

# Advanced Digital Locking System using 8051 Microcontroller

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**Abstract---Security is a prime worry in our daily lives. Each individual protects his /her valuable belongings and documents and tries to make it as secure as possible. Increase in robbery has resulted in greater demand for secure storage system.**

There is a limitation in mechanical lockers that is they can be broken in an easier manner. There is an essential need to provide high security to these lockers especially in banks. Features like digitization of lockers and One-Time Password (OTP) are used for enhancement of security of lockers and privacy of the users. This project proposes a Digital Code Lock using Microcontroller that provides Security. It will allow you to enter an OTP (which is generated, sent to Owners mobile and stored in microcontroller Memory). After the OTP is entered the locker opens if it matches with the stored OTP.

## I. INTRODUCTION

People want to ensure at most safety when it comes to their important documents and belongings. An Advance digital locking system is designed in order to ensure increased security. Safety can also be given through Mechanical or Electrical locks but they are much heavier and they can't cover greater area so Electrical locks are chosen. It is Supervised by Keypad.

Monitoring of opening and closing of the door (Locker Door) is an essential portion who has an entry and who don't is decided by the comparison result of OTP which is entered and OTP which is stored. This project aims at producing a low cost Locker using Digital Technology.

"Password Based Access Control System using Microcontroller" is used in confidential places where increased Security is essential. Password (OTP) is the Requirement for door to Open. Early Methods of lock Systems are Removed and improved Methods are enforced which is a blend of Mechanical and Electronic Appliances and are apt.

## II. METHODOLOGY

AT89S52 microcontroller is the most important component of this project. AT89S52 Microcontroller has an 8 kilobytes of Flash Memory along with 256 bytes of RAM. Other components include 4\*4 hex keypad, 16\*2

LCD display, SIM900A GSM modem, L298N motor driver which are interfaced with the microcontroller and a DC motor is connected to the motor driver. 5V Power supply is provided for microcontroller to operate. To create a complete project on ADVANCED DIGITAL LOCKING SYSTEM USING 8051 MICROCONTROLLER we must work on following phases -- Sending and Storing OTP, Comparison between entered and stored OTP, Opening of the Digital Locker door, Sending message on mismatch of OTP.

Firstly a generated OTP is sent to the mobile device of the owner and the same is stored in the microcontroller memory. GSM modem is used to send OTP and messages on OTP mismatch (OTP generated is of 4 digits in this project).

Next the OTP entered through the hex keypad, each row and column is continuously checked /scanned by the microcontroller in order to obtain the number entered then it is compared with the stored OTP.

After the comparison process if there is a match then the digital locker door opens for this purpose L298N motor driver is used which intakes instructions from microcontroller and controls the direction of rotation of the motor which is connected to the locker door. LCD is used for display purpose.

Processes such as generation, scanning of hex keypad, comparison, controlling and directing other components to perform their work is done by the microcontroller with the help of embedded C program.

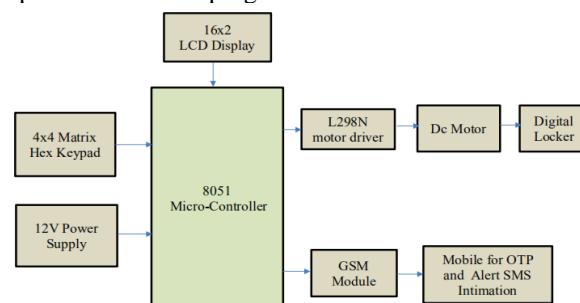


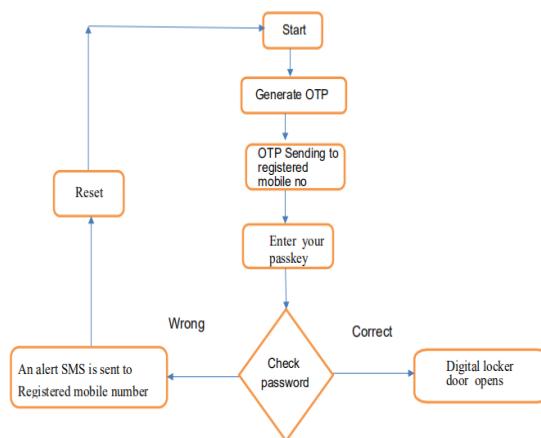
Figure 1: Block Diagram Of The Locking System

### III. ALGORITHM OF PROPOSED SYSTEM

After initialization of the Setup the LCD displays "sending otp" message then a password is generated and sent to the registered mobile number through GSM and it is also stored in the memory of the microcontroller. Then the LCD displays "Enter ur passkey" message requesting for Password, which is entered through hex keypad. Comparison is done between the Entered Number and Number stored in 8051 Memory.

If the Passwords found matched the LCD displays message "ACCEPTED" and the Digital Locker Door Opens and Closes with specified delay. In case if the Passwords found mismatched the LCD displays the Message "ACCESS DENIED" and along with it an Alert SMS of "ACCESS DENIED" is sent to the Registered Mobile Number.

### IV. FLOWCHART



### V. SOFTWARE SPECIFICATIONS

#### 1. Keil µVision

It is the software which acts as IDE. In order to program the microcontroller, IDE (Integrated Development Environment) is required. This is the environment (place) which converts the program (Code) into HEX files (the format which Microcontroller understands).

#### 2. ISP Programmer

In-System Programming (ISP) functions as IPE (Integrated Programming Environment). It accompanies burning Hardware which further performs the function of downloading of program available in Computer and then transferring it to Microcontroller. Both (Burning Hardware and Software) are required to burn a Microcontroller chip.

### VI. RESULT

Random Sequence(preferably a 4 digit number) is generated by the 8051 Microcontroller upon clicking the "Microcontroller Switch" and is sent Possessor's Registered Mobile number as Password through GSM Module. Once the OTP is sent to Registered mobile number LCD displays "Enter Ur Passkey". When the OTP obtained is entered as input

using a 4X4 Matrix Keypad, the System Opens the Door by rotating the Door Motor, displaying the message "ACCEPTED" on LCD, and closing the Door back again. In case If the Password entered is wrong The Door remains closed and displays the message "ACCESS DENIED" on LCD and along with this GSM will send an Alert SMS "ACCESS DENIED" to the Registered Mobile Number.



Figure 2: Model Overview

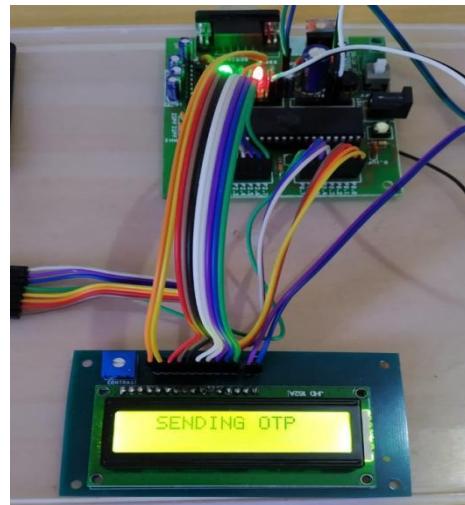


Figure 3: Sending OTP To Registered Mobile Number And Storing In Microcontroller Memory

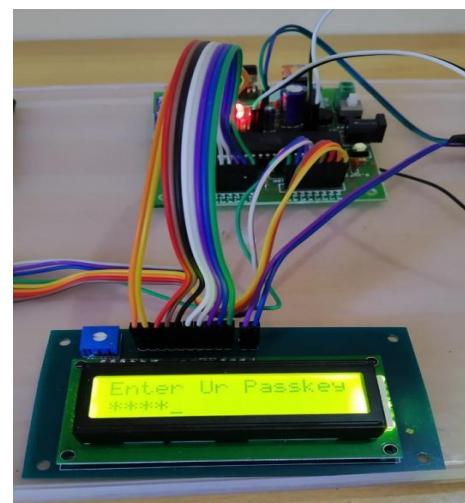


Figure 4: OTP Entered Through Hex Keypad

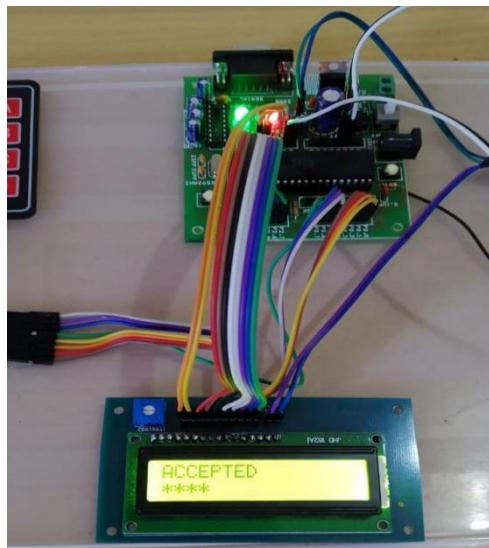


Figure 5: OTP Accepted

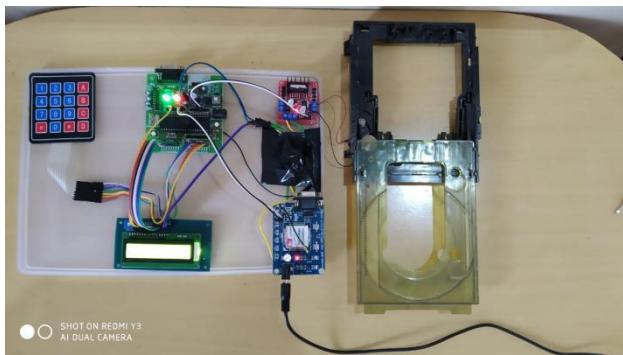


Figure 6: Opening Of Digital Locker Door

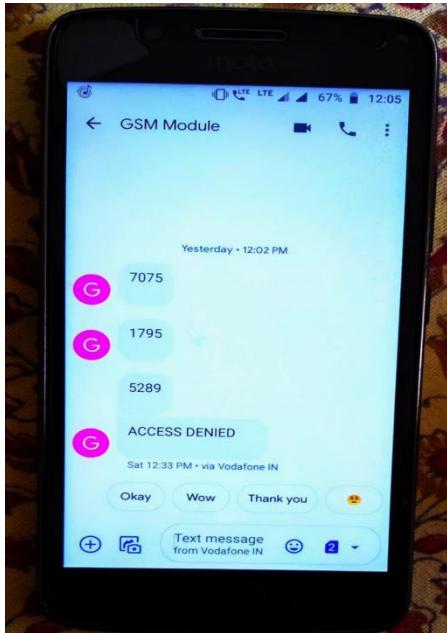


Figure 7: Access Denied Message Sent To Mobile on OTP Mismatch

organizations etc.). Most of the lockers which are used presently has a preset password but there is always a higher risk of unknown person having access to the password and thus resulting in lapse of security. The digital code lock ensures this is reduced significantly. It is useful as it requires less Power and has minimal cost and hence can be used as door locks and equipment locks.

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#### VII. CONCLUSION

In conclusion Digital code lock which provides security by sending OTP and messages to the owner's mobile can reduce robbery and unauthorized access in (banks, home,