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Android Password based Door Opener System

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Abstract: This project presents a prototype security door that can be remotely controlled by a GSM phone set acting as the transmitter and another GSM phone set with a dual tone multi-frequency (DTMF) connected to the door motor through a DTMF decoder interfaced with micro controller unit and a stepper motor. The design is composed of four main functional modules, namely; the GSM module, the IR SENSOR module, GAS SENSOR module and the FIRE SENSOR module. The GSM module act as both transmitting and receiving unit employs the use of a mobile phone set serving as the communication device between the user at one end and the object of access (i.e. the door) at the other receiving end. The codes for this project was written in Embedded C language with Android application compiled by visual studio and keil software , the program run without error before it was burn onto the micro controller using a device called the programmer by placing the micro controller on it socket equal to the pin number.

Keywords: GSM, Microcontroller, IR sensor, Security, Gas sensor, Fire sensor, Buzzer, Android application.

1. INTRODUCTION

Our project aims at remote password based door opener system through an android application. As soon as commands are sent through the android device using GSM as medium. These commands are then sent to the 8051 microcontroller.[1] The microcontroller 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. The authorized person needs to present near the door he/she just need to enter the right password through his/her android application in order to unlock the door. Increase the security level to prevent an unauthorized unlocking of the door, give the flexibility to the user to change or reset the password in case the user forgets that combinations, lock the door by using password, to give user more secure yet cost efficient way of door locking system. SMS will also be utilized for remote switching and control activities. This flexible home control and monitoring system control using an embedded micro-web server, IP connectivity for accessing and control devices and appliances remotely using android base smart phone application. The project intends to interface the micro controller with the GSM modem and start/stop the engine by sending the predefined messages from the mobile phone to the controlling unit, The software application and the hardware implementation help the micro controller read the messages sent by the user from a mobile phone or send messages to the mobile phone through the modem and accordingly change the status of the engine motor required. The measure of efficiency is based on how fast the micro controller can detect the incoming message and act accordingly. The system is totally designed using GSM and embedded systems technology. The Controlling unit has an application program to allow the micro controller read the incoming data through the modem and control the engine motor as per the requirement. The performance of the design is maintained by the controlling unit. Digital door lock has been one of the most popular digital consumer devices replacing a lot of conventional types of locks because of the user convenience and affordable price. It is a kind of electronic locking system that operates by the combination of digital key, security password or number codes providing higher secure protection with reliability over the conventional locking systems. Therefore, it is a good digital device appropriate for checking the access information and controlling the door on or off because everyone has to access to the door lock to go inside or out.

2. MY PROJECT

This system demonstrates a circuit named Password Protected Lock System Designed using Microcontroller where in once the correct code or password is entered, the door is opened and the concerned person is allowed access to the secured area. After some time, the door would close. Again if another person arrives and fails to enter the correct password, the door would remain closed, denying access to the person Many times we forgot to carry the key of our home Or sometimes we come out of our home and door latch closes by mistake. In these cases it is really difficult to get inside the house. This project is designed to solve this purpose.[2] Main concept behind this project is of a door latch opening using a password entered through keypad. As well as turning on the Buzzer when password is entered wrong for multiple times. User can change this password anytime he/she wish using a keypad The main component in the circuit is 8051 microcontroller. Here, 4×3 keypad is used to enter the password. The entered password is compared with the predefined password. If it is correct password, the system opens the door by rotating door motor and displays

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the status of door on LCD. If the password is wrong then door remains closed and displays password is wrong will on LCD.

3. EXISTING AND PROPOSED AUTHENTICATION METHOD

The existing system largely consist of physical locks and keys. It can cause security issues in case of burglaries. The problem is that every time we need a physical existence and key to open the door. There is no security the intruders can use their intelligence to open the door and they can do any crime especially stealing activities. If there is any gas leakage or fire we cannot detect it.With the help of this system, we can easily avoid the incoming of any offenders and strangers too. The system tends to make secure door opening mechanism so that the door only unlocks when a authorized person opens it by entering the right password. If Gas or fire sensor detects any gas leakage or fire respective sensor will detect and it will give siren and along with that it will send message using GSM. And if any intruder comes the door it will sense using IR sensor and it gives siren. And using LCD display it displays everything.Keyless system, hence no more worries of losing of keys.Since, it is the system having password facility, provide security as well.Increases the security level to prevent an unauthorized unlocking of the door.Gives an indication for unauthorized entry.It avoids any crimes especially stealing activities.

The authorized person needs to present near the door he/she just need to enter the right password through his/her android application in order to unlock the door. [3] Increase the security level to prevent an unauthorized unlocking of the door, give the flexibility to the user to change or reset the password in case the user forgets that combinations, lock the door by using password, to give user more secure yet cost efficient way of door locking system.

4. SYSTEM DESIGN

The system design of the proposed android password based door opener system as a follows:

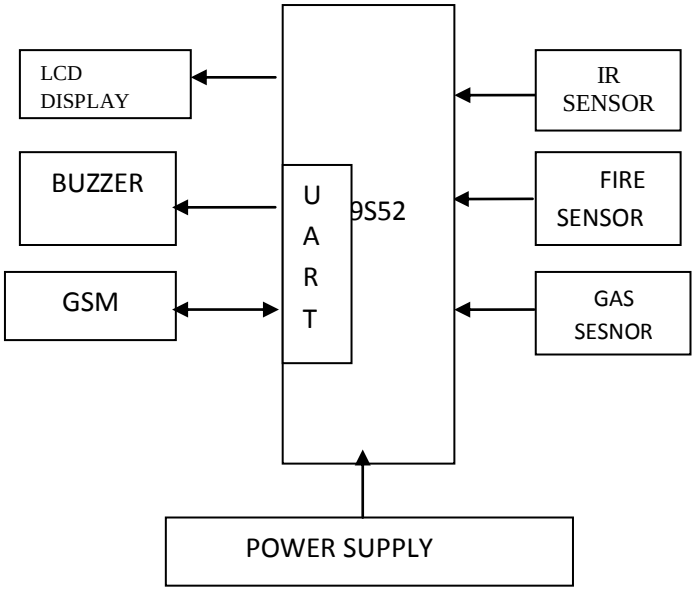

Fig 1: Block Diagram

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The microcontroller based door locker is an access control system that allows only authorized person to access a restricted Area. The system is fully controlled by the 8 bit microcontroller 8051 which has a 2Kbytes of ROM for the program memory. The password is stored in the EPROM so that we can change it at any time. The system has a keypad by which the password can be entered through it. When the entered password equals with the password stored in the memory then the relay gets on and so that the door is opened. If we entered a wrong password for more than three times then the BUZZER is switched on.
Microcontroller: This is the CPU (central processing unit) of our project. We are going to use a Microcontroller of 8051 family. The various functions of microcontroller are like:
I. Reading the digital input from Keypad
II. Sending this data to LCD so that the person operating this project should read the password
III. Sensing the password using keypad and to check whether it is a correct password or a wrong Password and rotate the stepper motor if the password entered is a correct password.
IV. Sending the data to the computer using serial port. This data consist of the status of entered Password (Correct/wrong) LCD We are going to use 16x2 alphanumeric.

Liquid Crystal Display (LCD) which means it can display Alphabets along with numbers on 2 lines each are containing 16 characters. Buzzer We are going to use a buzzer to indicate the wrong password to open the door. Keypad User will enter the password using the keypad.[4] **A** GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone. A GSM modem can be a dedicated modem device with a serial, USB or Bluetooth connection, or it can be a mobile phone that provides GSM modem capabilities. Cell horizontal radius varies depending on antenna height, antenna gain and propagation conditions from a couple of hundred meters to several tens of kilometres. The longest distance the GSM specification supports in practical use is 35 kilometers (22 mi). GSM networks operate in a number of different carrier frequency ranges.
2G GSM networks operate in these frequency 900 MHz or 1800 MHz bands if these bands were already allocated, the 850 MHz and 1900 MHz bands were used instead. 3G networks in Europe operate in the 2100 MHz frequency band.GSM is divided into timeslots for individual phones to use. It is divided into 8 timeslots and made into TDMA frame.
The channel data rate for all 8 channels is 270.833 Kbit/s.[5] The transmission power in the handset is limited to a maximum of 2 watts in GSM850/900 and 1 watt in GSM1800/1900.
The features of GSM system are:Subscriber Identity Module-One of the key features of GSM is the Subscriber Identity Module, commonly known as a SIM card. The SIM is a detachable smart card containing the user's subscription information and phone book. This allows the user to retain his or her information after switching handsets. The user can also change operators while retaining the handset simply by changing the SIM.Phone Locking- Mobile network operators restrict handsets that they sell for use with their own network. This is called locking and is implemented by a software feature of the phone. SIM Service Security-GSM was designed with a moderate level of service security. The system was designed to authenticate the subscriber using a pre-shared key and challenge-response. GSM only authenticates the user to the network. GSM uses several cryptographic algorithms for security. The system supports multiple algorithms so operators may replace that cipher with a stronger one.Liquid crystal display (LCD) offers several advantages over traditional cathode ray tube that makes them ideal for several applications. Of course LCD's are flat and they use only a fraction of power required by cathode ray tubes.Gas Sensor: This alcohol sensor is suitable for detecting alcohol concentration on your breath, just like your common breathalyzer. It has a high sensitivity and fast response time.The Fire sensor is used to detect fire flames . The module makes use of Fire sensor and comparator to detect fire up to a range of 1 meter.IR Sensor: Operating Voltage 5vSensitivity up to -6cm –Adjustable, Logic output - 1/0 -5v,Application - line follower Robots.

5. DESIGN IMPLEMENTATION

The main objective of this project is unlock a door by an android application using a unique password entered through the android application device. Opening and closing of door involves human labor. In this proposed system, opening and closing of a door is achieved by using an android application. [6] The owner can connect android application device to the system through GSM, which in term to connected to a microcontroller controlled door that can open/close the door by entering the password. This method is very convenient as one doesn't have to get down of his car to open/close the door physically. Remote operation is achieved by any smart-phone/tablet etc., with android OS, upon a GUI based touch screen operation. This project is based on the android application, android application send data through GSM. Another GSM 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 design of a door locking security system using GSM is a complex design which comprises of so many modules (parts) brought together to form the overall

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design. Each of these modules is made up of discrete components that are joined together to achieve a particular purpose. These separate modules are: The Power Supply Unit, The Buzzer Unit, The micro controller Unit, Telephone unit and Switching.These different units cannot function alone, they all need to function together to achieve the desired result.

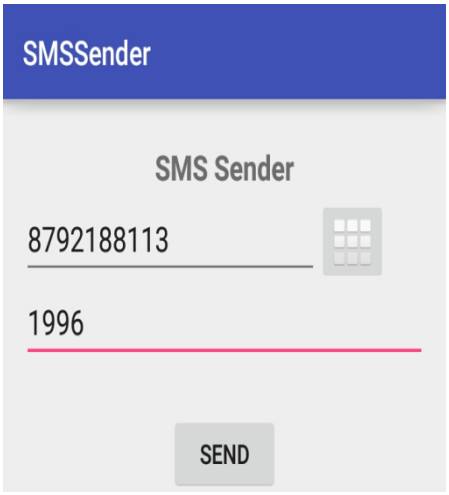

Fig 2: screen shot of android application

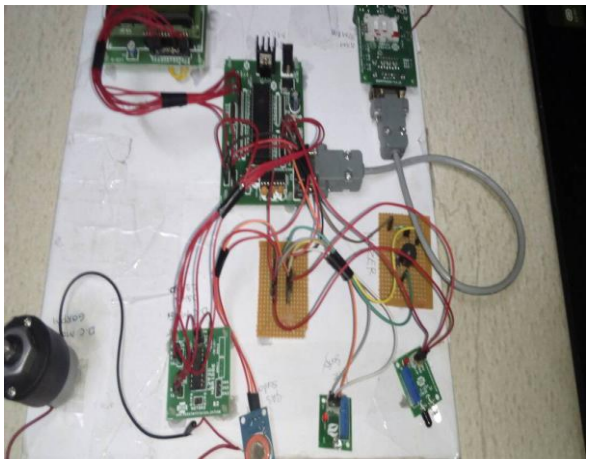
Fig 4: Hardware Tool Kit

The GSM modem received tone from the GSM network as shown by the direction of the arrow in the diagram below and transmit same to the DTMF decoder but the current value was very small (i.e. about 0.1mA) it was step-up by the tone transformer so that it could be decode by the DTMF decoder which then send the decoded codes to the microcontroller for processing and outputting to relevant component to act accordingly. Embedded C uses KEIL IDE software. The system program written in embedded C will be stored in Microcontroller. The following are some of the major reasons for writing programs in C instead of assembly. It is easier and less time consuming to write in C then assembly. C is easier to modify and update. You can use code available in function libraries. C code is portable to other microcontrollers with little or no modification.

6. ADVANTAGE AND DISADVANTAGE

The goal of the project 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. Unlock the door by using pre-decided password. Increase the security level to prevent an unauthorized unlocking of the door. [7] To prevent the opening of the door by unauthorized persons. Flexibility to the user to change or reset the password More secure yet cost-efficient way of door locking-unlocking system.Contains a matrix key pad, door system and a GSM modem for the security dial up interfaced to the micro controller. The keypad interfaced to the controller is used

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as the password entry. As soon as the user enters the correct password, the door lock opens. Keyless system, hence no more worries of losing of keys.Since, it is the system having password facility, provide security as well.Increases the security level to prevent an unauthorized unlocking of the door.Gives an indication for unauthorized entry.It avoids any crimes especially stealing activities.

7. CONCLUSIONS

The android application can be operated from any device running on android os and uses GSM as a medium for sending the commands This project is very helpful for disable persons, used at residential places to ensure better safety,it can be used at organization access to highly secure places .Thus, it provides ease of access, can control the device from long distance. he work was done successfully. It is evidence that the use of keypad with the right circuitry can be used to operate a security system.These systems have the ability to accesses a secure place (house, ATM, industries, office etc.). A password based recognition system can easily perform variation. In variation the system compare an input password to the enrolled password of a specific user to determine, if they are form the same password. Now the security of our home, office etc. The objective of this paper is to develop a model, which create a security interface to an Android mobile device and home appliances. It is also to be a short range system that is simple to use. The range and security aspects are achieved through the use of the on board Bluetooth radio of the mobile device. The system is able to actuate a pin to lock or unlock a door from a short distance away with the push of a button on the mobile device. It could also check the status of the door. The system also had a physical key included as a backup. Future work would include the design and building of a battery backup system. Improvements to the locking mechanism could also be another aspect for future work. This project could also be expanded to multiple doors and windows. It can be coupled with existing home automation devices to add thoroughness and completeness to the system.

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