

Password Based Remote Controlled Door Opening Using Android Application

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Abstract - The main objective of this paper is to unlock a hotel room door by using an android application using a password entered through the android application device. Opening and closing of hotel room door involves using of smart card. The opening and closing of hotel room door is achieved by using an android application. The owner can connect android application device to the system through Wi-Fi, which in turn is connected to a microcontroller controlled door that can open/close the door by entering the password. Remote operation is achieved by any smart-phone/Tablet, with Android OS, upon a GUI (Graphical User Interface) based touch screen operation. This paper is based on the android application, android application send data through Wi-Fi. Another Wi-Fi device connected at the receiving end which is fed to the microcontroller. The sent data (password entered by the user) matches with the password stored in the microcontroller, and then the microcontroller initiates a mechanism to open the door through a motor driver interface. The combination of Wi-Fi and android technology will satisfy timeliness, safety and involves elimination of smart card.

I. INTRODUCTION

The system tends to make a secure door opening mechanism such that the door only unlocks when a security personnel opens it by entering the right password through an android application. The authorized personnel need to be present within Wi-Fi range of the door but need not lock/unlock the door manually. But he needs to be connected to the Wi-Fi router which also gives a kind of security by limiting the wireless devices connect to it with the help of MAC address. He just needs to enter the right password through his android application in order to unlock/lock the door.

The command sending functionality is achieved through an android application. The application provides an interactive user friendly GUI for this purpose. The android application can be operated from any device running on android OS and uses Wi-Fi as a medium for sending and receiving commands. As soon as commands are sent through the android device a signal receiver (LAN CONTROLLER) is used to receive those commands. These commands are then sent to the ARM11 PROCESSOR. The PROCESSOR processes these commands and then tallies the password to check its correctness. If the right password is encountered it sends command to open the door. In case of wrong password it sounds a small buzzer. This is a useful concept in places where the security needs to open gates quite usually or need to operate a door from a vehicle without needing to get down from it. And also when the person is inside the bedroom and someone knocks the main door then with the help of video monitoring in mobile for right person it can unlocked.

II. KEY LOCKING SYSTEM

The mechanical locks are the most common mechanisms for access control on doors and security containers. They are found in (and guard the entrances to) the vast majority of residences, commercial businesses, educational institutions, and government facilities, and often serve as the primary protection against intrusion and theft. As important as locks are in their own right, their design and function has also influenced much of how they think about security generally. Computer security and cryptology borrow much of their language and philosophy from metaphors that invoke mechanical locks mitting. The concept of a “key” as a small secret that allows access or operation, the notion that system security should be designed to depend only on the secrecy of keys, and even the reference to attackers as “intruders”, can all be traced back to analogies that long predate computers and modern cryptology.

Conversely, the design of mechanical locks could well be informed by the philosophy and methodology of computer security and cryptology. For example, formal notions of the computational complexity and other resources required to attack a system could be applied to the analysis and design of many aspects of mechanical locks. In general, however, these concepts have not enjoyed widespread adoption by locksmiths or lock designers. Computer security specialists, for their part, are often surprisingly unskeptical in evaluating claims of physical security.

III. SMART CARD ENTRY SYSTEM

A smart card is like an “electronic wallet”. Imagine the power of a computer, the speed and security of electronic data, and the freedom to carry that information anywhere on earth. Imagine a computer so small it fits inside a plastic card like the credit card you carry in your wallet. Smart card technology has been around for more than 20years. Since its first introduction into the market, its main application is for the payphone system.

As card manufacturing cost decreased, smart card usage has expanded. In May 1996, several companies including Microsoft, Hewlett-Packard and Schlumberger formed a PC/SC workgroup which aimed at integrating the smart card with personal computer (PC). This workgroup mainly concentrates on producing a common smart card and PC interface standards for the smart

card and PC software producers. Many of the interface standards and hierarchy have already been established. Some of these prototype products are now available on the market.

The security requirements of smart cards in personal communication system are two folds; they are authentication & protection of information. Security advantages achieved by the use of smart cards in security system are discussed. Smart card is required to perform three fundamental functions 1) To communicate with a host device. 2) To store data. 3) And to process data received by and stored in the card.

IV. ANDROID APPLICATION SECURITY SYSTEM

Here this uses an android phone to unlock a room door with the help of Wi-Fi communication. This system of opening the doors is more advanced and it provides security to the user in many of forms such as: By limiting the number of mobiles that are connected to it by using the MAC address of the android devices. It also provides a security by giving the users with a login id and its matching password these details are being stored in the database of the corresponding door circuit and if it matches then the user can login.

A) OPERATING MODULES

It has three operating modules. And they are as follows,

- Reception Part [PC & Wi-Fi modem]
- Door Circuit [Raspberry Pi, Motor driver, Motor]
- Android Mobile [Door Opener application]

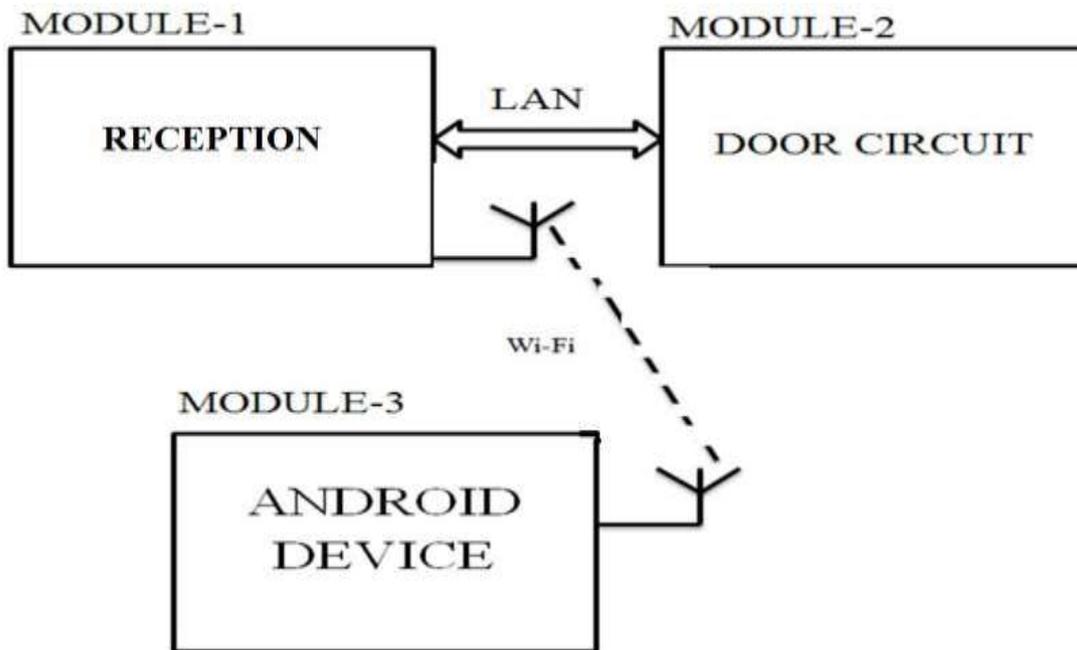


Fig.1. Operation Modules

1) RECEPTION MODULE

This module includes a PC for monitoring the database and a Wi-Fi modem which transmits and receives data between mobile and door circuit. The accessibility to database is limited/controlled by password such that on higher personnel can login for viewing details.

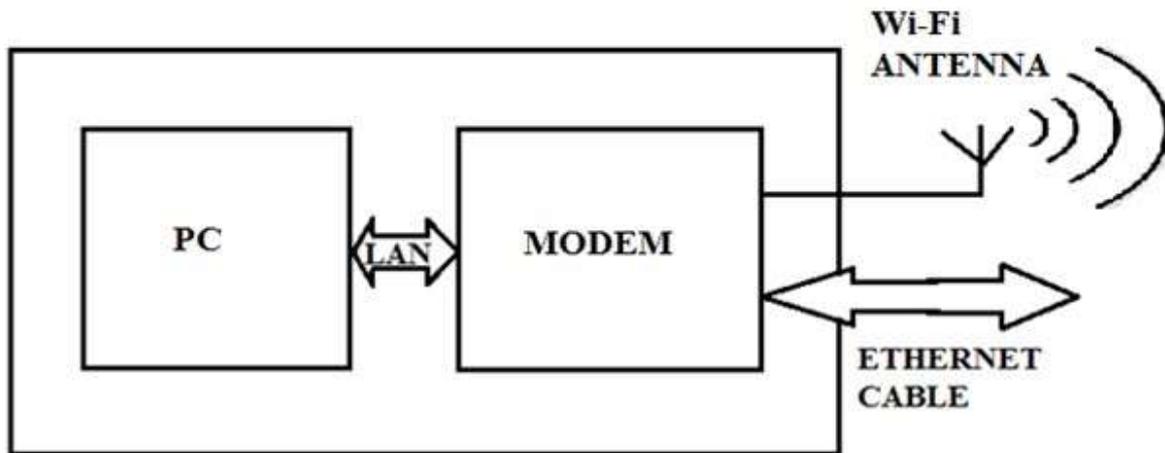


Fig.2. Reception module

a)PC

The PC is used for displaying all process that are being carried. It need to be ready with all necessary software supports. It requires following softwares installed :

- 1)phpmyadmin-for logging into the database of server.
- 2)filezilla-for making changes in the app at administrator level.

b)MODEM

Here I have used TD-W8951 ND modem for transmitting and receiving purposes. The TD-W8951ND connects to an Ethernet LAN or computers via standard Ethernet ports. The ADSL connection is made using ordinary telephone line with standard connectors. Multiple workstations can be networked and connected to the Internet using a single Wide Area Network (WAN) interface and single global IP address. The advanced security enhancements, IP/MAC Filter, Application Filter and URL Filter can help to protect network from potentially devastating intrusions by malicious agents from the outside of the network.

As soon as the guest enters in to the hotel his/her MAC Address of the device must be got and it must be registered to the Wi-Fi device and then he must be provided with the SSID & password for that id so that he can get connected to the Wi-Fi of the hotel. Then he can install the DOOR OPENER application in his android mobile by logging in to the server. Then he can login in to the corresponding room by getting the user name and password from reception. As soon as he gets the user name and password from reception he can move to corresponding room entrance door.

2. DOOR CIRCUIT

In this module there are three components. As soon as commands are received from the mobile through LAN cable to this module, these commands are sent to LAN controller chip of the pi board then it being verified and decoded by the processor. Then the commands are sent to driver circuit for processing the required action and the motor is being driven in either clockwise or anticlockwise as per requirement for locking or unlocking the door.

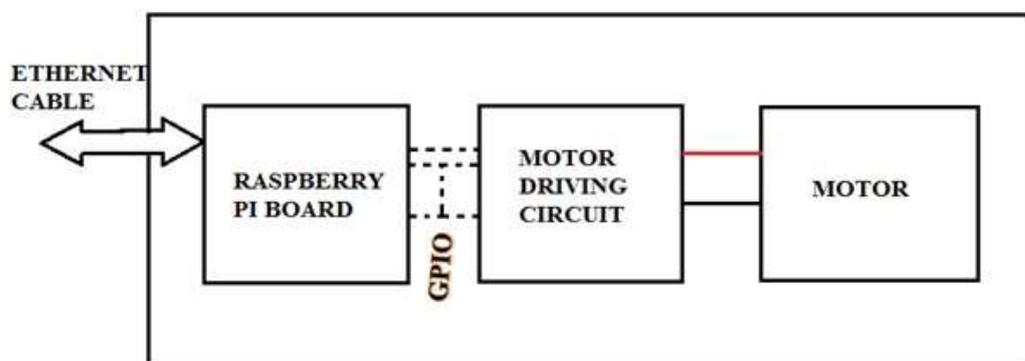


Fig.3. Door circuit

When the guest reaches the corresponding room he can login in to DOOR OPENER by entering the username and password that is provided by the receptionist. If there are many users for the same room then all will be provided with different user name and password, so that as each user logs in for opening/closing the room door he will be registered at the database with the time and date of login and logout.

The below flow chart explains the process that is being carried out.

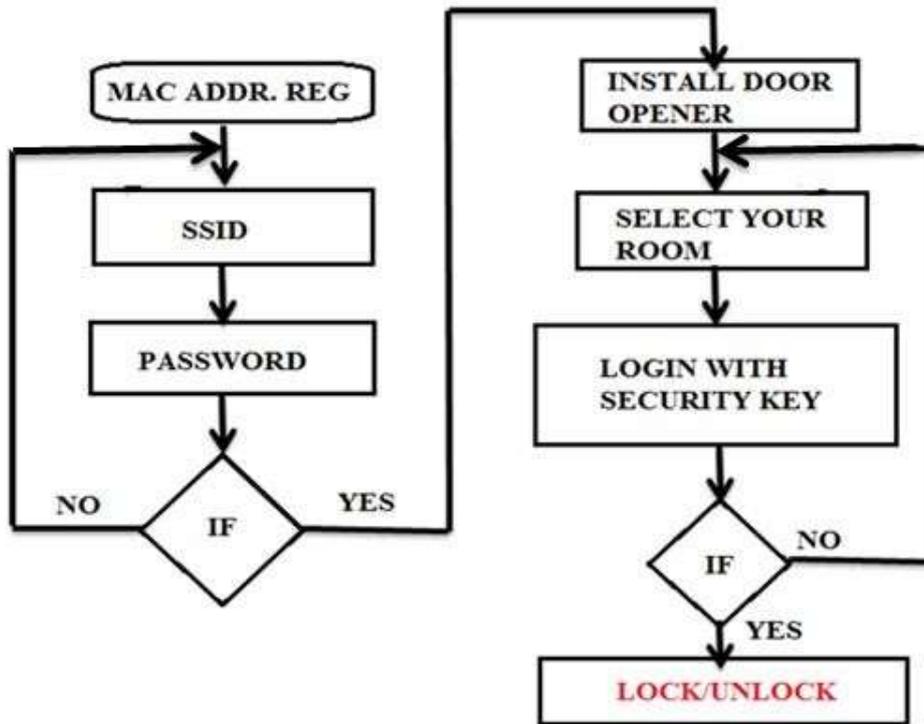


Fig.4.Flow diagram

V. RASPBERRY PI

The Raspberry Pi is a credit-card sized general purpose Linux computer designed and manufactured by the Raspberry Pi Foundation, a non-profit organization dedicated to making computers and programming instruction as accessible as possible to the widest number of people. Although the original mission of the Raspberry Pi was to get inexpensive computers with programming capabilities into the hands of students, the Pi has been embraced by a diverse audience. Tinkers, programmers, and DIYers across the globe have adopted the tiny platform ranging from recreating retro arcade cabinets to controlling robots to setting up cheap but powerful home media devices.

The Pi features a system on a chip setup built around the Broadcom BCM2835 processor (a tiny but fairly powerful mobile processor commonly used in cellphones) that includes a CPU, GPU, audio/video processing, and other functionality all on a low-power chip. Although the Pi is an amazing little device. The Raspberry Pi is not an outright replacement for desktop computer or laptop. It cannot run Windows on it (its ARM-based processor doesnot support x86/x64 code), although it can run many distributions of Linux including distributions with desktop environments, web browsers, and other elements. The Raspberry Pi is, however, an astoundingly versatile device that packs a lot of hardware into a very inexpensive body and is perfect for hobby electronics, setting up an inexpensive computer for coding/programming lessons and experiments, etc.,

VI.CONCLUSION

In this paper, a clearly growing awareness has been identified in society regarding the general security needs of people. Furthermore, as the purveyance of mobile technologies such as smart phones continues to increase, mobile applications will have unique opportunity to target security in a new way. In addition to the design issues, the dynamic nature of the mobile application market results in new applications constantly being released. Throughout the development of DOOR OPENER, competitors with similar products in the space had appeared and highlight the necessity of product differentiation if it is not possible to be the first to market. Even in a relatively peripheral category such as security applications, there are already dozens of applications attempting to address the issue of improving users needs.

Thus with the help of my design it could able to open the doors remotely with the help of android mobiles. This is a useful concept in places where the security needs to open gates quite usually or need to operate a door from a vehicle without needing to get down from it. And also when the person is inside the bedroom and someone knocks the main door then with the help of video monitoring in mobile for right person it can be unlocked. This system can be further enhanced to perform video monitoring of the people at the door and automatic opening of it.

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