remote location from the door, this idea achieves automatization and security in this way.

1. INTRODUCTION

The primary issue in today's society that needs to be addressed is security. IoT is a cutting-edge technology that is tackling numerous security-related issues, especially in light of recent advancements in new technologies. This is an Internet of Things (IoT)-based home security system. It includes a wireless module that can connect to the Internet and communicate with the user from any location in the globe. Using a smartphone with an app installed, the user can lock the door to his house. This paper aims to integrate a locking system into a door, which will have two locking positions that can be independently controlled by the user via a mobile phone. Additionally, the system will warn the user if someone attempts to physically unlock the lock. The user has the ability to utilize the system in two modes, which is an additional feature that provides better security. The first option involves connecting to the internet, while the second allows the user to monitor their home within a 30-meter radius by connecting to a local hotspot that the system has generated.Smart technology brings networking equipment and devices into the home to improve living conditions. It enables complete home automation, so that disabled people can live comfortably and profit from additional advantages. With very little changes or advancements made to the original technology,

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traditional locks and keys have been in use for millennia. The current door locking mechanisms are all outdated, requiring users to enter the system via an RFID (Radio-Frequency Identification) chip or a conventional key. Traditional locks, which are still a largely dependable technique to keep things safe in existing systems, have undergone a radical change in functionality with the introduction of the internet, which has affected practically every common product. When there are no manual means for humans to secure their private belongings, security becomes everyone's top worry. Banks, financial institutions, government buildings and offices, and retail establishments are frequently the targets of illegal access. There are several issues with the current system, such as: Lack of Security: Because a lock-key system only relies on its hardware, it is easier to manipulate the hardware. Disjointed Integration: Because traditional locks do not work with smart home components, it is necessary to always keep the physical key in your possession. Information Silos: One big disadvantage of traditional keys is that you can't tell from a distance whether the door is unlocked. The world has become more globalized as a result of the rapid speed of innovation, which has also greatly enhanced property and life safety. But despite all of this, technological progress has also brought about a rise in crime, including assaults by robbers, vandals, and intruders. To protect people and property, it is imperative that existing security systems in homes, offices, and other establishments be improved. In this research article, a keypad-based digital door lock security system that offers complete safety for people and property in homes, offices, and schools is described. By eliminating the standard locks'

mechanical key requirement, the suggested approach increases security and lessens their susceptibility to popular break-in techniques like lock picking. In addition to Remote Access The capability of smart locks to provide simultaneous access by numerous users and to provide remote access to a home or safe is a major advantage. The field of RFID (Radio Frequency Identification) technology is expanding quickly right now. In order to identify an object, warehouse management frequently uses this technology as a supporting tool. Because RFID can read object data without making physical contact with the object and does not require alignment with it, it offers advantages over earlier technologies, such as barcodes. Archives are actions or occurrences in different formats and media that are made and approved by state agencies, local governments, businesses, educational institutions, political organizations, community organizations, and people in the execution of social, national, and state life in line with the advancement of information and communication technology (Blazy & Leroy, 2009). Yet a lot of organizations continue to operate warehouses without RFID in order to protect sensitive data. The amount of historical records kept by government organizations is enormous, and it is crucial to have accountability files for each action taken inside a facility or agency. Therefore, it is imperative to strengthen security, as the existing system relies on metal keys, which can be reproduced without the archivist's awareness, leaving them susceptible to losing crucial files. Given the security of the RFID door lock system, which is more resilient and difficult for criminals to breach? For now, institutions and agencies who require an RFID

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door lock system use an automated door lock system.

2. LITERATURE SURVEY

There have previously been several types of smart locks. The vast majority of them are pricey. The idea of "Arduino based electronic lock using RFID and password" was put forth in this paper [5] by "Ni Ni San Hlaing, San SanLwin." This digital door lock uses an Arduino Uno MCU to facilitate pass code-based and audio-frequency identification technology. The authors of the study [6] Arpita Mishra, Siddharth Sharma, Sachin Dubey, and S.K. Dubey proposed a "secured password-based lock system." The goal of this approach is to stop strangers from opening doors for you. The numeric keypad, the lifting hook, and the GSM module—which creates a stable link for communication with the MCU—are the components that make up the Home Safety Service. The device's control panel is used because the door is opened and closed by a passcode access combination. "Shrinidhi Gindi, Naiyer Shaikh, Kashif Beig, Abdeali Sabuwala" suggested a "smart lock system using RFID" in a different work with the title [7]. There might be an RFID-enabled room security system here that is monitored frequently. Thanks to the door's continuous status update, you can access it from anywhere in the world. Moving on, "Mr. L. David William Raj, M. Deepika, V. Bhuvaneshwari, R. Harshitha, K. Haripriya" offered "An OTP-based wireless smart door locking system" in another work, [8]. In this invention, the electrically erasable programmable ROM [EEPROM] first stores the secret phrase for security. The two-way confirmation of an erroneously generated OTP

is sent off the client device at the moment when the client inputs the correct secret word. In the unlikely event that the OTP is coordinated, the necessary capacity is frequently started since the framework will open. Now for the following paper, titled [9], it was suggested by K. Rajesh, Asst. Prof. B. Venkata Rao, P.AV.S.K. Chaitanya, and A. Ruchitha Reddy to use a fingerprint system for unlocking doors. In our article, we employ a finger mark detector to scan an individual's character to function the car's gate instinctively. In such a scenario, we prefer to use an MCU to enable the door to open and close, provided that the scanned and existing facts match. Lia Kamelia, Alfin Noorhassan S.R., Mada Sanjaya, and W.S., Edi Mulyana presented "DOORWAY ROBOTIZATION network supported by CORDLESS for android smartphone" in the upcoming publication titled [10]. The automatic door lock system that utilizes Android smartphones with Bluetooth compatibility is suggested in this article. A prototype of the system is also provided. The Arduino MCU serves as the switch center and transformation center, the Android Smartphone serves as the controller, the Bluetooth device serves as an instructive factor, and the solenoid serves as the door lock output. [11] "Android Based Smart Door Locking System" was suggested by "Adarsh V Patil, Sreevarsha Prakash, Akshay S, Mahadevaswamy, Chandan B Patgar, Sharath Kumar A J." Let's move on. The procedure operates using a pre-coded passcode concept. By stopping an unathletically destructive scam, it enhances the safety procedure. Last but not least, [12] "A locks which operate by a secret knock" was proposed by "Dr. M. Shivasangari, Dhivakar, E, Gowthaam, K." A servo rotates when it senses the knocks and opens and shuts

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the door in order to unlock the lock by digging out the knocks detected by the piezo sensor. The aforementioned applicable technologies are somewhat connected to our suggested operational technology; however, given the perspective for the future and the availability of other options, we would like to suggest a multi-approach strategy for a single digital door lock. Before, a separate module that was vulnerable to theft was needed in order to access the fingerprint. According to our designed system, in order to access the lock—that is, the enhanced two-level security in the application—a user must first validate their fingerprint using the mobile application and then input the right PIN. Prior to now, certain applications were created using Bluetooth and Wi-Fi technologies. However, these technologies had limitations in terms of access range, and even with GSM, many locations lacked network connectivity, although Wi-Fi could be used to access the internet. We arrived to the conclusion that we would use IoT, allowing the lock to be controlled from any location in the world with an internet connection. One invention derived only from Internet of Things devices in a smart lock is that it is unaccessible in the event of a power outage at the installation site. Thus, we decided to provide an additional method of door unlocking that involves tapping the door using a pre-recorded pattern that may be altered to the user's delight. Our innovation to unlock the lock during a blackout is supported by a battery pack that can provide power backup for at least four to five hours. If the user can't remember if the door is locked or not, they can check the lock's state on the application and take appropriate action. After scrutinizing them, we have made the decision to incorporate more cutting-edge technologies to further improve the

system's security. We attempted to realize everyone's dream of owning a smart lock at an inexpensive price without sacrificing security because the smart locks that are now on the market are rather pricey and out of reach for many people. Building an RFID door lock system and enhancing security for rooms containing significant archives or documents is the goal of this research project. It is therefore envisaged that the RFID door lock system will both deter illegal access to the archives and stored papers while protecting them against document theft instances. An RFID door lock system's useful advantages directly affect the security of records or archives while also offering ease to archivists working for organizations or agencies. The implementation of door locks with RFID PPSDM Geominerba, the use of the ATMega A328P-U Microcontroller, RFID, solenoid or electric lock use, buzzer module, and IOT are the main foci of this research.

3. EXISTING SYSTEM

The current system does not offer increased home security. The security is operated manually. The current techniques for home and workplace security are ineffective and rely too heavily on a centralized approach. We are using IOT Android applications to increase the security of domestic, office, and home applications.

4. PROPOSED SYSTEM

In addition to conventional locks, smart locks are electromechanical devices that offer a locking and unlocking mechanism. Uses for the

password-enabled door locking system include offices and homes. This system illustrates an Arduino Password-based Door Lock System, in which the door is unlocked upon entry of the proper code or password.
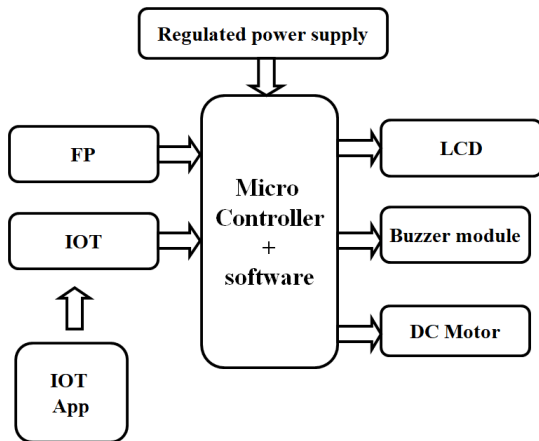

Fig.1. Proposed block diagram

WORKING MODEL:

The hardware subsystem and the software subsystem are the two main subsystems of the digital door lock system that we propose in this study. The Arduino IDE is used to write C++ code for the software subsystem, which is then uploaded to the microcontroller that manages the hardware subsystem's operations. A microprocessor is part of the hardware subsystem, helping to transport data from the code to the various hardware parts of the digital door lock. The two main pieces of hardware used in this project are the 4x4 matrix keypad

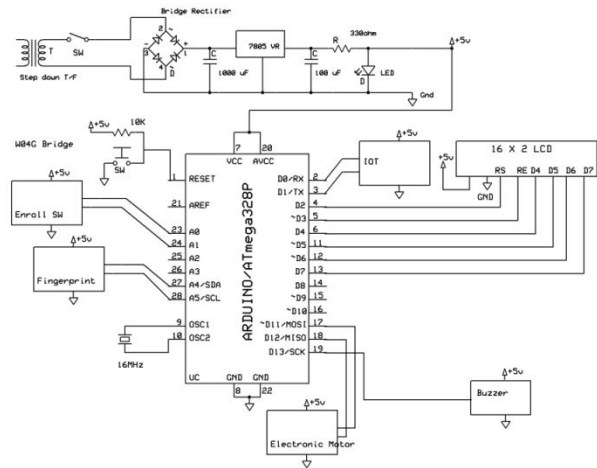and the Arduino Uno microcontroller.

Fig.2. Proposed Circuit diagram

Because they may be integrated with smart assistants, smart home management systems, or other IoT devices, smart locks provide further functionality. These can involve automating tasks, such as setting the temperature and turning on your lights when the entrance is unlocked, or setting off the security system to capture and send video if the door is left open after hours.
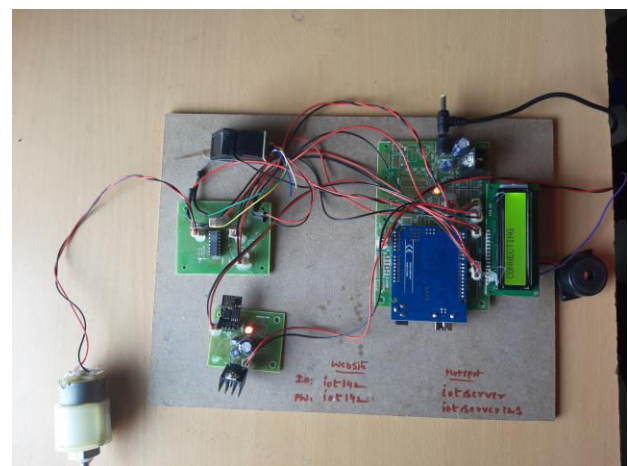
5. RESULTS

Fig.3. Proposed Output model

The Arduino's LED turns on and begins to blink red when the power is on. The LCD then turns on and shows the project's title, FP Door Access. Additionally, the IOT module's LED blinks, which is how the data is sent to the server.
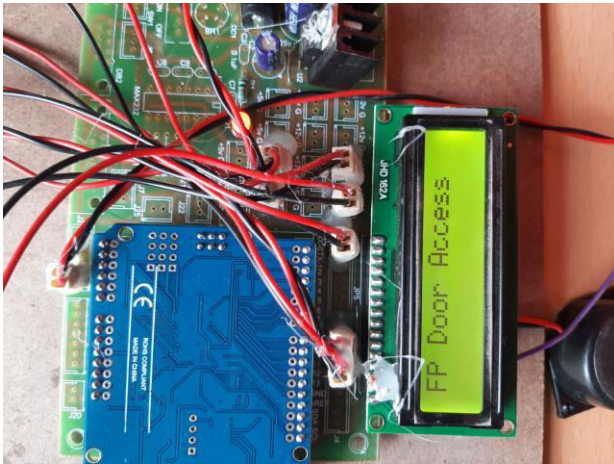

Fig.4. LCD Output door access

The process begins and the fingerprint sensor's data is read when the module is turned on.The buzzer indicates when it has reached its maximum level by making a buzzing sound. The data is uploaded to the server by the IOT module.

A webpage is made for the opening door from anywhere in the world. We are able to open our door from anywhere in the world through the webpage. by selecting the website's "open door" button.

Fig.5. Output

Table.1 Results comparison Table

Parameter	Existing Model	Proposed Model
Microcontroller	8051	Arduino
Speed	Low	High
Complexity	High	Low
Efficiency	LOW	HIGH

6. CONCLUSION

Our fingerprint access door accessing system with IoT notification was built and put into operation. We achieved the necessary results with success. The technology introduced in this project will enable people to live more adaptable, secure, and comfortable lifestyles and ultimately lead higher-class lives that are easier, more refined, more accessible, and more stable. It symbolizes ingenuity in managing a home by substituting digital codes and knocks for manual keys for door locks at home, keeping up with the escalating security trends in the years to come and overcoming the problem of using high-tech manual locks for our current doors with a Digital Smart Lock. Furthermore, all those looking for home security would find the produced system reasonable because of its minimal execution costs. It is easy to implement and maintain a digital smart house. It supports mobile technology, the Internet of Things, and an open-source, non-proprietary Android operating system. According to the suggested perspective, the intended architecture will be perceived by utilizing Android-based apps for client ingress and reliability, Wi-Fi technology for integration, and client testimonials for authentication and dependability. From here on, further aspects of home modernization and dependability might be incorporated into the outline structure. Furthermore, in order to

support operating systems other than Android, these experimentation assignments are frequently enhanced.

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