Door Unlock Control System By Android Using Raspberry Pi

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Abstract- *In today's technology driven world, smart home control system is a must need tool in daily life. The most popular home controllers are those that are connected to the wi-fi or mobile phones. This paper presents an idea of lock system for operating door without a control to open or lock it that brings a comfort and can be applied effectively. It is based on Android and Raspberry Pi platform with a use of network. The hardware design for door-lock system comprises of the combination of smart phone as the master, Bluetooth module as command agent, Raspberry Pi as controller centre / data processing centre, tiny camera, solenoid as door lock output and a few necessary modules, sensors and internet access to Raspberry Pi. People without internet access can lock/unlock the door by connecting to the raspberry pi using Bluetooth and sharing the password with it. A camera module is attached to the board which can used to track the movement in front of the door. In case of fire, detected by the fire sensor connected to the Raspberry Pi, the door will be automatically unlocked.*

Keywords- Bluetooth, Door unlock, IoT, Raspberry PI

I. INTRODUCTION

Privacy is a primary concern for each and everyone in the world. Lock system is one of the major systems needed by human as it is involved in protecting their privacy. It is mainly because human needs a security to put all their things or they want into the places that can only be accessed by themselves.

The lock concept was invented several centuries ago. As the use of Internet of Things (IoT)technology developed, the conventional lock has also been revolutionised and innovated. The development and the innovation on the conventional lock are aimed at decreasing the weakness it possessed. Then, there appear several designs of lock system utilizing IoT technology in which the application enables people to operate it. We come across many issues in the society where houses with conventional locks getting theft with duplications of keys and anonymous tools .To win over this shape of problems, Android based, with the use of completely safety locks and with Microcontroller, offers a greater answer with multilevel of securities and higher reachable GUI to user to address all path of leaks. As these locks are incorporated to android programs its easy and highly secured to us. The system reduces the crime and an un-authorized 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 door protection lock. As the password will be of maximum length with special characters it is going to be tough to crack the password. Even if systems security is bypassed to steal the password, it will impossible to know the actual password as it will be stored only after encrypting.

II. SYSTEM IMPLEMENTATION

The system is implemented using following hardware components:

A. Raspberry pi Board

It's actually the control board [Fig 1] which communicates with the Android Apps and triggers the door strike based on the command received from Android Apps.
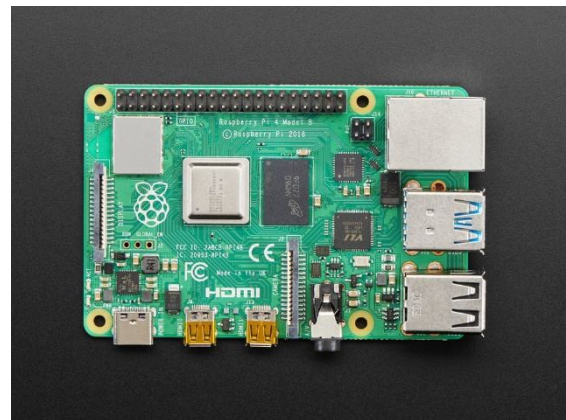

Fig. 1 Raspberry pi Board

B. GSM Module

SIM808 module is a complete Quad-Band GSM/GPRS module which combines GPS technology for satellite navigation. The compact design which is integrated GPRS and GPS in a SMT package will significantly save both time and cost for customers to develop GPS enabled applications. Featuring an industry-standard interface and GPS function, it allows variable assets to be tracked seamlessly at any location and at any time with signal coverage.

Fig. 2.GSM Module

C. Electric Door Strike

An electronic lock (or electric lock) is a locking device which operates by means of electric current.

Fig. 3 Electric Door Strike

D. Flame Detector

A flame detector is a sensor designed to detect and respond to the presence of flame or fire.

Fig. 4 Flame detector

E. Camera module

A camera module is portable light weight camera that supports Raspberry pi. It communicates with Pi using MIPI camera serial interface protocol.

Fig. 5 Camera module

III. ARCHITECTURE OF THE SYSTEM

In this section the explanation of theproposed architecture of the Smart door unlock control system is proposed completely and in detail.
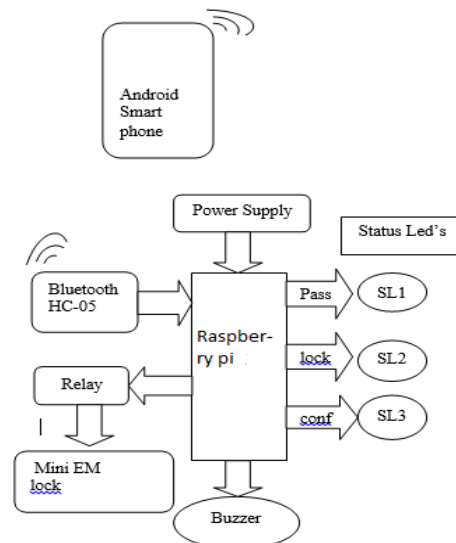

Fig. 6

The Fig. 6, 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 LED's during entering of wrong passwords, lock open / closing and configuration of new passwords this helps in alert the area with unauthorized people accessing the device. At any time the valid user can change the device password there is a option of password configuration and 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 .

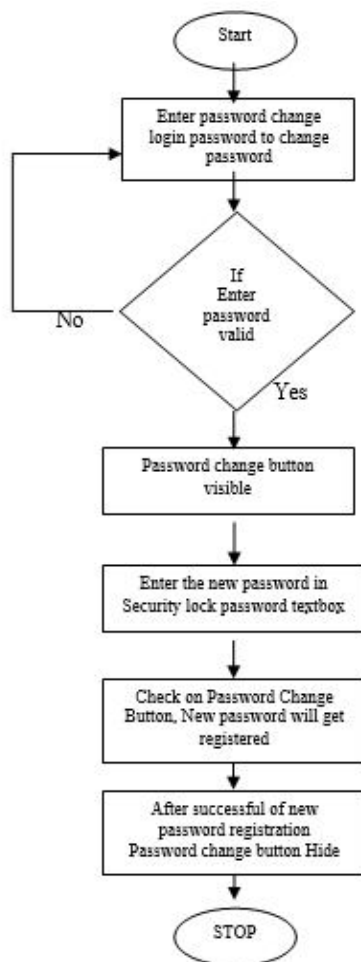Flow diagram for password reconfiguration.

Fig. 7

A fire detector sensor is also installed so as to unlock the door in case of any fire emergencies.
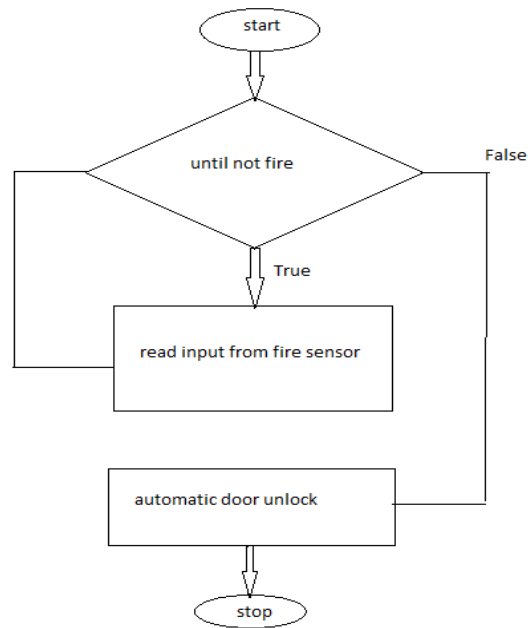

Fig. 8

IV. CONCLUSION

This work applies the common trend of smart home by integrating smart devices with home appliance to be automated. We use electric door strike device as a prototype for indoor and outside key lock machine and a camera to record the activities outside the door. This venture based on Android and Raspberry pi 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. 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.

V. FUTURE WORK

For the next research work, the implementation of the prototype can be modified by adding speech recognition feature. The authentication can be integrated by voice user recognizer. So, the security of the door automation system will be more unique and more interactive.

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