Android based Security Lock System with Password Reconfigurable Option using Bluetooth and Microcontroller

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***Abstract*: Our essential motive of designing this tool is to provide a greater secured multilevel protections and password reconfigure Options Using PAN (Personal Area Network) protocol gadgets like Bluetooth and Microcontroller. Android clever telephone are included to this protection locks to provide a GUI (Graphical User Interface) for customers to have greater flexible and right away accusable. The APK(Android Package Kit) connecting to device are advanced beneath the assist of android improvement platform MIT app Inventor .This form of protection locks will provide a greater low-fee ,secured ,smooth to put in and loose from thefts .**

***Keywords*: PAN (Personal Area Network), Bluetooth, Microcontroller, GUI (Graphical User Interface),MIT app Inventor**

1. Introduction

We see many issues over the society with conventional locks getting theft with duplications of keys and nameless tools .To triumph over this shape of problems this Android based totally completely safety locks with Microcontroller , offer a higher answer with multilevel of securities and greater reachable GUI to purchaser to address in all path of elements. This kind of locks may be used for automobile Ignition starters, schools, hospitals, domestic, banks and other main sectors. As this locks are incorporated to android programs its easy and greater secured to us. The systems reduces the crime and an un_authorizers getting access to our premises .As using PAN devices like Bluetooth there is no alternative using of conventional keys .Hardware circuits relating our safety locks may be placed inside the walls of premises ,So the un_authorizers can't assume the location place of wi-fi protection lock. As the password may be with maximum duration with special characters it is going to be tough to expect with the aid of unknown women and men entering to skip the security. Even the legal person phone is accessed however converting password are blanketed with login templates.

2. Literature survey

Referring to researches positioned assisting in making ready the device It's a superb idea of door open and close to motion constructed for handicap peoples regarding[1] .This allows the handicaps to manipulate the door moves wirelessly integrating to android smart cellular telephone .Its create a comfy living zoon to otherwise in a position peoples. But decided with lack of safety issues.

Studding the idea of Bluetooth Security lock and not using a reconfiguring of password referring[2],Single password could be set default of the device a whole lot protection not supplied ,safety is furnished handiest with android application GUI(graphical customer interface). The Study on [3] offer heaps greater informative wherein a safety lock designed with a hex key pad with password reconfigure alternatives which facilitates hundreds for designing our system to precise way .But handiest the downside become the device have become not in to wireless safety machine and value will be high due to more hardware and insecure due to whole hardware usage this leads a thefts through bad the tool. Applying a security over automobile with GSM and GPS [4], its feels greater insecure over some distant places .The mobile networks are more obligatory to have. Providing safety all over again with lot of resources can simplest furnished for peoples who're rich [5], keeping server and connecting from multiple nameless network gadgets might also bring about mot an entire lot cozy. Studding

3. Hardware and software

A. Hardware

A set of digital modules are used to prepare a wi-fi Android based totally security locks which are briefly described inside the subsections.

1) Arduino UNO

Fig. 1. Arduino uno development board

It's a microcontroller based totally platform which might be utilized in rapid prototyping, product development and different custom designed packages. Seeing all component and necessities of designing our safety tool it's enough and more

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finest[11][9].It has various functions of elements we use few of them in our initiatives, UART protocol to connect Arduino, Bluetooth and Android utility, I/O ports to address relay lock ON/OFF, EEPROM to store if user adjustments the password.

2) Bluetooth

It is a PAN (Personal Area Network device) used for short distance of conversation Bluetooth Module Features Support Master & Slave Mode Serial communications and it works with Frequency: 2.Four~2.524 GHz. Over the designing of the Wi-Fi security lock device, we are ideally the usage of HC-05 module. HC-05 are smooth to integrate with Arduino and provide a safety parameters earlier than connecting device. But there may be an issue with Bluetooth HC-05 Like the default password and baud price needs to be changed otherwise it might be easy to unauthorizers having access to Our safety tool ,So with the help of AT commanding [8] can be configured with desired password and person names.

Fig. 2. Bluetooth HC-05 module

3) Relay

Relays are electromagnetic device, electrically operated switch Where the Mini Electromagnetic lock which works with 12V to 24V, this 5V relay coil will work as intermediate between the controller and the actuator and helps open and locking system.

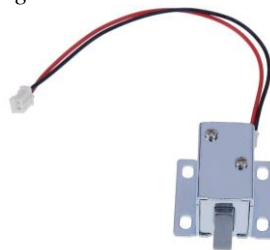Fig. 3. Electromagnetic relay

4) Mini Electromagnetic lock

Fig. 4. Rrimin Lock Cylinder Mini Electromagnetic Control

The lock frame is product of iron cloth, hard and stable low power intake voltage 6V/12V/24V three specs, contemporary is handiest approximately 350mA/600mA/1.2A, strength instantaneous trigger release symmetrical design, vivid processing, irrespective of the advantageous, terrible, left, proper, generic installation, handy protection anti vibration,

anti-prying, drilling, open design generation for an expansion of merchandise of cupboard. This module will get included to 5V relay.

5) Step down converter

Where most of the hardware modules of the security lock are works with 5v of supply so need a protective and regulated supply .Using the below device we can achieve that.
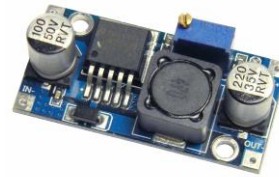

Fig. 5. DC DC Converter LM2596 step down

B. Software

Programming of microcontroller and APK for android .we need an IDE (Integrated Development Environment),which provides integrated library functions and tools for designing.

1) Arduino IDE

Fig. 6. Arduino IDE

The open-source Arduino Software (IDE), which helps to develop code and upload them to Arduino based boards we have used 1.8.3 version for programming [11].

2) MIT App inventor

Fig. 7. App inventor

It's an online based android app development and editor tool uses a block code technique that helps in rapid apk development [6].

4. Methodology

Block diagram shows the Android Based Security lock system with Password Reconfigurable option using Bluetooth and Microcontroller. The Fig6 describes the architecture of the complete application of wireless security lock system, initially The user has to install Bluetooth security lock Apk to Android smart phone once after finishing of installation. Start paring the corresponding Bluetooth module HC-05 connecting over the security lock by entering Bluetooth module valid password .Once Bluetooth module is connected it will be listed over the connected devices then select the module and its ready to send the security passwords to destination lock .Enter the valid password which have been saved in the hardware EEPROM

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memory of security lock and with user requirement of open and closing of lock select on open/close button. The device also provides sound alerts and status of lock with help of status leds during entering of wrong passwords, lock open / closing and configuration of new passwords this helps in alert the area with un_ authorizers accessing the device. At any time the valid user can change the device password there is an option of password configuration that to will be secured by password so even though accessing the user mobile by un_ authorizers can don't have option of accessing or changing the password .Each of the time password are sent by user from his mobile a prefix will be added and sent that's only known developer of the device and another advantage of device is the lock will close automatically once open by the user it is done by using timer function so not to wait for user to close the door or user forgotten close the lock ,As we said our main objective is provide a multilevel ,low-cost secured security system and more convenient to handle by user with all our study this prototype provide maximum efficient of security comparing with conventional locks.

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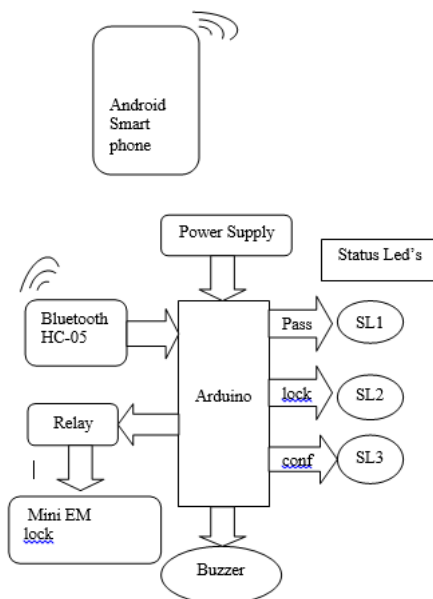
5. Flow chart

A. Workflow diagram

Fig. 8. Block diagram shows the Android Based Security lock system with Password Reconfigurable option using Bluetooth and Microcontroller

The Fig. 8, describes the architecture of the complete application of wireless security lock system, initially the user has to install Bluetooth security lock Apk to Android smart phone once after finishing of installation. Start paring the corresponding Bluetooth module HC-05 connecting over the security lock by entering Bluetooth module valid password .Once Bluetooth module is connected it will be listed over the connected devices then select the module and its ready to send the security passwords to destination lock .Enter the valid password which have been saved in the hardware EEPROM memory of security lock and with user requirement of open and closing of lock select on open/close button. The device also provides sound alerts and status of lock with help of status

Fig. 9. Shows the workflow of security lock system
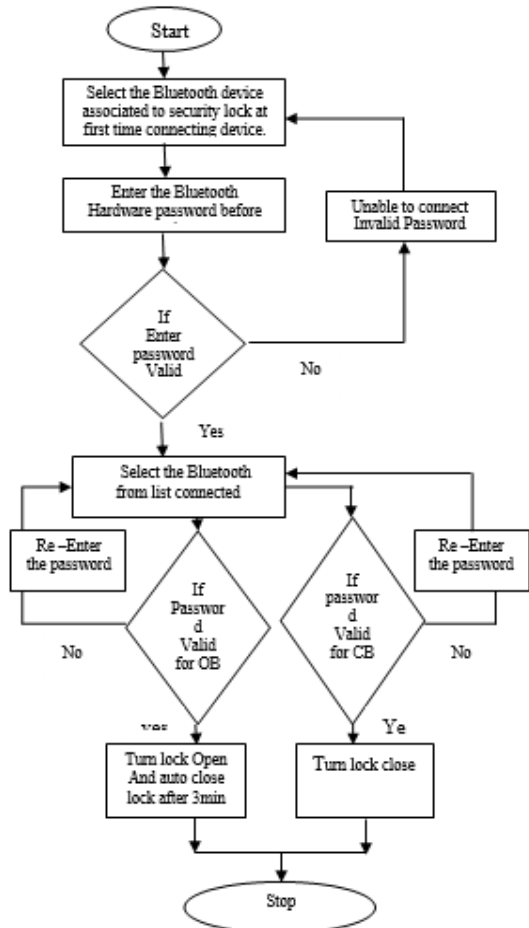
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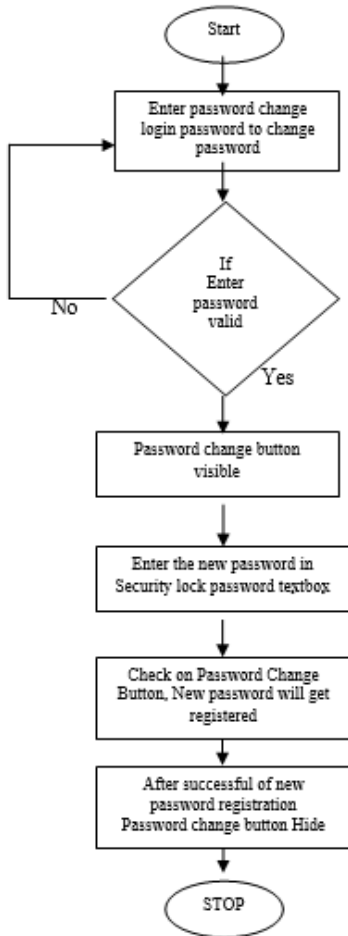*B. Flow diagram for Password reconfiguration*

Fig. 10. Shows the Password configuration of security lock System

The Fig. 9, PB (open Button) and CB (Close Button) functions over the lock and Fig8 shows the password reconfiguration of the security lock system. Its explains the multilevel of security the user has to enter before accessing a security lock.

6. Result and discussion

The below Pictures demonstrates outcome of the device designed and describes the complete working. Each of the images are attached based on the output results and testing of the device.

A. Modules of prototype

Fig. 11. Status Led's with Buzzer for user to know the status of the device and alert during wrong password entries.

Fig. 12. Internal Circuitry of Android Based Security lock system with Password Reconfigurable option using Bluetooth and Microcontroller
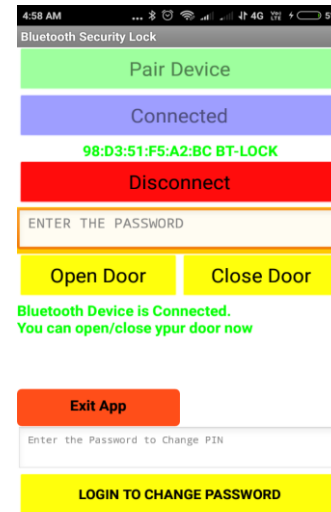

Fig. 13. Mini Electromagnetic Lock

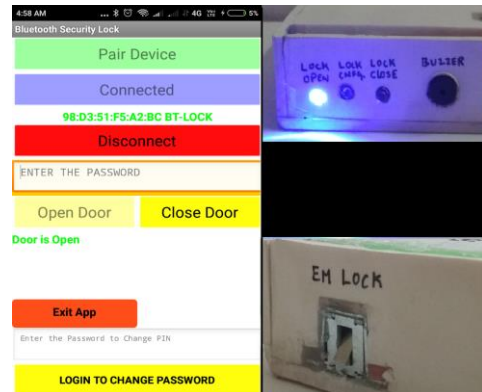Fig. 14. GUI (Graphical user Interface) Integrating Security lock, using smart android phone

Fig. 15. Lock status During OPEN Command.

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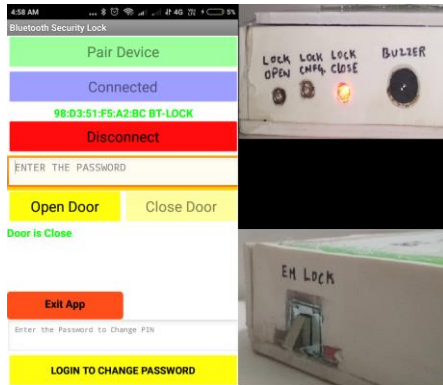www.ijresm.com | ISSN (Online): 2581-5792

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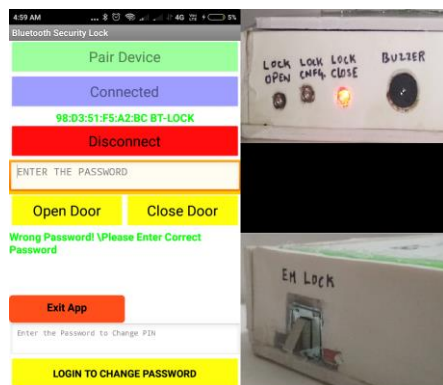Fig. 16. Lock status During CLOSE Command.

Fig. 17. Lock status During WRONG password Entry, Buzzer will turn on for certain duration.
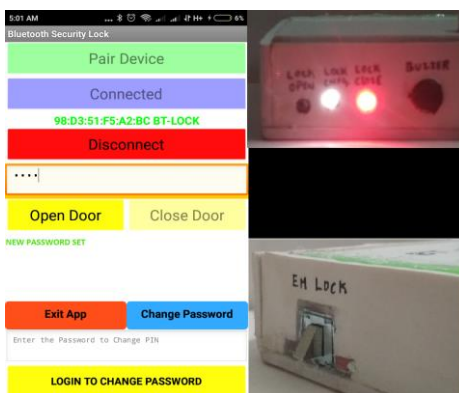

Fig. 18. User set with NEW PASSWORD

7. Conclusion

This is an ongoing assignment. This paper gives primary idea of the way to manage domestic protection for smart domestic, mainly for door key locks. We use solenoid door lock device as a prototype for indoor and outside key lock machine. It additionally provide a safety and smooth for Android mobile phone/tab customers. This venture based on Android and Arduino platform each of which can be Free Open Source Software. So the implementation rate is inexpensive and it is low-priced through a common person. Accomplishment of wi-fi Bluetooth connection in microcontroller permits the device set up in extra easy manner. The device has been efficaciously designed and prototyped to manipulate the door state of affairs the usage of an Android Bluetooth-enabled Smartphone and Bluetooth modules through Bluetooth HC-05. We have noted a simple prototype in this paper however in destiny it can be prolonged to many different regions.

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