International Journal of Scientific Research and Management Studies (IJSRMS)
ISSN: 2349-3771 **Volume 3 Issue 4, pg: 170-174**

REVIEW ON DIGITAL DOOR LOCK SYSTEM

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ABSTRACT
Technology has improved a lot in over the last few decades. One of the best and biggest technological advancement is the creation of "Smart Phones". Smart devices make life of a person easy and updated. There are hundreds of goods available today that allow us have power over the devices without human intervention, either by remote control; or even by voice command. Therefore in "Smart Lock" a micro controller and Wi-Fi module from the mobile device is used as smart lock system. The proposed system describes improvement of a security system that is integrated with an Android mobile phone device using Wi-Fi as a wireless connection protocol. Android OS is currently the go ahead on mobile market share while Symbian OS was already discontinued. This proposed system allows a user to lock or unlock a door over a short range from the door. The application was designed to allow the user to also check the status of the door. The mobile device requires a password to increase the security of the system. The hardware on the door uses a microcontroller to control a linear actuator that acts as the locking mechanism. The Wi-Fi protocol was chosen as a communication method because it is already integrated into many Android devices and is secured through the protocol itself. It also fits well into the design requirements of the project for a short range, wireless connection method. The system will be designed for security purposes.

KEYWORDS: *Microcontroller, Solenoid lock, Wi-Fi Module.*

I. INTRODUCTION

Various control systems have been designed over the years to prevent access to unauthorized user. The main aim for providing locks for our home, school, office, and building is for security of our lives and property. It is therefore important to have convenient way of achieving this goal. Today, most mobile phones are a 'smart phone', which offers more advanced capabilities in connectivity issues than regular cell phones. According to an investigate by ABI Research, at the end of 2013, 1.4 billion smart phones has been in use: 798 million of them run Android, 294 million run Apple's iOS, and 45 million run Windows Phone [7]. Smart phone usually support one or more short range wireless technologies such as Bluetooth and infrared, making it possible to transfer data via these wireless connections. Smart phone can provide computer mobility, ubiquitous data access, and pervasive intelligence for almost every aspect of business processes and people's daily lives.

One of the smart phone applications that have been developed is smart homes technology [8]. Smart home technology is the technologies that are used in homes with various apparatus converse over a local network. According to the Smart Homes Association the best definition of smart home technology is: the combination of technology and services through home networking for a better value of living. This technology can be used to monitor, alert and execute, according to the desired functions. Smart homes technology makes automatic connection with environment via Internet, telephone or regular fixed phones. Smart homes actually have the ability to make life easier and more proper. Home networking can also offer peace of mind. Whether you're at job or on holiday, the smart lock will aware you to what's going on, and security system can be built to offer some help in

emergency situations. For example, not only would a house owner be woken with warning of a fire alarm, the smart lock would also release doors, call the fire department and light the pathway to safety [9] .

The paper is divided in 4 sections. First section provides introduction about the idea of the paper. Second section is dedicated to the literature review which provides the related work done about the proposed idea. Third section gives the methodology and fourth section is the conclusion.

II. LITERATURE REVIEW

LiaKameliaetal [1] This paper gives overall idea of how to control home security for smart homes especially for door key locks. They used android based door lock system for indoor and outdoor key lock system. It also provides a secure system for Android phone users. This project based on Android platform which is Free Open Source i.e. it is easily available. So the implementation rate is inexpensive and it is reasonable for a common person. The wireless Bluetooth connection in microcontroller permits the system installation in more easy way. The system has been designed successfully and aimed to control the door condition using an Android phone which is Bluetooth-enabled via Bluetooth HC-05.

Smart Home is the term commonly used to define a residence that uses a home controller to integrate the residence's various home automation systems. The most popular home controllers are those that are connected to a Windows based PC. In this paper they have presented a part of smart home technology which is using Bluetooth in a mobile device, so it will more easy and efficient to use. It also based on Android and Arduino platform both of which are free open source software. In this paper, a system called door locks automation system using Bluetooth-based Android Smartphone is proposed and prototyped. First the hardware design and software development are described, then the design of a Bluetooth-based Smartphone application for lock/unlock the door are presented. The hardware design for door-lock system is the combination of android smart phone as the task master, Bluetooth module as command agent, Arduino microcontroller as controller centre / data processing centre, and solenoid as door lock output.

Shilpi Banerjeeetal [2]This paper gives detail information about system in which we can unlock the door by using pre-decided password. It increases the security level to prevent an unauthorized unlocking done by attacker. In case the user forgets the both passwords, this system gives the flexibility to the user to change or reset the password. This automatic password based lock system will give user more secure way of locking-unlocking system. First the user combination will be compared with prerecorded password which are stored in the system memory. User can go for certain number of wrong combinations before the system will be temporarily disabled. The door will be unlocked if user combination matches with the password. The same password can be used to lock the door as well. This system will give the user an opportunity to reset his own password if he wants.

Arpita Mishra etal [3] This paper proposed idea that in day to day life security of any object or place password based system plays a major role. This paper has considered about this and created a secure access for a door which needs a password to unlock the door. Using keypad it enters a password to the system and if entered password is correct then door is open by motor which is used to rotate the handle of the door lock. When it is entered incorrectly at the first time it will give three attempts to enter the password. Some extra features like adding new users and changing old password are configured by the keypad as usual. To display messages to the user LCD module is used. Now a day's most of the systems are automated in order to face new challenges to achieve good results. These systems have less manual operations, so the flexibility, reliabilities are high and accurate are there characteristics. Hence every field prefers automated control systems especially in the field of electronics.

The goal of the paper is to develop a unique system through mobile technology which can control various units of the houses, industries, and also provides a security system. The various appliances can be utilized by managing them remotely by using GSM technology, which enables the user to remotely control the operations of the appliances. Just by pressing keypad of remote telephone the user can perform ON/OFF operations on the appliances. The paper also exhibits low cost home security system which is widely employed in our daily life. This system is designed to prevent the opening of the door by unauthorized persons. The structure of home security system contains a matrix

key pad, the door latch opener and a GSM modem for the security dial up interfaced to the microcontroller. The keypad interfaced to the controller is used as the password entry system to open/close the door. As soon as the user enters the correct password, the door lock opens. If the password entered is incorrect, then a security alarm is rung and at the same time it enables the security dial-up through the GSM modem interfaced to the microcontroller. The GSM modem uses the UART interface to the controller. When the unauthorized person gives an invalid password then the controller uses the modem to inform the owner.

R. Piyareetal [4]This paper has proposed design and implementation of a low cost, flexible and wireless solution for home automation, especially or on/off the lamp and to on/off the television automatically. However, this is a basic system without advanced features like integration of RTOS, and also not has light sensors that are used to intelligently control the home appliances without human intervention. This system is designed to improve the standard living in home. The remote control function by smart phone provides help and assistance especially to disabled and elderly. In order to provide safety protection to the user, a low voltage activating switches is replaced current electrical switches. Moreover, implementation of wireless Bluetooth connection in control board allows the system install in more simple way. The control board is directly installed beside the electrical switches whereby the switching connection is controlled by relay. Wireless technologies are becoming more popular around the world and the consumers appreciate this wireless lifestyle which gives them relive of the well known "cable chaos" that tends to grow under their desk. Now with the embedded Bluetooth technology, digital devices form a network in which the appliances and devices can communicate with each other. Today, home automation is one of the major applications of Bluetooth technology. Operating over unlicensed, globally available frequency of 2.4GHz, it can link digital devices within a range of 10m to 100m at the speed of up to 3Mbps depending on the Bluetooth device class. With this capability of Bluetooth; they propose a home automation system based on Bluetooth technology. There are few issues involved when designing a home automation system. The system should be scalable so that new devices can easily be integrated into it. It should provide a user- friendly interface on the host side, so that the devices can be easily setup, monitored and controlled. This interface should also provide some diagnostic services so that if there is any problem with the system, it can be tracked down. Moreover the overall system should be fast enough to realize the true power of wireless technology. Finally the system should be cost effective in order to justify its application in home automation.

D. Javale et.al [5] This paper gives basic idea of how to control various home appliances and provide a security using Android phone/tab. This project is based on Android and Arduino platform both of which are FOSS(Free Open Source Software). So the overall implementation cost is very cheap and it is affordable by a common person. Looking at the current scenario they have chosen Android platform so that most of the people can get benefit. The design consists of Android phone with home automation application, Arduino Mega ADK. User can interact with the android phone and send control signal to the Arduino ADK which in turn will control other embedded devices/sensors.

Home automation is automation of the home, housework or household activity. Home automation may include centralized control of lighting, HVAC (heating, ventilation and air conditioning), appliances, and other systems, to provide improved convenience, comfort, energy efficiency and security. The concept of home automation has been around for a long time and products have been on the market for decades, though no one solution has broken through to the mainstream yet. Home automation for the elderly and disabled can provide increased quality of life for persons who might otherwise require caregivers or institutional care. It can also provide a remote interface to home appliances or the automation system itself, via telephone line, wireless transmission or the internet, to provide control and monitoring via a smart phone or web browser. This paper will describe the approach which we are implementing to control various home appliances with Android smart phone.

Pei Zhengetal [6]This paper proposed information that Smart phones usually support one or more short range wireless technologies such as Bluetooth and infrared, making it possible to transfer data via these wireless connections. Smart phone can provide computer mobility, ubiquitous data access, and pervasive for almost every aspect of business processes and people's daily lives. The next generation mobile computing will create a fantastic world in which we will be able to enjoy predecendent level of communication, computing and entertainment. The power of convergence of data access and pervasive mobile intelligence enabled by smart mobile devices such as smart phones

is the driving force behind this wave of computing. They discussed experience about many exciting technological breakthroughs and innovations of mobile computing in the next several years.
All research that mentioned above, inspired our research to make a research about the device that providing a safe and efficient solution for controlling home automation. The first step to build a smart home is about the security and the door is the major device for security system.

III. METHODOLOGY

The result which we expect from our project is a system that is used to lock and unlock the door. Rather than using a key, it uses a command in the form of a password .The password would be pre-decided. Due to use of password only authorized users would be allowed to access the door thus increasing the security level. The use of electronic lock using Bluetooth module and Android smart phones in addition to providing ease of use, also provide better security than conventional key. The system is basically designed to simulate an electronic key, which is controlled through a Wi-Fi-enabled smart phone. Controlling conducted by sending a command via Android smart phone to Wi-Fi module and then to the Microcontroller circuit that acts as a connection between Android smart phone and lock.

IV. CONCLUSION

This paper gives basic idea of how to control home security for smart home, especially for door key locks. It also provides a security and easy for Android phone users. This project based on Android platform which is Free Open Source Software. So the implementation rate is inexpensive and it is reasonable by a common person. With the wireless Wi-Fi connection in microcontroller permits the system installation in easier using an Android Wi-Fi-enabled phone and Wi-Fi modules. Future scope of our project is very high. We have discussed a simple prototype in this paper but in future it can be extended too many other regions.

ACKNOWLEDGMENT

We would like to take pleasure in thanking MIT Group of Institutions for giving this opportunity to develop this project. With great pleasure, we wish to thank to Mr Amit Saxena (project co-ordinator) for his valuable guidance and cooperation as and when needed. We would also like to express our gratitude to Prof. Kshitij Singhal (HOD-EC Department, MITGI) for his valuable cooperation.

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