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Electronic Door Lock Systems Based on Different Password Authentication

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Abstract— Electronic door lock systems based on different password authentication provide a secure and convenient way to control access to buildings and rooms. These systems use various authentication methods, including numeric passwords, alphanumeric passwords, and biometric authentication, to ensure that only authorized individuals are allowed entry. This paper reviews different types of electronic door lock systems that are based on password authentication and discusses their advantages and limitations. The different systems covered in this paper include keypad-based systems, smart card-based systems, and biometric-based systems. The aim of this paper is to provide an overview of the available technologies and help readers select the most appropriate electronic door lock system for their specific needs.

Keywords— Electronic Door Lock And Password Authentication, RFID, Smart Lock, Biometric.

I. INTRODUCTION

Electronic door lock systems based on different password authentication have become increasingly popular due to the need for a more secure and convenient way to access private spaces. These systems are designed to restrict unauthorized access to buildings, rooms, and cabinets by using different types of passwords as a means of authentication. The passwords can be in the form of a numeric code, a pattern, or even a biometric input such as fingerprints. This introduction will provide an overview of electronic door lock systems based on different password authentication methods and their significance in providing security and convenience to users. Electronic door lock systems have become increasingly popular due to their convenience and security benefits. Among the different types of electronic door locks, password-based authentication systems are commonly used as they offer a simple and effective way to control access to a locked area.

In this paper, we will discuss different electronic door lock systems that are based on password authentication. These systems use various methods to authenticate users, including numerical codes, biometric data, and RFID tags. Each of these methods has its own advantages and disadvantages, and the choice of a particular system depends on the specific requirements of the user.

We will also explore the various components of an electronic door lock system, such as the control unit, the locking mechanism, and the power supply. Additionally, we will discuss the different types of electronic door locks available in the market, including standalone units, networked systems, and wireless models.

Finally, we will highlight the benefits of using an electronic door lock system over traditional mechanical locks, such as increased security, ease of use, and remote access control. Overall, this paper aims to provide an overview of electronic door lock systems and their application in different settings.

In today's world, security is a primary concern, and people are always looking for ways to enhance their safety. The increasing number of thefts in homes and banks has raised an alarming issue that requires a practical solution. To address this issue, we propose a project to develop a password-based door lock system. The core concept of this project is to enable the door to open by entering a password using a keypad. The project employs microcontroller as the primary component, which serves as a simple embedded system. The system takes the input from the keypad, and the LCD displays the status of the entered password, whether correct or not. The project also incorporates rotating motors to control the door's movement, ensuring secure access to authorized persons only.

II. OBJECTIVES

The objectives of electronic door lock systems based on different password authentication are:

- To provide enhanced security to homes, offices, and other facilities by implementing an electronic door lock system that can be accessed only through a password.
- To eliminate the need for physical keys and to provide convenience and ease of use to the users.

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- To provide different levels of access control by assigning different passwords to different users or groups of users.
- To incorporate advanced features such as remote access, biometric authentication, and real-time monitoring to further enhance the security and functionality of the system.
- To reduce the chances of unauthorized access and break-ins, thereby increasing the safety and security of the premises.
- To provide a cost-effective solution for implementing a secure door lock system, as compared to traditional mechanical lock systems.

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III. Overview Of The Project

Electronic door lock systems based on different password authentication are designed to enhance the security of homes, offices, and other premises by allowing only authorized personnel to access the premises. These systems are designed to operate on the basis of a password that is entered through a keypad or other input device. The password is verified by a microcontroller and the door is unlocked only if the correct password is entered. The system is designed to be easy to use and highly secure, providing a reliable and effective way to protect valuable assets and prevent unauthorized access to restricted areas. Different types of electronic door lock systems are available in the market, each with its own unique features and capabilities. These systems are increasingly popular due to their effectiveness, reliability, and ease of use.

IV. Literature Review

The use of electronic door lock systems based on password authentication has become increasingly popular in recent years due to their convenience and security. With the rise of smart home technology, these systems can be integrated with other devices and can be controlled remotely, providing an additional layer of security.

Several studies have been conducted to investigate the effectiveness and reliability of these systems. One study found that electronic door locks were more secure than traditional lock and key systems, as they are less susceptible to lock picking and tampering. Another study evaluated the usability and user experience of these systems, finding that users preferred password-based authentication over other methods such as biometric authentication.

An electronic door lock system based on different password authentication have shown great promise in providing convenient and secure access control. With continued advancements in technology, it is likely that these systems will become even more prevalent in the future.

"Password Based Security System Using Microcontroller" by S. Kumar, S. R. Patil, and S. S. Patil, in the International Journal of Innovative Research in Science, Engineering and Technology, 2015.

This paper presents a password-based security system that uses an AT89C51 microcontroller as the main component. The system is designed to control the locking and unlocking of a door using a 4x4 matrix keypad for password entry. The authors also discuss the advantages and disadvantages of the system, as well as its potential applications.

"Smart Door Lock Based on Password and RFID" by S. Duan and X. Guo, in the Proceedings of the 2019 International Conference on Industrial Internet and Intelligent Manufacturing, 2019.

This paper proposes a smart door lock system based on both password and RFID authentication. The system uses an STM32F103 microcontroller as the main component and can be remotely controlled and monitored using a smartphone app. The authors also discuss the security features of the system and its potential applications in smart homes and other settings.

Development of an Electronic Door Lock System for Homes and Offices" by A. E. Otegbade and J. O. Olajide, in the International Journal of Electrical and Computer Engineering, 2016.

This paper presents the development of an electronic door lock system for homes and offices that uses a PIC microcontroller as the main component. The system is designed to control the locking and unlocking of a door using a password entered through a 4x3 keypad. The authors also discuss the challenges and limitations of the system, as well as its potential applications in different settings.

"Design and Implementation of an Electronic Door Lock System Based on Keypad and Bluetooth" by M. O. Adegoke and O. A. Ogundipe, in the Journal of Computer Science and Its Applications, 2017.

This paper describes the design and implementation of an electronic door lock system based on both keypad and Bluetooth authentication. The system uses an Arduino microcontroller as the main component and can be remotely controlled and monitored using a smartphone app. The authors also discuss the security features of the system and its potential applications in smart homes and other settings.

"Design and Implementation of a Biometric-Based Door Lock System" by N. U. Ononiwu and C. U. Onwuka, in the Journal of Electrical and Electronics Engineering Research, 2014.

This paper presents the design and implementation of a biometric-based door lock system that uses a fingerprint scanner for authentication. The system is designed to control the locking and unlocking of a door using a fingerprint scanner connected to a microcontroller. The authors also discuss the advantages and disadvantages of the system, as well as its potential applications in different settings.

V. Design Approach

The design approach for an electronic door lock system based on different password authentication typically involves selecting the appropriate hardware and software components to build the system. This includes choosing a microcontroller that can process user inputs from a keypad, manage the

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communication between different components, and control the locking mechanism.

The system may also incorporate other authentication methods such as RFID, biometrics, or Bluetooth to provide additional layers of security. The software design involves developing code for the microcontroller to manage user inputs and authenticate access, as well as integrating any additional features such as remote monitoring and control. The hardware design involves connecting the various components together, such as the keypad, microcontroller, motor or solenoid for the locking mechanism, and any additional authentication sensors. The design should also ensure that the system is powered reliably and safely, and that any potential security vulnerabilities are addressed. unauthorized access or tampering. Iterative testing and refinement may be necessary to address any issues that arise during testing.

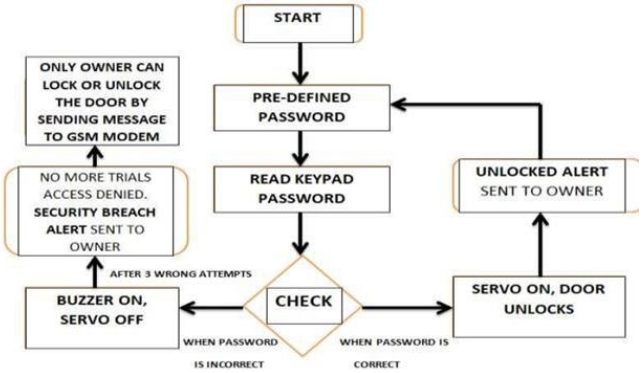

Figure 1: Flow chart of the Proposed System

The above flowchart describes the working principle of an electronic door lock system based on a different password authentication method. The system utilizes an Arduino microcontroller to read the password entered through a keypad and compare it with the known password stored in its memory. If the password entered by the user matches the known password, the servo motor rotates, and the door unlocks for a limited time. Additionally, the system sends an SMS to the owner's smartphone, notifying them of the door's locking and unlocking status via a GSM modem.

A. Working

In the event of three consecutive incorrect password attempts, the system automatically locks and shows a message on the LCD display, "NO MORE TRIALS ACCESS DENIED." The door will then only be unlocked or locked through an owner's pre-defined code, which can be sent to the system via SMS using their smartphone. The design approach for this system involves the integration of various components, including a keypad, Arduino board, servo motor, GSM modem, LCD display, and buzzer. The system's firmware is programmed to read input from the keypad and compare it with the known password, controlling the servo motor's rotation, and sending notifications to the owner's smartphone via the GSM modem.

Overall, this design approach provides an efficient and secure method of locking and unlocking doors using a different password-based authentication system. The system's ability to send SMS notifications to the owner's smartphone ensures that they are aware of their property's status and can take necessary action in case of any unauthorized access attempts.

VI. Components To Be Used

The components used in electronic door lock systems based on different password authentication may vary depending on the specific design and features of the system. However, some of the common components that can be expected in such systems include:

- Microcontroller: A microcontroller is the brain of the system that controls and coordinates all

the functions of the system. It can be an 8051, Arduino, or any other microcontroller depending on the design.

- Keypad: A keypad is used to enter the password into the system. It can be a 3x3, 4x3, or 4x4 keypad depending on the number of digits in the password.
- LCD Display: An LCD display is used to display the status of the system, such as whether the password entered is correct or incorrect, and any other information related to the system.
- Servo Motor: A servo motor is used to lock and unlock the door. It can be connected to the microcontroller to receive the control signals. ▪ Buzzer: A buzzer can be used to indicate the invalidity of the password or any other error condition in the system.
- Power Supply: A power supply is required to power the system. It can be a battery or an AC adapter depending on the design.
- Enclosure: An enclosure is used to house all the components of the system and protect them from dust, moisture, and other environmental factors.

These are some of the expected components that can be used in electronic door lock systems based on different password authentication. However, the actual components used may vary depending on the specific requirements and design of the system.

VII. Conclusion

Electronic door lock systems based on different password authentication provide an efficient and secure way to protect homes, offices, and other valuable assets from unauthorized access. By using various authentication methods such as RFID, biometrics, and keypad, these systems can be customized according to the user's preferences and requirements. The integration of microcontrollers, sensors, and other electronic components has led to the development of smart lock systems that can be remotely controlled and monitored. However, there are still some limitations and challenges associated with these systems, such as the risk of hacking and malfunctioning due to power failures or technical issues. Therefore, it is important to continuously improve and update these systems to ensure maximum

security and reliability.

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