Smart Locking Systems: An Arduino UNO-Based Security Solution

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Abstract: Security is very important and to be safe, security is must in our daily life. Locking door is important and we do them using metal locks. These locks are not safe as they use to be before. Anyone can get in with these old lock system, And its danger for our society. We need security 24/7. So, We are using Smart Door Lock which is IOT based, We use Arduino board, keyboard where we enter our security password, and we use LCD. When we enter our right security password, the door opens for certain time and automatically locks after the time ends. And when we enter wrong password the door doesn't open and LCD shows 'WRONG PASSWORD'. These Doors are made for high security. This would be great success for developing India.

1.INTRODUCTION

Introduction Security has always been an essential aspect of human life, protecting personal spaces, valuable resources, and sensitive information. From homes and offices to schools, laboratories, and corporate environments, maintaining a secure space is crucial in preventing unauthorized access and safeguarding assets. As technology continues to evolve, so do security threats, making it imperative to implement robust access control systems that can adapt to modern challenges. Over time, security measures have progressed significantly, from traditional locks and keys to more sophisticated methods such as password-protected systems, RFID authentication, biometric verification, OTP-based access, and cryptographic security protocols. As security systems evolve, digital threats and breaches continue to rise, emphasizing the need for constant innovation in protective measures. One of the simplest yet most effective solutions to enhance security is a digital code lock, a system that

ensures access is granted only when the correct password is entered. This method is widely used in homes, offices, lockers, and restricted areas to prevent unauthorized entry and enhance safety. Unlike conventional locks, which can be picked or bypassed, a password-protected system adds an extra layer of security by requiring users to input a predefined code before gaining access. In this project, we explore the design and implementation of a password-based door lock system using an Arduino UNO. This system functions by verifying the user-inputted password and unlocking the door only when the correct code is entered. If an incorrect password is provided, access is denied, and the door remains locked, preventing unauthorized individuals from entering. By integrating this system into security setups, we can enhance safety measures while maintaining ease of use and accessibility.

2.LITERATURE SURVEY

[1] Akshaya Krishnadas Bhat et al. 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.

[2] Prof. A.Y. Prabhakar et al. 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.

[3] Dr. Manish kumar et al. 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.

3.METHODOLOGY

Locking system is important usually most of use mechanical locks. In this Modern world we Use IOT Devices a lot, which gives high security. IOT locking system is modern and it shows more security to our society.it includes Arduino UNO, Keypad, LCD, Servo motor and connecting wires. At first we set right password to the door lock. Then door security device is on, servo motor angle is set ,we use keypad to enter the password. When we enter the password Arduino read the password and compare it with the password which we set to unlock our door, when the both matches the servo motor rotate and unlock the door for certain time and shut the door. And when the password doesn't match with the password we set to unlock the door, the door stay unlocked and on LCD it display 'WRONG PASSWORD'. And it says try again .IOT smart door lock gives high security which is easy to operate and control.

4.ARCHITECTURE
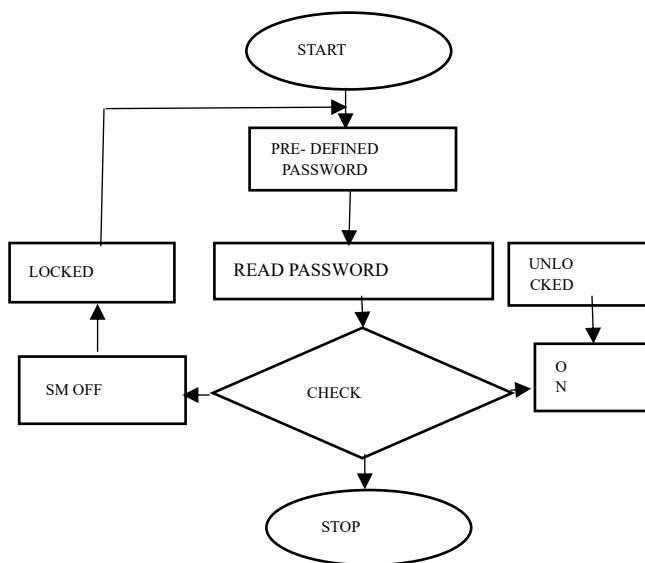
Servo Motor: A servo motor is a small but powerful motor that can move with precision. It is commonly used in robotic arms, remote-controlled cars, and automated door locks. In a password-based door lock system, the servo motor acts as the locking mechanism—it rotates when the correct password is entered, unlocking the door. If the password is incorrect, the motor stays in its locked position, keeping the door secure.

Keypad: The keypad is the main input device of the system, allowing users to enter their password. It looks similar to the number pad on a telephone and typically comes in a 3x4 or 4x4 grid of buttons. When a key is pressed, the Arduino detects which button was used. If the entered sequence matches the preset password, the system grants access by unlocking the door. This simple interface makes the system user-friendly and secure.

Arduino UNO: The Arduino UNO is like the brain of the system. It processes the information from the keypad, checks if the password is correct, and then controls the servo motor accordingly. It is a small, programmable circuit board that runs on a microcontroller, making it perfect for DIY electronics projects. The Arduino executes the programmed logic to ensure the system functions properly, providing a seamless experience for the user.

LCD Display (16x2): A 16x2 LCD display helps users interact with the system by providing real-time feedback. It can display messages like "Enter Password," "Access Granted," or "Wrong Password, Try Again." This ensures that users know what's happening at every step. The display makes the system more intuitive and improves security by preventing guesswork or confusion.

5.RESULT

The implemented door security system, which includes benefits and drawbacks. servo motor, LCD display, and keypad, effectively manage Table. Comparison Between Various Door Locking Access through password protection and provide feedback mechanisms on the door status. The integration of a lockout mechanism Locking Systems Advantages Disadvantages after a set number of failed attempts successfully prevents Simple and easy to use, vulnerable to brute/unauthorized access, enhancing the

overall security of the required minimal force attacks. Password-based system. The LCD display provides
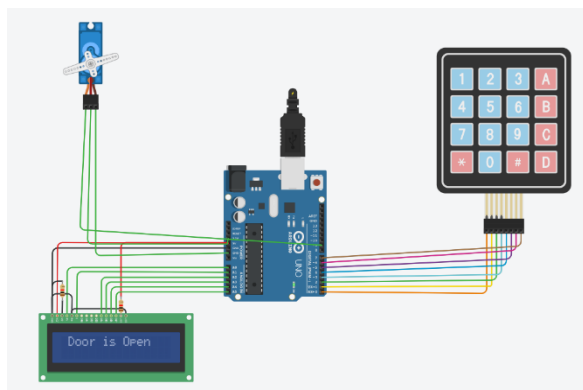
6.OUTPUT

Fig : Output as display

7.CONCLUSION

We will conclude that enhancing door locking systems using smart lock features such as password protection and alerting systems. This approach makes use of an Arduino microcontroller and other related hardware components to develop a successful prototype with the software being coded in Arduino C. Password-based locking systems typically have an accuracy or success rate of around 80-90%, largely depending on the strength of the password and the user's ability to remember and correctly enter it. The risk of false positives is relatively low because access is granted only when the correct password is entered. However, false negatives can occur moderately often when users forget their passwords or enter them incorrectly, leading to denied access attempts. Overall, the security effectiveness of password-based systems is moderate, as it heavily relies on the complexity of the passwords and user behavior, making them susceptible to various attacks, such as force.

8. REFERENCE

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