

FINGERPRINT BASED DOOR UNLOCKING



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GROUP MEMBERS:

- 1)GOPIKA K T(CE19BTECH11004)
- 2)SANJAY KRISHNA(CS19BTECH11013)
- 3)G V SURYA SAI(CS19BTECH11014)
- 4)UPPALA SEHOURIEY(CS19BTECH11015)
- 5)NARAYANA SREEHITHA(CS19BTECH11016)
- 6)R GOKUL KANNAN(CS19BTECH11048)

INTRODUCTION



- *FINGERPRINT BASED IDENTIFICATION IS ONE OF THE MOST RELIABLE IDENTIFICATION TECHNIQUE*
- *EVERY FINGERPRINT IS UNIQUE AND USING IT HAS BEEN CONSIDERED AS ONE OF THE BEST SECURITY METHODS. EVEN IDENTICAL TWINS HAVE DIFFERENT FINGERPRINTS*
- *FINGERPRINTS WILL REMAIN MOSTLY UNCHANGED DURING AN INDIVIDUALS LIFETIME*

PROJECT DESCRIPTION

- *FIRST OF ALL, WE HAVE TO ENROLL THE FINGERPRINTS OF DESIRED PEOPLE. FOR ENROLLING THERE IS A SEPARATE PROGRAM*
- *ALL THE FINGERPRINTS THAT WE ENROLL WILL BE STORED IN THE FINGERPRINT SCANNER ITSELF. IN THE SCANNER, YOU CAN STORE UPTO 128 FINGERPRINTS*
- *WHEN A PERSON COMES, HE/SHE WILL BE ASKED TO PLACE HIS/HER FINGER ON SCANNER*
- *AFTER HE/SHE PLACES HIS/HER FINGER, THE SCANNER WILL TAKE AN IMAGE OF HIS FINGERPRINT*

PROJECT DESCRIPTION

- *THEN THE SCANNER WILL COMPARE THAT IMAGE WITH THE EXISTING FINGERPRINTS IN THE SCANNER*
- *IF THE FINGERPRINTS MATCHED, THE SERVO MOTOR WILL ROTATE WHICH MAKES THE GEAR ROTATE WHICH INTURN MAKES THE LATCH GO IN, THUS UNLOCKING THE DOOR*
- *FOR 5 SECONDS THAT LATCH WILL BE IN AFTER THAT IT WILL COME OUT AUTOMATICALLY*
- *THIS LOCK CAN BE USED ONLY FOR DOORS HAVING AUTO CLOSE MECHANISM*
- *WE ARE USING 3D PRINTED GEAR AND LATCH*

COMPONENTS USED :



ARDUINO UNO R3

COMPONENTS USED :



SERVO MOTOR

COMPONENTS USED :



16X2 LIQUID CRYSTAL DISPLAY

COMPONENTS USED :



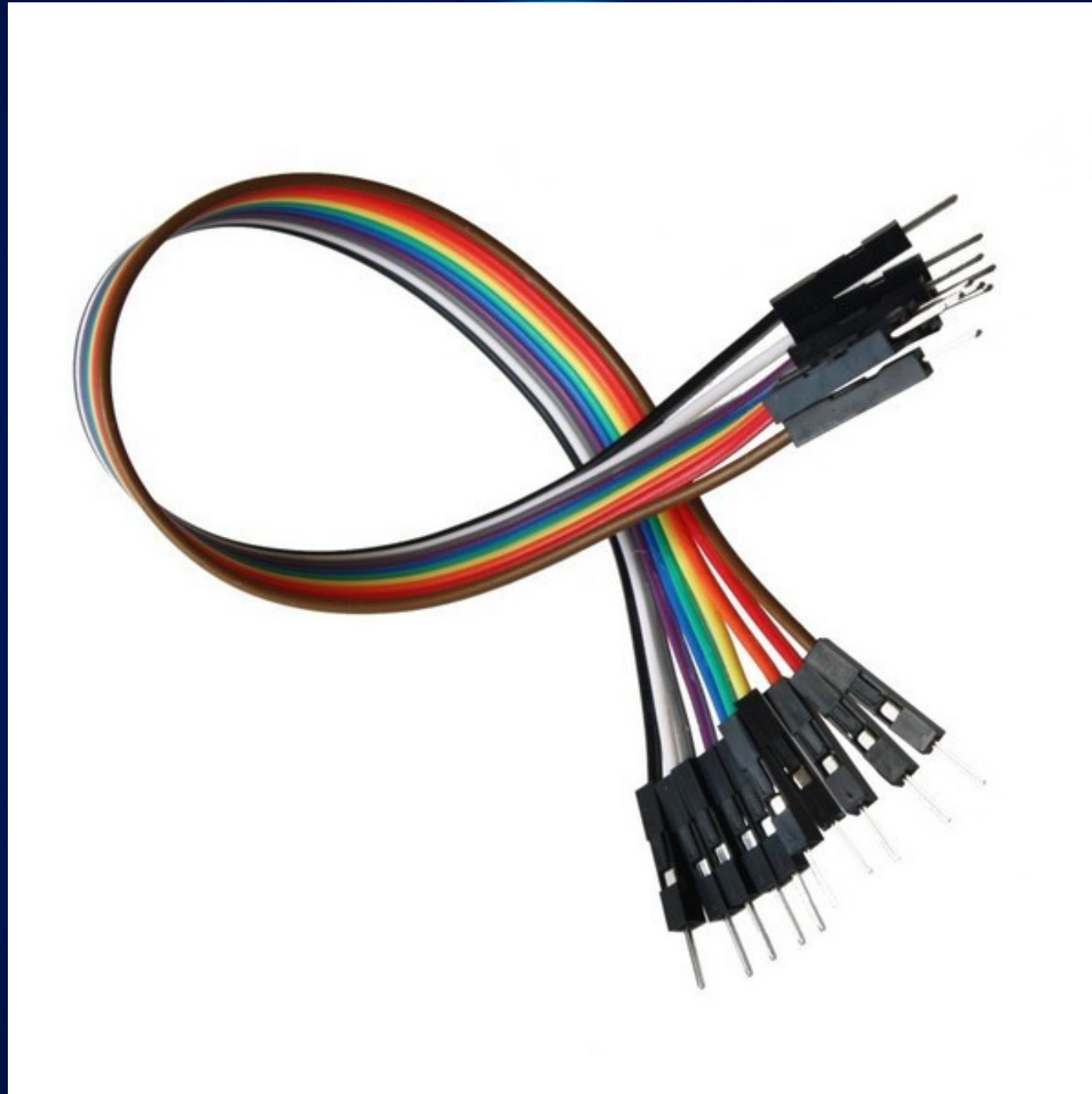
FINGERPRINT SCANNER

COMPONENTS USED :



BREAD BOARD

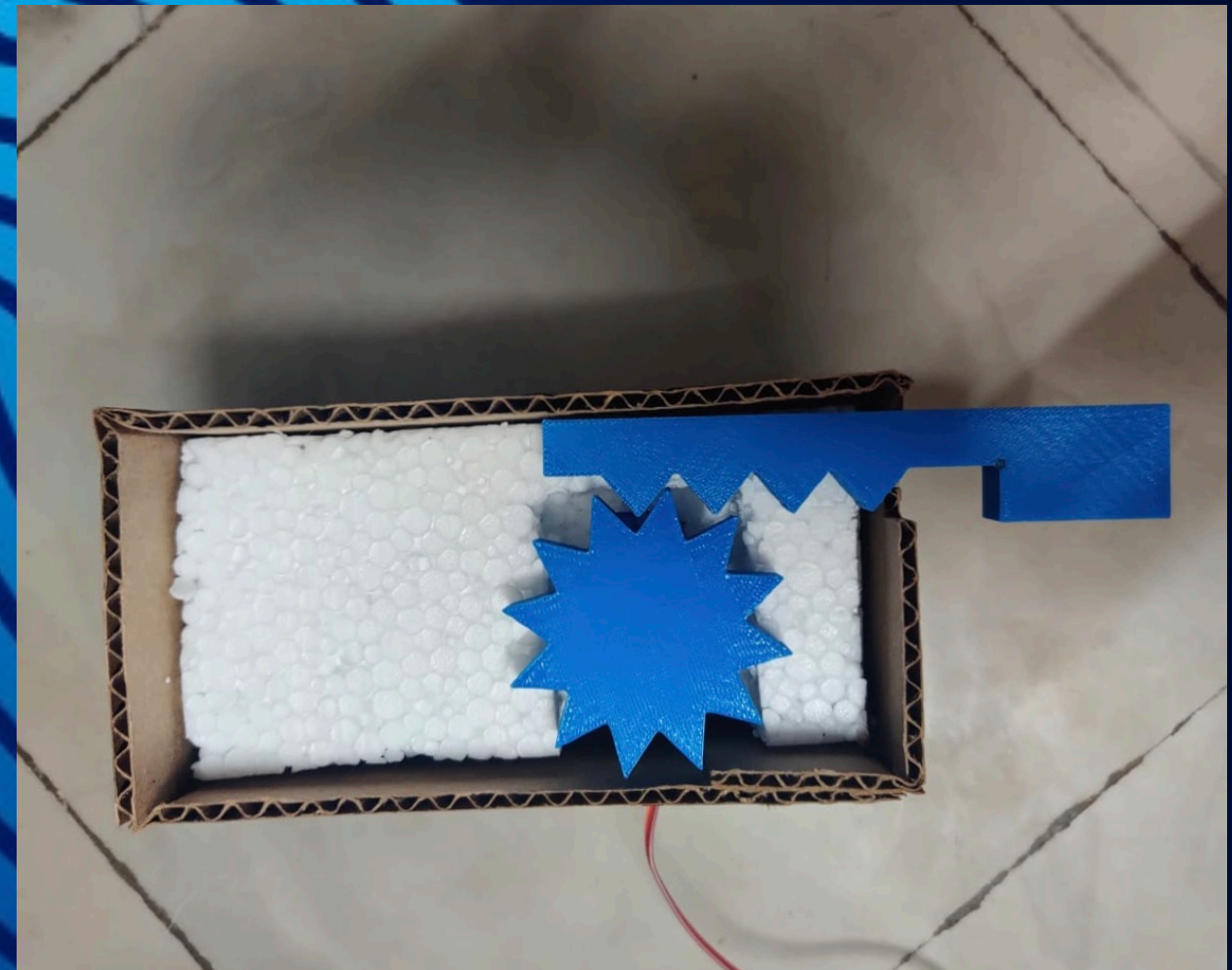
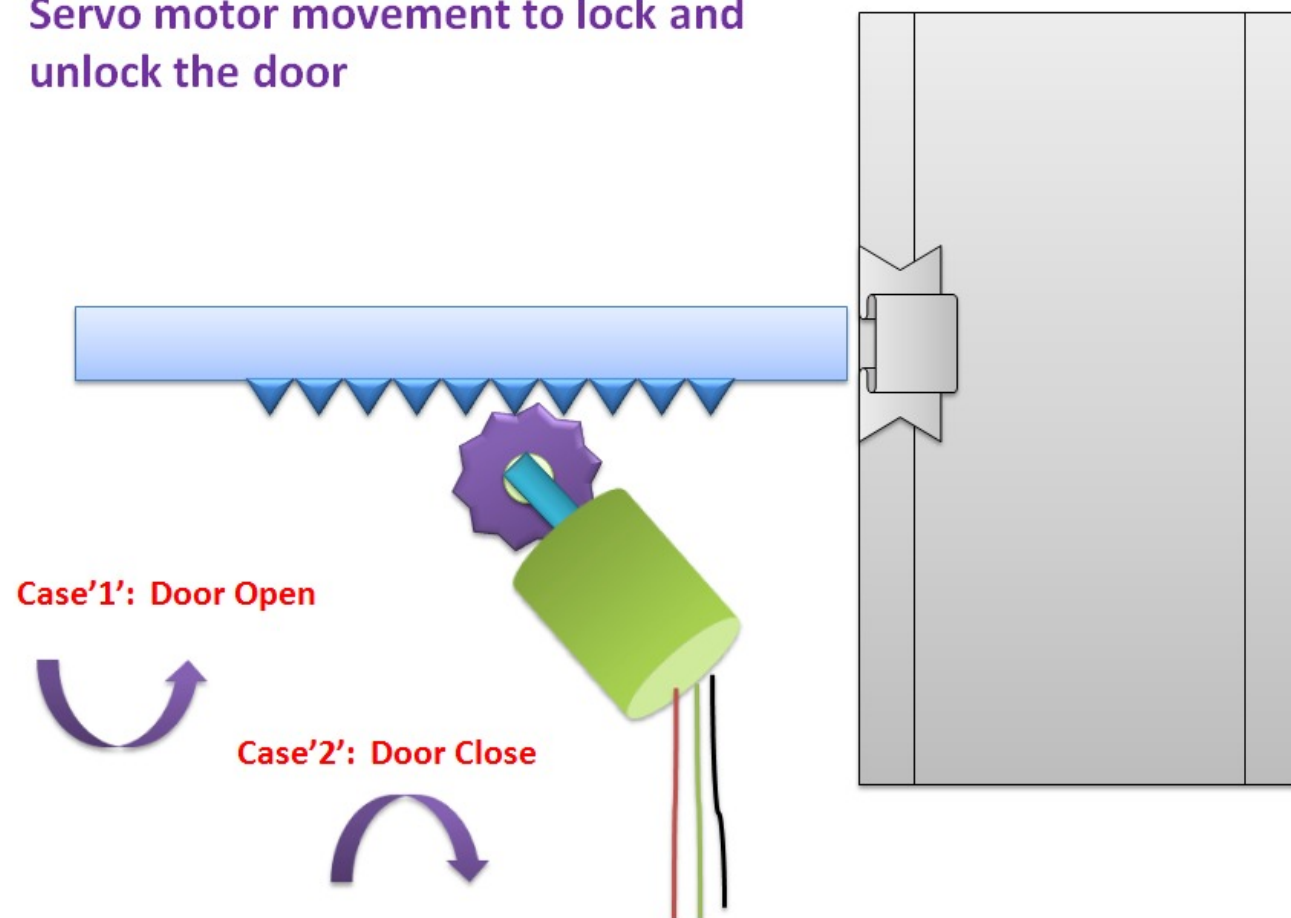
COMPONENTS USED :



JUMPER WIRES

WORKING OF GEAR

Servo motor movement to lock and unlock the door



ADVANTAGES



- *NO KEYS TO BE LOST,STOLEN*
- *SECURITY*
- *HIGHLY ACCURATE*
- *SMALL STORAGE SPACE*
- *LONG TERM STABILITY*
- *ABILITY TO ENROLL MULTIPLE FINGERPRINTS*
- *DIRECT POWER SUPPLY FROM AC OUTLET*

DISADVANTAGES

- *COSTLY*
- *HAND, SCANNER MUST BE CLEAN AND DRY*
- *WE CAN USE THIS ONLY FOR AUTO CLOSING DOORS*

EXTENSIONS

- *THIS PROJECT HAS MANY FUTURE SCOPES IN DEVELOPING VERY HIGH SECURITY SYSTEMS*
- *PERFORMANCE CAN BE INCREASED IN TERMS OF SPEED AND MEMORY*
- *THE SYSTEM CAN BE MADE TO COMMUNICATE WITH MODEMS AND MOBILE PHONES*
- *WE CAN ADD FIRE AND GAS SENSORS SO THAT IN THE CASE OF ACCIDENT,THE DOORS WILL OPEN AUTOMATICALLY*
- *ANTI THEFT ALARM CAN BE ADDED. LIKE ALARM WILL BE ACTIVATED IF CONTINUOUS FINGERPRINT MISMATCHES ARE FOUND*

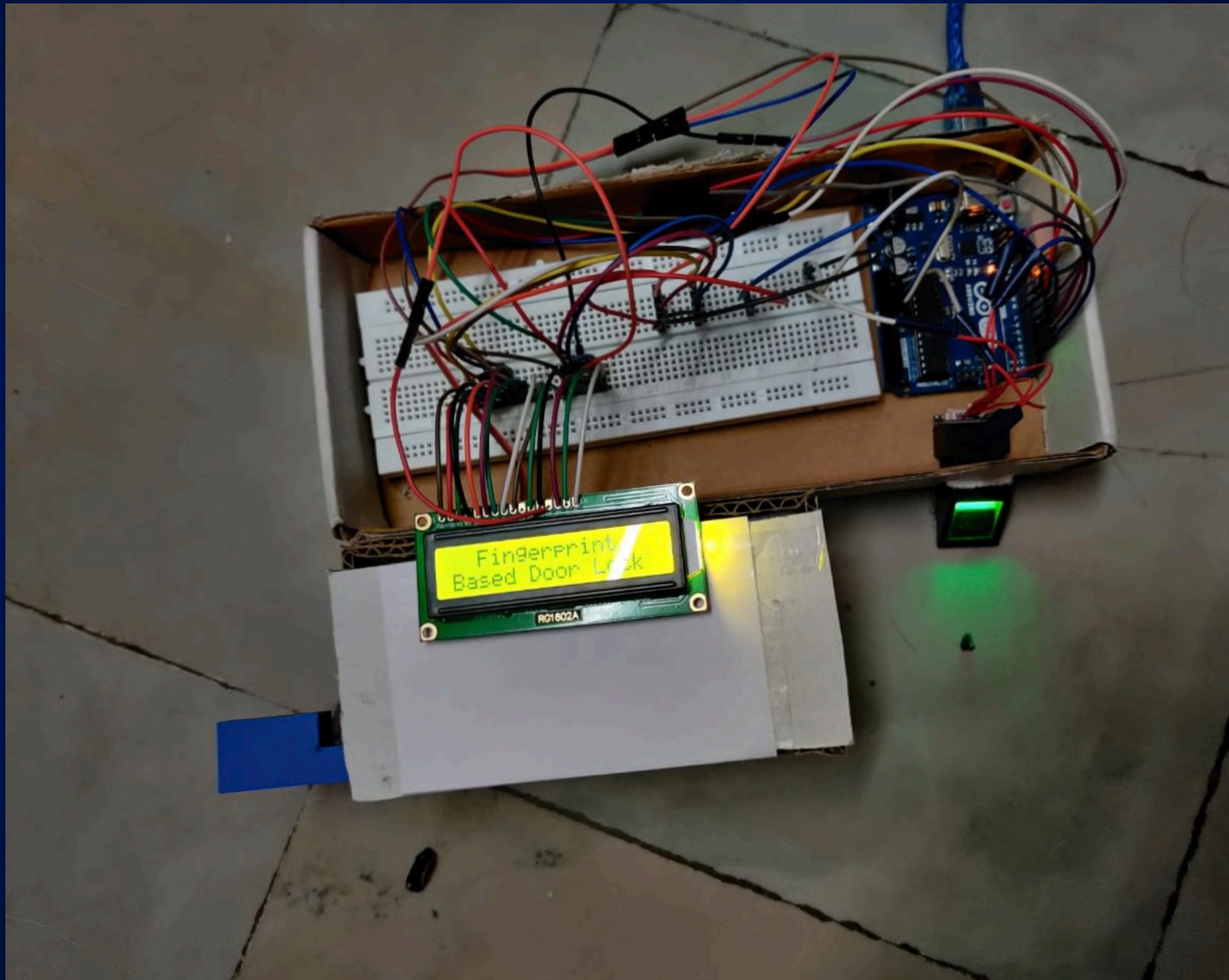
The diagram illustrates the hardware setup for a fingerprint-based door lock system. The central component is an **ARD1 ARDUINO UNO R3**. It is interfaced with three external modules:

- LCD1 LMD16L**: A 16x2 character LCD connected via I2C. The SCL pin is connected to Arduino A5, and the SDA pin is connected to Arduino A4. Power is supplied from the 5V and GND pins.
- Servo Motor**: Connected to a digital pin (D9) for pulse-width modulation (PWM) control. The motor's ground is connected to the Arduino's GND.
- Fingerprint Scanner**: A module with a sensor and a small display. It is connected to the Arduino's 5V and GND pins for power.

The wiring is as follows:

- Arduino to LCD:**
 - Arduino A5 to LCD SCL (pin 14)
 - Arduino A4 to LCD SDA (pin 13)
 - Arduino 5V to LCD VCC (pin 1)
 - Arduino GND to LCD GND (pin 3)
- Arduino to Servo:**
 - Arduino D9 to Servo Signal
 - Arduino GND to Servo Ground
- Arduino to Fingerprint Scanner:**
 - Arduino 5V to Scanner VCC
 - Arduino GND to Scanner GND

ACTUAL MODEL





**THANK
YOU!**