

Touchscreen and SMS Based Door Locking System

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Abstract

This project is a prototype of "Touchscreen and Sms based security door locking system" which is accessed by a Touch screen module. The touch Screen module is further interfaced with a microcontroller unit where the password is inputted and compared with the original password stored in its EPROM and will give further instructions accordingly. The design consists of three main functional modules, namely; the Touch screen module, the Micro-controller and the GSM module. The Touch screen module acts as an input device used to access the door via a password or pattern locking system. The Micro-controller unit does all the comparison of the inputted password and accordingly give further instructions. The GSM module works as a transmitting unit, used to send intrusion messages to the user mobile device at the receiving end.

1. Introduction

1.1 Current System

It largely consists of a key and a lock. The main issue with the current system is that it majorly causes security problems in case of burglaries. As physical locks could be opened by lock picks or can be easily broken down there for the precious things to one can be easily damaged if they are being protected by existing security systems i.e. Locks.

1.2 Proposed System

The idea of designing a touch screen and Sms based door locking system is to provide modern security features than the currently used mechanical lock. The door locking security system consists of a micro controller(control unit) which allows only authorized person to access the restricted area, this type of security system is best suitable for office security, areas having automatic teller machine, home's, etc. Apart from the microcontroller unit, security system comprises of an electronic device which is installed at the door entry to control the automatic lock (solenoid-operated) which uses the help of a stepper motor, when a person enters the correct user password through the touch screen module, the stepper motor operates for a limited period of time to unlatch the lock so as to open the door. After the preset delay time, the stepper motor operates in the opposite direction and the door is locked automatically. However If there is incorrect password entered up to three times then the password lock will automatically switched to block mode, this function prevents any attempt by hackers to get any access through the door. If by any chance the admin forgets the password then it can be reset by changing the input commands of the code. Micro controller is interfaced with the GSM module which sends a predefined message to the user mobile phone whenever an intrusion or someone entered through the door. The efficiency is measured on the basis of how fast the microcontroller is able to send the message and its instant processing whenever user enters the password. Embedded system and GSM system technology is used in the project. Microcontroller unit has an application program burnt into it which allows it to read and compare the user stored password whenever a password is entered through the touch screen and it also controls the functioning of stepper motor as per the requirement. The design performance of this security system is completely dependent on the control unit. This project uses AVR microcontroller as the central processing unit

2. Literature Survey

Autonomous door locking security systems can be classified on the basis of technology used some of them are: 1) Password lock, 2) Biometric lock, 3) GSM operated, 4) smart card operated, 5) RFID operated, 6) Bluetooth operated, 7) OTP, 8) Motion detector, etc.

2.1 Password Based System

This system [1-2] is programmed in such a way that the user defined password will be identified when it is entered otherwise if any other password is entered it would not recognize it and will give error. It is also known as integrated combinational lock.

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2.2 GSM based System

In many security systems GSM [2-4] [6-7] is used for the purpose of communication. With the help of GSM module, the system sends a message (SMS) to the user's mobile number whenever an intrusion has occurred

2.3 Smart Card based System

These security systems [8] rely on smart cards where access is provided through these cards only.

2.4 RFID based System

These systems [9] are based on RFID technology where user has RFID tag and only through that tag access is provided.

2.5 Bluetooth based System

Here in these systems [10] the unlocking mechanism is operated wirelessly through Bluetooth app.

2.6 OTP based System

These systems [3] are secured on one time password concept here user gets OTP on registered mobile phone or email id which later acts as key for access.

2.7 Motion Detector based System

The systems [11] where there is no password or secure access and have to provide access on anyone's arrival are based on Motion detectors.

3. System Designed

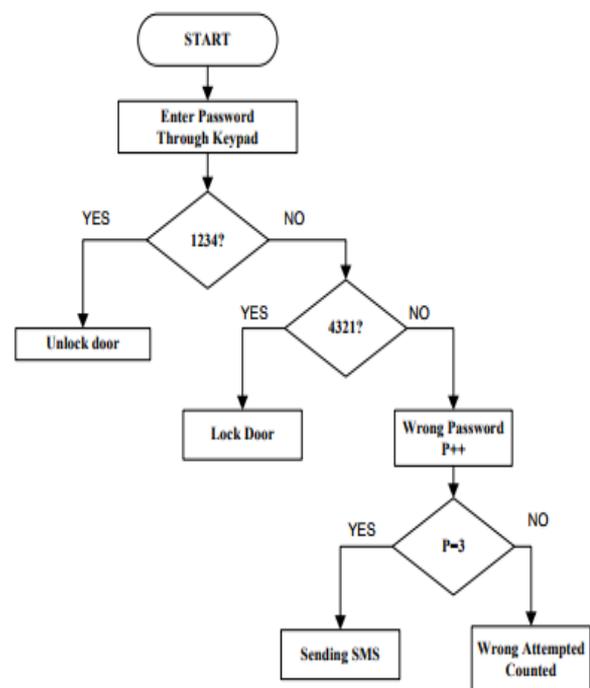


Fig. 1: Flowchart of the system

Here user enters the password through touchscreen keypad. If the password is correct then door unlocks whereas if it is found incorrect

then after 3 incorrect attempts SMS is sent at registered mobile. Fig. 1 above shows the flowchart or working principle of the system.

For designing the system following modules are used:

- 3.1 **Microcontroller:** This is the “brain” of the project that is CPU (central processing unit). We are going to use a microcontroller of 8051 family specifically AT89c51. The various functions of microcontroller are mentioned below:
 - 3.1.1 Reading and comparing the digital input with the predefined password.
 - 3.1.2 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.
 - 3.1.3 Sending the data to the GSM modem using serial port. This data consist of the status of entered password (Correct/wrong). Also giving it the instruction to send an intrusion message or someone entered message to the user.
- 3.2 **LCD:** an alphanumeric LCD is used of 16X2 size on which alphanumeric numbers or numeric numbers on 2 lines each containing 16 characters can be displayed.
- 3.3 **GSM Module:** The GSM module used in this project is sim900D. The status of persons entered the room when password entered was correct or if any intrusion is done a predefined message will be sent to the user mobile phone via GSM module.
- 3.4 **Touch Keypad:** User will enter the password using the Touchpad which is a graphical LCD. The Fig. 2 below shows the circuit diagram of the system.

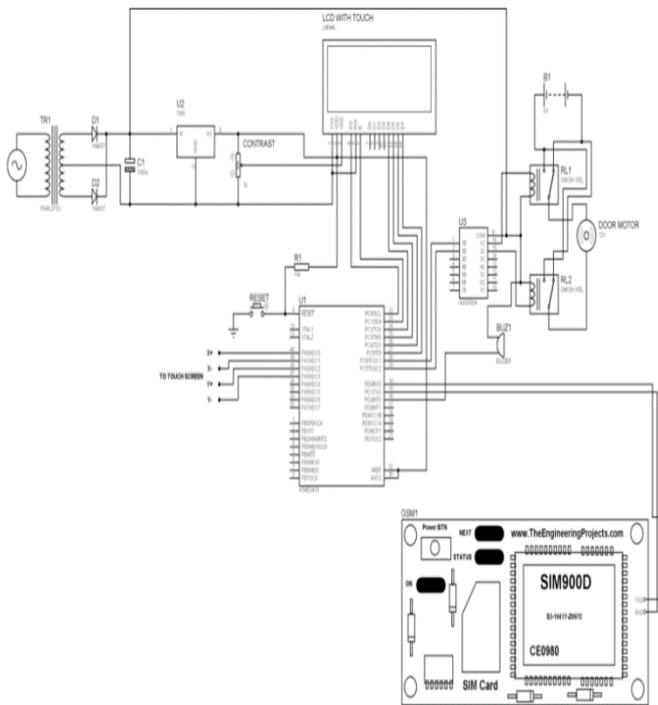


Fig. 2: Circuit diagram

4. Applications

The proposed system has wide range of applications; some of them are listed below:

- Home security
- Security in offices
- Security in industrial plants against intruders
- Installation at places where remote access is required.

5. Conclusions

Technological advancements are going on, automation in systems are gaining rapid popularity. So with the advancement in Security, a lot of research and development is happening as a result the latest technology comprises of automatic door lock security systems. The need for this kind of security system is increasing day by day as security has always been a very crucial part of everyone's life. The recent development in the methods of security for home, buildings,

companies, vehicles etc., there is no need to worry about the security any longer, as autonomous systems are here to deal with it. The recent autonomous security systems use mobile phones to operate the security system, since the mobile phone in today's world are quite handy and user friendly as opposed to specially fabricated keys and smart-cards.

References

- [1] OO Alice, AA Adebisi, SF Adeleye, FO Alamu. Development of a programmable electronic digital code lock system, International Journal of Computer and Information Technology 2(1), 2013.
- [2] M Amanullah. Microcontroller based reprogrammable digital door lock security system by using keypad & GSM/CDMA technology, IOSR Journal of Electrical and Electronics Engineering (IOSR - JEEE), 4(6), 2013.
- [3] A Jadhav, M Kumbhar, M Walunjkar. Feasibility study of implementation of cell phone controlled, password protected door locking system, International Journal of Innovative Research in Computer and Communication Engineering, 1(6), 2013.
- [4] E Supraja, KV Goutham, N Subramanyam, A Dasthagiraiah, HKP Prasad. Enhanced wireless security system with digital code lock using RF & GSM technology, International Journal of Computational Engineering Research, 4(7), 2014.
- [5] I Yugashini, S Vidhyasri, KG Devi. Design and implementation of automated door accessing system with face recognition, International Journal of Science and Modern Engineering (IJISME), 1(12), 2013.
- [6] SR Khan, AA Mansur, A Kabir, S Jaman, N Chowdhury. Design and implementation of low cost home security system using gsm network, International Journal of Scientific & Engineering Research, 3(3), 2012.
- [7] RS Satti, SEM Arshad. A smart visitors notification system with automatic secure door lock using mobile communication technology, International Journal of Computer and Communication System Engineering, 2(1), 2015.
- [8] KE Kumar, AK Yadav, T Srinivasulu. Smart Card based Robust Security System, International Journal of Engineering Inventions, 2(5), 2013, 29-35.
- [9] U Farooq, MU Hasan. Muhammad Amar, Athar Hanif, and MU Asad. RFID Based Security and Access Control System, IACSIT International Journal of Engineering and Technology, 6(4), 2014.
- [10] D. Naresh, BChakradhar, Krishnaveni. Bluetooth Based Home Automation and Security System Using ARM9, International Journal of Engineering Trends and Technology (IJETT) – 4(9), 2013
- [11] S Suresh, J Bhavya, S Sakshi, K Varun, G Debarshi. Home Monitoring and Security system, International Conference on ICT in Business Industry & Government (ICTBIG), IEEE explorer, Indore, India