SMART DOOR UNLOCK SYSTEM USING FACE RECOGNITION AND VOICE COMMANDS

Prof.M.R.Sanghavi[1], Srujal Sancheti[2], Bhakti Patel[3], Sanjana Shinde[4] , Neha Lunkad[5]

[1,2,3,4,5]*Dept. of Computer Engineering, SNJB's LATE SAU. K.B. JAIN COLLEGE OF ENGINEERING, NEMINAGAR, CHANDWAD 423101*

---***---

Abstract - In today's era of automation and smart devices, there is crucial need to alter the security measures of system as privacy and security are notable issues in the information system. It is difficult to trust blindly on traditional and simple security measures of the system. In traditional system many of the doors are having mechanical lock which were restricted on the number of keys. This article proposes Smart Door Unlock System based on Face Recognition to enhance the security. In this system camera sensor is used to capture the face and image matching algorithm will be used to detect the authenticated faces. Only the person whose face is matched can be able to unlock the door. So, limitation of managing keys will be resolved. The security system is also made by means of maintaining into the eye of old age humans for whom it is hard to open the door manually. This system will not only enhance the security but also make the system keyless. Proposed system will be robust from hacking attacks as we are proposing machine learning based approach.

Key Words: IOT, Face Recognition, Machine Learning, Smart Door, Security

1. INTRODUCTION

Now-a-days with the extreme use of smart devices are used to automate many of the processes. Home automation is one of the aggressively developed technology use by high end society. It's far tough to consider blindly on traditional and simple security features of the device. in conventional gadget many of the doors are having mechanical lock which have been constrained on the number of keys. So, to overcome the aforementioned issues and traditional locking system one has to modify them and make them smart and automated. It works well but when we wish more secured environment and accountability of who locked and unlocked when is the major part was missing in traditional system.

This paper proposes Smart Door Unlock System based on Face Detection to enrich the security. Machine learning based approach with Haar Cascade method is proposed in the paper. In this system camera sensor will be used to capture the face and image matching algorithm will be used to detect the authenticated faces. Only the person whose face

is matched can be able to unlock the door. So, limitation of dealing with keys will be resolved. This system will now not best beautify the safety however additionally make the device keyless. Many promising digital based automated solutions came in market whose detailed analysis is given in literature survey, a few are thumb based, Iris based and Face Based. Many people tried to develop the automation on door based on smart cands,thumb based, iris based but very few of them are prominent for face based solution .

This system is so promising but has its own pros and cons. Certain challenges are also faced when we use face detection such as lightening, varying brightness. The main advantage of this system is acquiring the door using face detection approach and entire face is recognized. Face recognition technique involves attribute extraction from facial image with help of smart door model an intense innocence is expected in security industry and to make daily objects synergistic.

2. LITERATURE SURVEY

Year	PAPER NAME	PUBLISHED BY	FEATURES
2017	Door unlock using face recognition	Abdul Azeem,Kandula Rama Rao & team	Liberated to do programming on Linux. Algorithm for Face recognition.
2017	Facial recognition enable using smart door Microsoft face API	Karan Maheshwari & Nalini N	Automated face recognition by neural network.
2018	Automated door access control system	Tejas Saraf ,Ketan Shukla & team	Email alert system. Haar cascade algorithm is used.
2018	Facial recognition enabled smart	M Vamsi Krishna & team	Use neural network. Door lock app.

	door unlock system		Provide live stream video
2019	Smart Door with Face Unlock	Divins Mathew	Use Bolt IoT cloud API & .NET for image processing
2019	Makers Pro Project(Simple Door Unlock using Face Recognition Solenoid Lock)	Muhammad Abiq	Simple Face Unlock

3. Proposed Methodology

In the present system we have been using the equipment's as follows:
Raspberry Pi 3
Pi Cam
Mic
Speaker
Stepper motor
Monitor Display
Solenoid Lock

3.1. Raspberry PI 3

It is a sort of development board which has the modules like WIFI and Bluetooth comes on board, we can connect any form of sensors to raspberry pi3 through the GPIO pins. it has forty GPIO pins 4 USB ports ,1 LAN port ,1 port for electricity supply and it has on board provided with 1gb RAM

3.2. Pi Cam

It communicates with **Pi using** the MIPI **camera** serial interface protocol. It is normally used in image processing, machine learning or in surveillance projects..

3.3. Mic

A sound sensor acts like a **microphone** that detects sound signals. The sensor will detect sound signals a provide digital or analog output.

3.4. Speaker

It is used for voice and sound. The purpose of **speakers** is to produce audio output that can be heard by the listener.

3.5. Stepper Motor

The **stepper motor is used** for precise positioning with a **motor.** Speed of **motor** is controlled by the frequency of the pulses.

3.6. Monitor Display

Display is used to show the picture of visitor standing in front of door.

3.7. Solenoid Lock

Solenoid lock denotes a latch for electrical **locking** and unlocking.

4. System Architecture

Basic flow of the face detection system is image of the visitor standing in front of the smart door is captured with the help of camera, then it will be identified by using method called haar cascade method. The captured image will be matched by the face that is stored in the database. If the Face will be matched then the name of person will be said to the user by using speakers and voice commands will be taken as input by user with help of mic. If the user gives command to open the door, then door will be unlocked automatically else would be remain closed.

5. Mathematical Model

Mathematical model is a description of system using mathematical concepts and language. The process of Mathematical model developing is termed as Mathematical modeling.

S=I,P,O

Where,

S=System

I=Input

O=Output

P=Process

S=I,P1,P2,P3,O1,O2

Where

I=Image of visitor

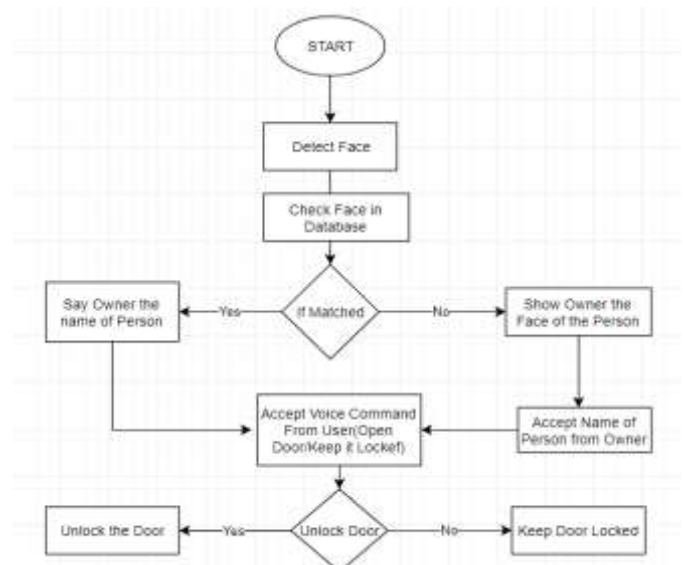P1=Match the face with the dataset

P2=Acknowledge the admin about the visitor and the input

P3=Lock or Unlock the door on basis of Actions

O1=Lock/Unlock the door

O2=Give alert

6. Flowchart

7. Conclusion

In this system we have implemented the Smart Door Unlock System using Face Recognition and Voice Commands. The system in able the accurately detect and recognize the face ,and informing the owner/admin about the user name and taking the voice command from the owner. The owner is able to remotely access the door from any other location. The owner is also able to blacklist the person and get alert if the blacklisted person comes in from of the door. The implemented system is moderate cost, so that it is a affordable to the averaged salaried person.

APPENDIX

Abdul Azeem is with the Department of Electronics and Communication Engineering, Andhra Loyola Institute of Engineering and Technology, Vijayawada, India.

Sathuluri Mallikarjun Rao is with the Department of Electronics and Communication Engineering, Andhra Loyola Institute of Engineering and Technology, Vijayawada, India. Kandula Rama Rao is with the Department of Electronics and Communication Engineer-ing, Andhra Loyola Institute of Engineering and Technology, Vijayawada, India.

Shaik Akbar Basha is with the Department of Electronics and Communication Engineer-ing, Andhra Loyola Institute of Engineering and Technology, Vijayawada, India.

Harsha Pedarla is with Department of Electronics and Communication Engineering, Andhra Loyola Institute of Engineering and Technology, Vijayawada, India

Modela Gopi is with the Department of Electronics and Communication Engineering, Andhra Loyola Institute of Engineering and Technology, Vijayawada, India

REFERENCES

[1] Door Unlock using Face Recognition (Abdul Azeem, Sathuluri Mallikarjun Rao,Kandula Rama Rao, Shaik Akbar Basha, Harsha Pedarla, Modela Gopi)
[2] Facial Recognition Enabled Smart Door Using Microsoft Face API (Karan Maheshwari , Nalini N)
[3] Automated door access control system using face recognition (Tejas Saraf, Ketan Shukla, Harish Balkhande, Ajinkya Deshmukh)
[4] Facial recognition enabled smart door unlock system(M Vamsi Krishna, A Bhargav Reddy, V Sandeep)
[5] Smart Door with Face UnlockApache2.0 (https://create.arduino.cc) (Divins Mathew)
[6] Makers Pro Projects(Simple Door Lock Using Face recognition Solenoid Lock)(Muhammad Aqib)