Chapter-1

INTRODUCTION

In today's rapidly advancing technological era, the demand for smart and secure solutions is increasing. The conventional mechanical lock systems are gradually being replaced by intelligent door locking systems that offer enhanced convenience and robust security features. This project presents a Smart Door Locking System that utilises the 8051 microcontroller, integrating a keypad and a WiFi module for a two-way unlocking mechanism.The primary objective of this system is to provide a reliable, secure, and user-friendly approach to accessing doors. The combination of the keypad and WiFi module allows users to unlock the door using their unique passcode through the keypad or remotely via a mobile application, adding an extra layer of convenience.Here we used esp 8226 as wifi module and Solenoid Door lock as locking mechanism.

BENEFITS

- Antitheft
- Enhanced Security
- Keyless Entry Options
- Temporary Access and Guest Management
- Lost Key Replacement

Chapter-2
2.HARDWARE DESIGN AND IMPLEMENTATION

2.1 BLOCK DIAGRAM

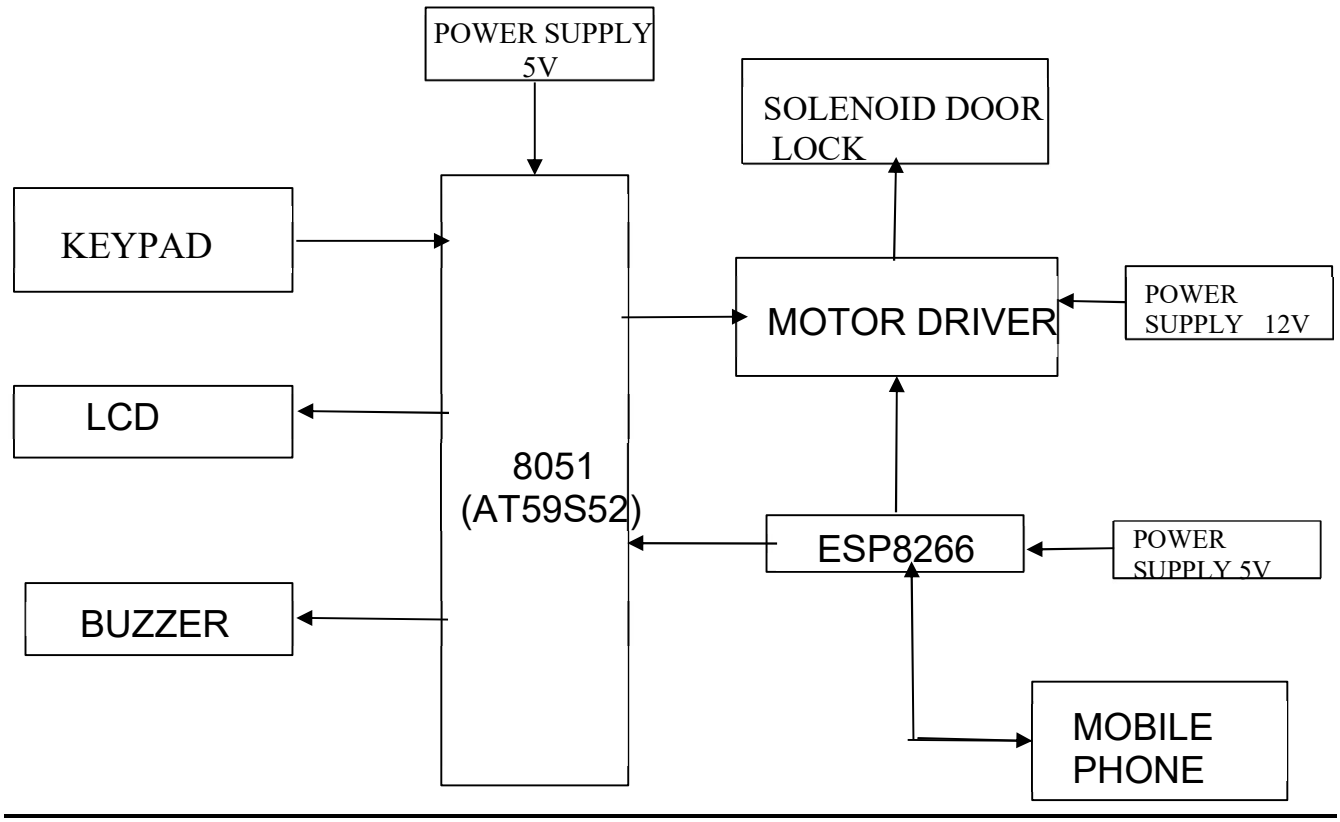

FIGURE 2.1 BLOCK DIAGRAM

2.2 LIST OF COMPONENTS

8051 MICROCONTROLLER MODULE
ESP8266
L298N MOTOR DRIVER IC
4*3 KEYPAD
16*2 LCD DISPLAY
BUZZER
JUMPER WIRES
BREADBOARD

2.3 COMPONENT DESCRIPTION

8051 MICROCONTROLLER MODULE

The 8051 microcontroller is a widely used 8-bit microcontroller that was originally developed by Intel. It features a simple and efficient CPU core and a rich set of peripherals, including I/O ports, timers/counters, UART, and serial communication interfaces. The 8051 microcontroller uses a modified Harvard architecture with separate program memory and data memory. The 8051 microcontroller has four I/O ports: P0, P1, P2, and P3. Each port is 8 bits wide. When configured as an output port, each pin of the I/O port can be set to either a logic high (1) or a logic low (0). When configured as an input port, each pin of the I/O port can be used to read the state or value of an external signal. It works at a frequency of 11.0592Mhz. In addition to I/O ports, the module has a USB connection, a power jack, and a reset button. It simply connects to a computer with a USB cable or powers it with an AC-to-DC adapter or battery to get started.

Figure 2.2 8051 module

ESP8266 IC

The ESP8266 is a highly popular Wi-Fi module that combines a microcontroller with integrated Wi-Fi connectivity. The ESP8266 is a highly popular Wi-Fi module that combines a microcontroller with integrated Wi-Fi connectivity. The ESP8266 module requires a power supply in the range of 3.3V to 3.6V. It is important to ensure a stable and regulated power supply to prevent issues
during operation.

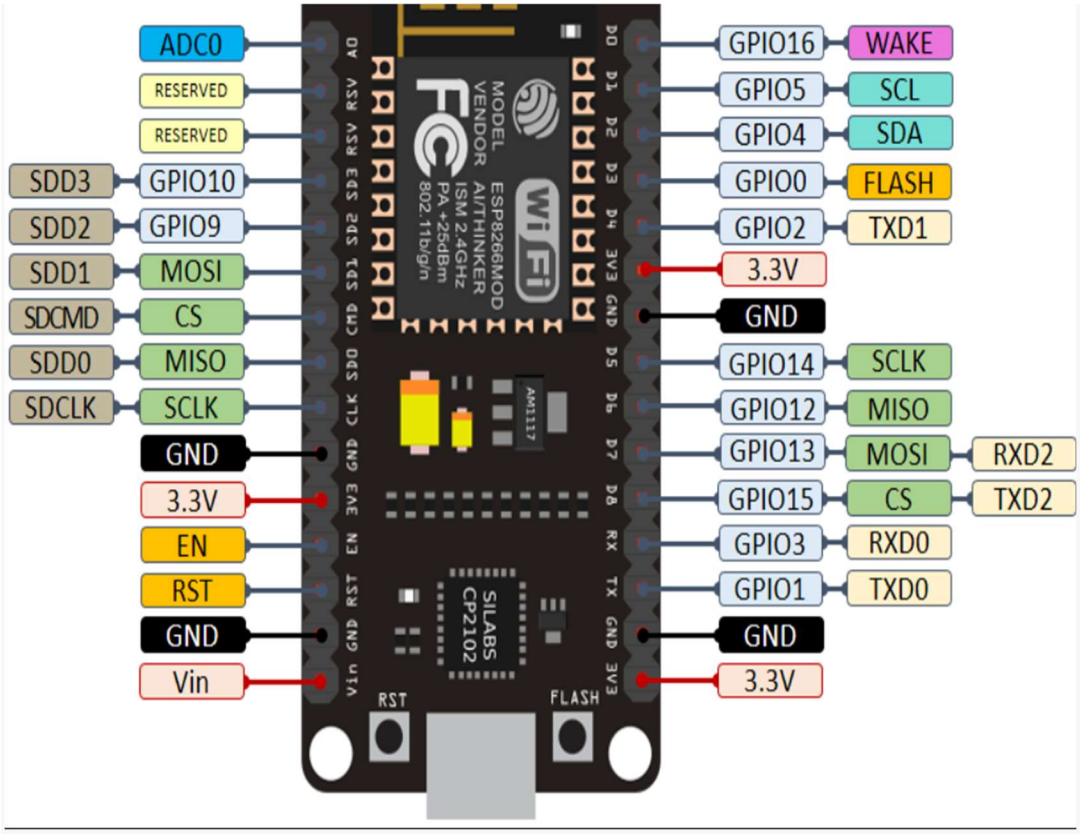

Figure 2.3 esp8266 IC

L298N MOTOR DRIVER IC

The L298N is a popular motor driver module used to control and drive DC motors and stepper motors. The L298N motor driver module allows bidirectional control of two DC motors. It provides the necessary circuitry to drive motors with higher current and voltage requirements. The L298N motor driver module is capable of handling a wide range of motor voltages, typically from 5V to 35V. It can provide a continuous current of up to 2A per channel (4A peak) for DC motors and control a stepper motor with a current of up to 2A. The L298N module features separate control inputs for each motor channel, allowing independent control of the motors. The control inputs accept digital signals (0 or 1) to determine the motor direction (forward or reverse) and enable/disable the motor. To dissipate the heat generated and prevent overheating, the module often comes with a heat sink or provisions for attaching an external heat sink. Here the 2 inputs of motor drive is connected to 8051 microcontroller(IN1,IN2) and the other 2 input pins to the esp8266 IC(IN3,IN4).Both the outputs are connected to the solenoid door lock(OUT1,OUT2,OU3,OUT4).

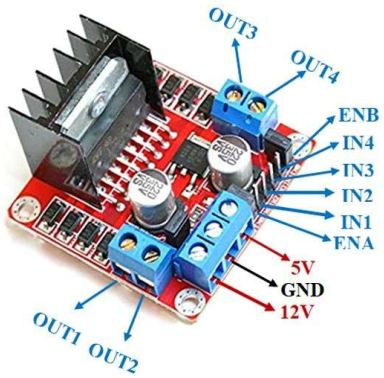

Figure 2.3 L298N motor driver

4*3 KEYPAD

A 4x3 keypad, also known as a matrix keypad, is a commonly used input device that provides a simple way to capture user input in the form of numeric or alphanumeric characters. A 4x3 keypad consists of 12 buttons arranged in a 4-row by 3-column matrix. Each button represents a specific character or symbol, typically including the digits 0-9, asterisk (*), and

pound (#). The buttons of the keypad are arranged in a matrix configuration, where each button's position is defined by the intersection of a row and a column. This matrix arrangement enables efficient use of microcontroller I/O pins for input scanning. Here the keypad is connected to the port1 of 8051.

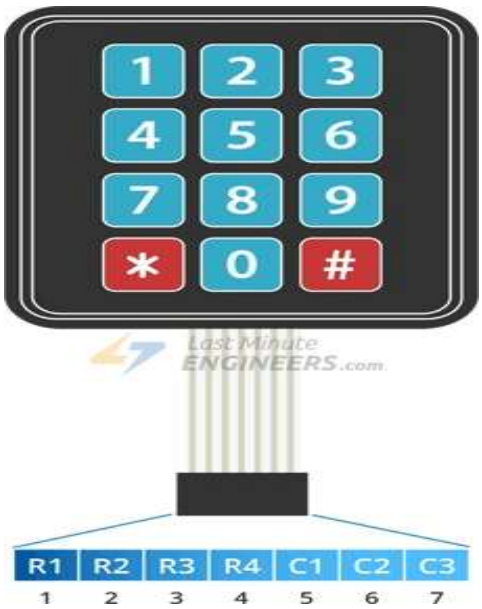

Figure 2.4 Keypad

16*2 LCD DISPLAY

The 16×2 LCD has 16 Columns and 2 Rows. The first pin is the ground pin. The second pin is used to supply power to the LCD module, typically connected to a +5V source. The third pin allows for adjusting the contrast of the LCD display to achieve optimal visibility. The fourth pin serves as the control pin. When set to 0, the LCD module operates in command mode, whereas a non-zero value puts it in data mode. The fourth pin serves as the control pin. When set to 0, the LCD module operates in command mode, whereas a non-zero value puts it in data mode. The enable pin (Pin 6) is used to enable or disable the LCD module. It is typically held high (1) to enable the module. Pins 7 to 14 are the data pins, connected to the port 2 of the 8051 microcontroller. These pins carry the

actual data to be displayed on the LCD. The remaining two pins are for the positive (+5V) and negative (ground) connections of the LCD module, providing the necessary power for its operation.

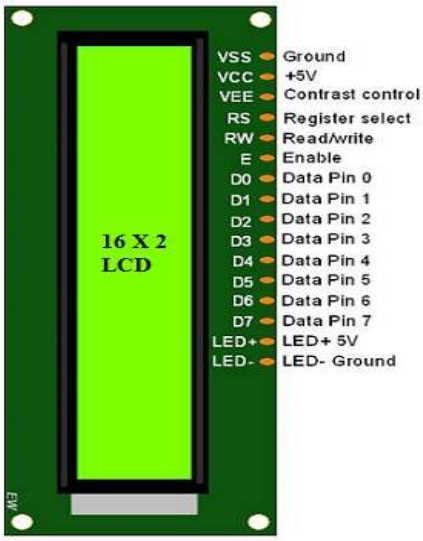

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Figure 2.5 LCD

BUZZER

The remaining two pins are for the positive (+5V) and negative (ground) connections of the LCD module, providing the necessary power for its operation. It includes two pins namely positive and negative. The positive terminal is powered through 5Volts whereas the negative terminal is represented with the '-' symbol or short terminal and it is connected to the GND terminal.

Figure 2.6 Buzzer

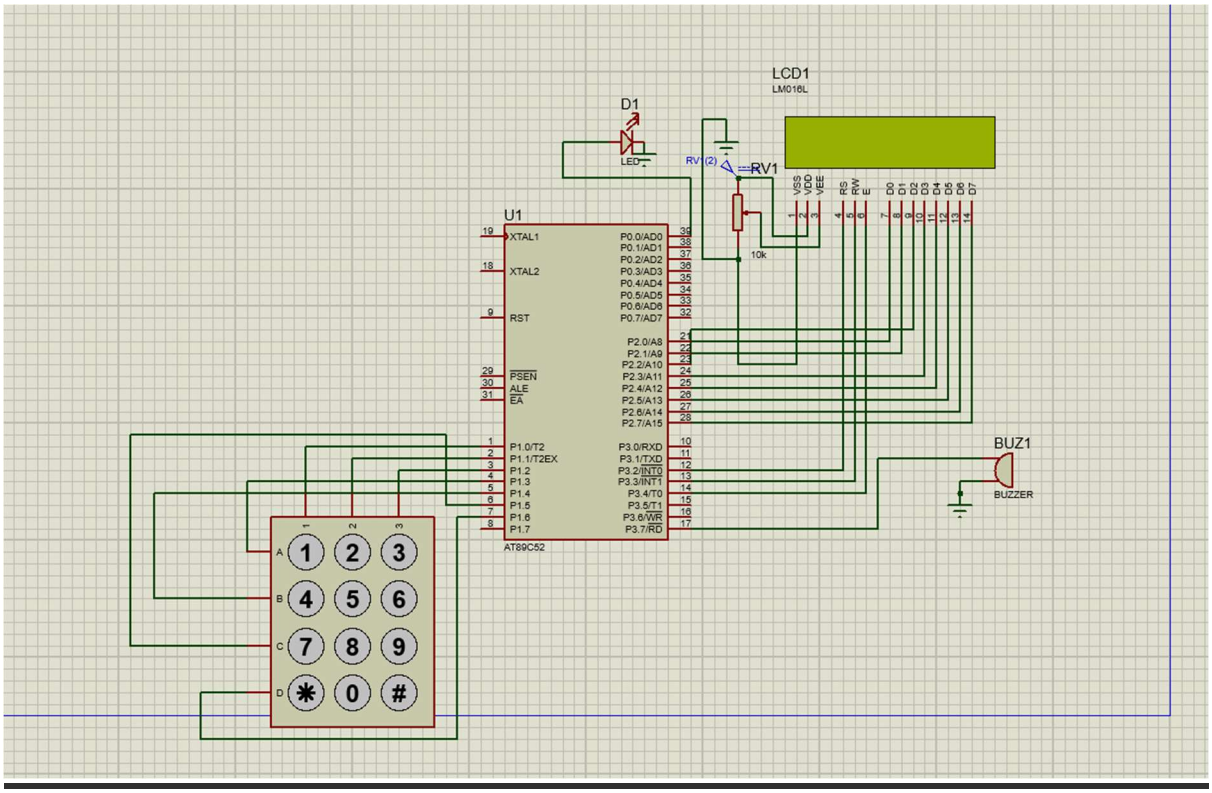
CHAPTER-3

WORKING

In the smart door locking system, there are two ways to unlock the door: through a keypad or by using a phone. The keypad is connected to the 8051 microcontroller as an input device, while the buzzer and LCD display are connected as output devices. To unlock the door, we enter a password using the keypad. The microcontroller compares the entered password with the predefined password. If the password is correct, the microcontroller sets the P3.5 and P3.6 pins to a high logic level. These pins are connected to the inputs of the motor driver, which activates the door unlocking mechanism. If the entered password does not match the specified password, the microcontroller keeps the P3.5 and P3.6 pins at a low logic level, indicating an incorrect password and preventing the door from being unlocked.

Another method to open the door is through a phone using the Blynk app. A custom app is created in the phone using Blynk software, allowing the user to lock and unlock the door remotely. The ESP8266 serves as the Wi-Fi module for this setup. When the unlock button is pressed in the Blynk app, a signal is sent to the Blynk cloud server. The server then forwards this signal to the microcontroller. Upon receiving the signal, the microcontroller triggers the door unlocking mechanism by sending a high signal to the inputs of the motor driver. The motor driver, in turn, provides the necessary power and control signals to operate the motor, resulting in the unlocking of the door. This enables convenient door access from anywhere using the Blynk app and the Wi-Fi-connected microcontroller setup.

CIRCUIT DIAGRAM



Connections are made as per the figure. The pin which is connected to the LED is the input pin that is connected to the esp8266.