SMART DOOR LOCKING-UNLOCKING SYSTEM FOR HOME AUTOMATION

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Abstract: In the affection of advanced way of life in a smart city, home security has turned into a reasonable yet in fact testing territory. The proposed framework controls the entryway bolt through an Android Application utilizing Wi-Fi as the correspondence convention, that communicate with Arduino, Wi-Fi module inserted in the entryway bolt and the Firebase cloud informing administration. The project verify the accreditation of the client and after that sends an OTP to the portable Application interface utilizing cloud-based secure informing administration.

INTRODUCTION

Digital home security systems are becoming inevitable in modern lifestyle. There may be situations when nobody is inside the house, but the owner of the house wants to allow the access to the house to some bona fide visitor. Since such systems allow access only to the bona fide visitors, it acts as an efficacious deterrent in the case of break-ins and robberies. On the flip side, anybody having the access code of such digital home security system may be seen as the bona fide visitor. Therefore, these systems are prone to potential misuse, in which, a person with mala fide intention can hack the access code of this digital dome security system and thereby, get the access to the house without anybody noticing or suspecting it. Nonetheless, the good thing is that statistics show that burglars are less likely to attempt to break into a home in which there is a home security system installed. Furthermore, in the case of those burglars who are smart enough to attempt a break-in into a house with a digital home security system, the likelihood of them being apprehended is substantially higher than them getting away. Home automation system is computer intelligent network of electronic devices which isdesigned to monitor and control the home appliances. Home automation allows users to remotely monitor and control customer electronics through the external network such as Internet. Home automation is the new smarter field that has attracted the attention in both the commercial and research field. Wired home networks were famous at the early developments of home automation systems but nowadays wireless communication is replacing the wired system which are very complex and also difficult to setup. Wired system requires

proper planning and construction works for easy and clean design. It is the reason wireless communications are replacing the wired ones. Furthermore, wireless system provides more flexibility and extensibility.

LITERATURE SURVEY

In the pretext of digital lifestyle in a Smart City, home security has become a prudent yet technically challenging area for players of this field. Home access system is a part of home security. In their paper, they present a smart locking and unlocking system for home door security. The proposed system controls the door lock through an Android App using Wi-Fi as the communication protocol that communicates with WeMos D1 Wi-Fi module embedded in the door lock and the Firebase cloud messaging service. With the help of cloud-based secure messaging service, it is easy to a send a message to a remote Android mobile which belongs to the owner/user of the house. This aspect removes the need to embed GSM module with a smart lock system. To keep vigil of the open/closed status of the door and the unusual events like door smashing, keeping door open for a long time, we use the accelerometer and magnetometer, respectively. The mobile phone App is personalized with a unique user password for the secure access to the door lock system. The system verifies the credentials of the user and then sends an OTP to the mobile App interface using cloud-based secure messaging service. The implementation of the proposed system demonstrates its practicality with minimal accessories. In case of breaching of the secured access, such as, theft or unauthorized opening of the door, the proposed system sends a warning message to the user/owner of the house.

In their paper, they propose a smart digital door lock system for home automation. A digital door lock system is a model that use the digital information like secret code, semi-conductors, smart cards for authentication instead of the old key system. In their proposed system, a ZigBee module is used in digital door lock and the door lock acts as a central main controller of the overall home automation system. Technically, their proposed system is the network of sensor nodes and actuators with digital door lock as base station. Their system consists of RFID reader for user authentication, touch LCD, motor module for opening and closing of the door.The sensor modules for detection and the control module for controlling other modules. Sensor nodes for sense the environment are placed at appropriate places at home. Status of singleZigBee module can monitored and controlled by one centralized controller. The door lock is the first and last module for people to come into the home, the home automation function in digital door lock system enables user to easily control and monitor home environment and condition at once before entering or leaving the home. The System allows the users to remotely monitor the condition inside the house through Internet. The main advantage of their proposed system over existing ones is that it can be easily installed when and where necessary. It may not require any infrastructures and proper planning.

The Android Operating System finds wide use in smart phones and tablets and is thus suitable for home controllers. The systemuse the Bluetooth

and Android device to control the operation of an automated security door system. The software was designed by using an Android app which generates a password that is recognized by the Bluetooth to control the opening and closing of the door. The Bluetooth module that is installed on the door, which receives the commands from the android phone, and then pass these commands to the microcontroller that control the open and close of the door. The design was developed in integrated development environment. The hardware was built on a wooden board. The performance of the system agrees excellently with its concept. The system can be used in various situations where access to an enclosure need to be secured.

Smart home automation system plays a major role which helps in reducing a work by using some technologies. The proposed work is to send a signal to door from a tablet or mobile devices by using Bluetooth system. This allows the user to lock and unlock a door from inside or outside a house with a Bluetooth device available. The main purpose of the work is, if the door is not locked in first floor or in any other floor. The user of ground floor can open the door or close the door from mobile phone or laptop, by which the person reduce its energy or saves the time. The major components of the system are latest Arduino board, Servo motor and a Bluetooth module standard protocol for wireless communication.

Their main objective is to utilize the different electronic parts available in the market and build an integrated home security system by using Bluetooth device and Microcontroller technology. This system gives service at low cost compared to the cost of the available security system. They want to make a system that will give 24x7 service by using registered password in their system. They can unlock the door and increases the security level to prevent an unauthorized access to door. If the user forgets the combination of password this system gives the flexibility to the user to change or reset the password. Security measure is very high as provided in two ways,the first way is theyhave to enter password for bluetooth connection and second way is for unlocking the door in application. Both passwords can be changed as and when required. Their automatic password based lock system will give user more security and low costing for project.

In their study, they propose a wireless access monitoring and control system based on the digital door lock, which is mostly used as a digital consumer device. Digital door lock is an electronic locking system operated by the digital key, security password or number codes. To develop the system with ZigBee network protocol they usedfour types of modules for develop a system.ZigBee module, digital door lock module, human detection module, and ZigBee relay module are the modules that are used to develop a system. ZigBee module is designed as per to support wireless sensor network. It is used for the ZigBee tag to identify the access objects. Digital door lock module is implemented as a digital customer device to control the access system as well as locking system.

SYSTEM DESIGN

For home to be secure we have to use number of locks to doors which will have more number of keys to a single door and which will be

open by a single person having keys. If key is lost or other person from family want to open door in absence of other, it becomes more difficult without keys. So we are proposing secured door lock system which will not require any sort of key to open. This will be open only on entering real time requested OTP.
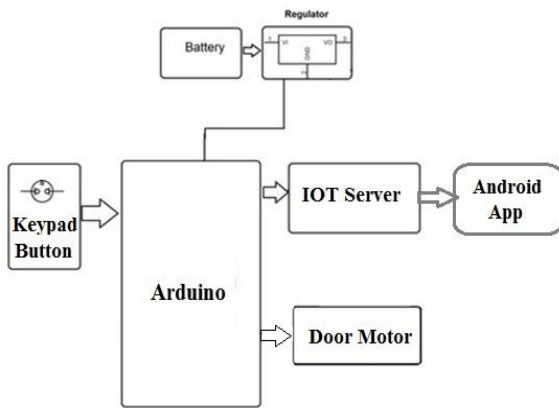

Fig 1: System Architecture

The purpose of this project is to study and evaluate a suitable set to develop a smartdoor lock which is intended to offer high security, easy access, and control. A key challenge that is faced in this project is the security and privacy of the IOT systems. Therefore, the proposed system will present an extensive investigation for the security and privacy of IOT systems seeking to enhance the lock mechanism by connecting it to the internet, making it more robust, reductive and innovative.

RESULT ANALYSIS

We implemented a prototype system for the access monitoring and control based on smart door lock. An Android smartphone is installed with App that runs the Firebase messaging service. This Firebase messaging service class checks for messaging-events received by the App. The message event received by the Firebase messaging service is

shown as push notification. The OTP generated is shown at TOP and also display the message "OTP generated successfully, please verify OTP".
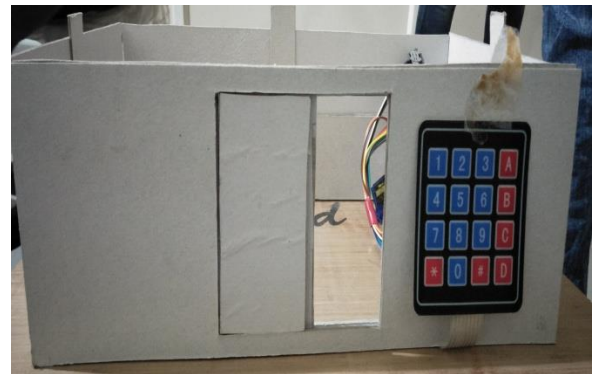

Fig 2: The demo model of overall implementation of the Smart Door Lock System
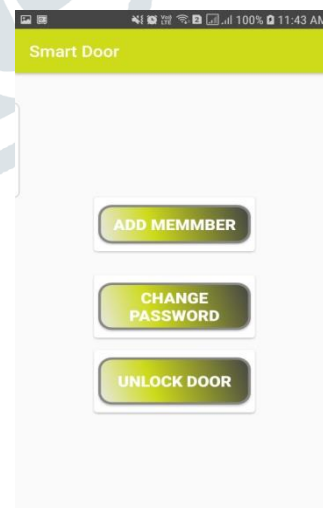

Fig 3: System representation

Fig 4: Android App

If the door is opened once after unlocking then door does not lock automatically. In case, if the door is closed state after 60 seconds since the unlocking time, then this system locks the door. The

automatic door locking happens only if last closing time equals last unlocking time and time difference between last unlocking time and the current time reaches to 60 seconds. We have used a magnetometer to find the open door status after unlocking. If the door is opened once after unlocking then door does not lock automatically. If the door is closed state after 60 seconds since the unlocking time, then this system locks the door. The automatic door locking happens only if last closing time equals last unlocking time and time difference between last unlocking time and the current time reaches to 60 seconds.

ADVANTAGES

Using a smart door lock system has many advantages which is as follows:

- It's secure.
- Simple and easy to access.
- It's pick-proof.
- Entire lock and electronics housing is designed well.
- We can use multiple smart locks.

APPLICATION

- Control of doors and windows shutters
- Faster operation and efficient
- Security system
- This project will be used in Industries, Home, Office or Shops.
- It can also be used for garage doors and gates for garage security.
- By using smart application of android, disabled and elder people can control lock the home appliances anywhere inside house.

CONCLUSION

In this project, smart door lock system which integrates the home security with home automation. Home security system for automatic doors will provide advance security of today's standard for home owners. Proposed system will be used for real time home security which will avoid theft at houses. Due to the use of IOT each member will get notification about door open which will home security full proof.

FUTURE WORK

The IOT system that was developedin this project focus on the security approach more than the functionality of the system. Some of the functionality that this system needs to be further developed is to make it deployable for a group of users.

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