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Project Report

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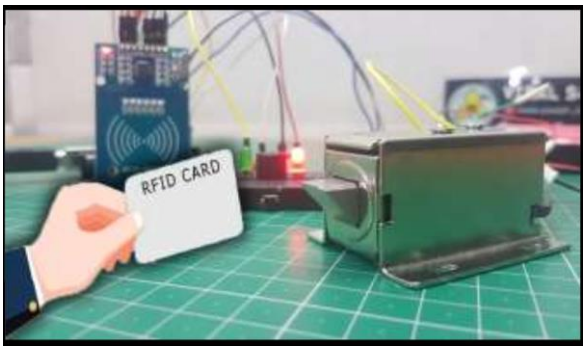
RFID Solenoid Door Lock System



Abstract:

The RFID Solenoid Door Lock System is designed to provide a secure and convenient access control mechanism using RFID technology. The system utilizes an Arduino UNO microcontroller, RFID sensor, relay, LEDs, jumper wires, battery, solenoid lock, breadboard, buzzer, and USB cable to create a reliable and efficient door locking system.

Introduction:

Access control systems play a crucial role in ensuring the security of homes and offices. This project aims to implement a door lock system using RFID technology for authentication. RFID tags are assigned to authorized users, and the system unlocks the door upon successful card scanning. This approach provides a seamless and contactless authentication method, enhancing user convenience and minimizing the risks associated with traditional key systems.

Components:

- **Arduino UNO:** The central microcontroller that processes RFID data and controls the locking mechanism.
- **RFID Sensor (Tag + Reader):** Reads RFID tags to authenticate users.
- **Relay:** Controls the connection between the solenoid lock and the Arduino, enabling or disablingthe lock.
- **LEDs (Red and Green):** Indicate the status of the system (Red for card scanning, Green for opening the lock).
- **Jumper Wires:** Connect various components on the breadboard and ensure a stable electricalconnection.
- **Battery:** Powers the solenoid lock through the relay.

- **Solenoid Lock:** The electromechanical device responsible for physically locking and unlocking the door.
- **Breadboard:** Platform for prototyping and connecting electronic components.
- **Buzzer:** Produces an audible signal to indicate a successful card scan.
- **USB 2.0 Cable Type A/B:** Connects the Arduino to a computer for programming and monitoring.
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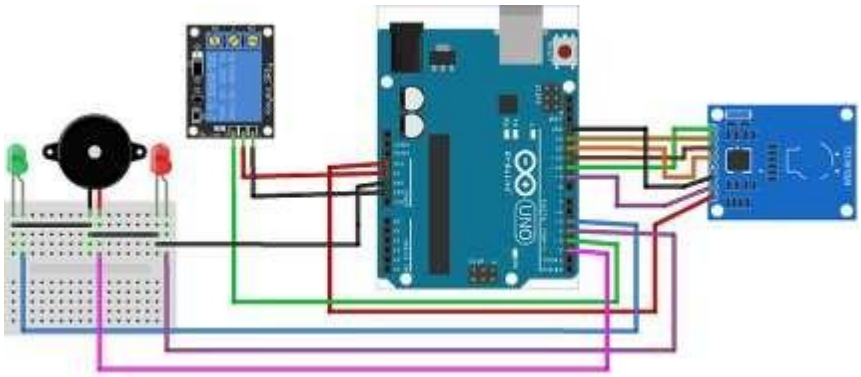
System Architecture:

The Arduino processes RFID data, controls the relay to manage the solenoid lock, and triggers visual and audible indicators based on RFID authentication.

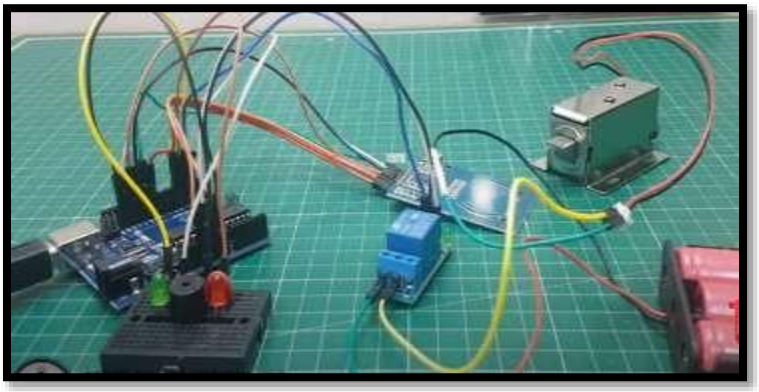
Schematic Diagram

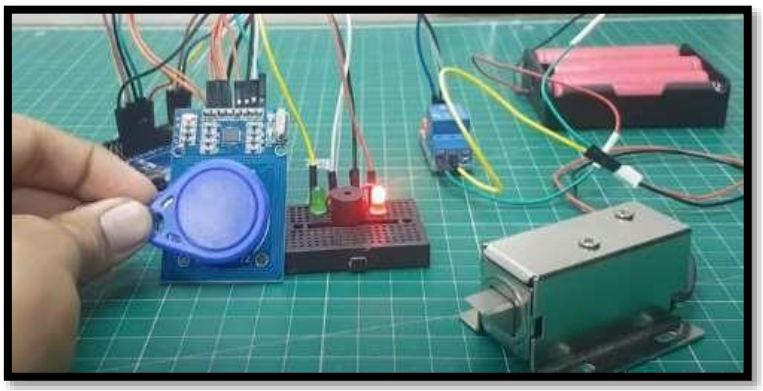


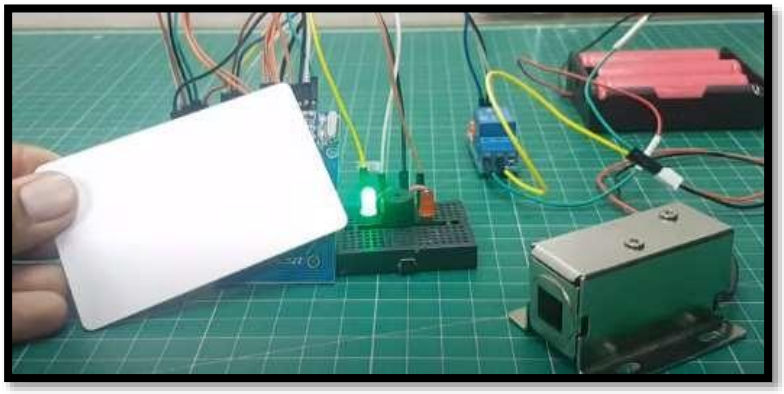
Programming:

The Arduino code manages RFID authentication, relay control, and feedback mechanisms for LEDs and the buzzer. The code is provided with explanations of key functions.

Outputs:







Conclusion:

The RFID Solenoid Door Lock System demonstrates a secure and user-friendly access control solution. RFID technology's contactless nature enhances convenience, and the integration of visual and audible feedback ensures a robust user experience.

References:

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