

**SMART DOOR UNLOCK SYSTEM**

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**ABSTRACT**

In today's generation of automation and smart kind of devices, there is very important need is to alter the security measures of system as privacy and security concerns are notable problems in the information system. It is very difficult to trust blindly on traditional way and simple security way measures of the system. In traditional way system many of the doors are having mechanical locks which were worked with the number of keys.

This article proposes Smart Door Unlock System based on Face Recognition to enhance the security. In this system camera sensor device is used to capture the face and image matching algorithm will be used to detect the authenticated faces. It allows only those persons whose face is matched to unlock the door. So, limitation of managing keys will be resolved. This kind of system will enhance the security as well as make the system keyless.

**Keywords:** *automation, sensor device, Face Recognition*

**INTRODUCTION**

Now-A-days in this world is connected to the smart devices there is a crucial need that is to improve the existing objects and make them smart. Especially to our door locks. To make any object smart enabled we need to explore allots existing drawbacks and add some extra specifications. The major disadvantages in a normal door locking system is that anybody can open a normal door by a duplicate key and it's very difficult if we want our friends and family to get into our house. This is why we cannot decrease these problems. So just change this normal door locking system into a facial recognition enabled smart door lock, which we can open the door whenever we want, So this implementation has come where devices can interact with the users and at the same time verify the safety and keeping them smart. The main concept is that to design and model this Facial recognition door unlock in advanced knowledge of the microcontrollers and interfacing the requirements, as the Raspberry Pi 3 computing is used and been inter-faced with the different devices along with the development of application to develop a desktop application. By a thorough study on the libraries and there functions we has generate the code, we does a most depend able and perfect facial recognition with the new and effective use of the hardware. It is how I initiated and making life easy and interconnected with objects. This wills contribute a major change in Home Security.

**LITERATURE SURVEY**

[1] This paper talks about building a door locking system that can recognize the face of the owner of the house and family members who will have access to pass through the door in the house. It can be done by using face recognition algorithms which are gaining much importance in this era of Artificial Intelligence. The advantage of using face recognition over other identification features like RFID or Passcode is because it is less intrusive. There are plenty of methods for face detection and recognition, in this paper face detection is done based on haar features and face recognition is done based on local binary pattern histogram using OpenCV library. This paper also provides a detailed explanation about kNN image classifier, its working and computational abilities which is used to classify images consistent with their location.

[2] This paper describes a design of a door locking system to operate the door with a different control. It uses Bluetooth technology, which is easily available on almost every gadget and consumes less power. The design of the proposed system also includes a special feature to increase the security and to make it simpler for use.

[3] This paper proposes an idea to provide high level security to home by using IoT technology. A standard UBS camera captures the image to spot the person. It's a prototype that identifies the visitor. If the door recognizes the visitor, it will greet them by name, and therefore the door is going to be unlocked. If they are not identified the door will remain firmly locked. This paper talks about four features: security, safety, control and monitoring to home automation. When an unauthenticated user tries to log in, the face will be captured and would be sent as an email.

[4] In this research, it provides a foundation of software and Algorithms that can be used for Image processing and Facial Recognition. Software library: The library has a lot of optimized algorithms, which may be utilized in many IOT related sectors including face detection and recognition. Image processing is a mathematically intensive operation that converts the image into desired looking output. Haar Cascade Classifier Algorithm is used to detect the thing that it's been trained for, from the source. The Haar Cascade classifier detects a single face and crops the face out of the scene. The Eigen face classifier then will try to recognize the cropped face and return the confidence of its prediction at the same time. This paper gives enhanced information about face Recognition and the most used Algorithms for the process. Also, there is high accuracy in recognizing house owner faces and it could realize sending the matched face image to a different Raspberry Pi in time and provides a good output.

[5] Has proposed a GSM based door lock security system using PIC platform. By using a gear motor, a 5-digit password has been used to lock or unlock the door. If the user enters the wrong password for 3 consecutive times a warning is sent to the owner.

[6] This paper describes the objectives to design the face detection system. The objectives include: 1. To design a real time face detection system. 2. To utilize the face detection system based on Haar classifier. 3. To develop face detection system using open CV. 4. Users could operate screen to pick entering the house by recognizing face or entering password. For face recognition, a picture is going to be captured by camera and pre-processed and converting, resizing and cropping, then face detection and recognition are performed. This development scheme is cheap, fast, and highly reliable and Raspberry pi takes less power and provides enough flexibility to suit the need of various people.

[7] The proposed system in this paper is a wireless monitoring and control system using ZigBee network protocol and based on digital door lock. The project was developed as four modules- ZigBee module, digital door lock module, human detection module, and ZigBee relay module. The ZigBee module supports wireless sensor networks and ZigBee tag identifies the access objects. This model can be used as an access monitoring and control system, in real market for home networking system, and also as a connection between mobile phone and home networking system.

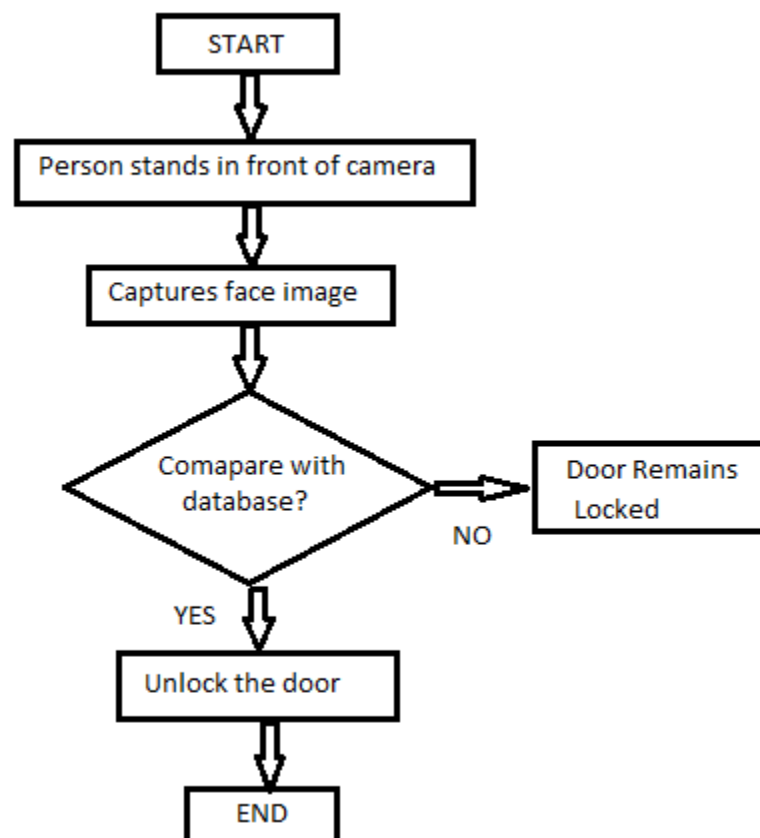
[8] This paper discusses a GSM based digital door lock security system where the design has built-in NFC capabilities that would become the key to open the door through logical link control protocol which matches the user's password to unlock the door. To identify the users a system that uses logical link control has been proposed that is based on NFC in a smartphone.

## PROPOSED METHODOLOGY

The technologies used in this project primarily are Face recognition and Internet of Things (IoT). Face recognition is used to identify the faces of the person near the camera and IoT is used to operate the lock. IoT is used to integrate and manage the working.

The RPi is powered using its own power source (battery powered). The RPi powers the Pi camera and the motor. The basic functionality of the project is, open the door for the recognized faces, and else remain locked.

When a person stands in front of the camera, the camera scans the face of the person and then compares the face in its database. If the face is recognized, that is, if it matches in the database, the door is unlocked and it opens. However, if the face is not recognized, then the door remains locked. The new faces can be later updated in the database by the user. The reading of the face and the recognition process is a part of Face Recognition and Image Processing. The working between the camera and the motor is controlled by the RPi.



Proposed system will be robust from hacking attacks as we are proposing machine learning based approach.

## CONCLUSION

Using face recognition and IoT, we have proposed an advanced system for door lock to provide access to the user for entering into the house. Since face is a distinctive feature for humans and is intrusion free, it is more secure to use facial recognition to unlock the door rather than worrying about losing keys or forgetting password.

**REFERENCES**

1. Omkar Pawar, Prathamesh Lomkar, Randhir Singh, Vivek Salunke and Prof. D.M. Ujlambkar, "Door Lock System using Facial Recognition", IJRASET March 2019.
2. Muhammad Sabirin Hadis, Elyas Palantei, Amil Ahmad Ilham, Akbar Hendra, "Design of smart lock system for doors with special features using bluetooth technology", 2018 International Conference on Information and Communications Technology (ICOIACT).
3. Sandesh Kulkarni, Minakshee Bagul, Akansha Dukare and Prof. Archana Gaikwad, "Face Recognition System Using IoT", IJARCET November 2017. [4] Sourav Roy, Md Nasir Uddin, Md Zahirul Haque and Md Jahidul Kabir, "Design and Implementation of the Smart Door Lock System with Face Recognition Method using the Linux Platform Raspberry Pi", IJCSN December 2018. [5] A. Ibrahim, A. Paravath, P. Aswin, S. M. Iqbal, and S. U. Abdulla, "GSM based digital door lock security system," in Power, Instrumentation, Control and Computing (PICCC), International Conference, 2015.
5. Rajat Bhise, Nikilesh Phadnis, Rahul Bari, Vijay Dhage "IoT Based Door Lock And Unlock System Using Face Recognition," International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056 Volume: 05 Issue: 12 | Dec 2018.
6. I.-K. Hwang and J.-W. Baek, "Wireless access monitoring and control system based on digital door lock," IEEE Transactions on Consumer Electronics, vol. 53, 2007. [8] C.-H. Hung, Y.-W. Bai, and J.-H. Ren, "Design and implementation of a door lock control based on a near field communication of a smartphone," in Consumer Electronics-Taiwan (ICCE-TW), 2015 IEEE International Conference on 2015.
7. Paul Viola and Michael Jones, "Rapid Object Detection using a Boosted Cascade of Simple Features" Accepted Conference on computer vision and pattern recognition, 2001.

