Fingerprint Authenticated Smart Door Lock (Doc Version 1.0)

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Contents

1 Document Version History

S.No	Version	Notes
1	1.0	First Version

Table 1: Document Version History

2 Project Description

Objective of this project is to design a fingerprint authenticated Smart Door Lock. Door lock gets opened only if a valid fingerprint which can be pre-stored in the fingerprint module is present. Multiple users can also be given access by storing multiple fingerprints. Such a system is more secure and user need not worry about carrying keys for opening/closing the door.

3 Bill of Materials

Below is a list of components, materials and tools required for the project

1. Arduino Uno Rev3 Board
2. Fingerprint Sensor Module R307
3. 12V DC Solenoid for Electric Door Lock
4. Wall powered adapter with 12V output
5. DC power jack - female connector with 2 pin Screw Terminal (for connecting wires to DC power jack)
6. Relay Module
7. 9V battery and connector
8. Breadboard, Connecting wires - male-to-male, male-to-female
9. Tools like wire stripper, screw driver

4 Module Level Functionality

4.1 Arduino Uno Rev3 Board

This is the main board containing the microcontroller responsible for system level logic and control flow and interfacing with all the other modules like HC-06 bluetooth module and Relay module.

4.2 Fingerprint Sensor Module

R307 is the fingerprint sensor module used in this projet. This is a very useful module and also includes memory for storing fingerprint information. Adafruit's fingerprint library for Arduino was used along with this module and provides an easy interface for both storing new fingerprints and fingerprint authentication.

4.3 12V DC Solenoid for Electric Door Lock

A 12V DC Solenoid for Electric Door Lock is used in this project. It has 2 terminals - one for 12V supply and the other for ground. When 12V input power is provided to the electric lock, it is open otherwise it remains in lock position.

4.4 Relay Module

Relay is an electronic switch which can be controlled ON or OFF electronically by setting it's input SIG(signal) pin to HIGH or LOW respectively.

For controlling wall powered devices which operate at high voltages of 120-240V and high currents from few hundred milliamps to few Amps, we can use a relay instead of powering the device directly from an Arduino GPIO which can only provide 5V and few milliamps of current.

Interfacing Arduino with a relay module is also very simple. On one side of the relay, it has three pins - one for 5V power from Arduino, second for Ground and third for SIG(signal) for switching ON/OFF the device connected to the relay. On the other side, we have screw connectors for connecting wires from the device to be controlled. When SIG input pin is set to

HIGH 5V, the device connecting wires are shorted together (assuming connections at COM and NO(normally open) terminals) otherwise the wires are unconnected/open.

5 High Level System Interface Diagram

Figure 1 shows a high level system interface diagram.

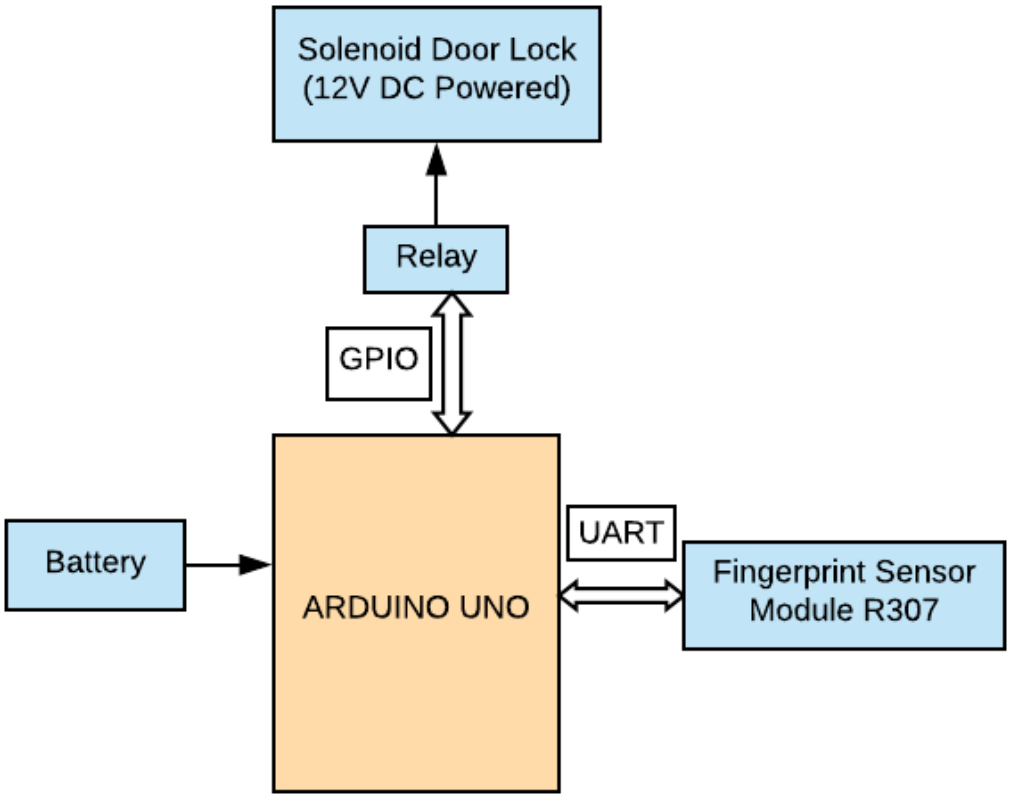

Figure 1: High Level System Interface Diagram

6 Pin Connectivity

Table 2 documents the pin connectivity of Arduino with the different peripherals. R307 in the table refers to the fingerprint sensor module.

S.No	Arduino	Relay	R307
1	4	SIG	
2	2		TX (Yellow 3rd pin)
3	3		RX(White 4th pin)

Table 2: Pin Connectivity of Arduino with different peripherals

7 Project Demo and Snapshots

Figures 2, 3 show snapshots of the working prototype. Link to Demo Video - (LINK) .

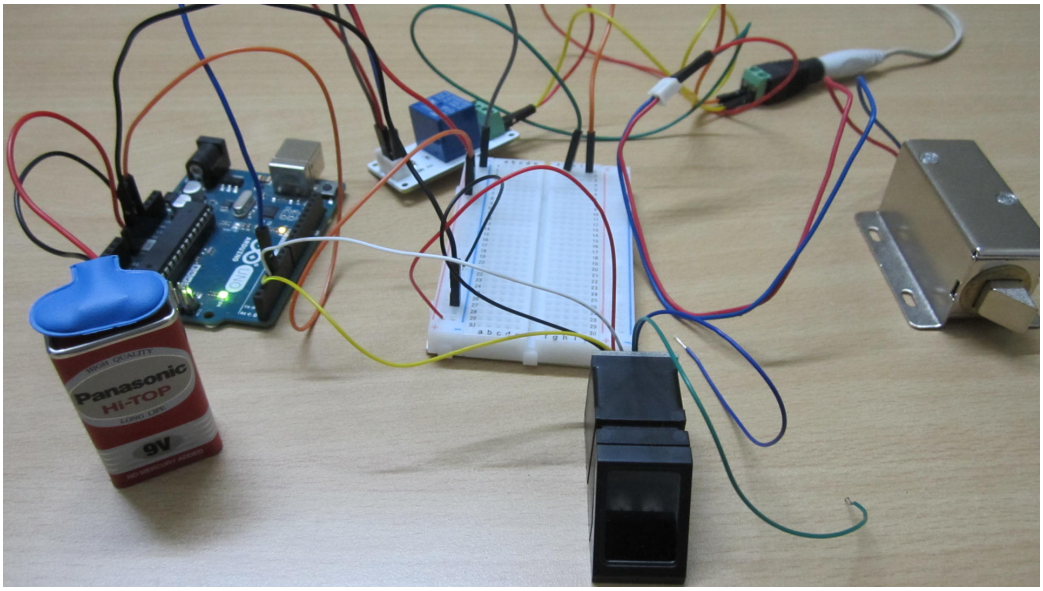

Figure 2: Smart Door Lock Setup Snapshot 1

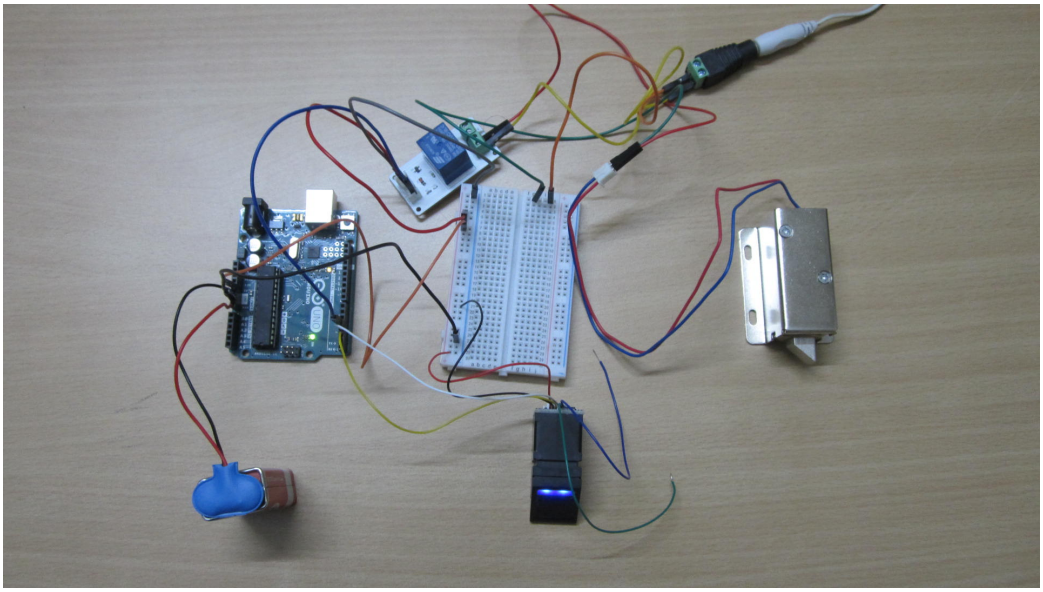

Figure 3: Smart Door Lock Snapshot 2

8 Important Notes and Learnings

Important notes and learnings from the project are captured in this section.

1. Fingerprint sensor module R307 has 6 pins. However, only 4 pins need to be connected for the functionality required in this project. Below are the pin details for R307 module.
   (a) Pin 1 (Red) - 5V
   (b) Pin 2 (Black) - GND
   (c) PIN 3 (Yellow) - (Tx for Fingerprint module)
   (d) PIN 4 (WHITE) - (RX for fingerprint module)
   (e) PINS 5,6 - Unconnected

9 Contact Information

If you have any questions or need help in building this project, please feel free to reach out to us by messaging us on Facebook (LINK), or through the message option on our website (LINK) or sending me an email at vasu.gupta9@gmail.com