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MICROCONTROLLER BASED SMART DOOR LOCKING SYSTEM

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ABSTRACT

As everyone knows that the demand for insecurity can be finished by locks which can be with one or a few keys, but for locking a big resource, wealth, and credit many locks are required. so the aim is to provide a locking system that will give constantly security service by using a registered password. Micro-controller based door locking system is designed using ARDUINO UNO wherein once the security code or password is press, the door is opened and the concerned person is to allowed to access in the secured area. The main purpose of research is to provide a smart solution to deal with these challenges and provide a feasible solution.

KEYWORDS

Arduino UNO, Servo motor, LCD Screen.

1. INTRODUCTION

In recent times, the manual locking system is in used and these can be replaced with better and advance techniques of locking systems. These methods are a sequence of automatic and microcontroller devices that is extremely intelligent and are full of advanced features. This is a Micro-controller Based door Locking System that is mainly based on Arduino, where a secure password will act as a door unlocking system. Security has been a leading problem these days because of the increased rate of crime and everybody wants to take proper action to resist unauthorized users. Micro-controller Based Smart door locking system is designed to resist the unauthorized access, invalidate and unwelcome people in the place. Banks, corporate offices, financial organizations, jewelry shops, and many government organizations are some of the common targets where unauthorized access, invalidate and unwelcome take place and the main aim behind such crime is to stealing money, jewels or any important documents for personal gain.

The main motive behind this research work is to open a door-latch using a password that will be entered through a keypad. The main component in the circuit is Arduino UNO, servo motor and LCD screen. The keypad is used to the password where the password is compared with the known password. If the password is correct, the servo motor opens the door-latch and displays the status of the door on LCD as "Access Granted". If the password is wrong then the door remains closed and displays "Invalid" on the LCD screen. The owner can change the password if he/she wishes to do it by the method of programming. Many lock systems have been available in the market to prevent the unauthorized user.

2. REQUIRED COMPONENT

2.1 LCD

A liquid-crystal display (LCD) is a flat-panel display Technology. Each LCD screen contains a matrix of pixels that display the image on the screen

Figure 1: LCD display

2.2 Keypad

Keypad is used as an input device to read the key pressed by the user and to process it. 4x4 keypad consists of 4 rows and 4 columns. Switches are placed between the rows and columns. A key press establishes a connection between the corresponding row and column, between which the switch is placed.

Figure 2: 4X4 Keypad

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2.3 Potentiometer

A potentiometer of 10Kohm resistance is used to adjust the contrast of the LCD.

Figure 3: Potentiometer

2.4 Servomotor

Servo Motor that is used in the research work is SG90. Its weight is about 9g. It used to unlock and lock the door latch.

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Figure 4: Servo Motor

2.5 Arduino

Arduino is a micro controller company that can be easily programmed, erased and reprogrammed at any instant of time. using Arduino UNO It contains 20 pins (0-19) in which 6 are for analog inputs and 14 are digital input-output along with USB port, a power jack, and a reset button.

Figure 5: Arduino UNO

3. PIN DIAGRAM

Table 1: connection b/w keypad and Arduino

	3*3 Keypad	Arduino
1.	Pin 1	D 1
2.	Pin 2	D 2
3.	Pin 3	D 3
4.	Pin 4	D 4
5.	Pin 5	D 5
6.	Pin 6	D 6
7.	Pin 7	D 7
8.	Pin 8	D 8

Table 2: Connection b/w servo motor and Arduino

Servo Motor	LCD
1.Green(GND)	GND 9(Arduino)
2.Red(+5v)	Pin 2
3.Black(PWM)	Pin 1

Table 3: Connection b/w LCD and Arduino

LCD	ARDUINO
1.Gnd	GND
2.Vdd	5v
3.Ve	Potentiometer
4.Register selected	A0
5.Read/Write	Potentiometer
6.Enable	A1
7.D 4	A2
8.D 5	A3
9.D 6	A4
10.D 7	A5
11.Led positive	Potentiometer
12.Led negative	Potentiometer

4. SYSTEM FLOWCHART

Figure 6: Flowchart of the system

5. CIRCUIT DIAGRAM

Figure 7: Circuit Diagram

6. WORKING PRINCIPAL

As the Circuit Diagram as shown above(fig:-9) The password were set as "1234" in the Arduino UNO. When the user enters the password through the keypad, it will match it with the correct password that is stored in the Arduino ATmega328. If it is correct, then it will show 'Access Granted' on the display of the LCD screen and then the servo motor rotates the door latch in 180 degrees and the door will be opened. And If the password is wrong, then it will show 'Invalid' and door will remain closed

The contrast of the LCD screen can be easily changed, with the help of a potentiometer. User can also change the password if he/she forgets the password.

7. RESULT

The given below figure (fig 8) demonstrate about the Microcontroller based smart door locking system.

Figure 8: Microcontroller based smart door locking system.

The given below figure (Fig 9) demonstrate as the correct password is entered, the door will open and "Access Granted" will display on the LCD screen

Figure 9: door will open and "Access Granted" will display on the LCD screen

The given below figure (fig 10) is demonstrate as after press the "B" on the keypad. The door will be locked again. and message will display in the LCD.

Figure 10: door will be locked again. and message will display in the LCD.

The given below figure (fig 11) demonstrate as if the password is entered wrong the door will remain closed and display as "Invalid key"

Figure 11: door will remain closed and display as "Invalid key"

8. CONCLUSION

This research work is beneficial in providing enough security as long as the password is not shared. In the future, this "Micro controller based smart door locking system" can be provided maximum security by the future improvement to satisfy user's needs. Hence, a common man can afford to

buy such a locking system at a low cost to keep his valuables safely without any worries.

9. FUTURE SCOPE

The security level can be modified by adding a biometric fingerprint scanner. The LPG gas and smoke detecting sensors could be added in the micro controller so that in case of any accident door will open automatically. Camera could be installed to the micro controller so that it could capture the image of the known user who is trying to gain the access.

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