



# Secure Door with Face Recognition and Voice Command Technique

Mohamed Zeeshan N<sup>1</sup>, Mohammed Atif Khan<sup>2</sup>, Jeevan M<sup>3</sup>, Shivaprasad GM<sup>4</sup>,  
Prasanna Kumar<sup>5</sup>

<sup>1-4</sup>Student, Information Science and Engineering, NIE Institute of Technology, Mysore, India

<sup>5</sup>Assistant Professor, Information Science and Engineering, NIE Institute of Technology, Mysore, India

**Abstract:** Security is one of the most important aspects since the dawn of today's civilization. A smart home indicates an application for different technological implementations, it could indicate any system which controls the door lock and several other devices. Facial identification which is an important section to achieve surveillance and safety, especially for handicapped people, can be considered as one of the ways that deal with biometrics and performed to identify facial images via utilizing fundamental features of the face.

**Keywords:** Face capturing module, Face recognition module, Voice command recognition module, Buzzer, Raspberry Pi.

## I. INTRODUCTION

- It is agreed that handicapped persons suffer from a lot of daily issues indoors and outdoors specifically as no one accompanies them in their houses. This issue can be resolved with the help of the Secure Door unlocking system as the door can be easily unlocked with the help of Voice command and Facial recognition technique. The door can easily be unlocked with the help of this technique as no external force is required to open the door.
- If the door is unlocked a notification is sent to the user via the telegram and if the face recognition is failed then an alert is created using a buzzer.

## II. PROBLEM STATEMENT

**Existing system:** Introduced a system for face-recognizing established on a PC of a single board quality of Raspberry Pi. This system comprised detecting the face as well as localizing them by utilizing the cascade classifier of Har established on features. Gives information concerning automatic speech recognition by machines for man-machine communications in the voice command technique.

**Proposed system:** Combining the existing solutions into a simpler form and making them more effective. If we try to open the door forcefully the owner receives an alert message. If the door is tried to be unlocked by an unknown member an alert is created using a buzzer.

## III. FUNCTIONAL REQUIREMENTS

- Functional requirement defines a function of a software system and how the system must behave when presented with specific input or conditions.
- These may include calculations, data manipulation and processing, and other specific functionality.
- In this system following are the functional requirements.
  - Input test case must not have compilation and run time error
  - The system must not stop working when kept running for even a long time.
  - The system must function as expected for every set of test cases provided.
  - The system should generate the output for the given input test case and input.

## IV. NON-FUNCTIONAL REQUIREMENTS

- Non-functional requirements are the requirements that are not directly concerned with the specific function delivered by the system.
- They specify the criteria that can be used to judge the operation of the system rather than specific behaviors
- Response time-The time the system takes to load and the time for responses on any action the user does.



- Processing time -How long is acceptable to perform key functions or export/import phase data?
- Throughput the number of transactions the system needs to handle must be kept in mind.
- Architecture standards -The standards needed for the system to work and sustain.

V. FLOW DIAGRAM

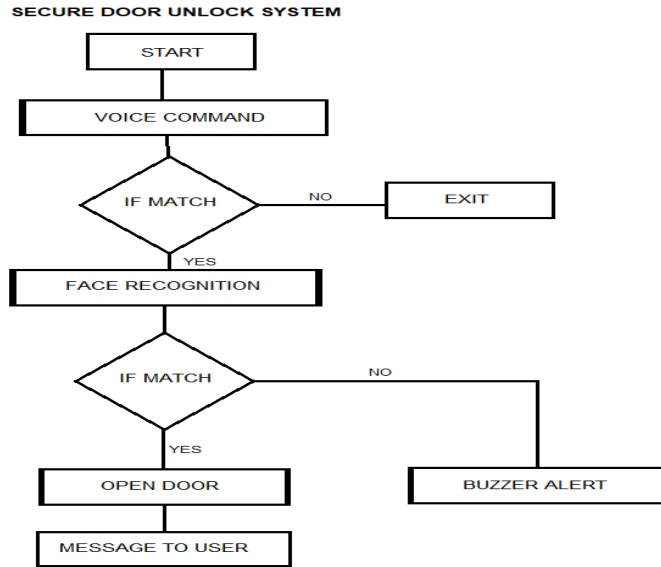


Fig .1 A process Flow diagram

The above Fig (Fig .1 A process flow Diagram) represents the flow diagram for a secure door unlock system. The Raspberry pi and the system must be connected to the same Wi-Fi using the allotted configurations. The Raspberry Pi and the system must be connected throughout the work without any disturbances. After successful settings and configurations, the voice command and the face are set into the system using the python programs and the equipment such as the camera, mic, and raspberry pi. These face and voice commands are stored in the directory folder which is later used for the detection of voice commands and face recognition. After setting up the voice command and the face, the python program for recognition of face and command is run. The voice command is detected first. If the voice command doesn't match the program is terminated. If the voice command is matched. The camera is turned on for facial recognition. If the facial recognition is failed the program is again terminated again and the alert is created using a buzzer. If the face recognition is successful the door is unlocked and a notification is sent to the owner through the Telegram bot. This is the implantation of the Secure door unlocking system.

VI. SOFTWARE ARCHITECTURE

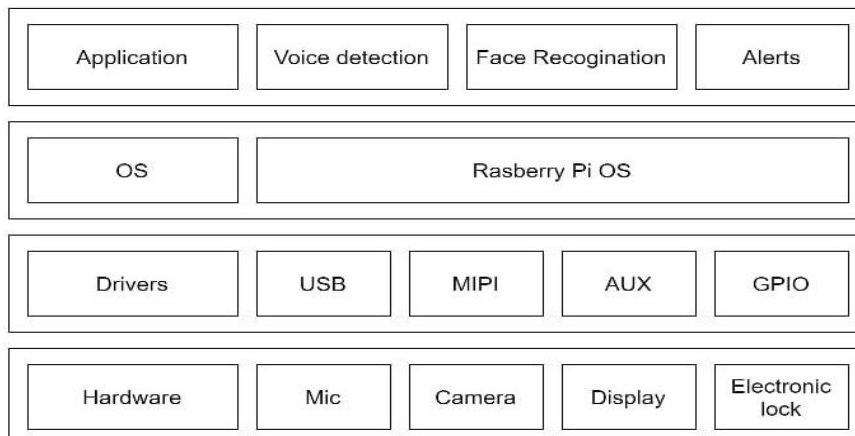


Fig .2 Software Architecture



Fig .2 represents the software architecture for the secure door unlocking system. The various different types of hardware equipment along with their software operating system are displayed in figure .2. It includes hardware components such as Mic, camera, Display, Electronic lock, Relay, Connecting wires, etc. The drivers are used for establishing the connection between the operating system and the devices. The driver programs allow the operating system to communicate with different devices. All these hardware and software components are interconnected with each other.

**VII. SECURE DOOR BLOCK DIAGRAM**

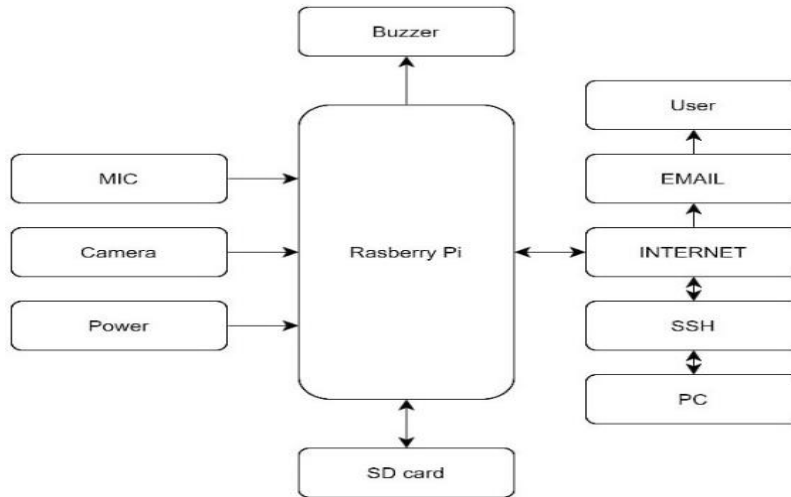


Fig .3 Secure door block diagram

Fig .2 represents the secure door block diagram. The Raspberry Pi board is connected with different components such as a Mic, camera, power supply, buzzer, SD card, pc, and internet with different types of pins and USB ports. The different USB ports must be connected in a rightful manner to avoid failure of the system during the run time. The Raspberry Pi model used should at least consists of 8GB of Random-access memory for performing faster operations. The power supply must be constant and without any fluctuations. If any loosened connection, then it may lead to termination of the system or delay in the processing of the result.

**VIII. TECHNOLOGIES USED**

**RASPBERRY PI**



Fig .4 Raspberry Pi

**Raspberry Pi** is a series of small single-board computers (SBCs) developed in the United Kingdom by the Raspberry Pi Foundation in association with Broadcom. The Raspberry Pi project originally leaned towards the promotion of teaching basic computer science in schools and in developing countries. The original model became more popular than anticipated, selling outside its target market for uses such as robotics. It is widely used in many areas, such as for weather monitoring, because of its low cost, modularity, and open design. It is typically used by computer and electronic hobbyists, due to its adoption of HDMI and USB devices.

**CAMERA**

Fig .5 camera

A camera is an optical instrument that captures a visual image. At a basic level, cameras are sealed boxes (the camera body) with a small hole (the aperture) that allows light through to capture an image on a light-sensitive surface (usually photographic film or a digital sensor). Cameras have various mechanisms to control how the light falls onto the light-sensitive surface.

**MICROPHONE**

Fig .6 Microphone

A microphone, colloquially called a mic or mike is a device a transducer that converts sound into an electrical signal. Microphones are used in many applications such as telephones, hearing aids, public address systems for concert halls and public events, motion picture production, live and recorded audio engineering, sound recording, two-way radios, megaphones, radio and television broadcasting.

**BUZZER**

Fig .7 Buzzer



A **buzzer** or **beeper** is an audio signaling device, which may be mechanical, electromechanical, or piezoelectric (*piezo* for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

#### ELECTRONIC LOCK



Fig .7 Buzzer

An electronic lock (or electric lock) is a locking device which operates by means of electric current. Electric locks are sometimes stand-alone with an electronic control assembly mounted directly to the lock. Electric locks may be connected to an access control system, the advantages of which include: key control, where keys can be added and removed without re-keying the lock cylinder; fine access control, where time and place are factors; and transaction logging, where activity is recorded.

#### RELAY

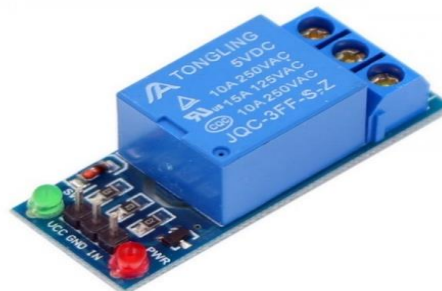


Fig .8 Relay

A relay is an electrically operated or electromechanical switch composed of an electromagnet, an armature, a spring and a set of electrical contacts. Relays are used where it is necessary to control a circuit by an independent low-power signal, or where several circuits must be controlled by one signal. Relays were first used in long-distance telegraph circuits as signal repeaters: they refresh the signal coming in from one circuit by transmitting it on another circuit. Relays were used extensively in telephone exchanges and early computers to perform logical operations.

#### AC TO DC CONVERTER



Fig .9 AC to DC converter

AC-DC converters are electrical circuits that transform alternating current (AC) input into direct current (DC) output.



## IX. CONCLUSION

- In this system we are planning to implement a Secure Door Unlock System using Face Recognition and Voice Commands. The system is able to accurately detect and recognize the face, inform the owner/admin about the user's name and take the voice command from the owner.
- The door should be unlocked when the user's face is recognized and, the door should be unlocked when the user's command is recognized.
- If the door is opened then the alert message notification is sent automatically to the user.

## X. ACKNOWLEDGMENT

The authors would like to thank everyone, whoever remained a great source of help and inspiration in this humble presentation. The authors would like to thank the management of NIE Institute of Technology for providing the necessary facilities to carry out this work. The authors would also like to show gratitude to two very special individuals **Mr. Prasanna Kumar G** for their immense contributions to this paper.

## XI. REFERENCES

- [1]. Meera Mathew, RS Divya 2017 International Conference on Networks & Advances in Computational Technologies (NetACT), 242-245, 2017 <https://ieeexplore.ieee.org/abstract/document/8076773>
- [2]. Marwa Khalid, Sadia Majeed IJCSNS International Journal of Computer Science and Network Security 16 (4), 97-101, 2016 [https://www.researchgate.net/profile/Sadia-Majeed-2/publication/329782639\\_A\\_Smart\\_Visitors'\\_Notification\\_System\\_with\\_Automatic\\_Secure\\_Door\\_Lock\\_using\\_Mobile\\_Communication\\_Technology/links/5cbad489a6fdcc1d49a112b1/A-Smart-Visitors-Notification-System-with-Automatic-Secure-Door-Lock-using-Mobile-Communication-Technology.pdf](https://www.researchgate.net/profile/Sadia-Majeed-2/publication/329782639_A_Smart_Visitors'_Notification_System_with_Automatic_Secure_Door_Lock_using_Mobile_Communication_Technology/links/5cbad489a6fdcc1d49a112b1/A-Smart-Visitors-Notification-System-with-Automatic-Secure-Door-Lock-using-Mobile-Communication-Technology.pdf)
- [3]. Shaik Mohammed Javed, P Preethi, K Geetha, Busetty Varun Sai Datta, K Nikhil Sai Chowdary <https://xajzkjdx.cn/gallery/382-april2020.pdf>
- [4]. Nagasree Y Lakshmi Venkata, Ch Rupa, B Dharmika, Teja G Nithin, N Vineela 2021 International Conference on Recent Trends on Electronics, Information, Communication & Technology (RTEICT), 268-273, 2021 <https://ieeexplore.ieee.org/abstract/document/9573869>
- [5]. N Hema, Juli Yadav 2020 6th International Conference on Signal Processing and Communication (ICSC), 211-215, 2020. <https://ieeexplore.ieee.org/abstract/document/9182778>
- [6]. CS Okafor, SU Nnebe, TL Alumona, VC Onuzuluike, UC Jideofor. [https://www.researchgate.net/profile/Alumona-Leonard/publication/359207223\\_Door\\_Access\\_Control\\_Using\\_RFID\\_and\\_Voice\\_Recognition\\_System/links/622e8ede9f7b3246342a3662/Door-Access-Control-Using-RFID-and-Voice-Recognition-System.pdf](https://www.researchgate.net/profile/Alumona-Leonard/publication/359207223_Door_Access_Control_Using_RFID_and_Voice_Recognition_System/links/622e8ede9f7b3246342a3662/Door-Access-Control-Using-RFID-and-Voice-Recognition-System.pdf)
- [7]. Hanaa M Salman, Rana T Rasheed Engineering and Technology Journal 39 (1), 222-230, 2021. [https://etj.uotechnology.edu.iq/article\\_168167.html](https://etj.uotechnology.edu.iq/article_168167.html)
- [8]. Rana Talib Rasheed Iraqi Journal For Computer Science and Mathematics 1 (1), 18-22, 2020. <https://journal.esj.edu.iq/index.php/IJCM/article/view/13>
- [9]. Vivek Raj, Athul Chandran, Anu Prabha RS 2019 2nd International Conference on Intelligent Computing, Instrumentation and Control Technologies (ICICT) 1, 1595-1599, 2019. <https://ieeexplore.ieee.org/abstract/document/8993202>
- [10]. Taewan Kim, Hyungsoo Park, Yunmo Chung 2013 IEEE International Conference on Consumer Electronics (ICCE), 320-321, 2013. <https://ieeexplore.ieee.org/abstract/document/6486910>