Implementation of Face Detection and Recognition for Security Purpose using ML

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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 is python.

Keywords: Face Detection, Machine Learning, Fisherface, Security.

ARTICLE INFO

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:

1. 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.

2. 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.

II. 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.

III. LITERATURE SURVEY

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 tonsuring 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.
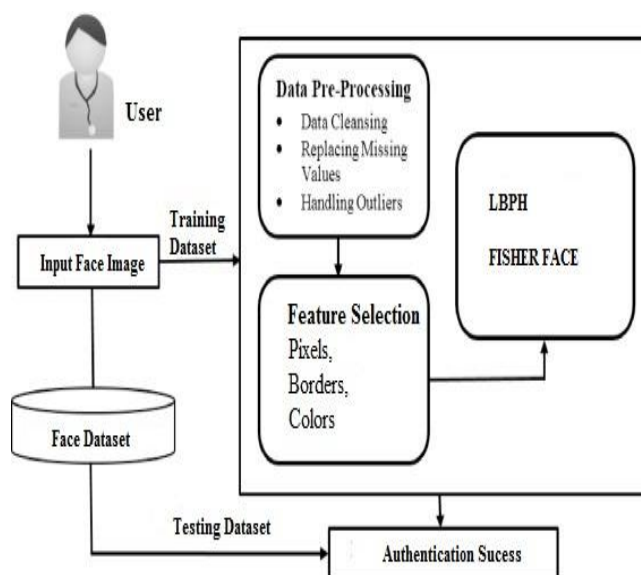
IV. PROPOSED SYSTEM

Fig 1. System architecture

A. Algorithm:

FISHER FACE:

Facial recognition using fisher face method. In general, face recognition system in this study can be seen in following figure 2.
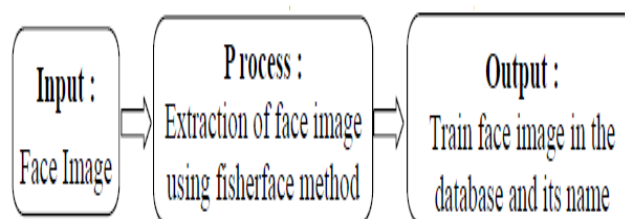

Fig 2. Algorithm process

Image Data
Image of the photograph result:
Here is a sample of photos photograph with each individual represented by a minimum of 5 samples of face images with different positions and different expressions

Image Data Training:
To know the success of the system created, then the system will be trained in the first with several images as follows:
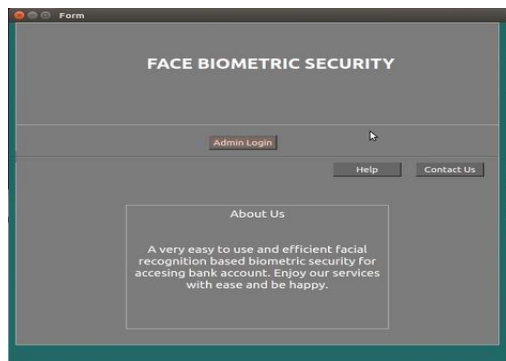
Input :
Face Image

Process :
Extraction of face image using fisherface method

Output :
Train face image in the database and its name

V. RESULT

VI. 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 used in implement so many application like automatic authentication system based on face recognition.

VII. REFERENCES

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