



LOW-COST HOME SECURITY SYSTEM USING RASPBERRY PI

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ABSTRACT

Nowadays home security systems are a very important part of modern-day houses. High-tech companies such as ADT and Google provide home security services at a very high cost. As an alternative to the above we provide a low-cost home security system using Raspberry Pi. Our solution is powerful and small-size system that can be used as a decent Home Security System. Our Home Security system consists of a main door lock, python programming language and OpenCV package, Keypad Number Entry, USB camera, RFID sensor and a solenoid 12V DC electric lock. A PIR sensor is used to detect motion of visitors and captures images via the USB webcam and sends a notification to the home owner's email. Our system also uses an alarm system, live streaming video and static pictures.

INTRODUCTION

- The Raspberry Pi is a low cost, credit-card sized computer that plugs into a computer monitor or TV and uses a standard keyboard and mouse.
- Using Raspberry Pi, we built three kind of door opening system
- The face-recognition system is going to open the door based on the authorized person's face. Keypad entry and RFID works the same way to open the door based on authorized password and registered RFID card.
- Open messaging protocol IMAP has been used for sending email notifications.

COMPONENTS

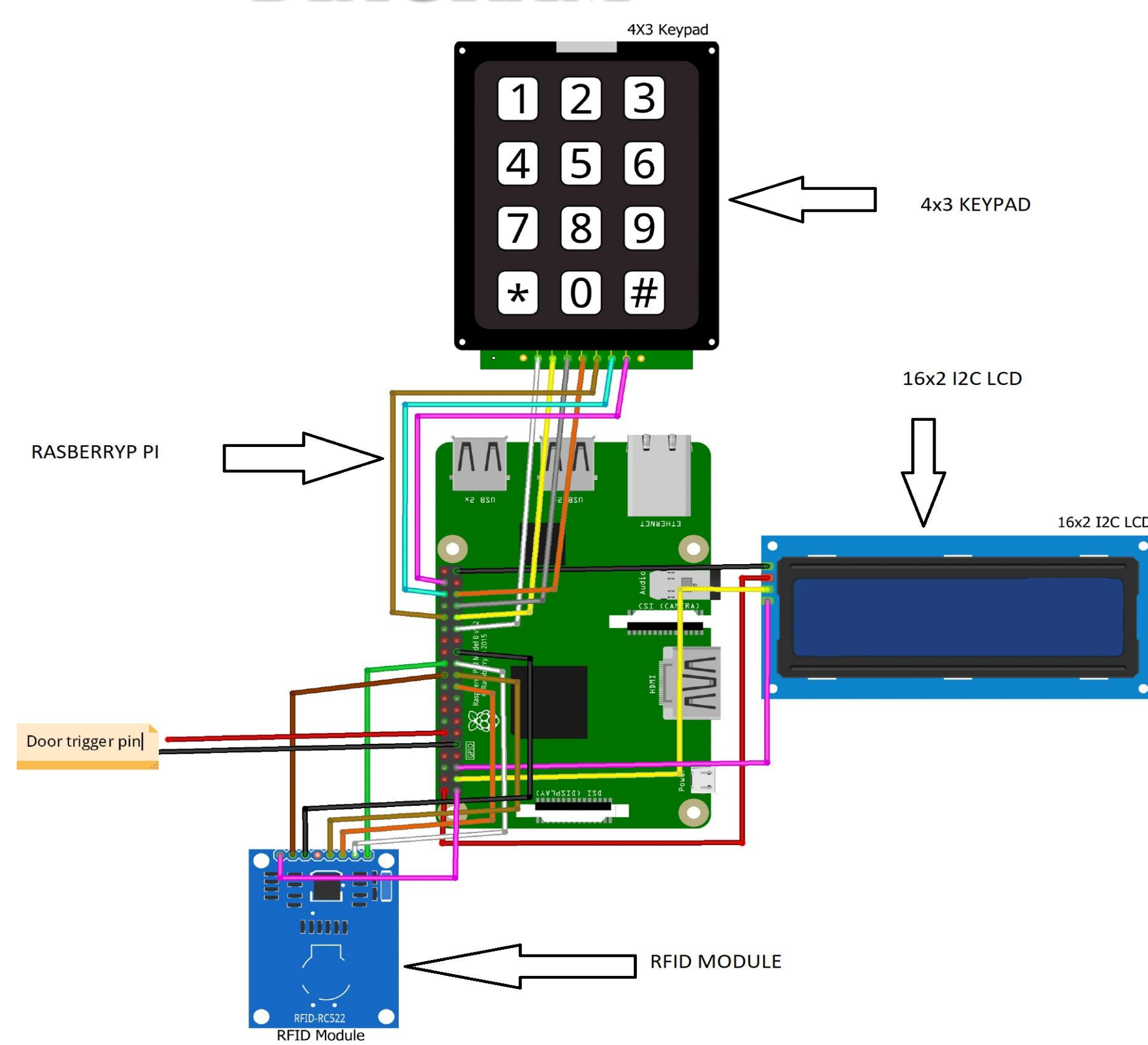
Hardware:

- Breadboard
- LCD Display
- RC522(Rely)
- Keypad
- Solenoid Lock
- Power supply Adapter
- Camera
- Jumper Wires
- Raspberry Pi

Software:

- Raspbian
- Open CV
- IMAP

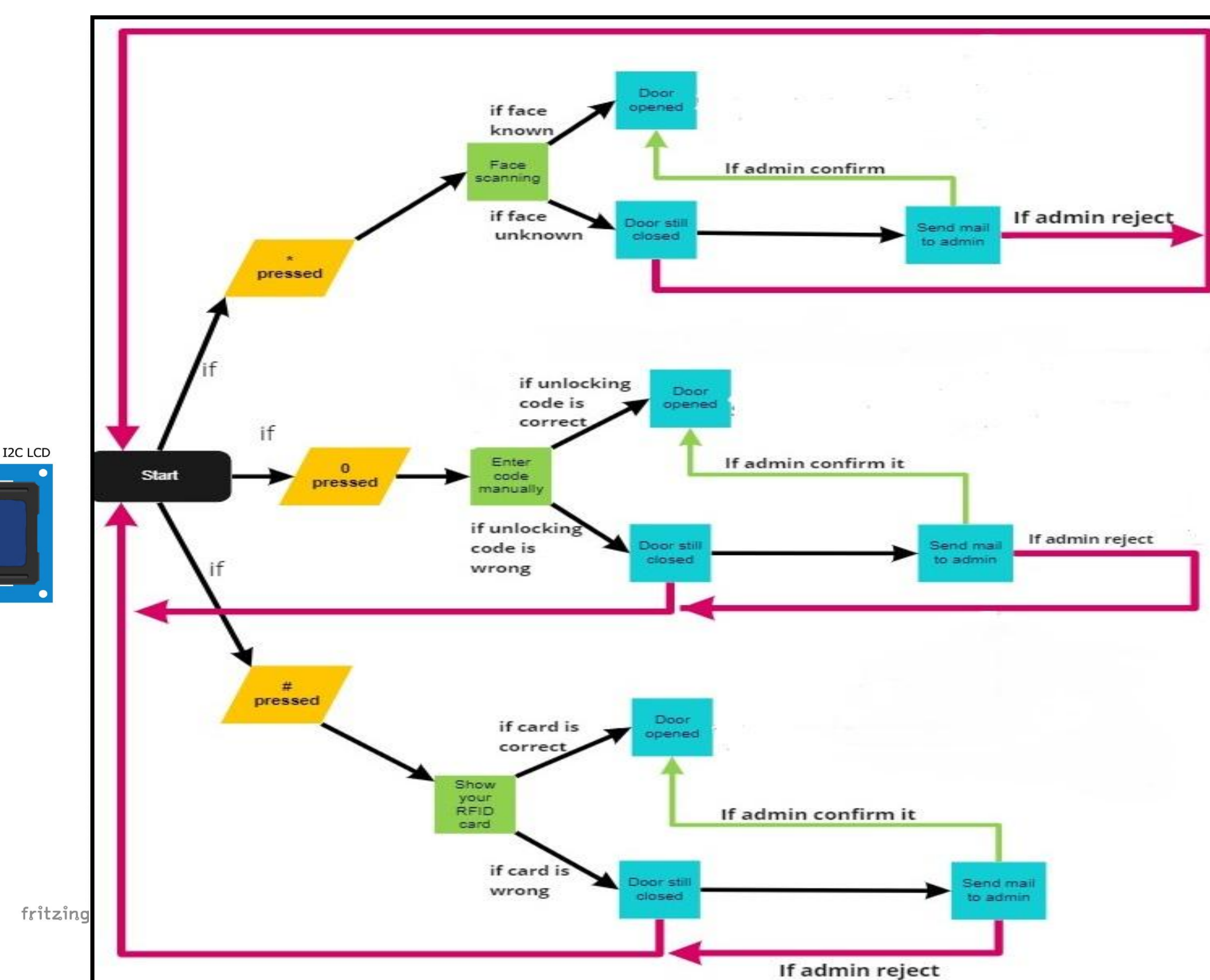
DIAGRAM



DESCRIPTION

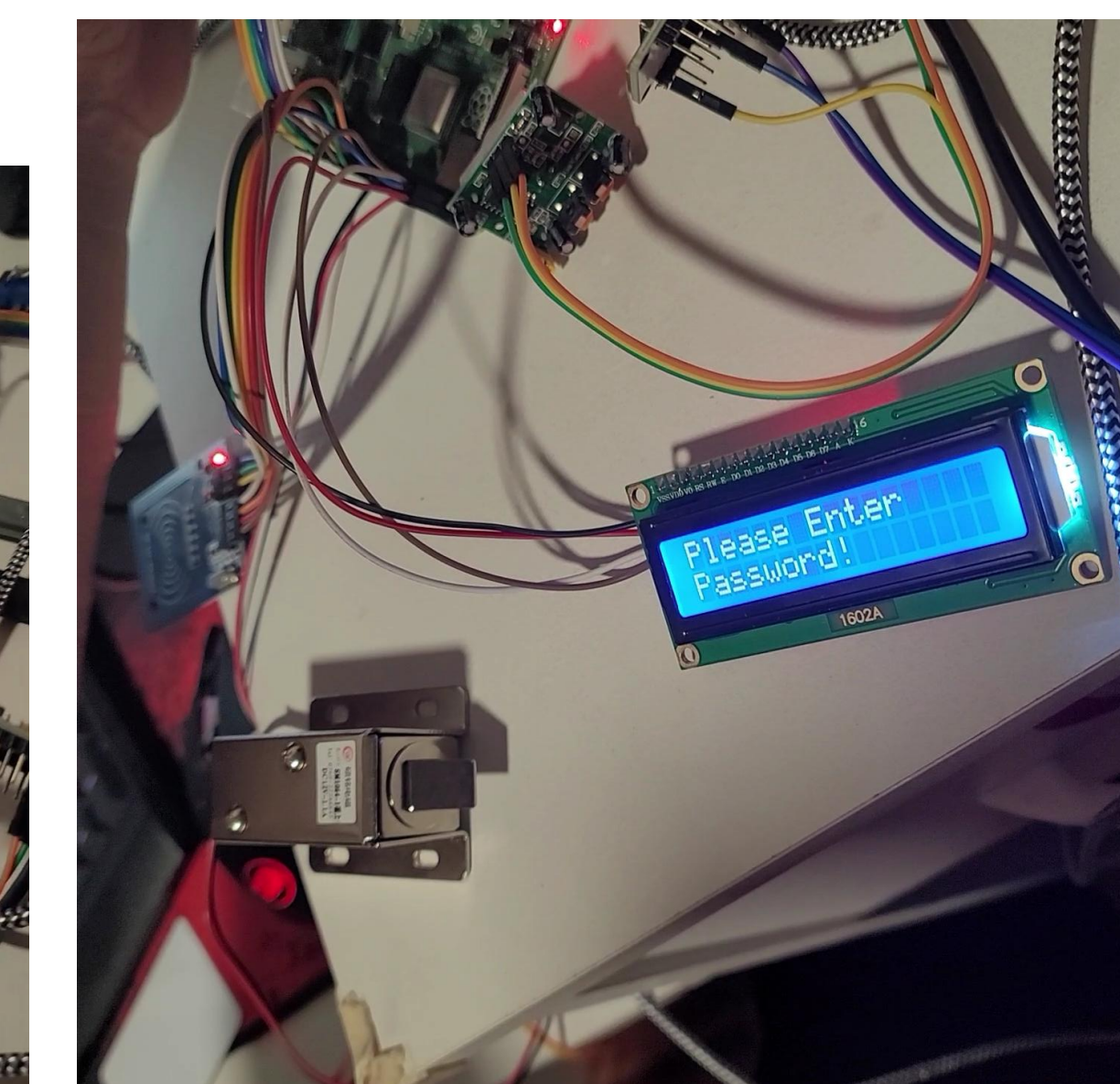
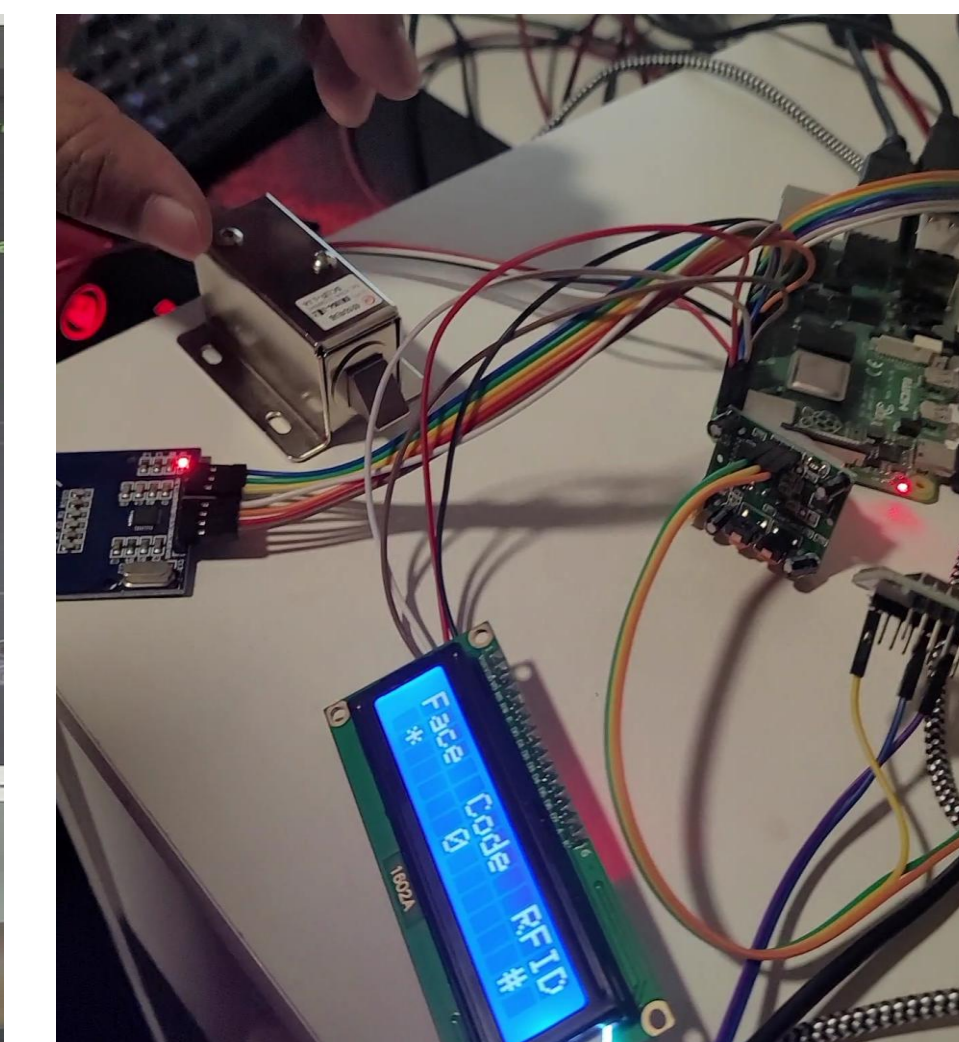
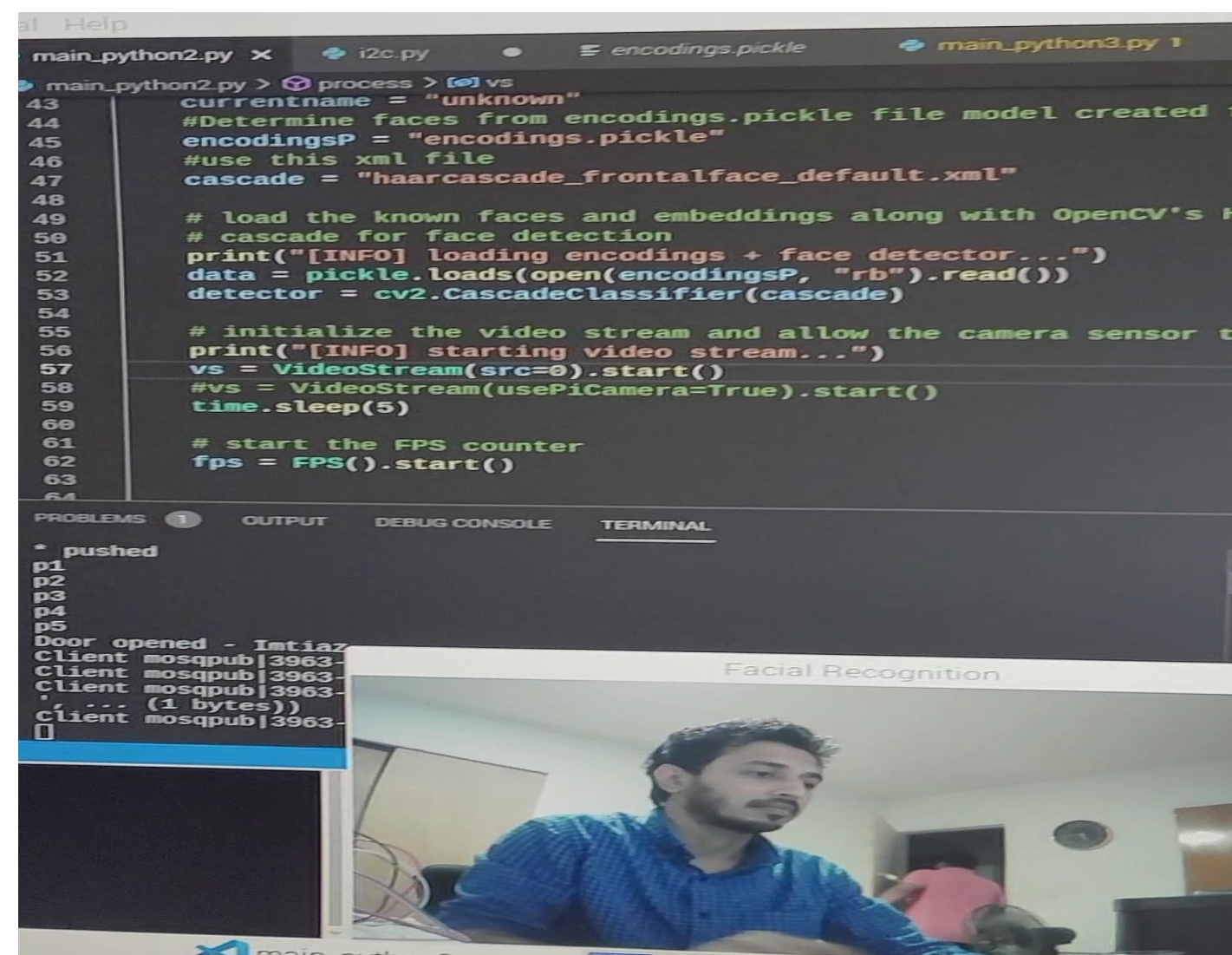
- Setup all hardware components according to the diagram.
- Install all required software, packages and libraries such as Python, IMAP, LCD Display, Face Recognition, Open CV, RFID in Raspberry Pi.
- Applied all codes such as face recognition, RFID and Keypad door entry codes in python IDE
- Testing and troubleshooting for errors in code.
- Open Raspberry Pi terminal and deployed the project code.
- Program it in a way only the users with administrative privileges will have access to modify and override the system.

FLOWCHART



RESULT

- LCD display showed three option. Enable those option from keypad, pressed "*" for face recognition, "0" for keypad entry and "#" for RFID entry.
- Successfully tested all three-door entry.



CONCLUSION

- The objective to build a low-cost home security system was successfully achieved.
- People who are authorized were able to enter using keypad, RFID and face recognition.
- In future we can add more option such as eye retina recognition, fingerprint door entry and voice command door entry to this system

REFERENCES

- "Burglary statistics: The hard numbers," National Council For Home Safety and Security, 19-Dec-2019. [Online]. Available: <https://www.alarms.org/burglary-statistics/>. [Accessed: 02-Oct-2021].
- "What is a Raspberry Pi?," Raspberry Pi, 20-Aug-2015. [Online]. Available: <https://www.raspberrypi.org/help/what-%20is-a-raspberry-pi/>. [Accessed: 02-Oct-2021].