**INTRA-DISCIPLINARY PROJECT REPORT**

On

**DIGITAL KEYPAD SECURITY DOOR LOCK USING AURDINO**

Submitted in Partial Fulfilment of the Requirements for the Degree of

ELECTRONICS AND COMMUNICATION ENGINEERING

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**(ACCREDITED BY NAAC WITH 'A+'GRADE)**

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# CERTIFICATE

This is to certify that the Minor project/IDP report entitled "**Digital Keypad Security Door Lock using Arduino**" that is being submitted by students V. Lakshmi Revanth kumar (201FA05043), CH. Sai Siva Ram (201FA05052), N. Anjana Sri (211LA05007) to the Department of Electronics and Communication Engineering, Vignan's Foundation for Science Technology and Research, is a record of work carried out by them under the guidance of Mr. P. Krishna Chaitanya of ECE Department.

Signature of Faculty Guide                    Signature of Head of the Department

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# 1.ABSTRACT

This research paper presents a microcontroller based digital door lock security system using keypad which will provide complete security solution to lives and properties at homes, schools and offices. The security system contains a 4X4 keypad input unit for entering the Personal Identification Number (PIN) and a display unit in form of Liquid Crystal Display (LCD) for visual display of information. It also contains a servo motor that serves as a switching for locking and unlocking the door and a programmed microcontroller that processes the input information and take appropriate action. When a user enters a PIN into the security system installed at any entrance, the system captures the PIN and compares it with the stored PINs for a match. If the captured PIN matches with any of the stored PINs, access granted is displayed on the LCD and the door opens; otherwise, access denied is displayed on the LCD and the door remains closed.

# 2. INTRODUCTION

The aim of this project is to create a security system which asks for a password before opening the door and opens the door only if the password matches the programmed keyword. In this project we will learn how to make the password-based security system using Arduino and keypad. As thefts are increasing day by day security is becoming a major concern now-a-day. So, a digital lock can secure your home or locker easily. It will open your door only when the right password is entered. The system has a keypad by which the password can be entered through it. When the entered password equals with the password stored in the memory then the door gets open. if we entered a wrong password then the alarm is switched on. We can easily access our garage, home, offices, etc. without the use of any kind of keys or opening it by ourselves. Password based door opener system provides us ease with security. With the help of this system, we can easily avoid the incoming of any offenders, strangers too. The system includes an electronic control assembly that controls the output load via a numerical password. An Arduino based door locker is an access control system that allows only authorized persons to access a restricted area. Hence, provides automation and security.
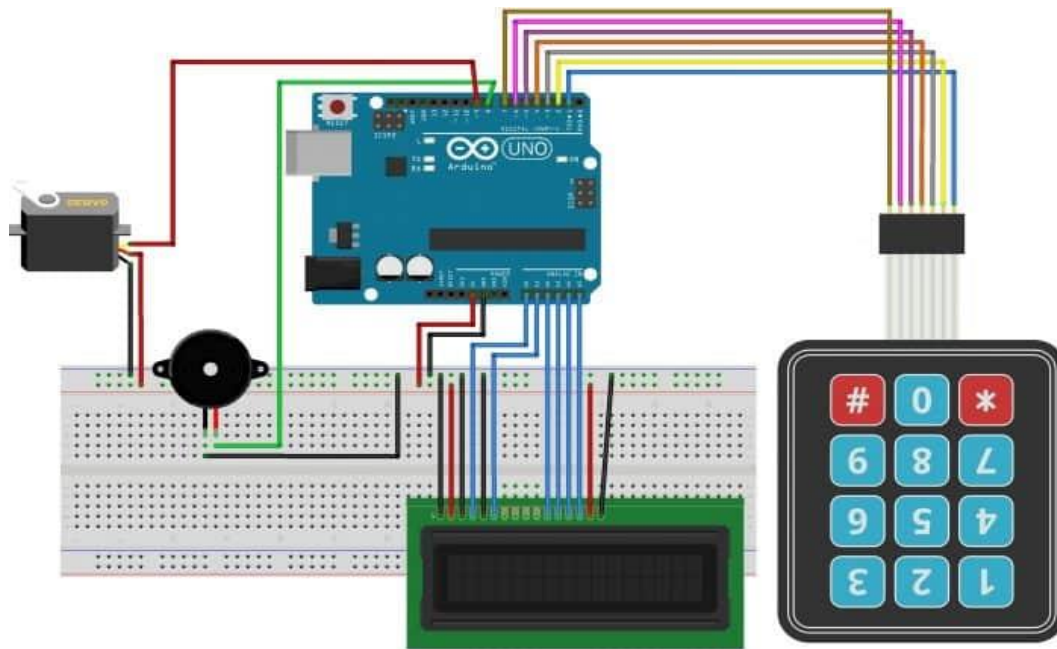
# 3.CIRCUIT DIAGRAM



Fig.1.Circuit Diagram of Digital Keypad Security Door Lock

# 4.COMPONENTS

## 4.1. ARDUINO UNO:

The Arduino Uno is an open-source microcontroller board based on the Microchip Atmega328P microcontroller and developed by Arduino.cc. The board is equipped with sets of digital and analog input/output (I/O) pins that may be interfaced to various expansion boards (shields) and other circuits, The board has 14 digital I/O pins (six capable of PWM output), 6 analog I/O pins, and is programmable with Arduino IDE (Integrated Development Environment), via a type B USB cable. It can be powered by the USB cable or by an external 9-volt battery, though it accepts voltages between 7 and 20 volts.
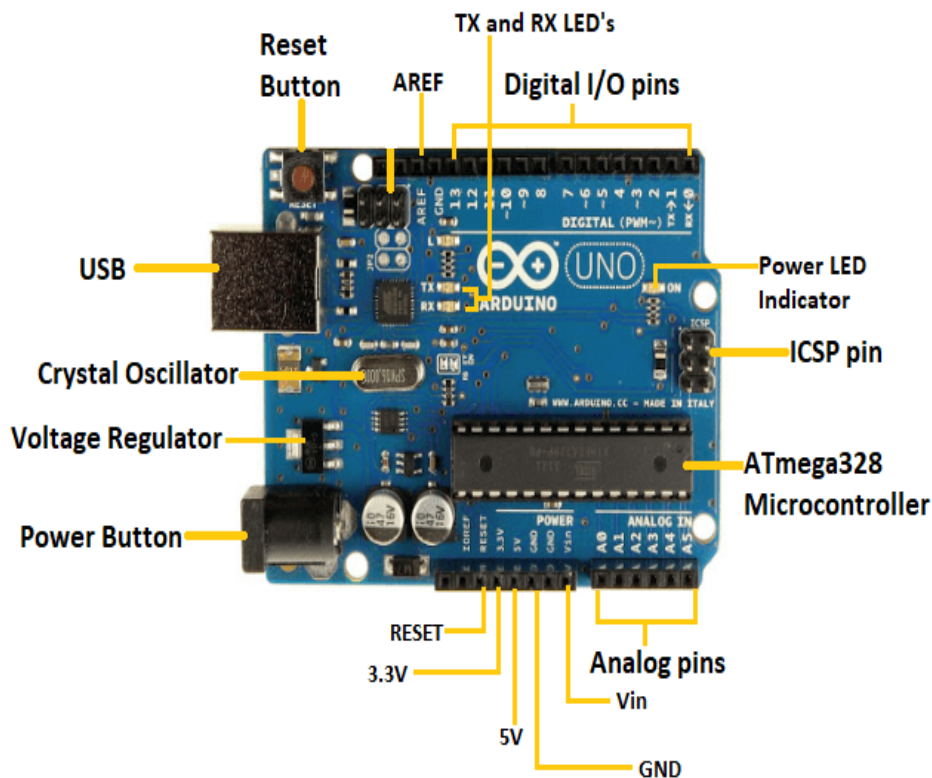


Fig.2. Arduino

## 4.2. 4x4 KEYPAD:

The 4×4 matrix keypad is an input device, it usually used to provide input value in a project. It has 16 keys in total, which means it can provide 16 input values. The most interesting thing is it used only 8 GPIO pins of a microcontroller. 4×4 Keypad Module Pin Diagram.



Fig.3. Keypad

## 4.3. LCD DISPLAY:

A liquid-crystal display (LCD) is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals combined with polarizers. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in color or monochrome.
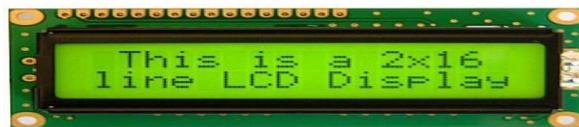


Fig.4.Liquid Crystal Display

## 4.4. SERVO MOTOR:

Micro Servo Motor: Micro Servo Motor SG90 is a tiny and lightweight server motor with high output power. Servo can rotate approximately 180 degrees (90 in each direction), and works just like the standard kinds but smaller.

Weight: 9 g

Dimension: 22.2 x 11.8 x 31 mm 9pprox.

Operating speed: 0.1 s/60 degree

Operating voltage: 4.8 V (~5V)

Temperature range: 0 ℃ – 55 ℃



Fig.5. Servo Motor

## 4.5. BREAD BOARD:

A modern solderless breadboard socket (invented by Ronald J Portugal for E&L Instruments, Derby consists of a perforated block of plastic with numerous tinplated phosphor bronze or nickel silver alloy spring clips under the perforations. The clips are often called *tie points* or *contact points*. The number of tie points is often given in the specification of the breadboard.
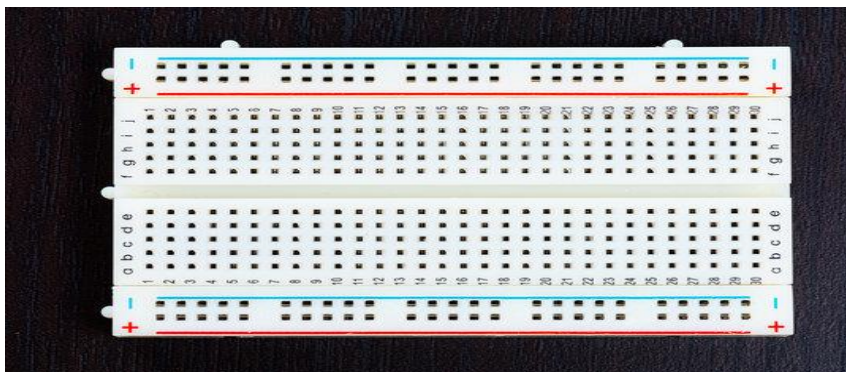


Fig.6. Bread Board

## 4.6. BUZZER:

A buzzer is a small yet efficient component to add sound features to our project/system. It is very small and compact 2-pin structure hence can be easily used on breadboard. The frequency range of this ranges from 2 kHz to 4kHz.



Fig.7.Buzzer

## 4.7. JUMPER WIRES:

Jumper wires are simply wires that have connector pins at each end, allowing them to be used to connect two points to each other without soldering.
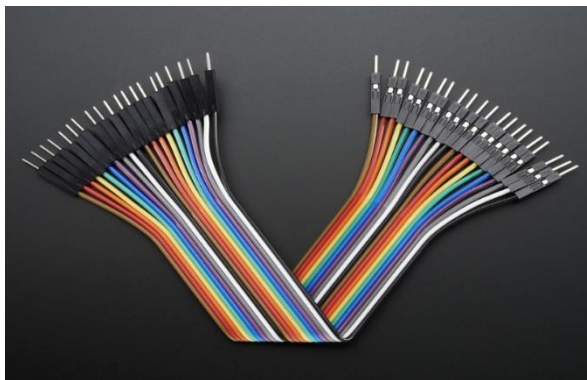


Fig.8.Jumper Wires

# 5. WORKING

We implemented the whole circuit in the software and uploaded the code for compilation, and it started the simulation. At first, the keypad was connected with the Arduino UNO & connected all the necessary pins of the Keypad to the Arduino board. All 7 pins were connected using connecting wires. Then we connected a 16×2 LCD Display to Arduino UNO. And also a 10K Ohm Potentiometer connected to the display for managing the voltage of the display. Later we connected Servo Motor to the Arduino, the rotation of Servo Motor allows us to open or close the door. All the pins were connected wires. We have to define the default password in the Arduino. You can change it via coding. When we enter a password in matrix keypad, it will match the password stored in the Arduino. If it is correct, then it will show "access granted", welcome' & then rotate the servo motor into 180 degrees as the door is opened. It will give 15 seconds time for entering via the door. Once the 15 seconds is completed, the door will get locked automatically. If the password is wrong, then it will show code incorrect go away, the buzzer will also beep once when any key is pressed.
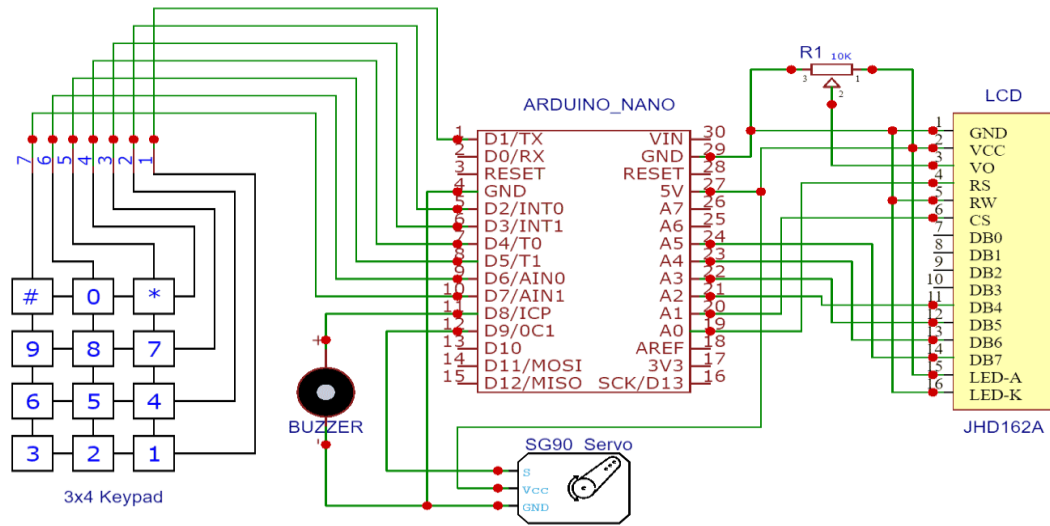
# 6.SCHEMATIC DIAGRAM



Fig.9.Schematic Diagram

# 8.ADVANTAGES

- Provide ease and automation

- Keyless system (hence no more worry of losing of keys)

- Provides security

- Power consumption is less

- Automatic door opening

- Gives indication for unauthorized entry

- Cost efficient

# 9.DISADVANTAGES

- If personal identification number is somehow forgotten the system could not be accessed.

- Powered by electricity, may not function properly in case of a power failure.

# 10.APPLICATIONS

- Can be used at residential places to ensure better safety

- Used at organizations to ensure authorized access to highly secured places

- Home access security

- Office access security

- Garage automation access

- Home automation access

# 11.FUTURE SCOPE

- We can send this data to a remote location using mobile or internet.

- We can add fingerprint sensor so entry will be allowed for the authorized person using their fingerprints.

- We can add fire, wind and LPG sensors so that in case of accident, the doors will automatically open.

# 12.CONCLUSION

Silent sound Technology is one of the recent invention in the field of information technology. Engineers claim that the device is working with 99 percent efficiency. Silent Sound technology aims to notice every movements of the lip and converted them into sounds, which could help people who lose voices to speak, and allow people to make silent calls without disturbing others. Rather than making any sounds, mobile would decipher the movements of mouth by measuring muscle activity and then convert this into speech that the person on the other end of the call can hear. So basically it reads lips. It will be one of the innovation and useful technology and in near future this technology will be used in day to day life.
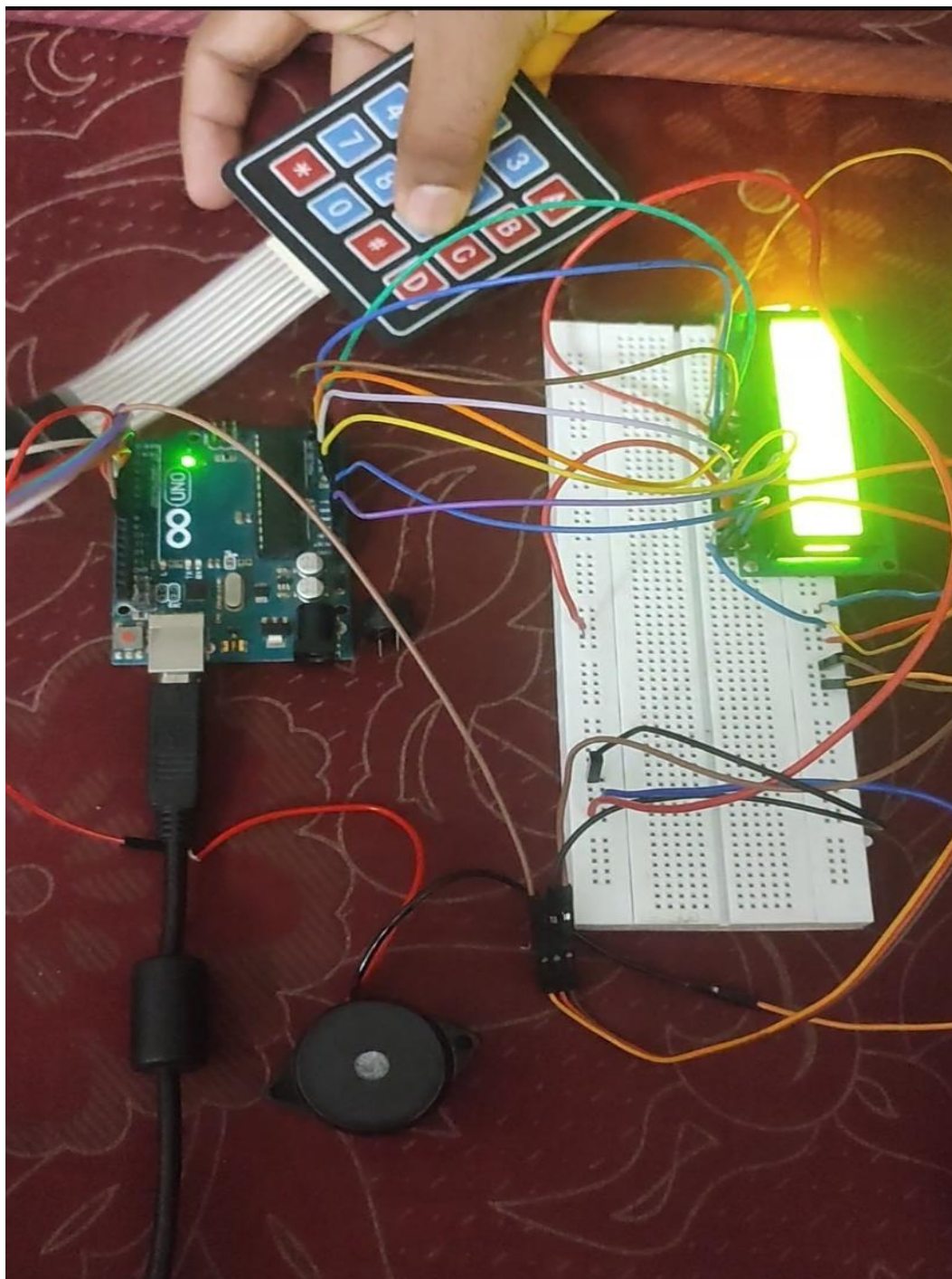
# 7.RESULT



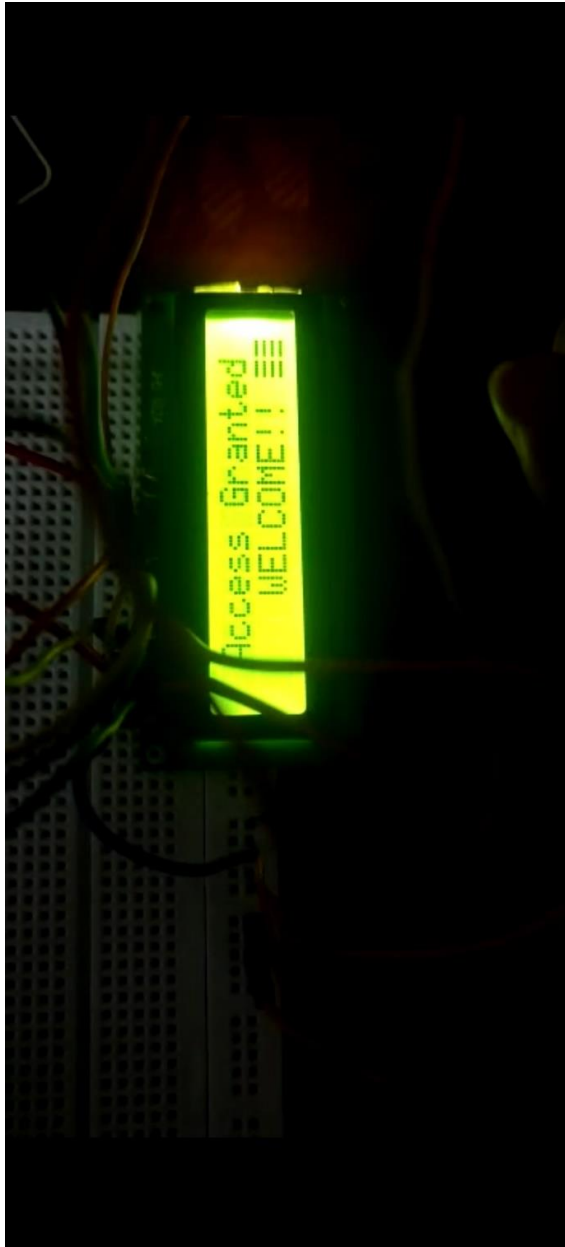Fig.7.1. Output of Digital Keypad Security Door Lock

Fig.7.2. Output of Digital Keypad Security Door Lock



Fig.7.3. Output of Digital Keypad Security Door Lock

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