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# Vision based Security System and Automation using Internet of Things

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**Abstract -** *In recent years, security is the most important part in human life. In this paper, a enhanced algorithm for face recognition is proposed. The proposed system monitors the movement of unauthorized person outside the house. Here Local Binary Pattern (LBP) is used to identity the face which is captured using the smart camera installed outside the house. Human face recognition and detection is done using Histogram of gradient which help to find the family members face. When unknown face is recognized, buzzer is set using Iot. Also when an unknown person enters the house, then the message will be sent to the family member along with unauthorized person face who enters the house.*

***Key Words*: LBP, internet of things, face recognition, face detection.**

## 1. INTRODUCTION

Today, the security system is a very important in all places. Security plays a vital role in our day to day life. IoT is the smarter way to provide security. IoT can be used in many places which can provide various benefits. Using IoT, smart homes can be made. It can control and mechanize precise things of houses, for example, lights, entryways, refrigerators, and conveyed media. The IoT is getting to be mainstream in numerous sides of life, for example, keen security, shrewd urban areas, medicinal services, brilliant transportation, online business windows and water system frameworks. The main objective of today's world is the security system field is a very important in all the places.

PC vision can introduce greater security framework in the IoT stage for shrewd houses. It has capacities to perceive a individual in the erroneous zone and at the wrong time since this individual might be a malignant one for nature. Face acknowledgment framework develop to be a standout amongst the most dynamic research regions particularly lately. It has an arrangement of expansive applications in the reaches: open security, get to control, charge card check, criminal ID, law requirement business, data security, human PC wise association, and advanced libraries. For the most part, it perceives people in open territories, for example, houses, workplaces, air terminals, strip malls and banks. This component grants secure access to the house by distinguishing movement constrained by the implanted framework.

The face is the major part in human's body. In this way, it can reflect numerous feelings of an individual. Few years back, people were utilizing the non-living things like brilliant cards, plastic cards, PINS, tokens and keys for verification, and to get access in limited places like ISRO, NASA and DRDO. The most important features of the face image are nose, eyes and mouth which are related to facial extraction. Face detection and recognition system is more accurate, and non-intrusive process as it is compared to other biometrics. This paper mainly focuses on two areas face recognition and face detection. To implement face detection Haar-like features is used. At that point, examining the geometric highlights of facial pictures, for example, separation and area among eyes, nose and mouth were given by a few face acknowledgment systems. There are a couple of methods for fetching the most important part from face images to execute face recognition. One of the feature extraction techniques is Local Binary Pattern (LBP). LPB depicts the shape and surface of an digital image. LBP gives great outcomes and it is efficient for real-time project. Haar-like features and LBP are strong when contrasted with the others. To get good performance and results, LBP method was selected for the face recognition. LBP creates the binary code that demonstrates the local texture pattern. From the LBP face picture, the nose and eyes territory are separated, and for each picture's pixel the LBP histograms will be drawn.

In this paper, Raspberry Pi 3 is used and Raspberry Pi camera is associated with it. The framework will take a picture when PIR sensor distinguishes any development. At that point, PC vision is connected to the caught pictures. In this manner, the framework sends the pictures to a cell phone through the Internet. For this situation, IoT based Telegram application is used to see the action.

## 2. LITERATURE SURVEY

In [1], ELM was explored and machine learning algorithm is used for face recognition. They also used voting classifier for

final predictions. ELM was compared with SVM. In [2], drowsiness detector was used to reduce the accident and it is based on deep learning algorithm. They also used driver monitoring system. Here facial landmark is taken as an input to predict whether the driver is drowsy or not. In [3], they have used Cohn-Kanade Database and they also used HAAR filter for face detection. For facial landmarks, they used machine learning algorithm. In [4], they used local gradient hexa pattern and they also used LDP, LTrP, MLBP and LVP for face recognition. In [5], here they used Histogram of Oriented Gradients from Three Orthogonal Planes (HOG-TOP) it is used for extracting the features from video sequence. Here they used multiple feature fusion to capture the facial expression from the video. In [6], PIR sensor is used to give the movement in the specific place and the Raspberry Pi will capture the images from the camera and predict whether the person is known or unknown. In [7], Automatic Facial Expression Recognition System (AFERS) is used for extracting facial features. They used AAM (Active Appearance Model) method and for facial expression recognition they used Euclidean Distance method.

## 3.PROPOSED SYSTEM

In the proposed framework, a camera is used to accomplish the picture when a movement identified by PIR sensor. At that point, computer vision module is connected to the captured pictures to identify and recognize the human appearances. Then the image of the person will be sent to the smartphone. This framework is extremely valuable and essential to secure a place. The motion detection module detects any motion by using PIR sensor. After that, the algorithm used here will scan for human faces and after that face acknowledgment will be prepared. At that point, the picture will be sent to the cell phone.

Face acknowledgment can be described as arranging a face either known or unknown by means of looking at a face and putting away known people in the database. Face recognition system is divided into two types, face detection and face localization as indicated by Haar-like features. By using LBP algorithm, face features will be captured.

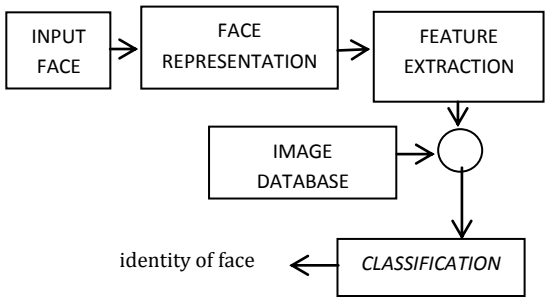


Fig1.depicts General steps for identification and recognition procedure

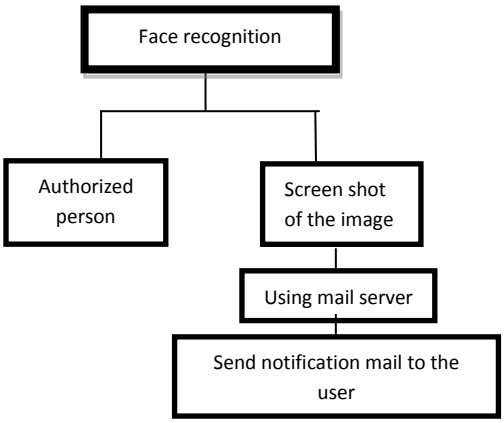


Fig2.working steps of image processing system.

## 4.EXPERIMENTAL RESULTS

Fig3. screenshot for authorized person

If PIR sensor detect any movement then, Raspberry pi camera capture the image of the person successfully. Afterwards, face recognition and face detection methods will be executed. The system was able to identify successfully the face of the person which is captured in the raspberry pi camera. The real-time face detection is implemented by Haar-like features and real-time face recognition is implemented by local binary pattern (LBP).In fig[3] shows the implementation for authorized person where the image of the person is already stored in the database.

Fig4.screenshot for unauthorized person

If unauthorized person enters the house, the system will identify the unknown person is coming to the house which is shown in fig[4].when unknown face is recognized, buzzer is set using Iot. Also when an unknown person enters the house, then the message will be sent to the family member along with unauthorized person face who enters the house.

## 5.CONCLUSION

In this paper ,face recognition and face detection techniques are used to capture the image of the person and send it to the smart phone using IoT. So, when the face of the person is detected, then the system will send the notification mail to the user using the smartphone and display the image of the person who is in that place. By using the face recognition system, people will be easily recognized and a secure city will be built. The main objective of this paper is smartphone is utilized by the client to receive the notification of the captured image sent by the raspberry pi camera. This system improves and computerize the security of industries, urban area, homes and towns. In this paper, LBP algorithm is used to identify the faces.

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