SRI SIDDHARTHA ACADEMY OF HIGHER EDUCATION

(DEEMED TO BE UNIVERSITY)

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SRI SIDDHARTHA INSTITUTE OF TECHNOLOGY

(A Constituent College of SSAHE)

KUNIGAL ROAD, MARALURU, TUMAKURU-572105

Dept. Integrated Lab (Embedded Systems and IoT)

Mini Project Report

"LOCK MANAGEMENT SYSTEM"

Submitted in partial fulfillment of the requirement for the completion of IVth semester of

BACHELOR OF ENGINEERING

Submitted by:

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

"Accredited by NBA, NEW DELHI"

2024

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CERTIFICATE

Certified that mini project work entitled **"LOCK MANAGEMENT SYSTEM",** is a bonafide work carried out by Mr. CHETHAN D M **(**22CS026**)** and BHIMA KOWSHIK H V **(**22CS124**)** in partial fulfillment of the requirement for the completion of IVth semester in **Computer Science and Engineering** of Sri Siddhartha Academy of Higher Education - Tumakuru during the year 2024. It is certified that all corrections/suggestions indicated has been incorporated in the report. The report has been approved as it satisfies the academic requirements with respect to Mini Project work.

Signature of the Faculties

Signature of the HOD

Dr. Renukalatha S
Professor and Head,
Dept. of CSE, SSIT

Introduction:

The integration of Arduino UNO in lock system management represents a significant advancement in security technology. Arduino UNO, a versatile microcontroller platform, offers the capability to design and implement sophisticated locking mechanisms with features such as biometric recognition, password protection, and remote access control.

With the proliferation of IoT (Internet of Things) devices, the demand for smart and efficient lock systems has surged. Traditional mechanical locks are being replaced by electronic counterparts that provide enhanced security and convenience. Arduino UNO serves as the backbone of these modern lock systems, enabling seamless communication between sensors, actuators, and the user interface.

The aim of this project is to explore the potential of Arduino UNO in creating an intelligent lock system that ensures robust security while offering user-friendly functionalities. By leveraging the capabilities of Arduino UNO, we can design a customizable lock system that adapts to various environments and user requirements.

This report delves into the design, implementation, and evaluation of a lock system management using Arduino UNO. It examines the hardware components, software algorithms, and user interface considerations involved in building a reliable and efficient lock system. Additionally, it discusses the potential applications, benefits, and future advancements in this field.

Objective:

The objective of implementing a lock system management using Arduino UNO is to provide a secure and efficient way to control access to a physical space or device. By utilizing Arduino's hardware capabilities and programming flexibility, the system can offer features such as keypad or RFID card authentication, remote access control, logging of access events, and integration with other smart home or security systems. This enhances security, convenience, and monitoring capabilities, making it suitable for various applications including homes, offices, and industrial facilities.

Applications:

1. **Home Security**: Arduino-based lock systems can be used to secure doors, windows, and cabinets in residential settings, providing homeowners with enhanced security and peace of mind.

2. **Access Control in Offices:** Arduino-based access control systems can be deployed in offices to regulate entry to restricted areas, track employee attendance, and prevent unauthorized access to sensitive areas or equipment.

3. **Industrial Facilities:** Arduino-powered lock systems can be employed in industrial facilities to control access to machinery, warehouses, and control rooms, ensuring only authorized personnel can access critical areas.

4. **Asset Management**: Lock systems using Arduino UNO can be integrated with asset management systems to secure valuable assets such as tools, equipment, and inventory, allowing businesses to monitor and manage their assets more effectively.

Advantages:

1. **Cost-effective:** Arduino UNO boards are relatively inexpensive, making them accessible for small-scale projects or prototypes.

2. **Ease of use:** Arduino's open-source platform and extensive community support make it easy for beginners to learn and implement.

3. **Versatility**:Arduino UNO can be easily integrated with various sensors, actuators, and communication modules, allowing for customization and expansion of the lock system.

4. **Low power consumption**: Arduino UNO consumes minimal power, making it suitable for battery-powered applications, such as smart locks.

Disadvantages:

1. Centralization: Limits decision-making power to a central authority.
2. Lack of Local Representation: Neglects input from regional or local perspectives.
3. Potential for Corruption: Concentration of power can lead to misuse and corruption.
4. Slow Response: Decision-making process may be sluggish.

Hardware and software requirements:

Hardware:

1. Arduino UNO board
2. LCD display
3. RFID card module
4. Connecting wires
5. Power source (e.g., battery or adapter)

Software:

1. Arduino IDE
2. Appropriate libraries for sensor modules (e.g., DHT sensor library)
3. Code for data logging and management
4. Serial communication for debugging
5. SD card library for data storage

Compents:

RFID module

Arduino UNO

Servo motor

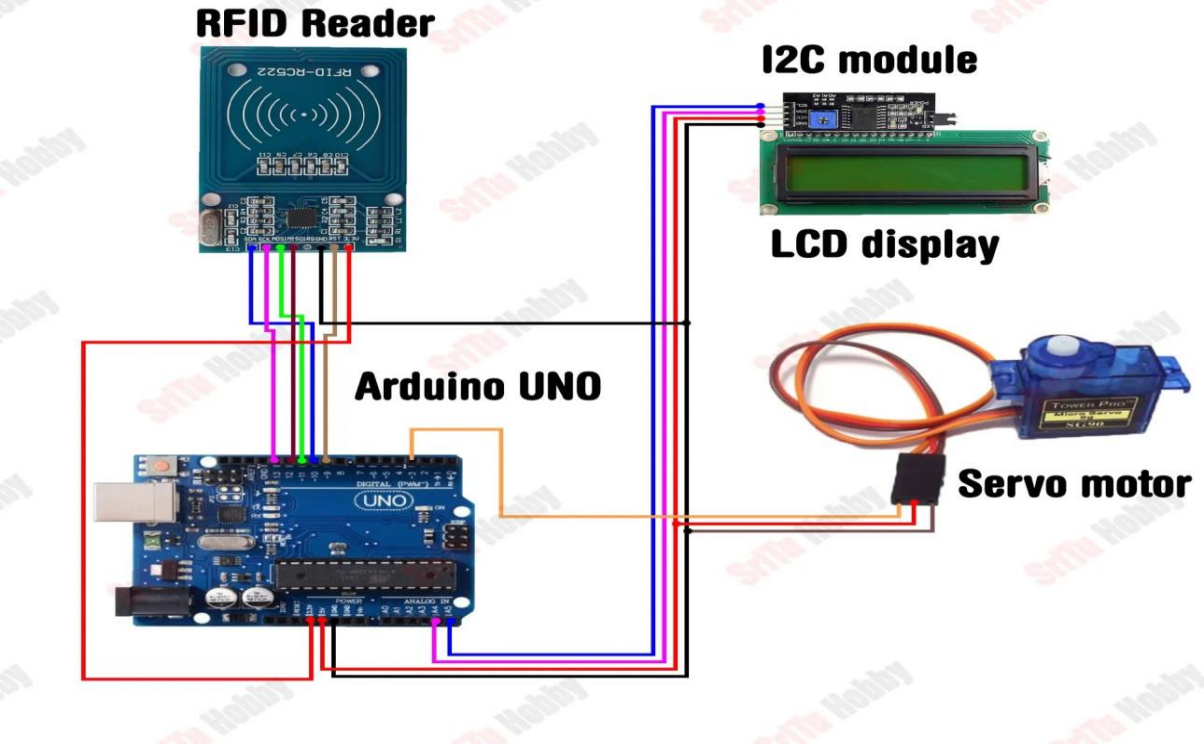
LCD display

Bolt

RFID card

Buzzer

Block diagram:



Working:

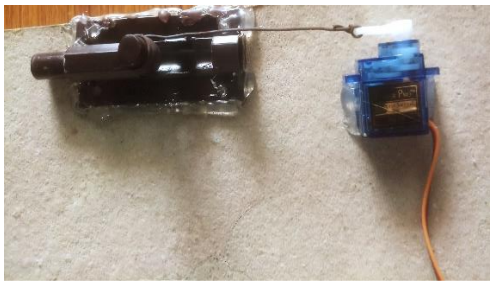
When power ON this door lock, the servo motor activates and pushes the door lock forward. Also displayed as “Welcome, put your card” on the LCD. Then when the RFID tag is moved closer to the RFID reader, it is scanned. In that case, it is displayed as “scanning” on the LCD. Then, if the RFID tag is correct, the servo motor is activated and the door lock is pulled back. The LCD shows “Door is Open”. When the RFID tag is moved closer to the RFID reader again, if it gets the correct tag, the servo motor will push the lock forward. Displays “Door is locked” on LCD. If a wrong RFID tag is used according to the program, it will be displayed as “Wrong card” on the LCD.

Connection:

1 pin – 2D pin
2 pin – 3D pin
3 pin – 4D pin
4 pin - 5D pin
5 pin – 9D pin
6 pin – 6D pin
7 pin – 7D pin

8 pin – 8D pin
Servo to Arduino
Positive (red) - +5V
Negative (brown) – Ground
Signal (yellow) – 11 pin

Result:



Door locked

Door unlocked

Conclusion:

The Door Lock System Management using SurveyMotor Arduino Uno RFID Module, LED Display, and Bolt works by integrating these components to control access to a door. The RFID module reads RFID tags/cards to authenticate users. The Arduino Uno processes this information and triggers the Bolt, an electronic lock, to either lock or unlock the door. The LED display provides visual feedback, indicating whether access is granted or denied. Together, these components create a secure and efficient door lock system.