Abstract:-

Human beings are outnumbered by Internet devices. One cubic inch of nanotube circuitry, once fully developed , would be up to one hundred million times more powerful than the human brain. As the Internet Of Things advances, the very notion of a clear dividing line between reality and virtual reality becomes blurred, sometimes in creative ways. This report presents an electronically controlled door locking system that employs Arduino, an open source microcontroller board that can sense, monitor, store and control applications. This system also employs an IoT based log that monitors the entry and exit of the users.

Literature Survey:-

Passwords aren't a novel concept when it comes to locking doors. However, as technology advances, these systems have become more sophisticated.

Akshaya Krishnadas Bhat et al. [1] This article illustrates how a password-protected door lock can be used in a variety of settings, including the home, office, and desk. The system will check the user's entered password for validity before unlocking it for the authorized user. This method could be a less expensive alternative to expensive door lock systems that use retina scans, iris scans, or fingerprints, among several other technologies.

Prof.A.Y. Prabhakar et al. [2] - This article shows how an ARDUINO UNO-based password-based door lock system is created, where the door is unlocked and the user who input the right code is authorized to enter the zone. And the common individual can bid on such a locking system for a low price in order to ensure the protection of their valuables.

Dr. Manish Kumar et al. [3] This study states how we may use an Android-based smart door lock system to address the issues of unwanted access, trespassing, and instruction. Also included in this concept is a Bluetooth module that serves as a communication channel between the Arduino Uno and a mobile phone. This application is simple to set up and maintain.

Shruti Jalpur et al. [4]– This paper depicts a secure and protected door lock system, with network security supplied by the use of cryptographic algorithms such as SHA-128 and SHA-512. The technology also allows the authorized user to access the information remotely. The user input is encrypted and hashed using the algorithms AES-128 and SHA-512. If the sensor detects unauthorized access, it will send a notification to the smart phone application placed on the authorized user's smartphone.

Keywords:-

Arduino Nano, Servo Motor, 4×4 Matrix Keypad Membrane , 9V Battery, Connecting wires.

Problem Statement:-

The main objective of this project is to unlock a door, using a unique password entered through the keypad. Opening and closing of door involves human labor, but in this proposed system, opening and closing of the door is achieved by just entering the correct password. The authorized person has to type the password manually , which in turn is connected to a door that can open/close the door . This method is very convenient as one doesn’t have to open/close the door physically.

Introduction:-

The password enabled door locking system can be used for households, offices, desk units, etc. The system will check for the validity of the password entered by the user and will unlock only for the authorized users. This system proves to be an optimal solution for preventing the unauthorized entries. The main concept behind this project is of a door-latch opening using a password entered through keypad. The entered password is compared with the predefined password. If it is correct password, the system opens the door by rotating door motor. If the password is wrong,then door remains closed . It can be used at organizations to ensure authorized access to highly secured places. With a slight modification by replacing the motor driver with a relay driver, this circuit can be used to control the switching of loads through code. Such an automatic lock system consists of electronic control assembly which controls the output load through a password. This output load can be a motor or a lamp or any other mechanical/electrical load.

Detail Description:-

1. Arduino Nano:-

Arduino Nano is a small, complete, flexible and breadboard-friendly Microcontroller board based on ATmega328p, developed by Arduino.cc in Italy in 2008 and contains 30 male I/O headers, configured in a DIP30 style. Arduino Nano Pinout contains 14 digital pins, 8 analog Pins, 2 Reset Pins & 6 Power Pin. It is programmed using Arduino IDE, which can be downloaded from Arduino Official site . Arduino Nano is simply a smaller version of Arduino UNO, thus both have almost the same functionalities. It comes with an operating voltage of 5V, however, the input voltage can vary from 7 to 12V. Arduino Nano's maximum current rating is 40mA, so the load attached to its pins shouldn't draw current more than that . Each of these Digital & Analog Pins is assigned with multiple functions but their main function is to be configured as Input/Output.

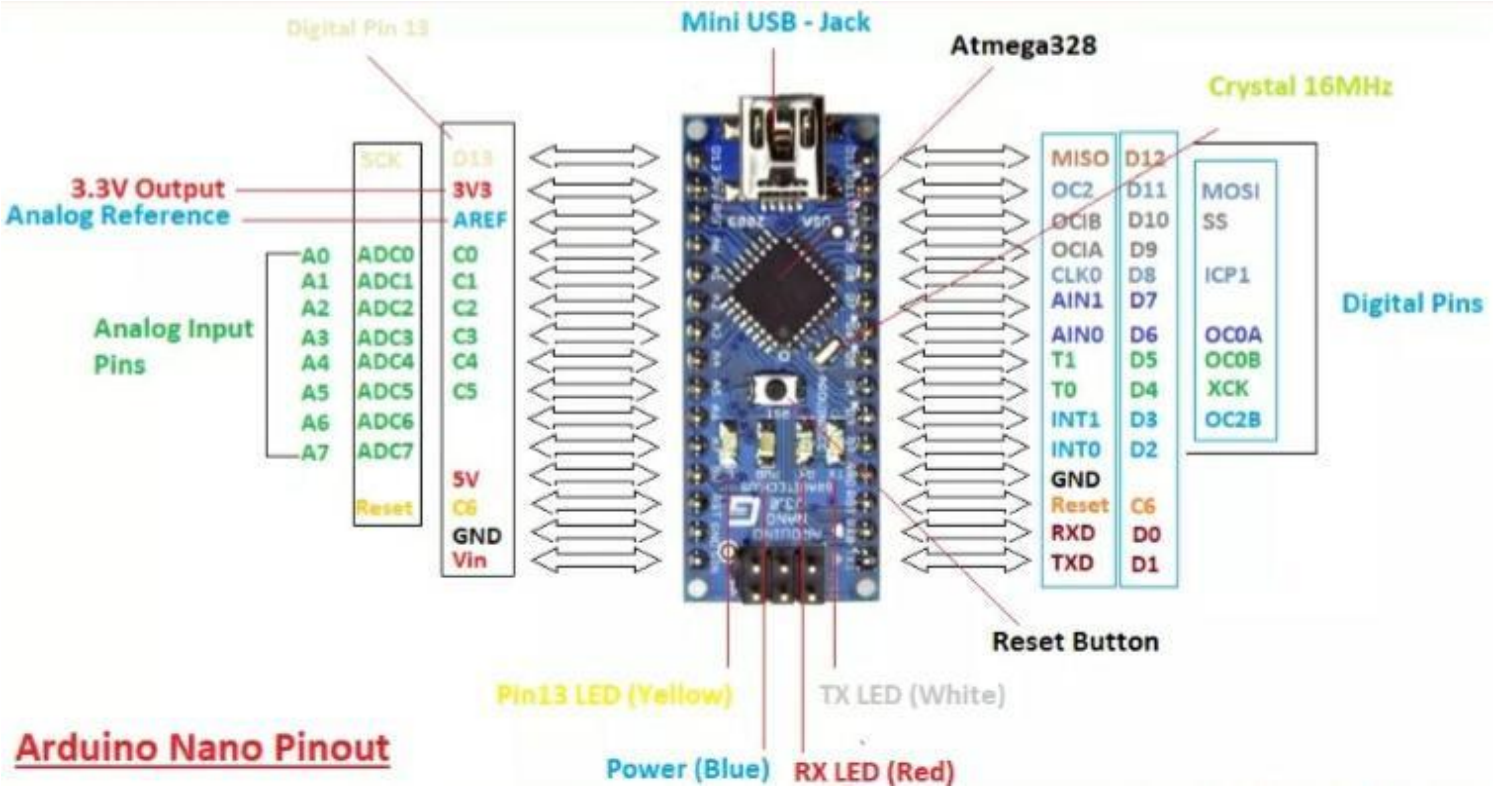


Figure1:- Arduino Nano Pin diagram

Pin Description:-

No.	Pin Number	Pin Description
1	D0 - D13	Digital Input / Output Pins.
2	A0 - A7	Analog Input / Output Pins.
3	Pin # 3, 5, 6, 9, 10, 11	Pulse Width Modulation (PWM) Pins.
4	Pin # 0 (RX) , Pin # 1 (TX)	Serial Communication Pins.
5	Pin # 10, 11, 12, 13	SPI Communication Pins.
6	Pin # A4, A5	I2C Communication Pins.
7	Pin # 13	Built-In LED for Testing.
8	D2 & D3	External Interrupt Pins.

Table 1:- Arduino nano pin Description

2. **Battery:-**

Batteries are a great way of powering Arduino specially for wireless based projects like weather monitoring, fire alarm systems or smart door lock system. Downside to battery usage is they are not that efficient in delivering long term power, one can consider rechargeable batteries if he/she needs to power Arduino without any external supply.

Arduino has an onboard Vin pin, using Vin pin we can connect a 9V battery across Arduino. This Vin pin can work in a dual way. It can either act as a power source for Arduino or can give power to external devices when a power supply is connected across a DC barrel jack. While powering to Arduino with 9V battery using Vin pin , it is recommended to check power connections, because Vin pin has no reverse polarity protection. To power the Arduino using a 9V battery, connect the positive terminal of the battery to Vin pin of Arduino and negative terminal with GND pin of Arduino.

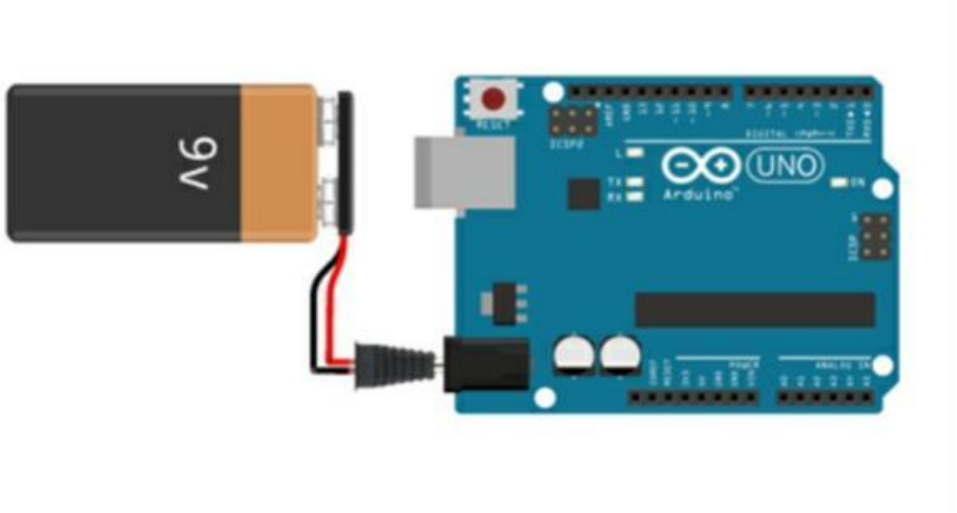


Figure2:- Diagram concluding the connection of a 9volt battery

3. **Servo motor:-**

(SG-90 Servo Motor)t is small and light weight server motor with large output power. A servo motor can turn 90 degree in either direction.

Figure3:- Servo Motor

4. **4×4 Matrix Keypad membrane :-**

These Keypad modules are made of thin, flexible membrane material. The 4 x4 keypad module consists of 16 keys, these Keys are organized in a matrix of rows and columns. All these switches are connected to each other with a conductive trace. Normally there is no connection between rows and columns. When we will press a key, then a row and a column make contact.

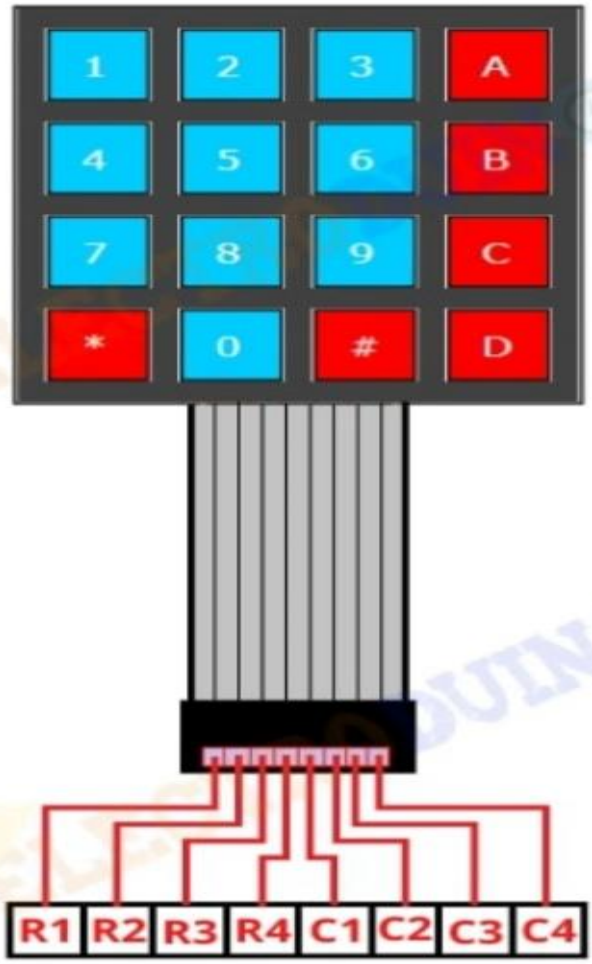
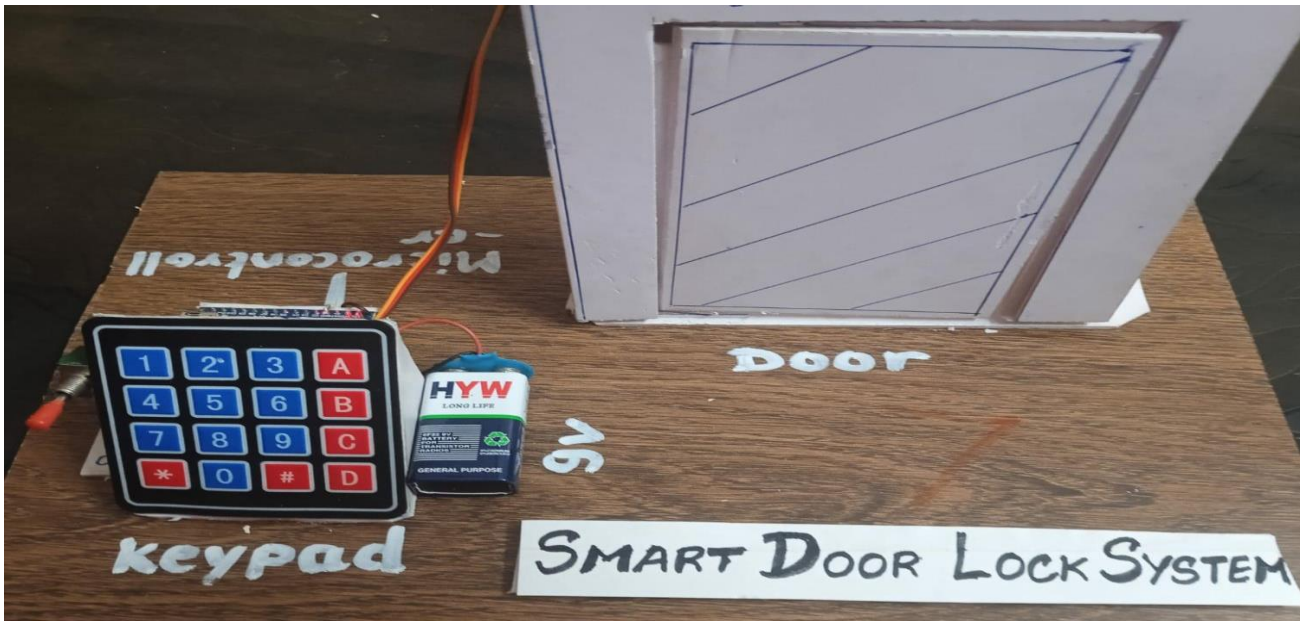


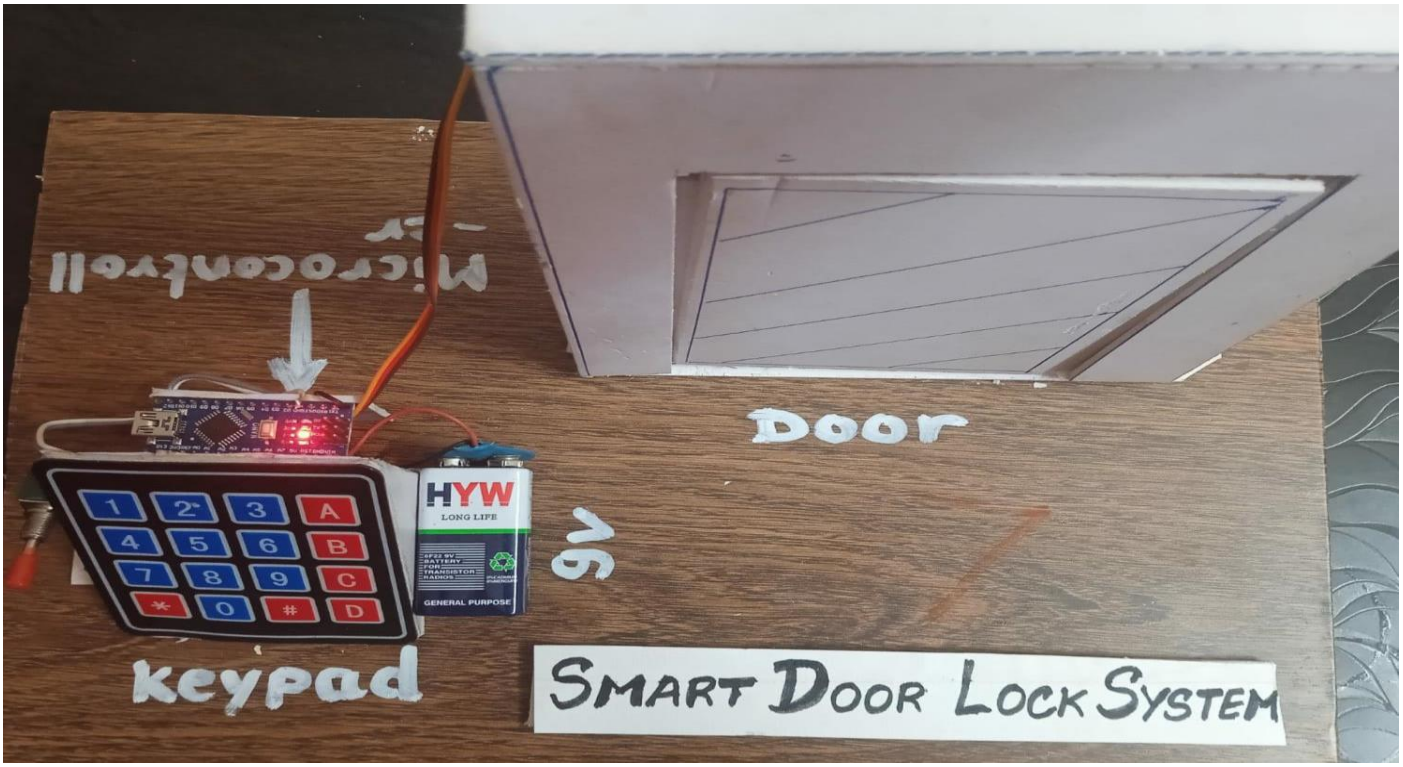
Figure 4:- Pin Diagram Of 4×4 Matrix keypad Membrane

Diagrams:-

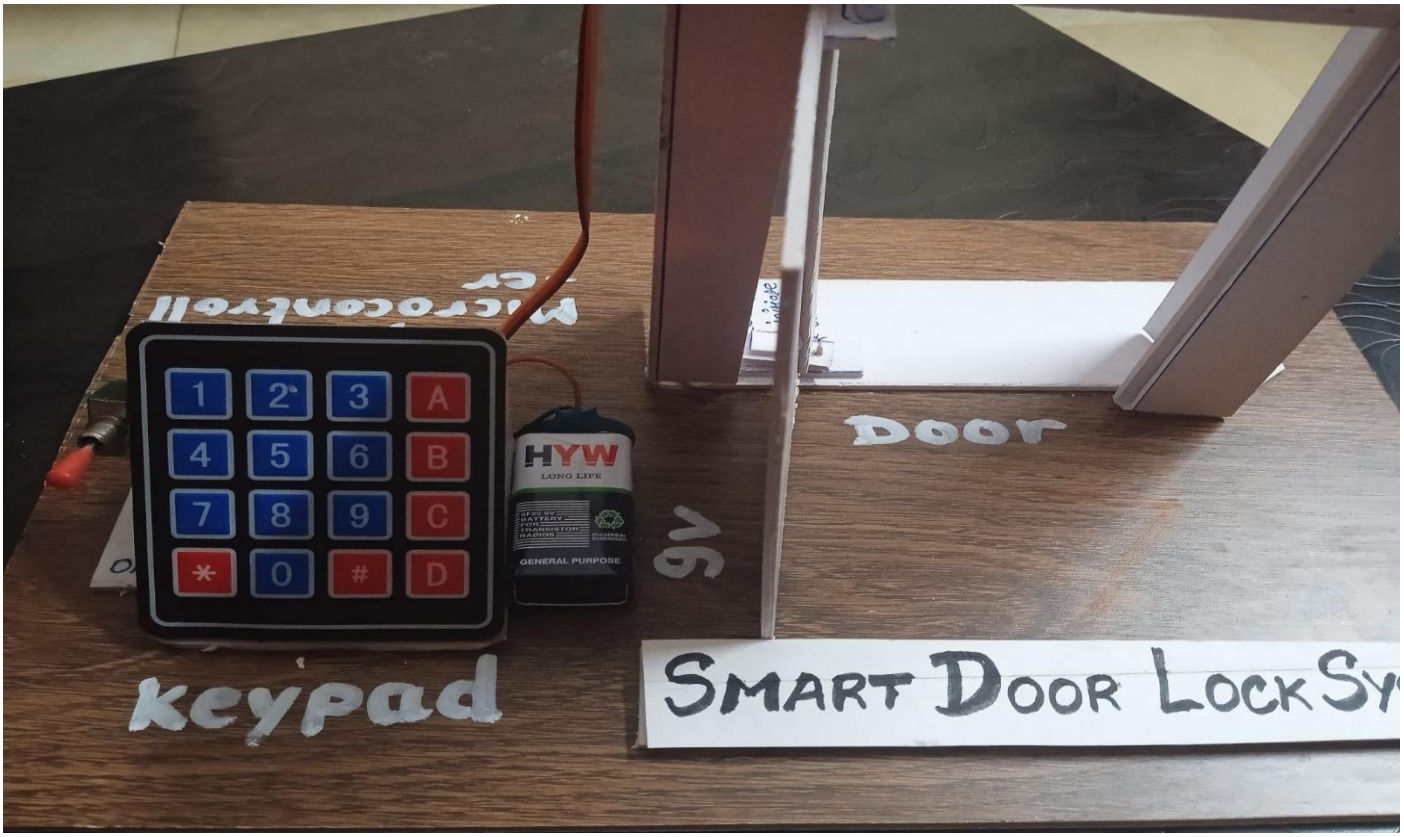
Step1:- Turn ON the ON/OFF Button.



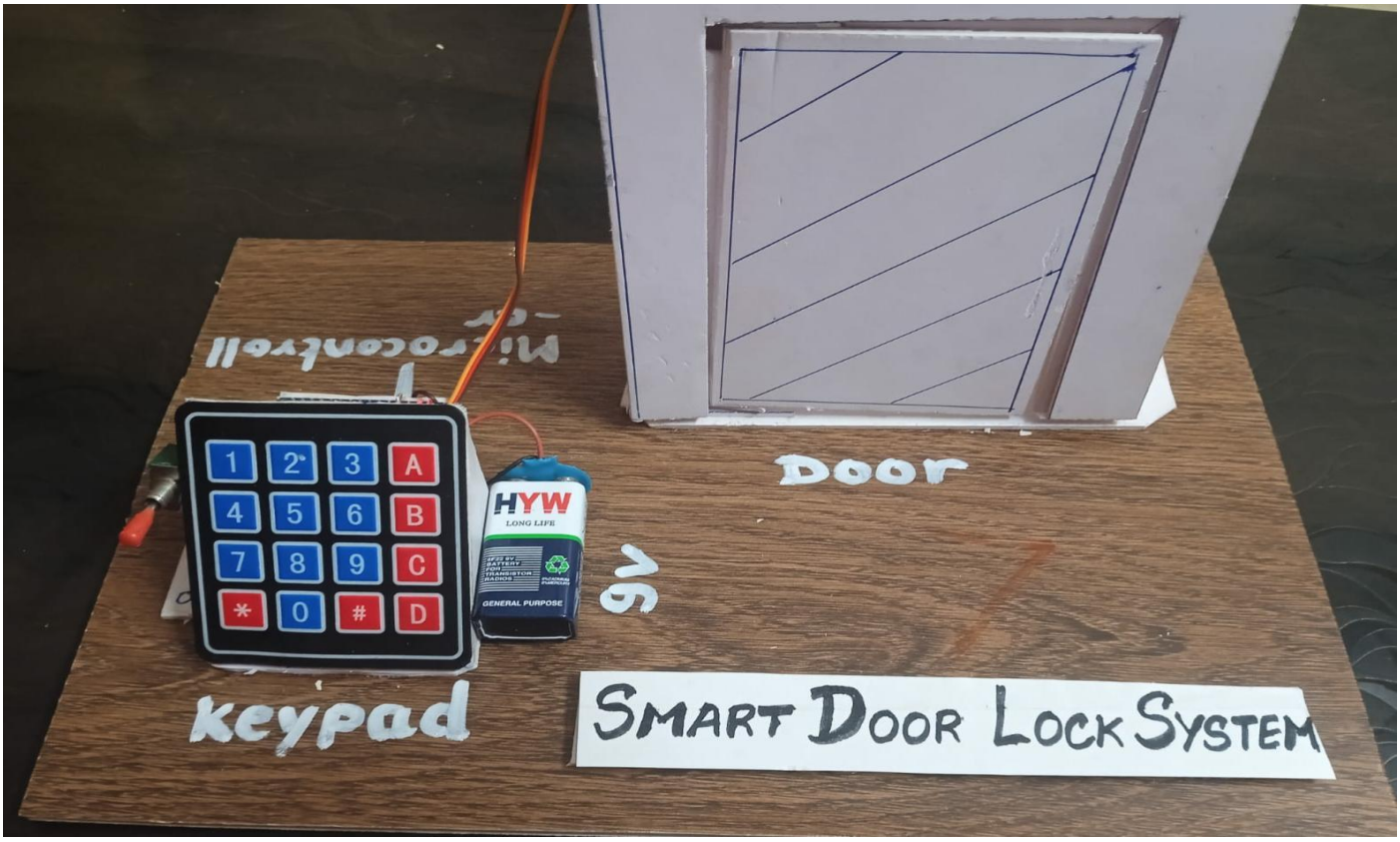
Step2:- Type the default Password.



Step3 :- The door will open , when the correct Password is entered.



Step4:- The door will close automatically after 2 seconds.



Methodology:-

As we connected the lock to relay in Normally Open condition**,** the solenoid lock is in locked position when voltage is not passed through it. When we upload the code and turn this ***DIY password door lock device***, the lock is still in locked position till we enter the correct password. The **default password is "2592"**. To enter password press # button and enter 1234 through keypad and to confirm press * button. Here , * button is used as OK button. So when you enter the correct password Arduino send the signal to relay module and it closes the connection making the lock to open.

Summary of the project:-

This project is effective in providing enough security as long as the password is not shared. In future this "Arduino based password security locking system" can be provided maximum security by the above enhancements in order to completely satisfy user's needs. Hence, a common man can afford to purchase such locking system in minimal cost to keep his valuables safely without any worries.

Future Scope:-

1. We can send this data to a remote location using mobile or internet
2. We can add fingerprint sensor so entry will be allowed for the authorized person using their fingerprints.
3. We can add fire, wind and LPG sensors so that, the doors will automatically open.
4. We can also add two step authentication process, which will enhance the security concerns.

References:-

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