

COVSTOP

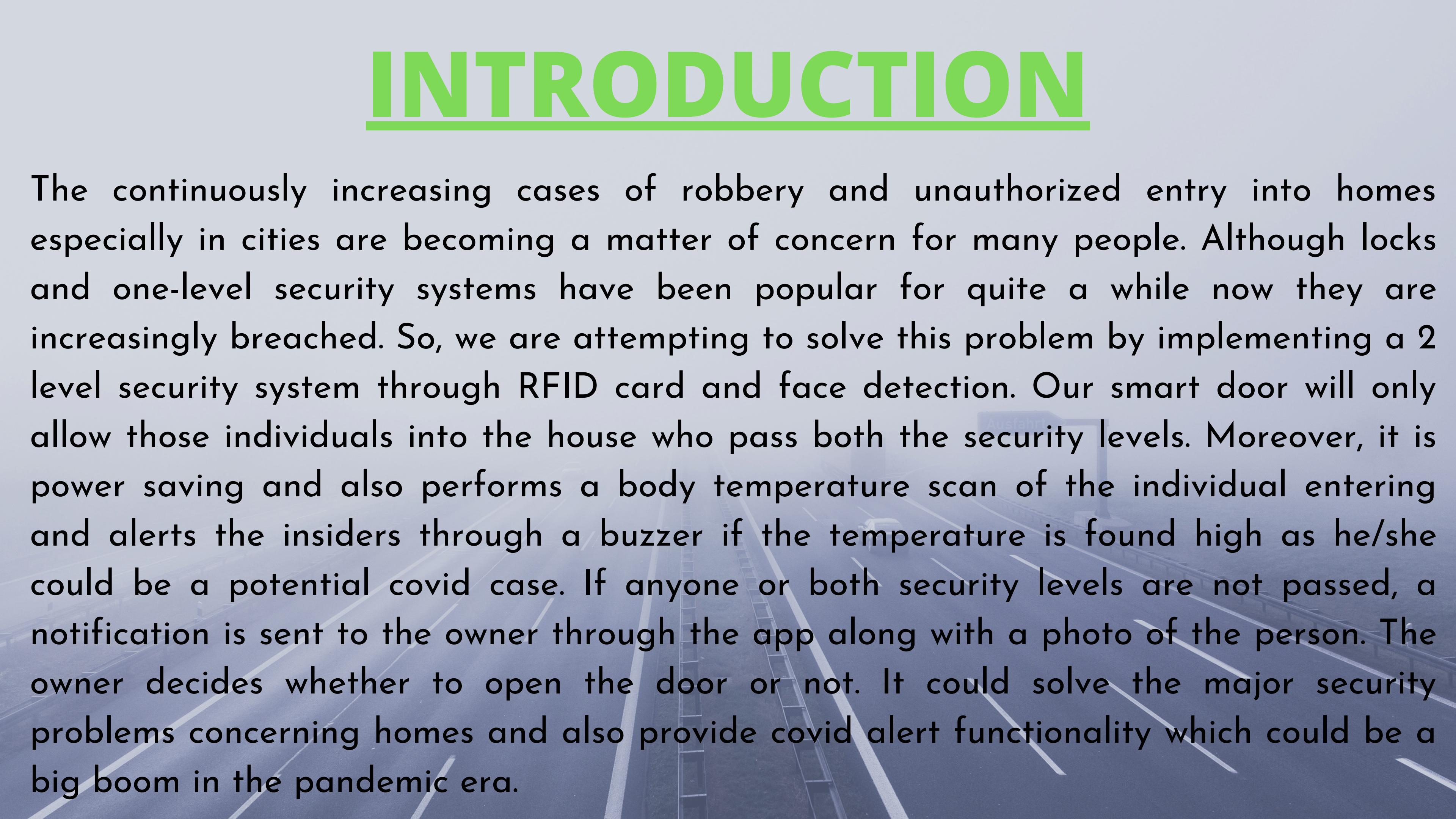
THE DOOR WITH A BRAIN



Group Members :-

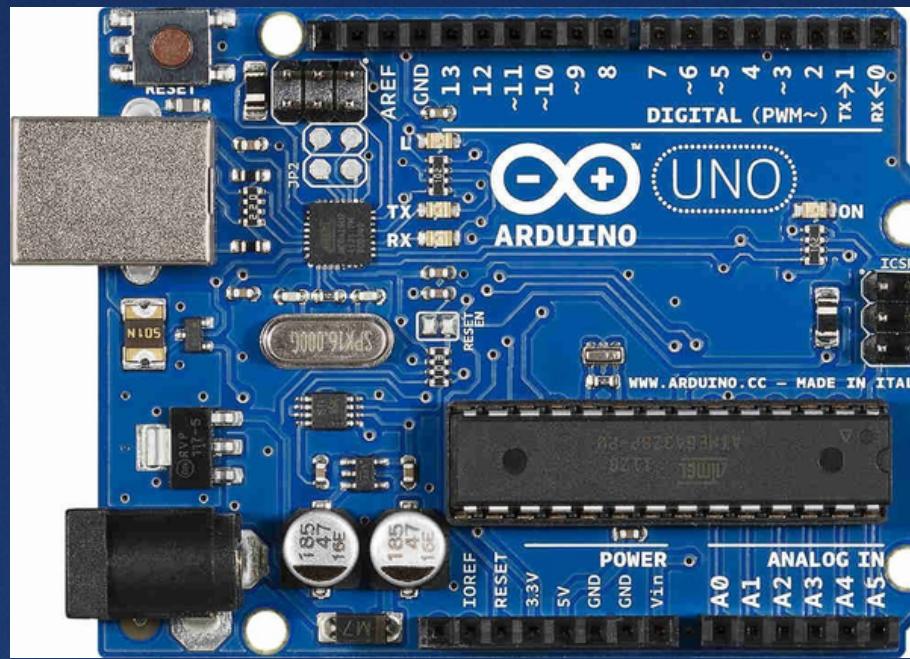
1. Yash (2019UCO1530)
2. Harsh (2019UCO1504)
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4. Hemant (2019UCO1534)

INTRODUCTION

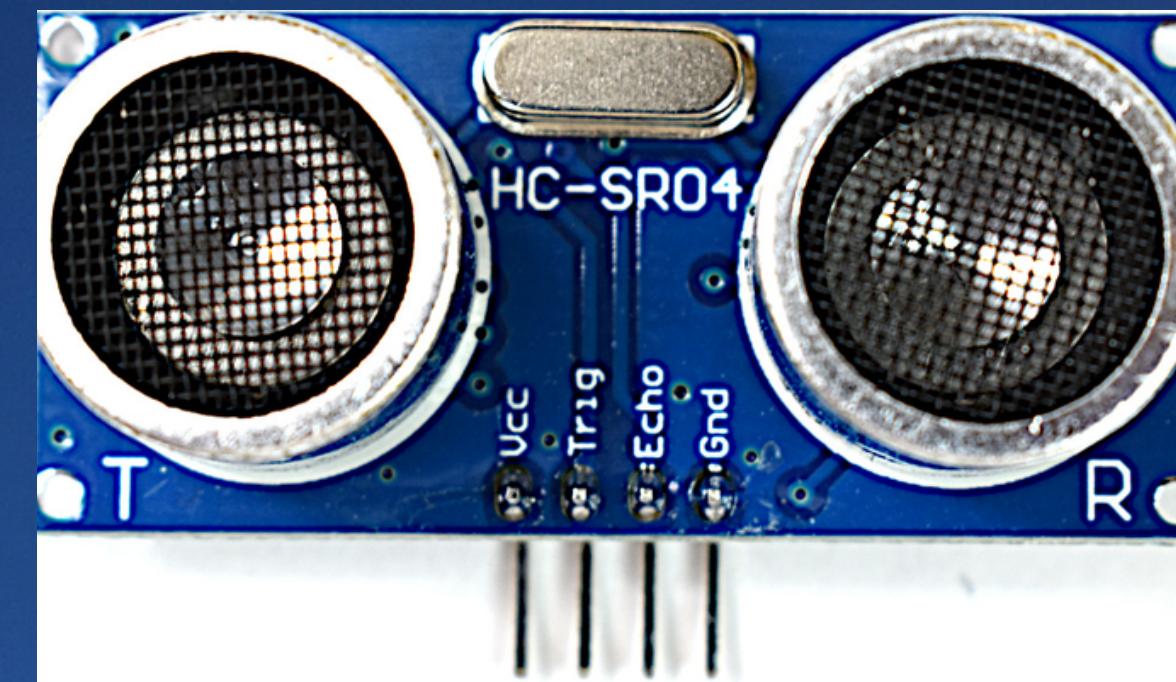


The continuously increasing cases of robbery and unauthorized entry into homes especially in cities are becoming a matter of concern for many people. Although locks and one-level security systems have been popular for quite a while now they are increasingly breached. So, we are attempting to solve this problem by implementing a 2 level security system through RFID card and face detection. Our smart door will only allow those individuals into the house who pass both the security levels. Moreover, it is power saving and also performs a body temperature scan of the individual entering and alerts the insiders through a buzzer if the temperature is found high as he/she could be a potential covid case. If anyone or both security levels are not passed, a notification is sent to the owner through the app along with a photo of the person. The owner decides whether to open the door or not. It could solve the major security problems concerning homes and also provide covid alert functionality which could be a big boom in the pandemic era.

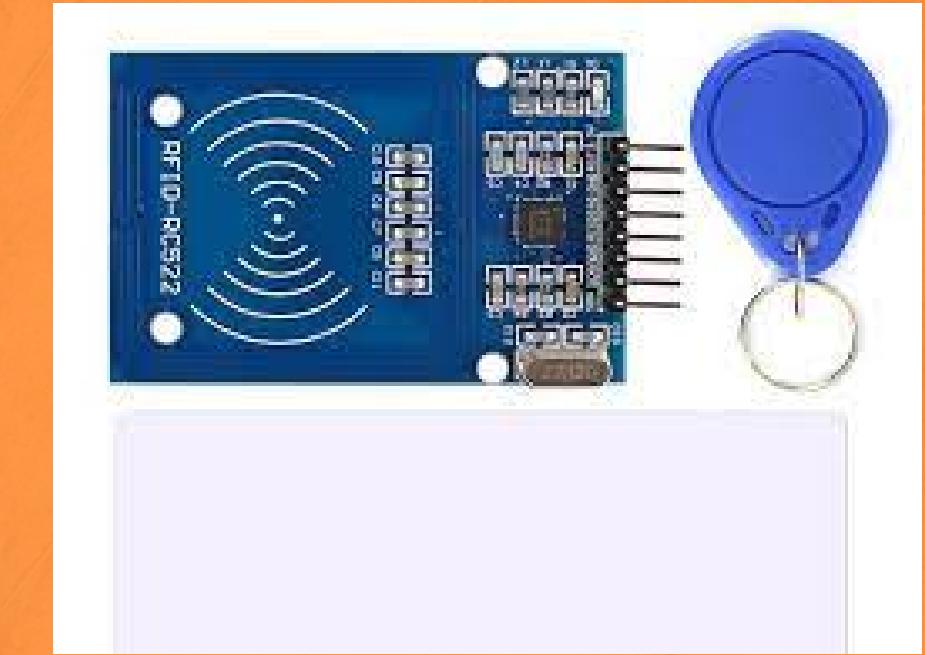
COMPONENTS



Arduino Uno

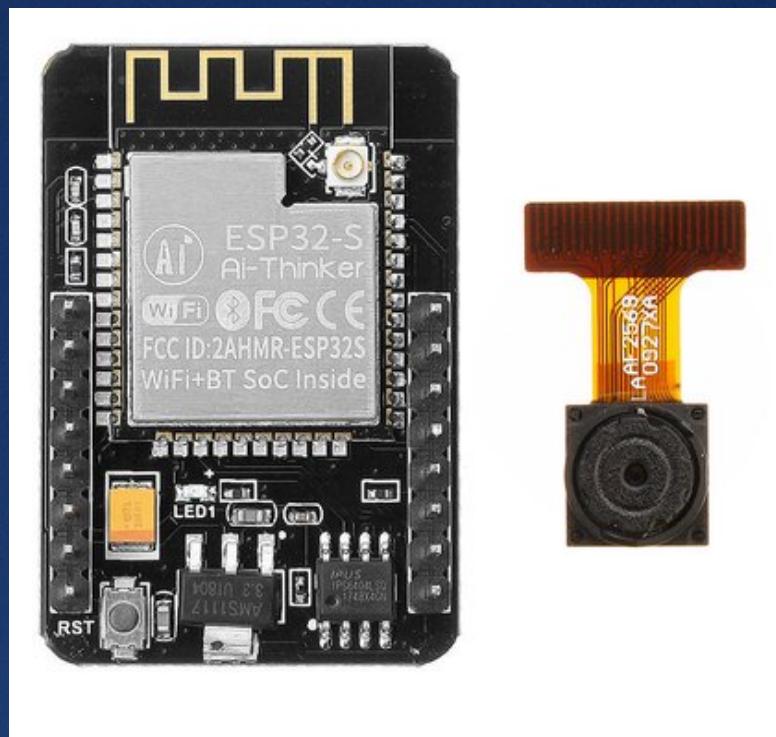


Ultrasonic Distance Sensor

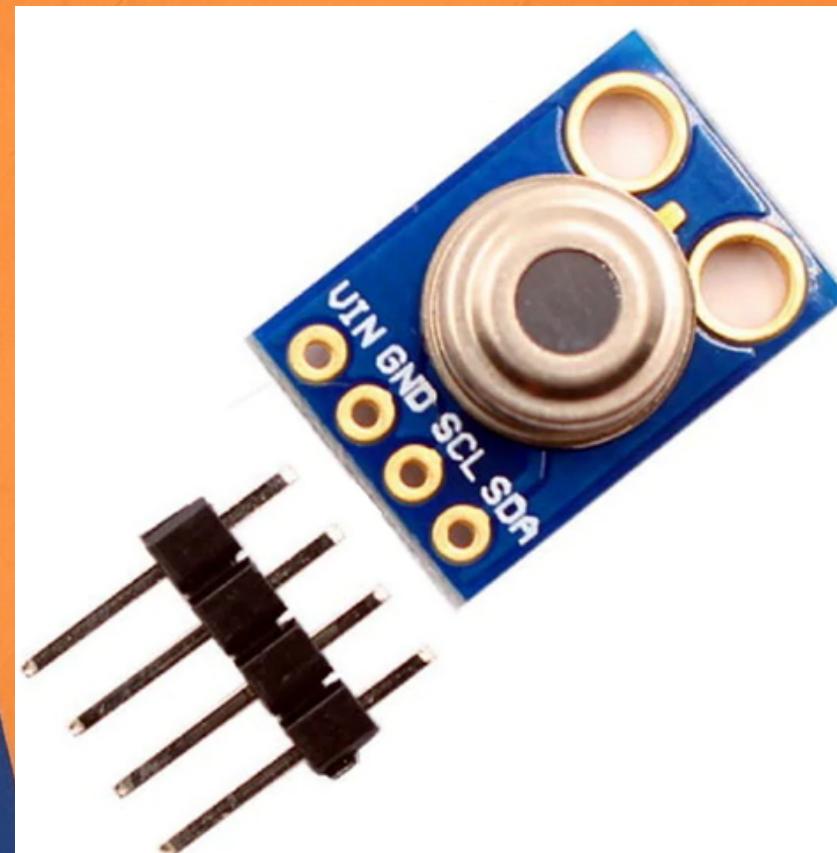


RFID RC-522

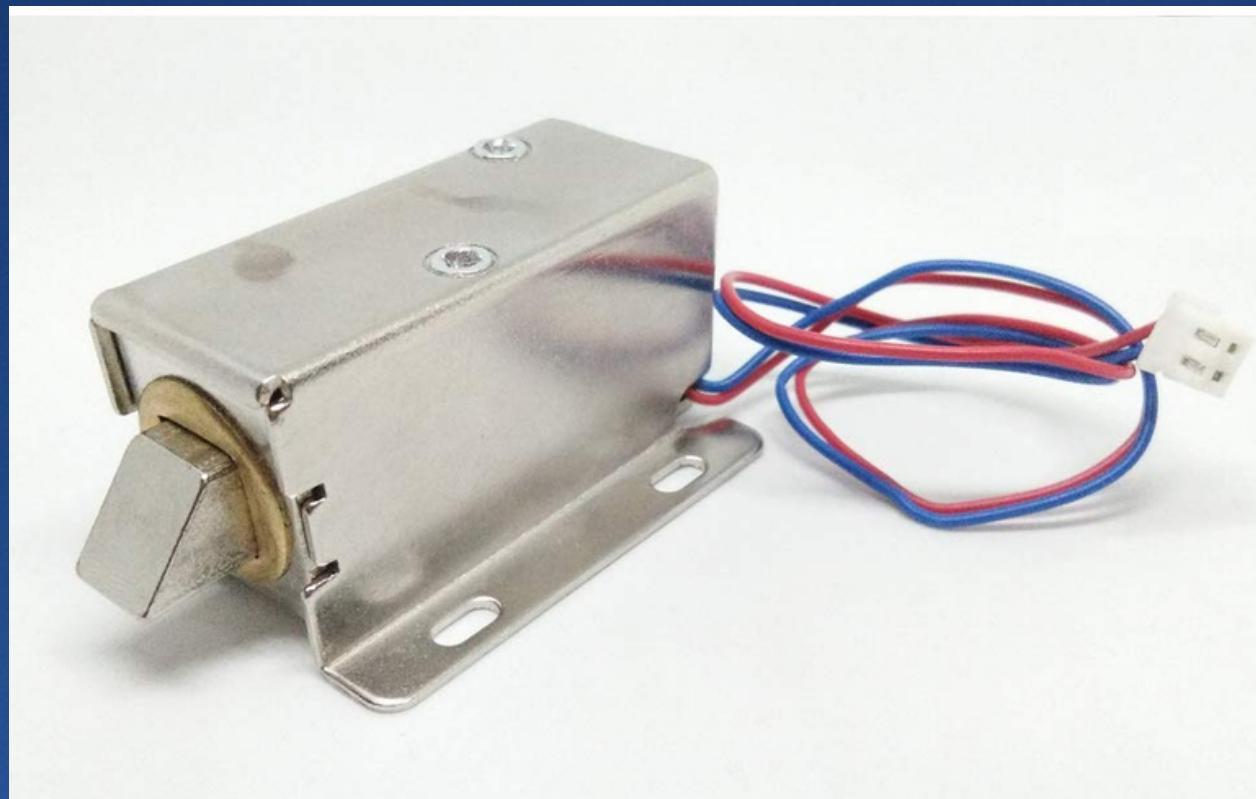
COMPONENTS



ESP-32 cam



MLX Temperature Sensor



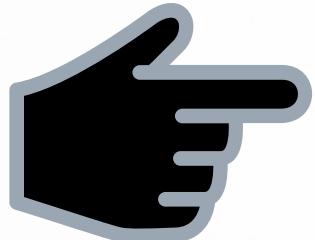
Solenoid Lock

FUNCTIONALITIES

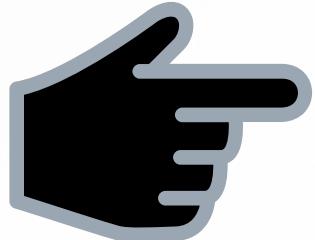
1. The door is able to think automatically and saves energy when not in use and gets activated only when a person approaches.
2. The door has Two-Level Security which includes the RFID sensor and the Face Detection.
3. RFID provides a touchless authentication system.
4. Face detection functionality would be implemented using ESP32 CAM.
5. In the case of a Potential COVID patient entering the house, the door automatically notifies the insiders via a buzzer.
6. In case any level of security is not fulfilled the owner gets a notification on his mobile to reject or approve the person's entry.



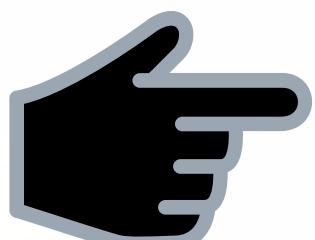
5 Components of IoT



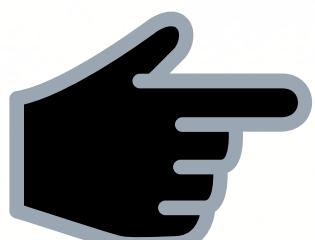
THING - Door



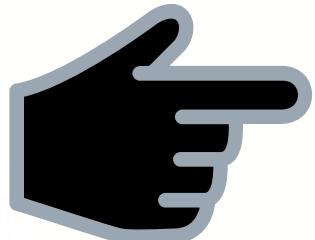
CONTROLLER - Arduino UNO, ESP-32, Telegram



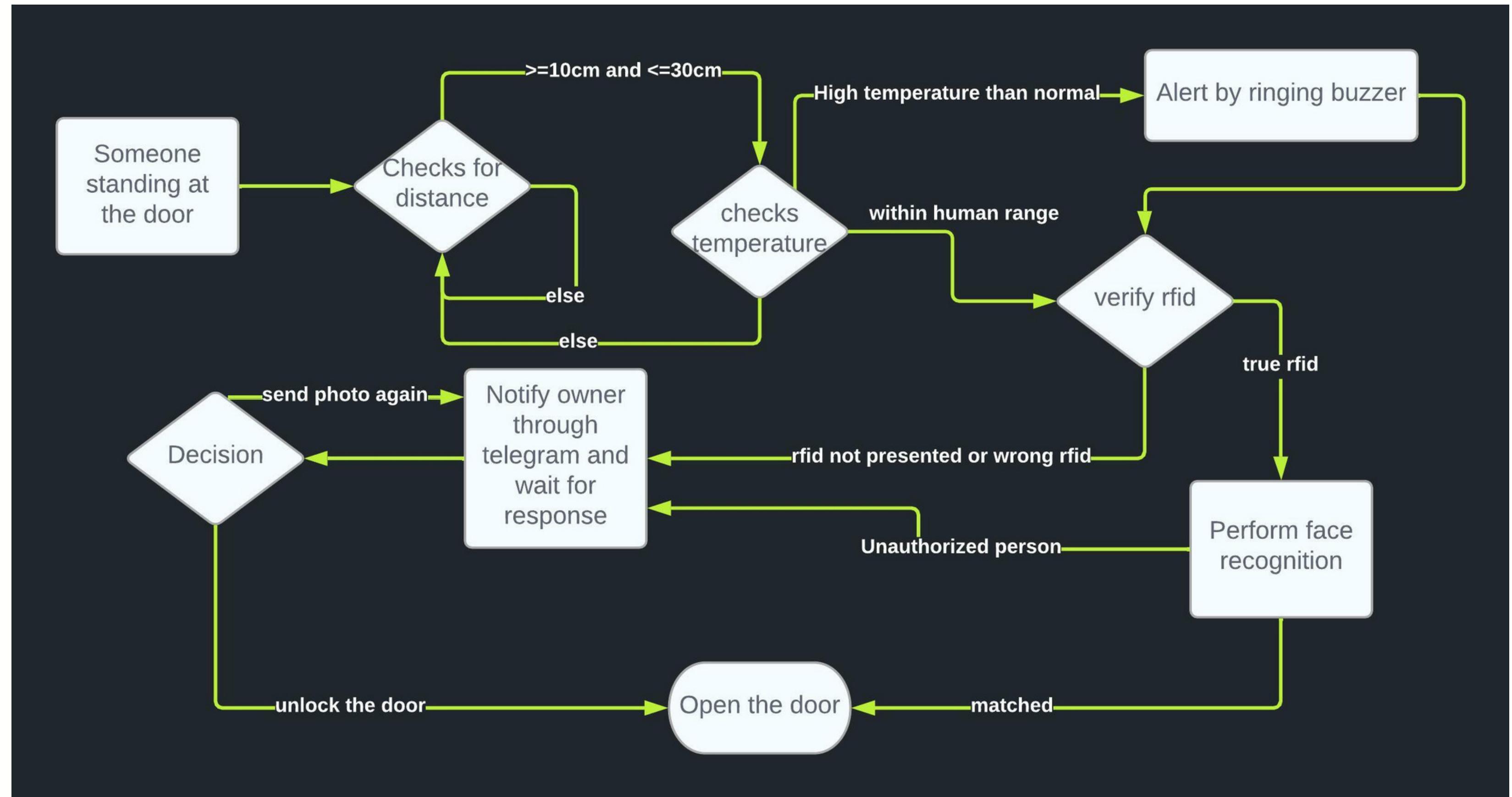
SENSOR - RFID Technology, Ultrasonic Distance Sensor, MLX Temperature IR Sensor, ESP-32 Cam



ACTUATOR - Solenoid Lock, Buzzer, LEDs



COMMUNICATOR - Wi-Fi, Radio waves(RFID)



WORKING WITH ESP32 CAM

Case 1: RFID Matched

Face recognition is done and the person's face is matched with the enrolled faces. If the face is recognized the door is straightaway opened, otherwise a photo is clicked and sent to owner via Telegram app.



Case 2: RFID not matched/ No RFID Card available

A photo is clicked and sent to the owner via telegram app and then a command is issued by the owner regarding whether the door has to be opened or not.

ENROLL FACE



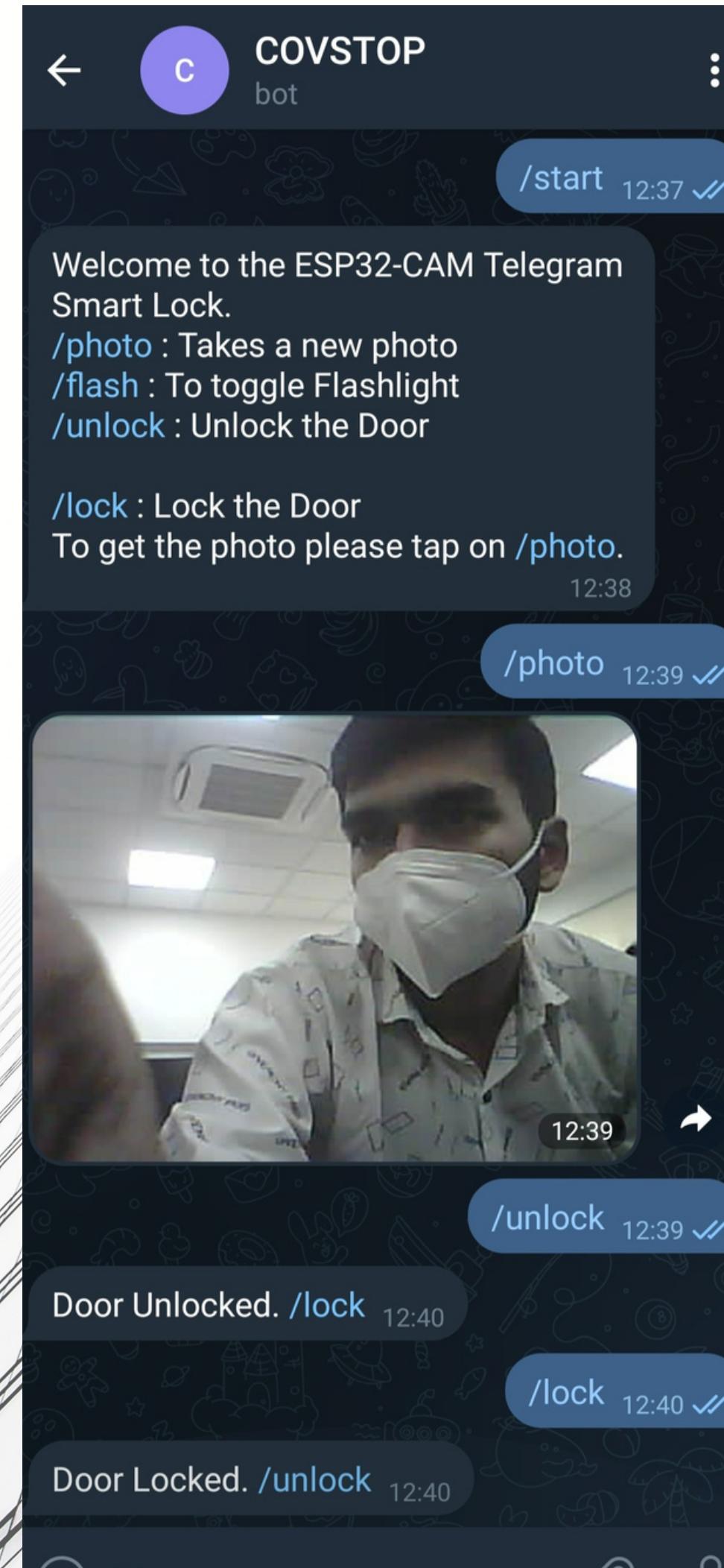
USE OF TELEGRAM

If any level of security is not matched, a photo of the person standing outside the door is sent to the owner via the Telegram app. The owner can issue several commands such as:

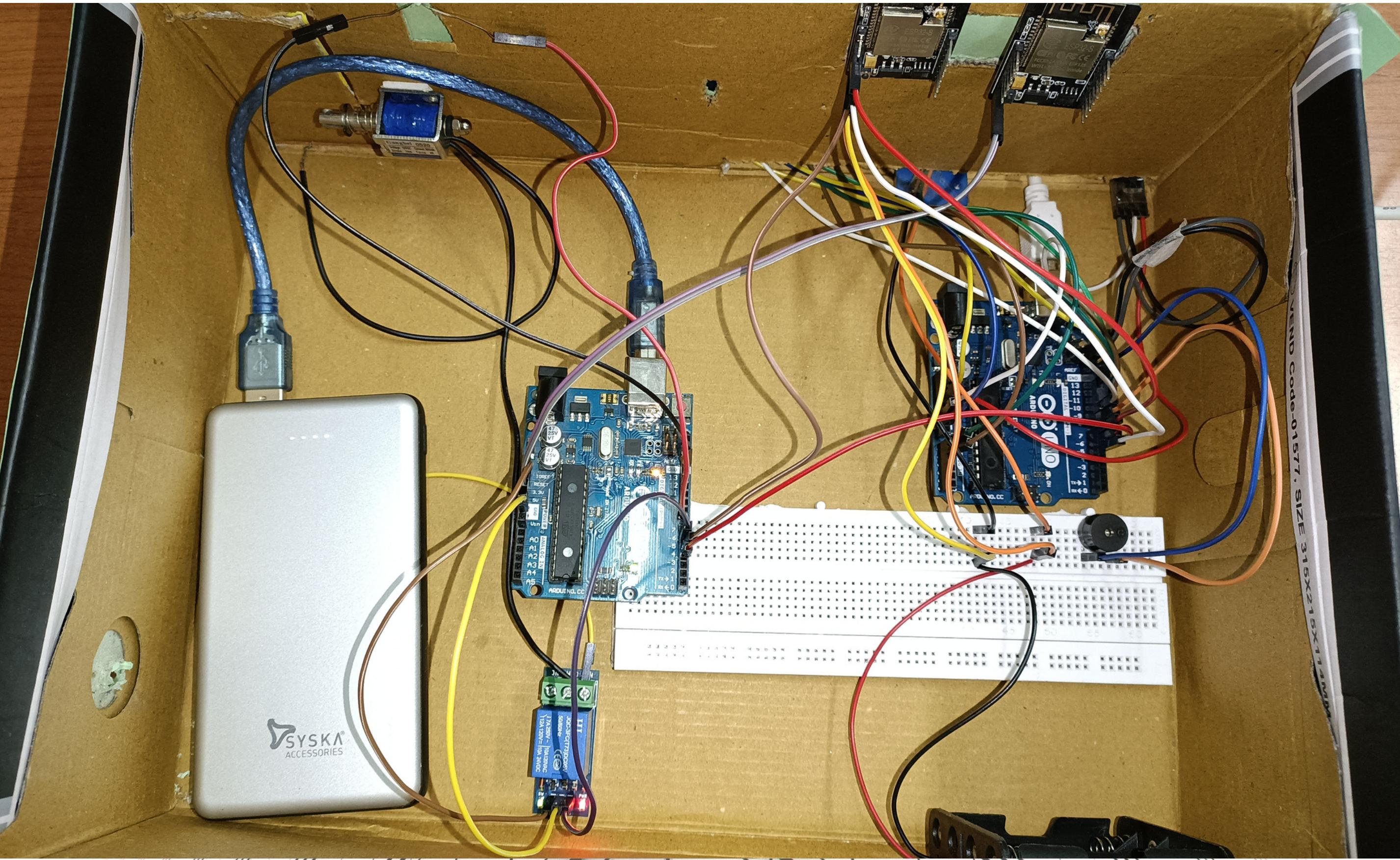
1. Photo: To get a live photo anytime from anywhere
2. Flash: To toggle the flashlight
3. Unlock: To unlock the door remotely
4. Lock: To lock the door



TELEGRAM DEMO



INTERNAL CONNECTIONS AND CIRCUITRY



THE FINAL MODEL



CHALLENGES FACED

- Arranging power source of accurate 5V was challenging because ESP32 cam works accurately at 5V.
- Because of the limited processing capability of ESP32 cam, two different ESP32 cam modules had to be incorporated.
- On combining multiple sensors, power of Arduino gets distributed and some sensors and devices show strange behavior such as the ESP32 cam showing horizontal lines while clicking an image and restarting with a burnout error.
- Quality of photo decreases when flash is turned on.
- Multiple devices are operating which require multiple inputs and outputs for working according to the workflow. Managing such a complex structure with limited pins of Arduino Uno and ESP32 was challenging.
- Arduino Uno and ESP32 cam work as separate microcontrollers so integrating them and managing the time delay was difficult.

HOW IT IS DIFFERENT FROM SIMILAR PRODUCTS

- Contactless security verification
- Power efficient
- COVID spread mitigation
- Remotely Controlled through Telegram App

FUTURE SCOPE

- In an industry standard product, to minimize the hardware size and to maximize processing capability more powerful camera modules can be used.
- Iris recognition can be incorporated with face recognition if the domain area is more sensitive and requires enhanced security like military bases.
- Image Classification can also be incorporated in an industrial standard product so that if an animal is standing in front of the door, then the hardware does not unnecessarily alert the owner through mobile notification.

*Thank
you*