

Bank Locker Security System Using Machine Learning With Face & Liveness Detection



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ABSTRACT

The face is one of the easiest ways to distinguish the individual identity of each other. Face recognition is a personal identification system that uses personal characteristics of a person to identify the person's identity. Human face recognition procedure basically consists of two phases, namely face detection, where this process takes place very rapidly in humans, except under conditions where the object is located at a short distance away, the next is the introduction, which recognize a face as individuals. Stage is then replicated and developed as a model for facial image recognition (face recognition) is one of the much-studied biometrics technology and developed by experts. There are two kinds of methods that are currently popular in developed face recognition pattern namely, Eigenface method and Fisherface method. We use the fisherface Face recognition method to authenticate the any system. The area of this project face detection system is Image processing. The software requirements for this project are python.

Keywords: Face Detection, Machine Learning, Face Recognition, Image Processing.

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I. INTRODUCTION

Face recognition is the task of identifying an already detected object as a known or unknown face. Often the problem of face recognition is confused with the problem of face detection Face Recognition on the other hand is to decide if the "face" is someone known, or unknown, using for this purpose a database of faces in order to validate this input face.

FACE RECOGNIZATION:

DIFFERENT APPROACHES OF FACE RECOGNITION:

There are two predominant approaches to the face recognition problem: Geometric (feature based) and photometric (view based). As researcher interest in face recognition continued, many different algorithms were developed, three of which have been well studied in face recognition literature. Recognition algorithms can be divided into two main approaches:

Geometric: Is based on geometrical relationship between facial landmarks, or in other words the spatial configuration of facial features. That means that the main geometrical features of the face such as the eyes, nose and mouth are first located and then faces are classified on the basis of various geometrical distances and angles between features.

Photometric stereo: Used to recover the shape of an object from a number of images taken under different lighting conditions. The shape of the recovered object is defined by a gradient map, which is made up of an array of surface normal.

A. Motivation

- The main motivation of system is to identify the user.
- It provides the less time to detect user using face detection.
- It is used to find unauthorized user.

B. Problem Definition

Face recognition is the task of identifying an already detected object as a known or unknown face. Often the problem of face recognition is confused with the problem of face detection. Face Recognition on the other hand is to decide if the "face" is someone known, or unknown, using for this purpose a database of faces in order to validate this input face.

II. LITERATURE SURVEY

Biometric authentication has gained a lot of importance in today's intelligent era of technology. This biometric identification can be done by iris recognition, Palm print recognition, face recognition, figure print recognition etc. From all these biometric application, face recognition mostly used, as it requires less intervention of human being [1]. Also accuracy is most important factor in face recognition. In addition, such application requires very less time for recognizing authorized person. There are various methods implemented by researchers for recognition of face. Now one of the technologies for recognizing face is by using Multilevel Block Truncation Coding.

As the uniqueness property of face, face recognition is widely used in area which needs security. But it has some spoof attack by the unauthorized person to gain access of the authorized person [2]. These attacks are the big challenge for current time. As the deep learning approaches gives the promising results in image processing so, in this study, a liveness detection technique for face recognition is proposed which gives robust and accurate results for different percentage of training set of images by using multilayer deep network DBN. The proposed DeBNet is used for extracting deep features and classification of real and spoof faces. Photograph imposter NUAA data set of images is used in this study.

Automated Attendance Management System Based On Face Recognition Algorithms [1] On this paper they propose an automated attendance management system. This system is basically based on face detection and recognition algorithms, automatically detect the student when he enters the classroom and marks the attendance by recognizing him. Because of LBPH outperforms other algorithms with better recognition rate and low false positive rate the system is based on this algorithm. The system uses SVM and Bayesian as a classifier because they are better when compared to distance classifiers. The workflow of the system architecture is when a person enters the classroom his image is captured by the camera at the entrance. A face region is then extracted and pre-processed for further processing. As not more than two persons can enter the classroom at a time face detection algorithm

has less work. The future work they are saying on this paper is to improve the recognition rate of algorithms when there are unconscious changes in a person like tansuring head, using a scarf, facial hair. The limitation of the system is it only recognizes face up to 30 degrees angle variations which have to be improved further. Gait recognition should be combined with face recognition systems in order to achieve better performance of the system.

An Evaluation of Face Recognition Algorithms and Accuracy based on Video in Unconstrained Factors [2] There are three well-known algorithms that this paper will compare Eigenfaces, Fisherfaces, and LBPH by using a database that contains a face of persons with a variety of position and expression. According to the experiment results, LBPH got the highest accuracy on the possible external factors like light exposure, noise, and the video resolution. However, this algorithm has limitation due to the negative light exposure and high noise level more than the other statistical methods. The recognition accuracy also tested with three various video resolutions that are 720p, 480p, and 360p. The results show LBPH got the highest accuracy in 720p while the others got the highest accuracy in 360p video resolution. LBPH can give reliable recognition accuracy hence it uses a histogram similarity, but it was sensitive in some cases.

Class Room Attendance System Using Facial Recognition System [3] This paper aims to introduce a new approach to identify a student using a face recognition system in the classroom environment, i.e. the generation of a 3D Facial Model. This research is to attempt to provide an automated attendance system that recognizes students using face recognition technology from an image/video stream to record their attendance in lectures or sections and evaluating their performance accordingly.

Real-Time Face Recognition For Attendance Monitoring System [4] On This paper they presented an automated attendance monitoring system with face recognition in a real-time background world for with a database of student's information by using Personal Component Analysis (PCA) algorithm. This task is very difficult as the real-time background subtraction in an image is still a challenge. And, managing a database with multiple of student information's is also a challenge to the system. Implementing of this system basically involving three main phases, which include face region detection, template extraction, and face recognition. Before the feature extraction process, all input images are extracted and converted from RGB into gray scale images.

III. PROPOSED SYSTEM

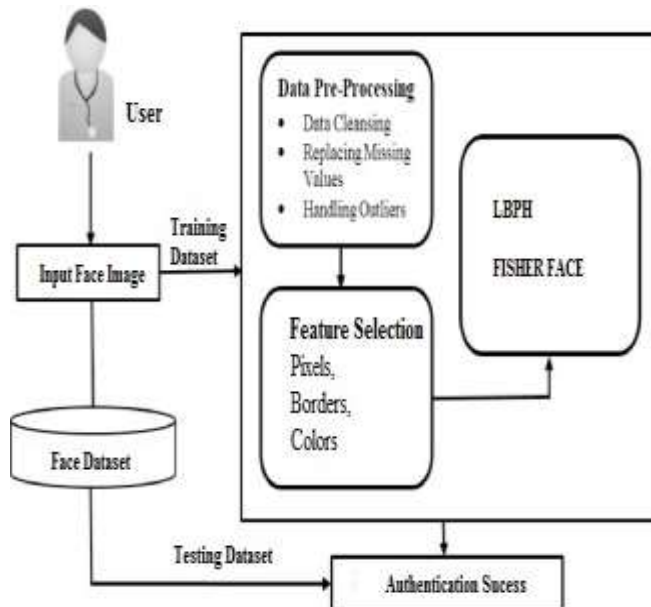


Fig 1. System architecture

- The faces taken in the database are needed to load into our workspace.
- We will load the train images into that.
- Now we need to split the data of each and every person into testing and training data.
- We need to fetch the cropped and gray scaled images.
- Now the training datasets are extracted with the image features and are stored with a count.

A. Mathematical Model

Let S be the closed system defined as,

$$S = \{Ip, Op, A, Ss, Su, Fi\}$$

Where,

Ip=Set of Input, Op=Set of Output, Su= Success State, Fi= Failure State and A= Set of actions, Ss= Set of user's states.

Set of input=Ip={username, password, Face image, bank details }

Set of actions =A={F1,F2,F3,F4,F5,F6} Where,

- F1= Authentication of user
- F2 = Capture and preprocess image
- F3 = Face detection
- F4 = Face recognition
- F5= Authentication Process
- F6= Bank details verified

Set of user's states=Ss={login state, recognize face, recognize, unauthorized person detection, validation}

Set of output=Op={ authorization, alerts }

Su=Success state={ Login Success, Image capture, face detection, alerts }

Fi=Failure State={Login failed, camera failure }

Set of Exceptions= Ex ={NullPointerException, NullValues Exception, Connection Exception }

IV. CONCLUSION

Capturing the images from camera and applying techniques face detection and recognition can decrease the manual work from human and increase the security safety, taking the decision from this recognition result. Based on this face detection and recognition can be used in implement so many application like automatic authentication system based on face recognition.

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