SMART LOCKER USING ARDUINO (ID:190003)

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Introduction

Security is a major concern in our day to day life, and digital locks have become an important part of these security systems. There are many types of security systems available to secure our place. Some examples are PIR based security system, RFID based security system, digital lock system, bio-matrix systems, electronics code lock [1]. In this project we build a Secret Knock Detecting Door Lock using Arduino, which can detect the pattern of the knocks at the door, and will only open the lock if the knocking pattern matches with the correct pattern.

SCOPE of the Project

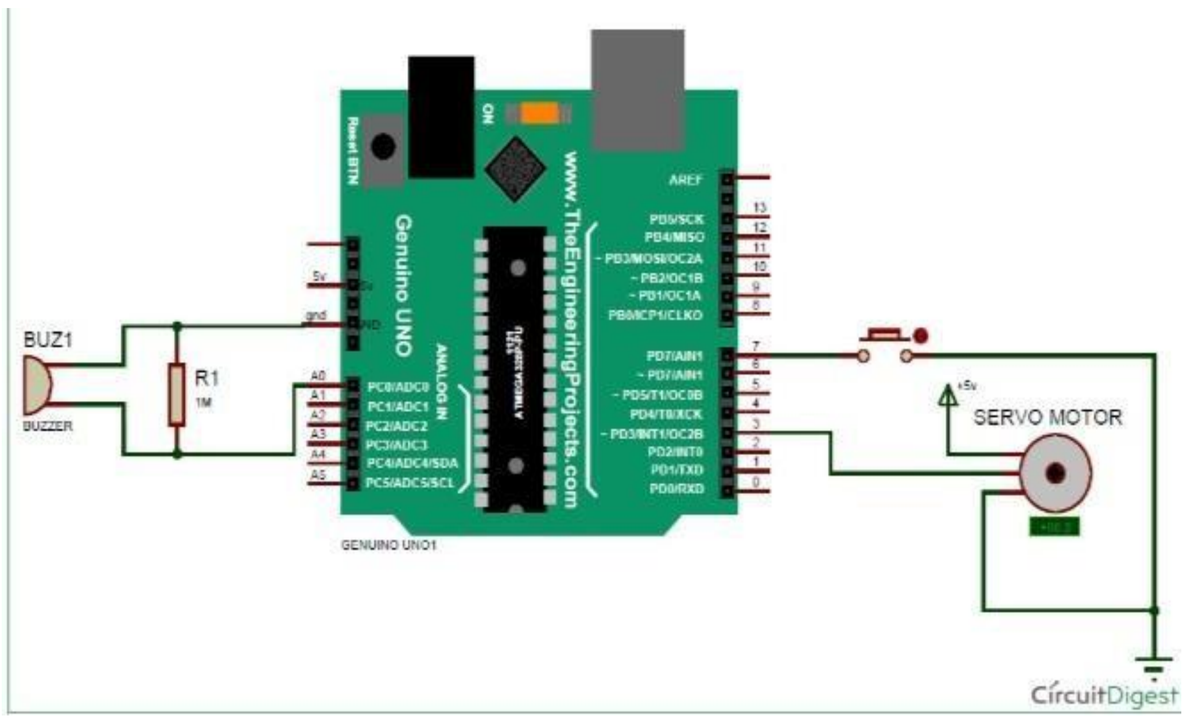
Security mean protection of our life and assets. Ensuring safety of peoples and their valuable things is very important for the prevention of illegal handling. Hence, mainly focusing on door lock security or gate security is very important to avoid crime in future. Even with the use of mechanical locks, crime like robberies get happened due to the fact that such locks can be easily broken. So, there is a need to invent other kind of locks which cannot be easily broken. So, we introduce a digital door lock with password, working method is explained below.

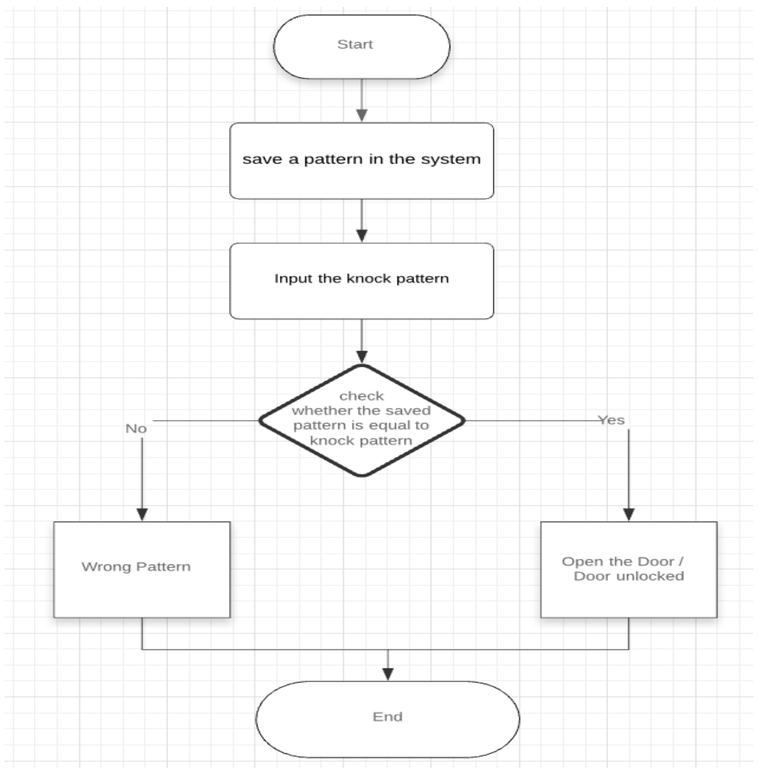
Methodology

Arduino: It is used to control the complete processes like taking password from Buzzer or Sensor, comparing patterns, driving Servo for open and close the gate and save the pattern to Arduino.

Buzzer: It is connected at analog pin A0 of Arduino with respect to ground and with a 1MΩ resistance between A0 and ground also. we have used Buzzer or Piezo Sensor to take knock input pattern in the system. Here we are using a push button to allow to take input from the sensor and also save that into the Arduino. This system is designed by taking idea from Morse code pattern but not exactly similar.

Driving Servo: It is connected to PWM pin D3 of Arduino. It is used for open and close the gate and save the pattern to Arduino. The circuit Diagram of this **Knocking Pattern Detector** is very simple which contains Arduino for controlling whole the process of the project, push button, buzzer, and Servo Motor. Arduino controls the complete processes like taking password form Buzzer or Sensor, comparing patterns, driving servo for open and close the gate and save the pattern to Arduino



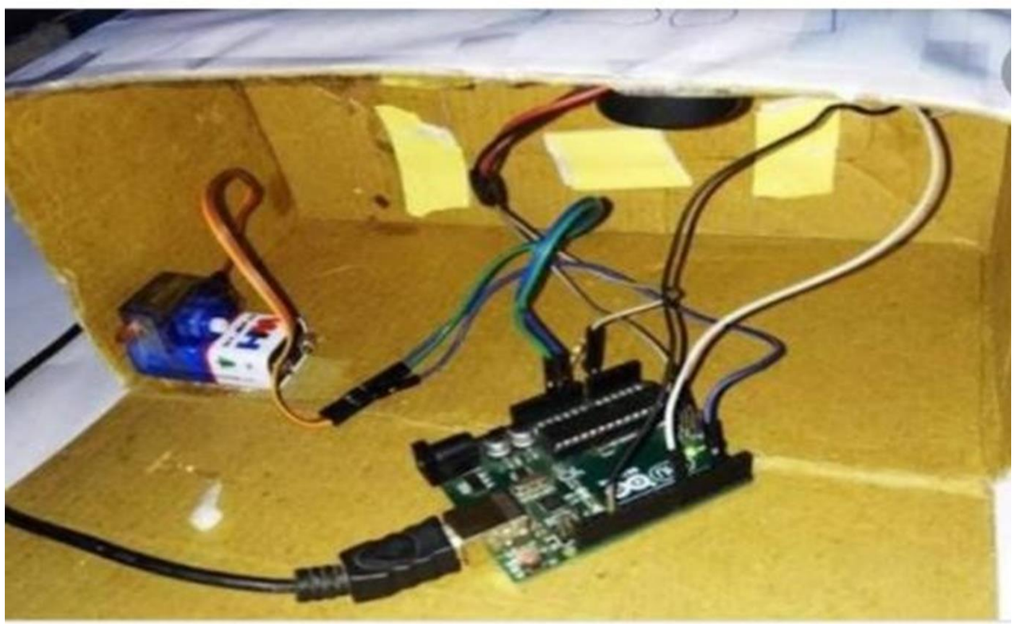


Working

Working of knock based Smart Lock project is simple [5]. First we have to save a pattern in the system. So we have to press and hold push button until we knock 6 times. In this project, we have used six knocks. After six knocks, Arduino find the knock pattern and save into memory. After saving the input pattern, we can press and immediately released the push button for taking input from the sensor into the Arduino to open the lock. Again we have to knock 6 times, and Arduino decodes it and compares with the saved pattern. If a match occurs then Arduino open the gate by driving servo motor.

In real time we have used a card board box for demonstration. For input we knock over the board after pressing push button. Here we have knocked by keeping a time period in mind that is 500ms. This 500ms is because we have fixed it in code and input pattern is depending upon it. This 500ms time period will define the input was 1 or 0. Check the code below to understand this thing. When we knock it, Arduino starts monitoring the time of the first knock to second knock and put that in an array. Here in this system, because of 6 knocks we will get 5 time periods.

Now we check the time period one by one. First, we check time period between first knock and second knock if the time difference between these less the 500ms then it will be 0 and if greater than 500ms it will be 1 and it will be saved into a variable. Now after it, we check time period between second knock and third knock and so on. Finally, we will get 5 digit output in 0 and 1 format (binary).



Conclusion

In this generation of advanced technology, theft and crime has taken the aid of technology itself in achieving its results many times. To avoid such circumstances, sometimes even small things can lead to Great change. Thus implementation of smart devices in security control like smart knock pattern based security system can proved to be very valuable to the person using it and also valuable to themselves. In this paper the issue of security is addressed by affordable technology like piezo sensor, push button, Arduino microcontroller

Applications of this Project

1. It is useful for the security purposes in houses, banks etc.
2. By using this digital lock we can used to store many valuable things like money, gold, etc., [6].
3. This simple circuit can be used at residential places to ensure better safety.
4. It can be used at organizations to ensure authorized access to highly secured places.

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References

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