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GSM based Door Locking and Unlocking System

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Abstract: Security and safety is major concern in every aspect of human life. The number of crimes in theft are increasing day by day security systems are necessary everywhere like banks, offices, home lockers etc. Because of technological advancement new systems are introduced one of such system is password protected electronic locking system that provide great benefit over a traditional lock system, as well as great security, the implemented locker system comprises of arduino, GSM, keypad, buzzer etc, in order to have access to the locker system one should know the correct password, if any intruder tries to open the locker system the owner will be notified via buzzer and SMS send to his cell phone.

Keywords: Arduino, GSM, buzzer, locking system, keypad

I. INTRODUCTION

Innovative technologies are developed by people to make the human life easier, the world is using technological advances in many different ways, and one of these ways is security system. Because of innovation in electronic field the electronic security systems is getting more importance. Locks are present in both complex and simple design, locks which are simple in design are easy to use often are easy to breach into but the locks that are complex in design are tough to breach but tedious to use. Traditional lock system can be easily broken by the thieves and owner are not even aware of it, today the locker security has reached to high level where control lies in the hands of owner. A secure embedded system is designed for the safety of residential places, offices, bank lockers, and other valuables of individual like money, jewellery, confidential important documents etc kept in a locker due to tremendous development in microcontroller unit and widespread applications of GSM technology.

A 4X4 keypad is used which has various buttons responding different symbols numbers and alphabets arranged in 4X4 array form which provides useful human interface to enter the password in order to have access to locker system. The proposed work aimed to develop an improved prototype of locker safety and security system using GSM i.e. global system for mobile communication, the system will send a notification short message service (SMS) to the owner if three wrong attempts are made by any intruder.

II. RELATED WORK

Hasan, et.al. Designed a microcontroller based home security system with GSM technology. A mobile phone is interfaced with the microcontroller through a Bluetooth device in order to control the system. A manual keypad is another way to lock or unlock the system. It is a reliable security system because its bi-modal (parallel) nature, but the system lacks code registration mechanism and the microcontroller program lacks auto generated code routine.

Nikhil Agarwal, G.Subramanya Nayak, et.al. Uses password protected door system methodology in home automation system. The door lock is password protected with an LED based resistive screen input panel which operates by detecting difference in light intensity captured by the photo diode which is emitted by surrounding red LEDs and reflected by the finger.

Alagu et.al., designed GSM based authorized access with separate user password door lock/unlock control system. SMS application sends data through GSM Modem. Another GSM device connected at the receiving end which is fed to the microcontroller. The microcontroller initiates a mechanism to open the door through a motor driver interface, if the sent data (password entered by the user) matches with the password stored in the microcontroller. This is simple and will give a good value for investment but the program in the microcontroller lacks auto-generated code routine.

Supraja, et.al, designed a digital code lock system with a status display by using wireless communications RF technology and GSM technology. The wireless communications is established by using RF modules and a digital keypad interfaced to the controller. The authentication is provided through password for locking or unlocking the system and the status will be displayed using LCD module and the acknowledgement is provided to the user via the GSM technology.

Mohan and Vinoth ,et.al, developed a home security system in which whenever the system notices human intrusion or senses leakage of raw gas, it immediately sends a Theft or Sensor alert message to the authorities via the GSM Modem and Passing alert messages to nearby ZigBee networked houses, and also the controller triggers the exhaust fan in the case of gas leakage. It has a password protected electromagnetic lock to open and close the house using GSM technology.

III. PROPOSED WORK

All the hardware components are powered up, ARDUINO microcontroller is used as the controlling unit of the circuit Initially a message is sent to owner to inform that somebody has approach to your locker, next the system asks for a password , a 3-digit password is entered using the keypad to open the door. Once the password entered is correct the door opens, the LCD displays “door open” message on the LCD screen GSM module is used for the sending message. The keypad is set with a three attempts for entering the password. The user can enter his password three times to open the door. If an unknown person enters the password for the first attempt, “wrong password” message is displayed on LCD and door remains closed. He tries for the remaining two attempts if he fails to enter the correct password the buzzer connected will alarm to alert the people nearby. At the same time, the owner also gets an alert message on his mobile that someone is trying to open the lock. If an unauthorized person tries to enter then a notification will be sent to the authorized person by the GSM module which is connected with the system. The user then has to enter * or # to close the door.

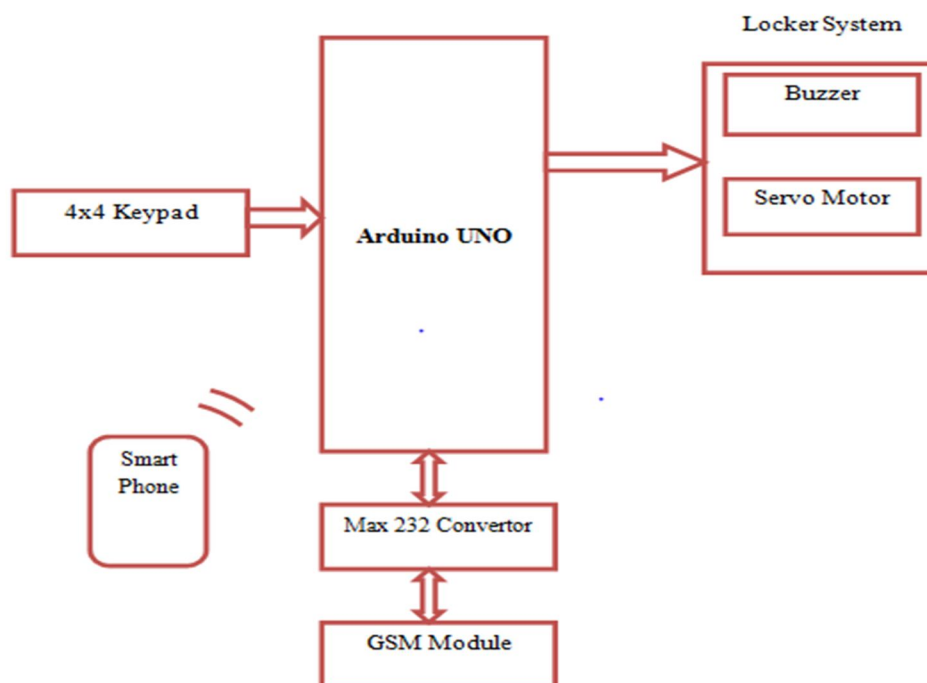


Fig. 1 Block Diagram

IV. HARDWARE IMPLIMENTATION

A. Arduino

Arduino is a Microcontroller-based prototyping kit ,it is Easy to use and low cost board for students, hobbyists & professionals , Many different board types and revisions are present , Also a software API and development environment is available along with open source Board layout and software . The arduino Uno is one of the most popular Arduinos are available Based on the Atmel ATmega328 microcontroller .it has 14 I/O pins, 6 analog pins, different power pins, USB & power connectors .the clock speed is 16MHz.

B. 4x4 Keypad

Because of Ultra-thin design, Adhesive backing, Excellent price/performance ratio the keypad can be easily interfaced to any microcontroller, and is convenient to use in wide variety of electronic devices, it has 16 buttons 0-9,A-D,* and #,in the proposed system it is used to enter the password to unlock the locker.

C. Buzzer

A buzzer or beeper is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric. Basically a buzzer is a transducer which converts electrical energy into sound, it has three pins VCC GND and input. Its operating voltage is 5v.

D. 16x2 LCD

LCD stands for liquid crystal display, 16x2 LCD is capable of displaying 32 characters in two rows and 16 columns, the characters can be numbers, alphabets and alphanumeric, it is available in two variety of backlight i.e. blue and green, operating voltage is 5v, it has two registers data register and command register where data and commands are stored respectively.

E. GSM

Stands for global system for mobile communications, different models are available with different features ,in the proposed system sim800A is used ,which is a dual band GSM/GPRS modules that work on two frequencies 900MHZ and 1800MHZ,operating voltage is 3.4v to 4.4v ,it provides various hardware interface, and operating modes hence can be use to design various applications.

F. Servo Motor

A servo motor is closed loop system which has the ability to precisely set the position of the shaft , The motor shaft will hold at this position as long as the control signal not changed. This is very useful for controlling robot arms, unmanned airplanes control surface or any object that we want it to move at certain angle and stay at its new position .inside servo motor we have four components DC motor, gear box, potentiometer and control circuit.

V. EXPERIMENTAL SETUP

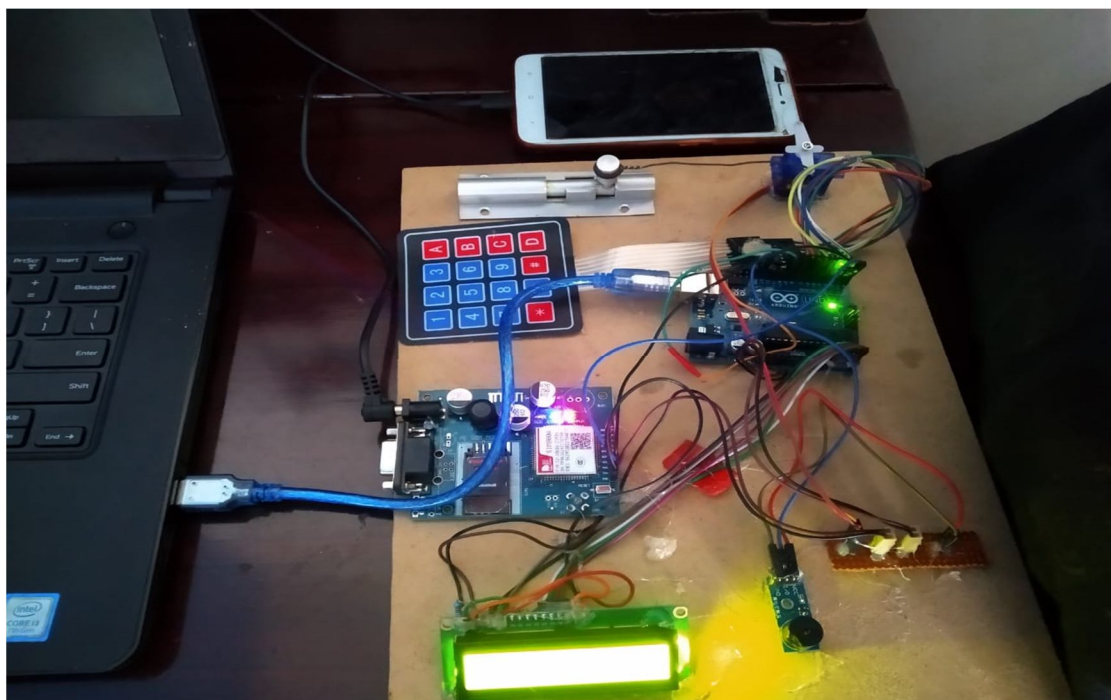


Fig. 2 Experimental setup

VI. RESULTS

- 1) On application of power welcome message is displayed and GSM is initialized and a message is sent to the owner as shown in figure

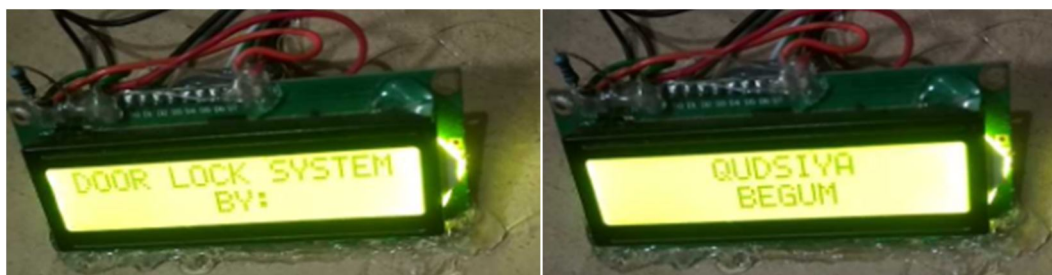


Fig. 3 Welcome message

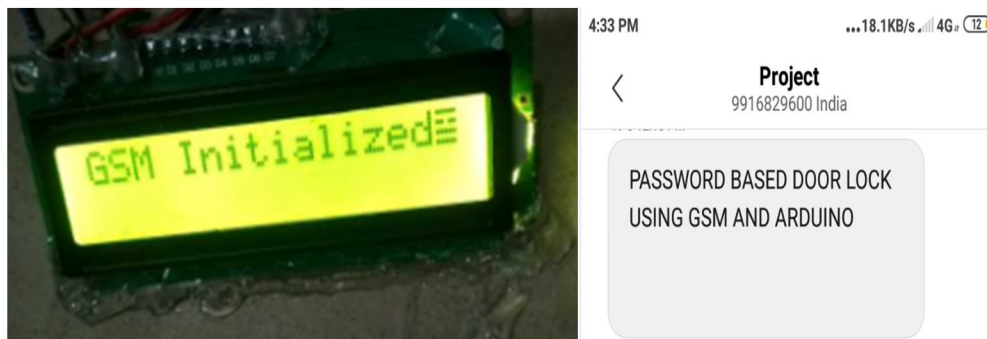


Fig. 4 GSM initialization and informing message to owner's mobile

- 2) Now the user is asked to enter the password.

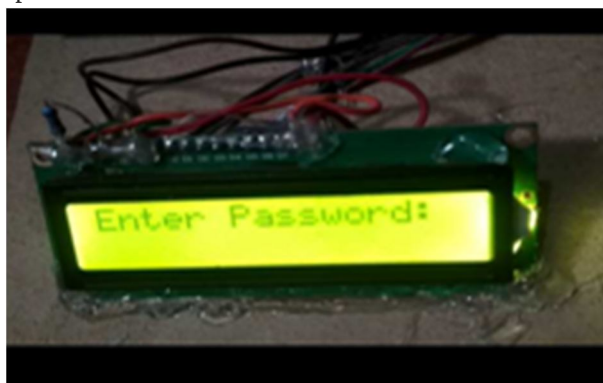


Fig. 5 Enter password

- 3) If the entered password is correct "password accepted" is displayed and door gets unlocked, "door open" message is displayed.

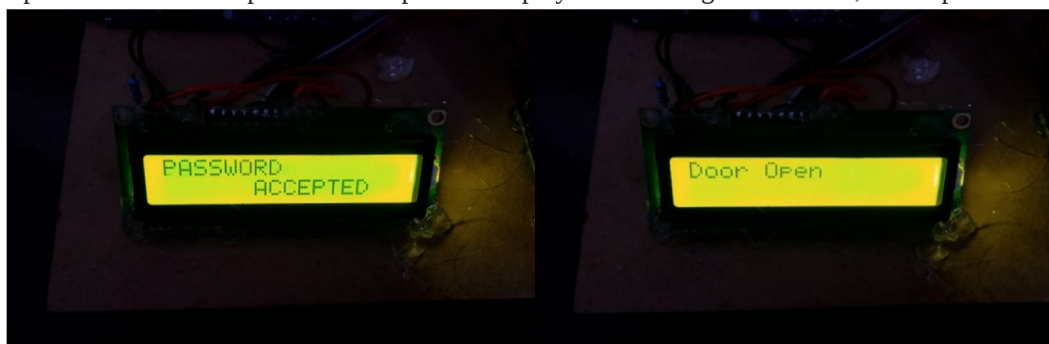


Fig. 6 door open

- 4) If the entered password is wrong "wrong password" is displayed on lcd and door remain close.



Fig. 7 Wrong password

- 5) If three such wrong attempts are made, the owner gets a alert message.

ALERT:someone is trying to open the door..

Fig 8.Alert message to owner's mobile

- 6) By entering * or # the door can be closed "door close " message is displayed on lcd.

VII. ADVANTAGES

- A. The proposed system is user friendly as it is easy to operate.
- B. Low cost.
- C. Low maintenance cost.
- D. Proposed system is fast and accurate.

VIII. CONCLUSION

The locker security system is implemented using ARDUINO, SOFT PASSWORD and GSM and tested; we found the system working is satisfactory. The systems having advanced features like portable and low cost and standalone system. The future work of this paper is planned to a develop In addition with bio-metric parameter like fingerprint and Iris scanner for visual identification of the person. And also we need to add Internet of Things feature to this system.

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45.98



IMPACT FACTOR:
7.129



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