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Smart Alert GSM Security System for the Home

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ABSTRACT:
An alarm system is essential for the protection and peace of mind of your family. Most people's worries these days center on protecting valuables like jewelry, papers, and cash from burglars who break into their homes. The vast majority of individuals, while looking to secure their personal items, purchase safe deposit boxes for their homes. These locks are simple to break and offer no warning to the owner if they are compromised. Therefore, we are creating a state-of-the-art alert home security system for homes that employs fingerprint and password authentication to unlock the door, therefore enhancing protection against intruders. When an unauthorized individual attempts to access the door lock, an SMS is sent to the user using GSM technology.

***Keywords*:** Hardware: fingerprint reader, keypad, CCTV camera, GSM module, Arduino, and an LCD screen.

INTRODUCTION

The rising need for safety and protection from a wide range of dangers makes it imperative that people install home security systems. Safety safeguards our lives and our possessions. Having a solid home security system is crucial for protecting your family and your possessions. Most individuals, whether they live in a city or a rural region, now consider safety to be a major concern. Thieves will attempt to break in, posing a threat to people's valuables such jewelry, papers, and cash at homes and businesses. Most individuals will probably put in a lot of locks to counteract this security risk. Mechanical locks, which may be broken over with sophisticated equipment and key loss may occur, are one of the shortcomings of traditional security systems. Therefore, we will create a state-of-the-art home security system that uses fingerprint and soft password authentication and also incorporates GSM technology to send a message to the user if an unauthorized person attempts to access the door lock. To increase safety, we'll be installing a CCTV camera outside to watch all the time. User can check the state of security any time as the CCTV camera utilized is linked to the Wi-Fi and with the assistance of android application user can check the status of security on android phone. The camera is a night vision camera, so it can maintain watch even when it's dark outside.

SYSTEM ARCHITECTURE AND BLOCK DIAGRAM

Figure 1 shows a basic block schematic of the proposed system. There are four parts to this system.
The fingerprint reader and keypad form the first module, and they'll be used to unlock the door. The fingerprint scanner employs lossless compression to store the fingerprints of over 300 individuals. If the fingerprint reader detects that the individual trying to enter is not authorized to do so, it will not allow them admission. When fingerprint module is interfaced to the Arduino, it will be in user mode. The scanned photographs that have been saved will be compared to the stored images and validated if a match is found. The pictures of person's fingerprint that are permitted to unlock the lock will be kept in the module with the unique id. Fingerprint scans are required to show that the people at the door are allowed to unlock it. This scanner has an Arduino connection. Fingerprint scanning and matching will be managed by this controller. The keypad may also be used as a fingerprint reader thanks to its integration with the Arduino. The four-digit PIN isn't only for accessing the system, however. The keypad may be used to input the password to unlock the door in the event of fingerprint problems. Each individual might have their own unique passcode to enter the building. Each person in the household just needs one PIN under this arrangement.
The second component is an LCD display that shows whether the user's fingerprint or password was accepted or rejected. A "WELCOME" message with the user's name will appear on the LCD screen if the fingerprint or password submitted is valid; otherwise, a "WRONG PASSWORD" message will be shown.

The GSM module, the third, will send a message to the homeowner if the front door is opened without permission. The GSM module will send an SMS to the home's owner informing them of the status of unauthorized access if the entered fingerprint or password is incorrect three times in a row. If the incorrect fingerprint or password is input three times in a row, the module will sound an alarm.CCTV camera usage for the purpose of continuous monitoring is the fourth module.

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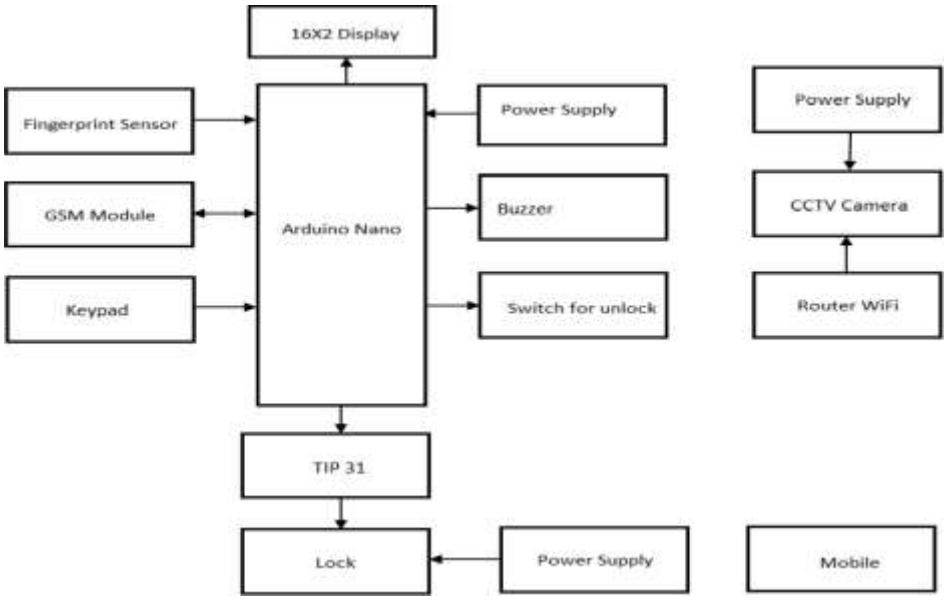

Fig 1. Block Diagram

I. CIRCUIT DIAGRAM

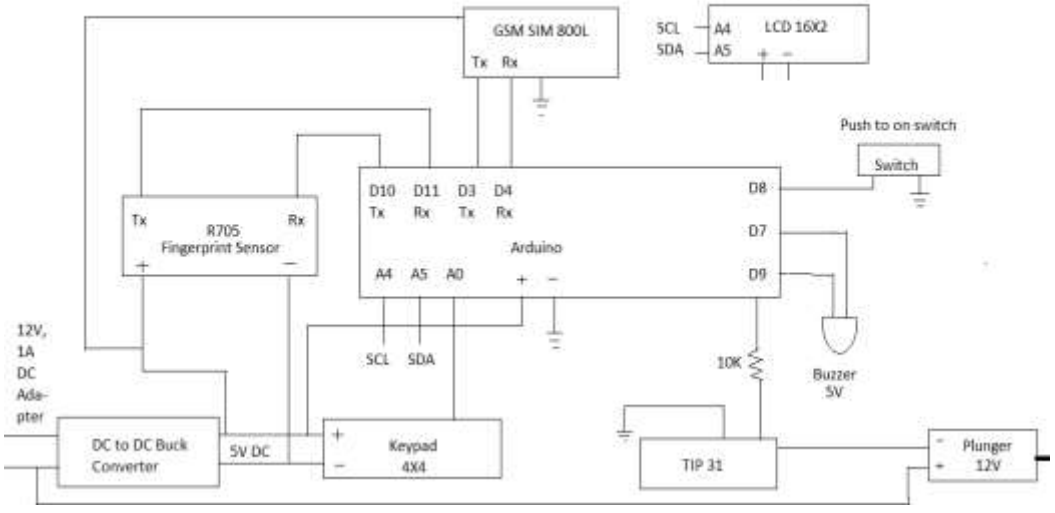

Fig 2. Circuit Diagram

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RELATED WORK

The Raspberry Pi-powered door lock system uses cameras, a keypad, and pi-lids to give an alerting system that can inform the owner and identify visitors by assigning them a unique user-id.[4] An alternative approach that uses voiceprint and Internet-based mobile authentication may speed up, simplify, and strengthen smart home authentication.[7] In Design and Implementation of an SMS Based Home Security System, provides an adaptable security and alarm system which may be employed by people, organizations and facilities who want a cheap yet dependable security system. The goal of this initiative is to provide its customers with a quick, easy, and trustworthy means of contacting emergency services.An ANDROID app is developed in Android Interface based GSM Home Security System to decipher the message a mobile device receives on a possible intrusion and send a reply (Short Message Service) SMS to set off an alarm/buzzer in the far-off home, alerting residents to the potential break-in.To ensure the comfort and safety of its residents, it is imperative that [10] a home security system that makes use of GSM technology and a mobile-based home security system be developed and put into place.[11] This system is a microcontroller-based home security system with a fingerprint reader, PIR motion detector sensors, a GSM module, and a surveillance webcam designed for use in developing countries.After reviewing the aforementioned articles, we've learned that there are many various kinds of security systems, each using its own unique combination of technologies. After researching the aforementioned options, we settled on creating an advanced alert home security system that combines features like fingerprint scanning, password authentication, sending alert messages via GSM technology, ringing buzzer to alert neighbors when intruder tries to unlock, and continuous surveillance with CCTV camera.

II. FLOW CHART

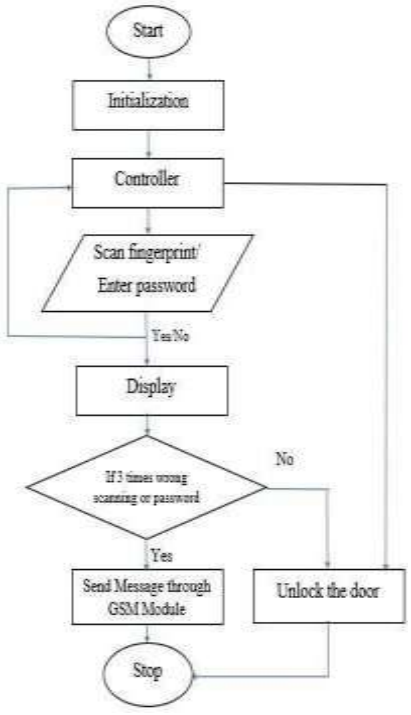

Fig 3. Flowchart of the system

1) Algorithm:

Step1. - Initialize Controller, Fingerprint Module and GSM Module.
Step2. - Scan the fingerprint or enter the password to unlock the door.
Step3. - Check and compare the currently scanned fingerprint and already stored fingerprint of the authenticate user or check whether the entered password is correct or not.
Step4. - If the scanned fingerprint or entered password is correct then controller will provide high pulse to TIP31 transistor which will unlock the door and will also display the message as “WELCOME”.
Step5. - If the scanned fingerprint or entered password is wrong then the “WRONG” message will be displayed on the LCD screen.
Step6. - If the person scans wrong fingerprint or enter the wrong password more than three times then initiate the GSM module to send alert message to the user or owner and make the i/o line high to the buzzer and sent the message “Somebody trying to open the door and try once again with authenticate password”.

III. RESULT

Fig 4. Overview of the system

Figure 4 shows the overview of proposed system. It shows 16X2 LCD display, 4X4 matrix keypad and fingerprint scanner.

Fig 5. Locked system

Figure 5 shows the front view of the proposed system. It continuously displays “AVCOE SANGAMNER” and “DOOR LOCKED” message on LCD display.

Fig 6. Authorised person scanning finger

When we scan the finger and it gets matched with the stored one then it shows the “WELCOME” message on display with the respective person name which is shown in figure 6.

Fig 7. System displaying message after scanning fingerprint

When door gets unlocked, it remains unlock for 6 seconds as shown in figure 7 and then the system gets locked again displaying the same message as shown in figure 5.

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CONCLUSION

There are a number of flaws in the traditional security system, including the potential for loss of keys and mechanical locks. All the issues with home security created by the standard locking system would be solved by the suggested method. The suggested system is an Advance Alert Home Security system that utilizes a fingerprint module, keypad, and GSM. The system's cutting-edge qualities include portability, cheap cost, and the ability to function independently. Constant surveillance via CCTV cameras is another benefit of the suggested method. In the long run, integrating this system with the Internet of Things will increase its adaptability and use. In this age of heightened security, this concept provides a glimpse into the future, fostering quick innovation.

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