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Arduino Based Portable Smart Lock

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ABSTRACT
Security has been playing an important role in many of the places like offices, institutions, libraries, laboratories etc. in order to keep our data behind closed doors so that no other unauthorized person could have an access on them. We aim to design a fingerprint based portable door lock system which provides security which can be used for many banks, institutes and various organizations etc. There are other methods of verifying authentication through password, RFID but this method is most efficient and reliable. Unauthorized access is prohibited by designing a lock that saves the fingerprints of one or more authorized users. Fingerprint is sensed by a sensor and is validated for authentication. If the fingerprint matches, the door will be opened automatically via Relay or Servo Motor. The system we plan to design would be portable, powered by a rechargeable battery and also accessible via Wi-Fi or GSM. We intend to design the system as small as possible.

Keywords: GPS, GSM, Microcontroller, Arduino

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I. INTRODUCTION

You perhaps must be conscious of the express development of Biometrics as an identity authentication and access control technology. The technology initially came into picture in the year 1858 when handprints were recorded on the back of a contract for each member of staff to tell apart employees from others who might claim to be member of staffs when payday arrives. Biometrics has develop into an integral part of nearly all security strategy and access control technologies, opening from government and military security standpoint to healthcare and telecom industries lately.

The main improvisation in these types of lock is that these are battery based hence can be taken anywhere. These are portable locks due to their battery backup. These locks inculcate the outstanding features of previous smart locks and new unseen features are also included in the system. These will be small in size so that they are easy to carry.

GPS Module-A GPS module which provide easy and cost-effective addition of location and tracking capabilities to virtually any product will be used. The receivers will be in a hybrid modular form that requires no external RF components except an antenna. This makes them simple to apply, even by engineers without RF or GPS/GNSS design experience.

Arduino Nano-The Arduino Nano is a compact-size, complete, and breadboard-friendly board based on the ATmega328 (Arduino Nano 3.x) or ATmega168 (Arduino Nano 2.x. It needs just a DC control jack, and it works with a Mini-B USB link rather than a standard one

This board was developed for applications and installations where space is premium and projects are made as permanent set ups. It is available in 5 V versions, powered by ATmega328 and 168.

A Lithium-ion battery -Li-ion battery is a rechargeable battery which is available in a very compact size and can be easily charged. It can be easily charged by using a battery charger.

DC-DC- The lithium ion battery is further connected to the DC-DC Step up converter that increases the voltage (while decreasing the current) from its source (input) to the load (output). Fingerprint sensor- The fingerprint sensor module will provide a user interface for opening the lock using the fingerprint. The Fingerprint processing comprises of two parts, fingerprint enrolment and fingerprint matching

II. REVIEW OF THE LATEST TECHNOLOGIES

(a)Kwikset Kevo

Kwikset is a renowned name in home locks, and their innovative keyless smart lock merge the look of their conventional key locks with high-tech functionality. The Kevo was one of the primary smart deadbolts on the market and utilizes together Bluetooth and Radio Frequency Identification (RFID) technology, so users can unlock the door through their Smartphone or with the built-in key fob.

The lock is iOS and Android compatible using Bluetooth technology, which means no Internet access, is necessary and your lock does not live on your network. Bluetooth enabled lock can sense when your Smartphone move towards and unlocks the door for you – no more fumbling with keys when you are in a rush or your hands are occupied. You can grant two devices with complete access eKeys and allocate an unlimited number of guest eKeys. The Kevo Mobile App lets you monitor lock activity and manage the eKeys.

(b)Yale Real Living Electronic Touch Screen Deadbolt

If you are looking for utmost flexibility in connecting your smart lock to your home's other smart devices, or even a whole-home automation system, the Yale Real Living lock is a strong candidate. The lock has the luxury appearance of many high-end Yale locks, plus the feature of a push button keypad or a modern capacitive touch screen, in deadbolt or lever lock designs. The lock acknowledges up to 250 user-selected codes, and also grants access by means of a conventional key.

(c) SoHoMiLL YL 99 Keyless Electronic Keypad Lock

The SoHoMiLL YL 99 Keyless Electronic Keypad lock is as effortless as they can be and, with a price tag of just $50, is the ideal starter electronic door lock. While it does not offer Bluetooth connectivity or internet of things compatibility, it is a well rated lock. It effortlessly substitutes the majority of standard door knobs and holds eight user-programmable pass codes, which you manipulate from your unique, master code. It consists of a low-battery indicator to indicate that now the battery has to replace and it can automatically lock from the outside after three seconds.

(d)August Smart Lock

No keys are involved in this lock system and no access codes are involved too, hence a burglar cannot use a key logger to duplicate your code and then break in when no is there at your home. The August Smart Key lock distinctly replaces most single cylinder deadbolts to grant secure access to your home by means of an iOS or Android devices. The August Smart Key lock operates independently, through a secure Bluetooth connection or personal Wi-Fi internet connection. The application mails a reminder if the lock's batteries are low so this lock keeps working, even if your power goes out.

(e)Samsung Digital Door Lock

Samsung includes quite a few IOT items, such as Smart TVs, refrigerators, and washer/dryers. As a result, their smart lock can be used as part of a complete Samsung smart home system. The bolt joins with Samsung's brilliant home arrangements, including camcorders, security sensors, and that's just the beginning. These access remote section capacities, occasion warning, guest check and more by interfacing the framework to your cell phone. In case you're utilizing it as a standalone bolt, despite everything you'll appreciate an assortment of alternatives and elements. It can be unlocked through pass codes, RF card, finger print (with the top tier model), smart tag, or via a conventional key. For additional security, users can choose two options (pass code plus finger print authentication) for access. The entryway bolts consequently when clients leave, in light of the fact that even the most grounded, most secure entryway bolt isn't viable on the off chance that you neglect to utilize it.

(f)Fingerprint & Push Pull Innovation SAMSUNG SHS-P910 digital lock

This Samsung bolt is as well as can be expected find and you will be more than fulfilled. It is touch screen based, dually way security through magic number and several ways to access, such as password, key tag, credit card, remote and few other ways. This door lock brings us Push and Pull innovation and fingerprint verification technology. They have programmed bolt include, so you won't need to stress over neglecting to bolt the entryway, since they will consequently bolt when it is shut.

III. APPLICATION & SCOPE

The major focus of this project is to help people who travel and people who live in rented rooms. Since they cannot install devices on the walls of their rooms/doors they can use this lock system which doesn't have to be installed on the wall/doors or needs to be connected to the mains. Hence it will help them to lock and unlock in merely ten seconds.

IV. CONCLUSION

This system will introduce a new world of locks which are both biometric and portable. The Portable Biometric Lock is built to ensure the safety and security of assets by using a nano Arduino microcontroller to detect any unauthorized user attempts by using a fingerprint sensor and send predefined text notification.

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