

## IOT BASED AUTOMATIC DOOR LOCK SYSTEM BY FACE AND VOICE RECOGNITION

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### ABSTRACT

The real-time Camera module face detection has been made feasible by applying the method of Haar Cascade, CNN work. The software initially capturing Camera video/image of all the permitted persons and records the information into database. Proposed work deals with automated system to recognise and classify the Faces using CNN(Convolutional Neural Network) algorithm and voice recognition using code word. The real-time Camera module body detection has been made feasible by employing the method of Haar Cascade work. The software first \staging Camera module of all the allowed persons and stores the information into database. Proposed work focuses with automated method to detect face and recognised the individual. Display that person name; categorise the body using CNN algorithm. The process comprised of three parts, first take footage and transform it into\sframes. Next apply blob analysis for the purpose of Body Detection from Camera module, third use CNN for the purpose of classification.

**Keywords:** CNN(Convolutional Neural Network), Machine Learning, Artificial Intelligence, Haar Cascade.

### I. INTRODUCTION

In biometric identification, the Face is frequently employed. Face tracking, criminal detection, airport security, forensics, and other security applications such as these all rely heavily on facial recognition technology. Fingerprint, handprints, and other biometrics features are less reliable than fingerprints Security-related applications such as fraud detection, face-tracking, airport security, and forensics can all benefit from these images. A webcam is being used to capture a face image for facial images. They use a camera to take a picture of the visitor and compare it to a database of images. Then they can be kept in a database after being classified with well-known classes. Experts in the field of face biometrics encounter numerous challenges because the restrictions imposed by various factors such as changes in illumination, head postures, facial expressions, occlusion, and the ageing process on machine face recognition. Researchers came up with a slew of ideas for dealing with the problem at hand. Feature extraction and face recognition, or face detection, are two steps in the process of automatic face identification. Geometric feature-based and image-template-based face-recognition algorithms are the two main categories. It is possible to detect a face by comparing it to one or more template models. Kernel approaches, principal component analysis, and linear discriminate analysis all fall under this category. Face templates are made with the help of several types of study and research. Analysis of explicit local features and their geometric relations is carried out using geometric feature-based approaches. To properly understand the information contained in images, multi-resolution tools like ridge lets have indeed been developed. These techniques have since found utility in pattern recognition and computer vision.

### II. OBJECTIVE

- New scheme for face detection with Haar Cascades Algorithm.
- To identify the face of persons in the image.
- To improve the face detection performances in the system.
- To improve the Accuracy of security performances in the system we are using voice code word authentication.

### III. PROBLEM STATEMENT

The primary difficulties of face recognition are intensity, illumination, stance, difficult to controlling and huge conclusion.

### IV. GOAL

The goal of face detection is to infer the correct face and then it will check the database, the user is authorized or not. Also system have goal to cover a security in the form of code word through voice.

### V. PROPOSED SYSTEM

This paper is presenting a proposed work of an automated image Capture system using Python . This work is experimented on user face we have to used classification methods Haar Cascades, CNN convolution neural networks algorithms, etc. But improvements are expected to increase its efficiency of classification. This system automatically detects the user face and detect the by recognizing their face. This system is developed by capturing real time human faces. The detected faces are matched against the reference faces in the dataset and detect the user .voice based authentication using code word is done using google API.

Advantages of Proposed System:

- We perform a detailed security analysis and performance evaluation of the proposed data.
- Required less time.
- Increase Efficiency.
- improve the accuracy.
- voice based authentication.

### VI. SYSTEM ARCHITECTURE

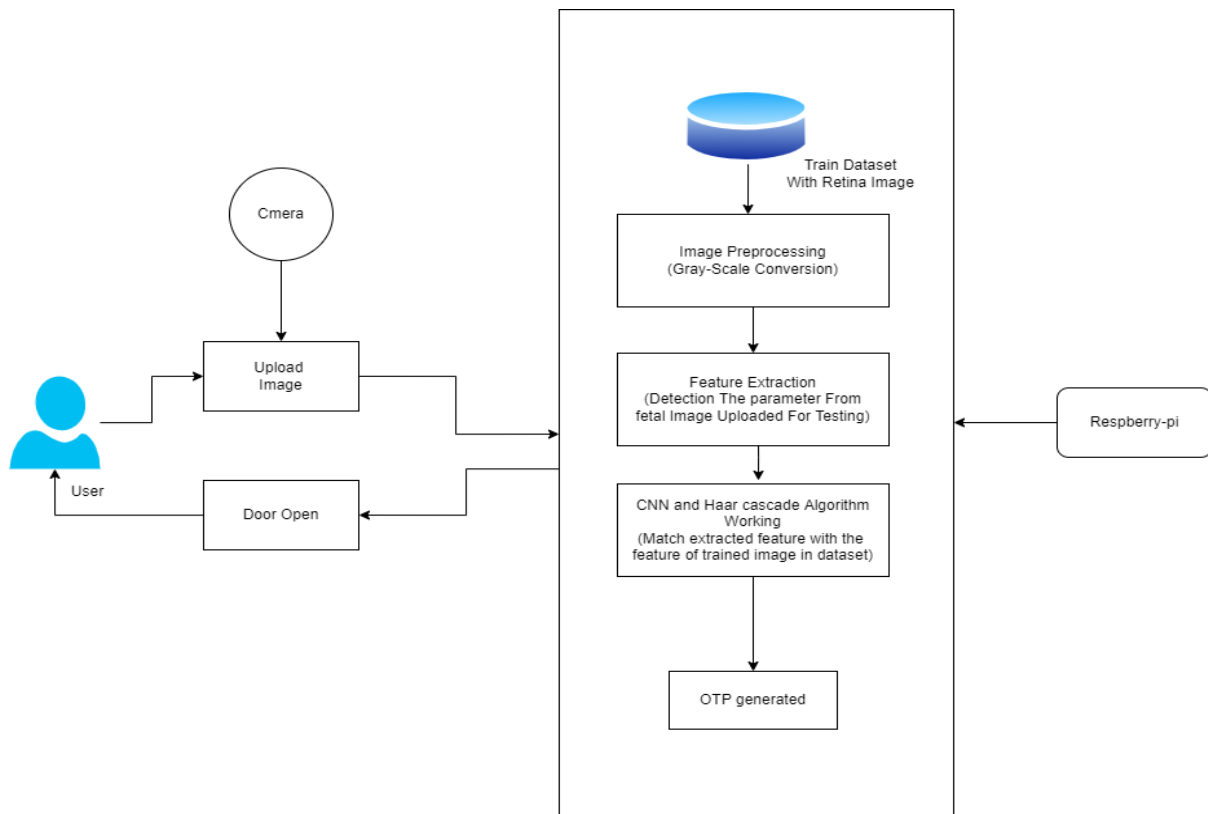


Fig: System Architecture

#### MATHEMATICAL MODEL:

Let S be the Whole system which consists:

$$S = IP, Pro, OP.$$

Where,

IP is the input of the system.

Pro is the procedure applied to the system to process the given input.

OP is the output of the system.

#### A. Input:

IP = I. Where, I is set of images, provided as an input.

#### B. Procedure:

Step1: Camera module capture the user face .

Step 2: verify the information into database.

Step 3: Proposed work deals with automated system to detect and classify the Faces using Convolutional Neural Network algorithm

Step 4: The comprised of three phases, first face Detection from camera module , second apply Convolutional Neural Network algorithm for the purpose of feature classification and extraction.

Step 5: The most useful and unique features of the face image are extracted in the feature extraction phase.

Step 6: The face image is compared with the images from the database.

Step 7: we empirically evaluate face recognition which considers both shape and texture information to represent face images based on Convolutional Neural Network for person independent face recognition.

Step8: As per comparison show Result.

step9: system using voice recognition by code word using google api for more authentication

C. Output: Camera module detects the face and show the locks/unlocks the door with voice recognisation.

## V. ALGORITHM

### Haar Cascade Algorithm:

Object identification using Haar feature-based cascade classifiers is a detection method developed by. This is a Machine Learning-based method in which the cascading functions is formally defined number of positive and negative photos before being used to detect objects in other photos. Face recognition, for example, necessitates a huge number of both positively and negatively images (images with and without faces) to train the classifier. The characteristics are then extracted. For this, the haar features depicted in the figure below are used. Each feature is a single value calculated by subtracting the sum of pixel values beneath the white rectangle from the sum of pixel values beneath the black rectangle. To handle each feature calculation that takes a lot of processing, a simple solution known as integral pictures was presented. It lowers the calculation of the pixel sum to a four-pixel operation. The majority of the traits we calculated are also meaningless. As a result, we must select the best characteristic from among these. For this aim, every feature is applied to all of the training photographs. It selects the best threshold for each attribute to classify the faces into positive and negative images. The attributes that best categorise face and non-facial photographs with the lowest mistake rate are then picked. Applying all of the final features to an image to determine whether or not it is a face is still inefficient and time-consuming. (Take a look at the 24x24 window of each image.) As a result, the concept of Cascade of Classifiers was established, in which features are organised into different stages of classifiers and applied one at a time, rather than applying all of them to a window at once. If the window fails at any stage during the procedure, it is abandoned and no further steps are taken. If it passes, the process moves on to the application of the second level of features. A face area is a window that passes through all stages.

### CNN Algorithm:

A convolutional neural network (CNN/ConvNet) is a type of deep neural network used to evaluate visual imagery in deep learning. When we think about neural networks, we usually think of matrix multiplications, but this isn't the case with ConvNet. It employs a technique known as Convolution. Perceptron is a mathematical operation on two components that yields a quaternary structure that explains how the shape of one is changed by the other. Various levels of neurones make up deep neural networks. Artificial neurones are mathematical in nature that compute the weight value of multiple outputs and inputs an activity value, similar to their natural counterparts. Each layer generates many activation functions that are passed onto next layer when you input an image into a ConvNet. A first layer usually removes basic properties such as horizontally or vertical edges. This information is passed onto next layer, which is responsible for detecting more complex features like angles and combinational edges. As we go deeper into the network, it can recognise even more complex features like items, continues to face, and etc.

### Applications:

Detect frauds at crowded areas such as:

- Banking System,

- Parking Area,
- Government Sector

**Disadvantages:**

- It is cumbersome to maintain a huge set of records.
- It is time Consuming
- Error-prone
- Its leads to wastage of Resources.

## V. CONCLUSION

The purpose of the project is to build a smart home system. It saves time and energy, specifically when a significant amount of people are involved. It may be expanded to video surveillance to detect people in crowded settings such as bus stops, theatres, and train stations, where the identity of a perpetrators can be determined using facial recognition algorithms. Recognition system is a difficult topic in the subject of computer vision, which has gotten a lot of recent interest due to its numerous applications in diverse of fields. Despite intensive research efforts in this area, which have resulted in mature face recognition systems that can operate under confined conditions, they are still far from meeting the ideal of being able to perform properly in all of the situations that applications in the real world confront.

## VII. REFERENCES

- [1] X. Wei, C.-T. Li, Z. Lei, D. Yi, and S. Li, "Dynamic Image-to- Class Warping for Occluded Face Recognition," IEEE Transactions on Information Forensics and Security, vol. 9, no. 12, pp. 2035–2050, Dec 2014.
- [2] P. J. Phillips, J. R. Beveridge, B. A. Draper, G. Givens, A. J. O'Toole, D. S. Bolme, J. Dunlop, Y. M. Lui, H. Sahibzada, and S. Weimer, "An introduction to the good, the bad, & the ugly face recognition challenge problem," in 2011 IEEE International Conference on Automatic Face & Gesture Recognition and Workshops (FG). IEEE, 2011, pp. 346–353.
- [3] Y. Taigman, M. Yang, M. Ranzato, and L. Wolf, "Deepface: Closing the gap to human-level performance in face verification," in 2014 IEEE Conference on Computer Vision and Pattern Recognition (CVPR). IEEE, 2014, pp. 1701–1708.
- [4] J. Wright, A. Y. Yang, A. Ganesh, S. S. Sastry, and Y. Ma, "Robust face recognition via sparse representation," IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 31, no. 2, pp. 210–227, 2009.
- [5] A. Wagner, J. Wright, A. Ganesh, Z. Zhou, H. Mobahi, and Y. Ma, "Toward a practical face recognition system: Robust alignment and illumination by sparse representation," IEEE Transactions on Pattern Analysis and Machine Intelligence, vol. 34, no. 2, pp. 372–386, 2012.
- [6] B. Quintana, S. A. Prieto, A. Adan, and F. Bosche, "Door detection in 3D colored laser scans for autonomous indoor navigation," in 2016 International Conference on Indoor Positioning and Indoor Navigation (IPIN). IEEE, oct 2016, pp. 1–8
- [7] A. Llopart, O. Ravn, and N. A. Andersen, "Door and cabinet recognition using Convolutional Neural Nets and real-time method fusion for handle detection and grasping," in 2017 3rd International Conference on Control, Automation and Robotics (ICCAR). IEEE, apr 2017, pp. 144–149.
- [8] B. Axelrod and W. H. Huang, "Autonomous door opening and traversal," in 2015 IEEE International Conference on Technologies for Practical Robot Applications (TePRA). IEEE, may 2015, pp. 1–6.
- [9] Y. Karayiannidis, C. Smith, F. E. V. Barrientos, P. Ogren, and D. Kragic, "An Adaptive Control Approach for Opening Doors and Drawers Under Uncertainties," IEEE Transactions on Robotics, vol. 32, no. 1, pp. 161–175, feb 2016.
- [10] Hteik Htar Lwin, Aung Soe Khaing, Hla Myo Tun, Automatic Door Access System Using Face Recognition International Journal Of Scientific Technology Research, Issue 06, Volume 4, June 2015.