

DOOR SECURITY SYSTEM USING FACE RECOGNITION

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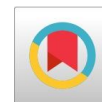
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Publication History

Manuscript Reference No: IJIRIS/RS/Vol.08/Issue02/JLIS10080

Received: 13, July 2021

Accepted: 20, July 2021

Published Online: 23, July 2021

DOI: <https://doi.org/10.26562/ijiris.2021.v0802.001>

Citation: A.Srinivasa,Prasanth,Rama (2021)." Door Security System using Face Recognition. IJIRIS: International Journal of Innovative Research in Information Security, Volume VIII, 06-10.

<https://doi.org/10.26562/ijiris.2021.v0802.001>

Peer-review: Double-blind Peer-reviewed

Editor: Dr.A.Arul L.S, Chief Editor, IJIRIS, AM Publications, India

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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 was 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. 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.

Keywords: IOT, Face Recognition, Machine Learning, Smart Door Security.

I. 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 the major part is was missing in traditional system.

This paper proposes Smart Door Unlock System based on Face Detection to enrich the security. Machine learning based approach 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 card 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..

II.ABOUT THE PROPOSED WORK

A. Literature Survey

We have discovered various papers identified with the security framework. The author in [1] proposed a novel approach of face recognition which based on Gabor filtering and supervised classification. The 2D filter bank are used and then produces 3D robust face for vector average distance used in supervised classifier and threshold based face verification method used by using this technique a high facial recognition rate is obtained. The author in [2] proposed an efficient face detection algorithm. This paper introduces the concepts of integral image, efficient AdaBoost classifier and cascading of classifiers thus reducing the computations and resulting in an efficient and fast detection algorithm. The author in [3] proposed a system to ensure security for automobiles. The system is based on Arduino and captures the image of the person trying to start the vehicle. The algorithm used for face recognition is PCA. The authors in [4] They were used an Embedded platform which was very unique and easy to implement. They proposed an image capturing technique in an embedded system based on Raspberry Pi board. The author in [5] he project was "Raspberry Pi Face Recognition in Treasure Box" a great example of how to use the Raspberry Pi and Pi camera with Open CV's computer vision algorithms. By compiling the latest version of Open CV, it can get access to the latest and most interesting computer vision algorithms like face recognition. The author in [6] He developed a system with an advanced surveillance camera capable of face detection and at the same time recognizing the face detected using OPENCV library, Eigen face methodology and these all processing has been done on Raspbian OS on Raspberry Pi. The authors in [7] They proposed there work on Raspberry pi 2 B+ model with camera interface to capture an image and convert this capture image into grey image with digital processing image algorithm. The author in [8] He proposed that real time application of Face Recognition concept by generating a MATLAB code using image acquisition tool box on the basic approach used is PCA using Eigen faces. The authors in [9] had implemented security system where if any person came at the door it was notified to the home owner via e-mail and twitter then the user could see the person standing at the door using camera from remote location.

B. Proposed Work

In this system, we are using Local Binary Pattern Histogram (LBPH) for face recognition. Open CV is an open source computer vision library that has three built-in face recognition algorithms, (i) Eigenfaces, (ii) Fishersface, (iii) Local Binary Pattern Histogram (LBPH). Compared with the two algorithms, the LBPH can not only recognize the front face, but also recognize the side face, which is more flexible. Therefore, the face recognition algorithms used here is Local Binary Pattern Histogram (LBPH). It is a simple yet very efficient texture operator which labels the pixels of an image by thresholding the neighbourhood of each pixel and considers the result as a binary number. And then it converts the binary number into a decimal number, and that decimal number is the new value of the centrepixel.

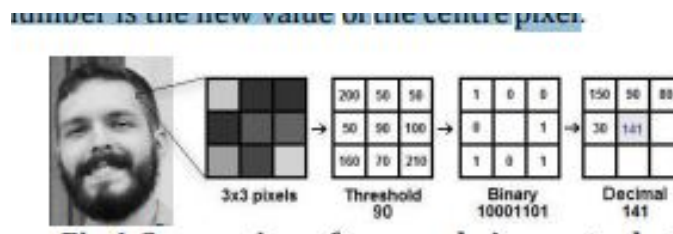


Fig.1 Representation of algorithm

At first, we have to save images by using data sets and after that, we will train that faces to LBPH algorithm then it stores into the database. At first, it converts colour images to gray scale images and then it converts into pixels for detecting this will divide the image into various pieces then it stores the values of each pixel. If pixels are less than it will be represented as 0 and pixels which are high will be 1 then it will be arranged in 3×3 matrix format for recognizing the images on screen compared to database stored images.

C. 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.



Fig.2 Architecture of Door Security System

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.

III. RESULTS AND OBSERVATIONS

A. Methodology

- Firstly, the training of data are done.
- Then, Features of Image is extracted into Encodings.
- Extracted Encodings are stored in database which we use them in pattern matching.
- We should run the code which it detects face checks for match in database.
- If it is Matched Then, Door will Unlocked
- If it is not matched with the Image in the database then, the door is locked.
- If unauthorized person try's to enter through the door. Buzzer will be raised and mail sent to the default mail id..

B. Results

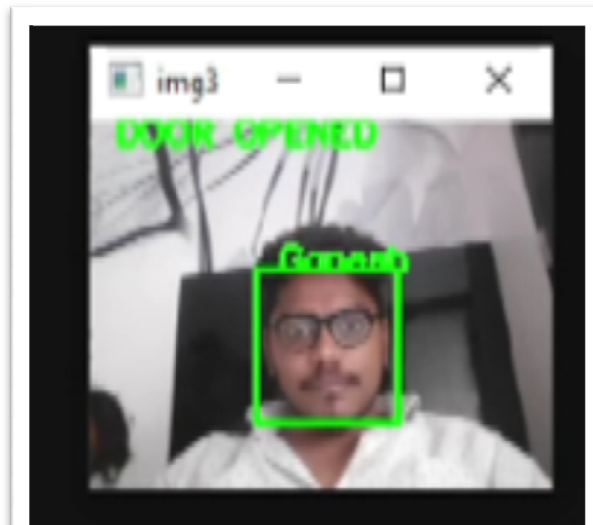


Fig 4. Image when Authorized Person unlock Door

Fig.3 shows the display when authorized person try's to unlock door. The green colour line indicates the face and name of the person.

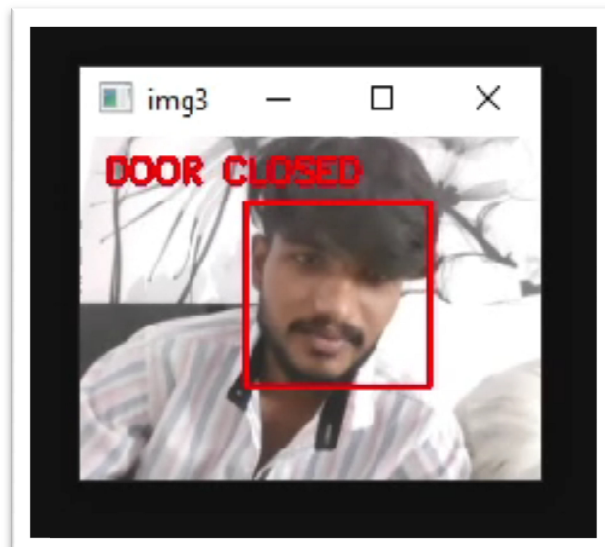


Fig 5. Image when Unauthorized Person unlock Door.

Fig. shows the display when unauthorized person try's to unlock door. The red colour line indicates the face.

security check > Inbox x



kotaganesh8328@gmail.com

to kotalakshmganesh. ▾

security image



Fig.6 Screenshot of Mail which sent to default mail.

C. Observations

We observe that our project is able to work in day light condition but when it comes to night it doesn't work as our system camera is not capable of it. This can be solved by using good quality camera. When it comes to face detection we have set deviation as 0.5 which leads to improve the detecting of face. As our system has pros and cons but cons can be reduced. Our project provides security regarding the door.

V. CONCLUSIONS

In this system we have implemented the Smart Door Unlock System using Face Recognition. The system is able to accurately detect and recognize the face and if an unauthorized person informs the owner/admin about the user using Gmail and buzzer. It also displays name when an authorized person enters. The implemented system is moderate cost, so that it is affordable to the average salaried person.

ACKNOWLEDGMENT

This research project was partially supported by the Department of Computer Science and Engineering, Andhra Loyola Institute of Engineering and Technology, Jawaharlal Nehru Technological University. We are grateful to **Professor Dr. A. Srinivasa Rao** for leading us to develop and contribute a paper to the conference.

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