Development & Implementation of Algorithms for Facial Recognition System

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***Abstract*— Previous approaches for classification of facial expressions either have used smaller data bases or used the same data for training and testing. The purpose of the present study was to develop an intelligent system for facial image based expression classification using large data bases. In this approach Eigen value and Eigen vector is calculated for Train database and Test database, then Euclidean distance is calculated.**

I. INTRODUCTION

Image Processing is any form of information processing for which the input is an image, such as photographs or frames of video; it is not necessary that output will be an image, it can be a set of features of the image. Most image processing techniques involve treating the image as a two dimensional signal and applying standard signal-processing techniques to it.

Simple approach of image processing

Bitmaps:- The original and basic way of representing a digital colored image in computer memory is bitmap. A bitmap is set up of rows of pixels. Each pixel has a particular value which determines it's appearing color. This value is calculated by three numbers giving the decomposition of the three primary colors **Red, Green and Blue**. The decomposition of a color in the three primary colors is quantified by a number between 0 and 255.

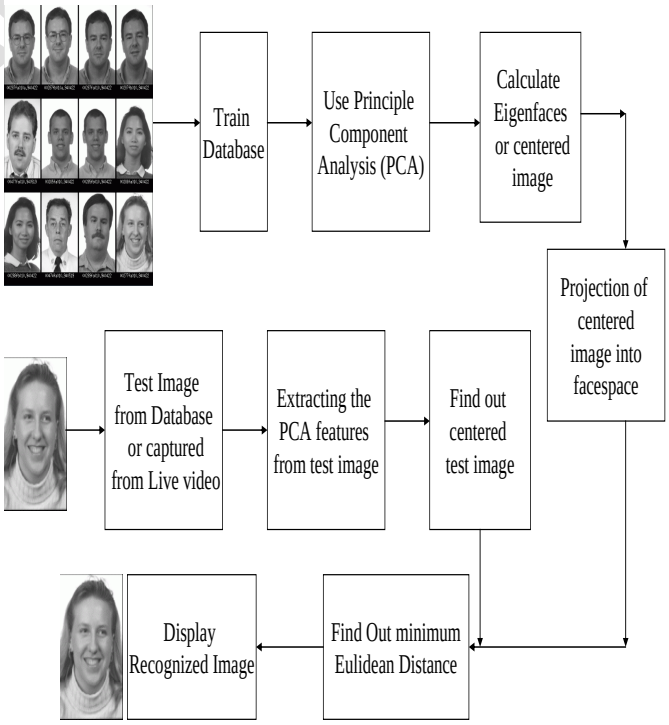
For example, white will be coded as R = 255, G = 255, B = 255; black will be known as (R,G,B) =(0,0,0); and say, bright pink will be : (255,0,255). In other words, an image is an extraordinarily large two-dimensional array of color values, pixels, each of them coded on 3 bytes, representing the three primary colors. There can
be total of 256x256x256 = 16.8 million different colors in the image. This technique is also known as RGB encoding.

The pixel is the basic unit of programmable color on a computer display or in a computer image. A pixel (or picture element) is the smallest item of information in an image. Pixels are normally arranged in a 2-dimensional grid, and are often represented using dots, squares, or rectangles.

The number of bits used to represent each pixel determines how many colors or shades of gray can be displayed. For example, in 8-bit color mode, the color monitor uses 8 bits for each pixel, making it possible to display 2 to the 8th power (256) different colors or shades of gray. The range of 0-255 was agreed for **two good reasons:--**

The first is that the human eye isn't sensible enough to make the difference between more than 256 levels of intensity (1/256 =0.39%) for a color. That is to say, an image presented to a human observer will not be improved by using more than 256 levels of gray (256 shades of gray between black and white).Therefore 256 seems enough quality. **The second** reason is that, value of 255 is convenient for computer storage. In truth computer's memory unit byte can be coded up to 256 values.

II. DEVELOPMENT & IMPLEMENTATION OF ALGORITHMS FOR FACIAL RECOGNITION SYSTEM



Algorithm: -

1. Take the images of Train Database

a) Read the pixel value of Images

b) Reshaping 2D images into 1D image vectors

c) Computing the average face image m = (1/P)*sum (Tj's)

d) Computing the difference image for each image in the training set Ai = Ti – m

e) Calculate Eigenvalues and Eigen vectors

f) Calculate Eigenfaces

g) Projection of centered images into facespace

2. Read the Test Image from Database or from Live Video

a) Extracting the PCA features from test image, first we convert image into column vector, and then subtract mean from it.

b) After calculating mean, find out projected image of test image using eigenface

3. Calculate Euclidean distances between the projected test image and the projection of all centered training images.

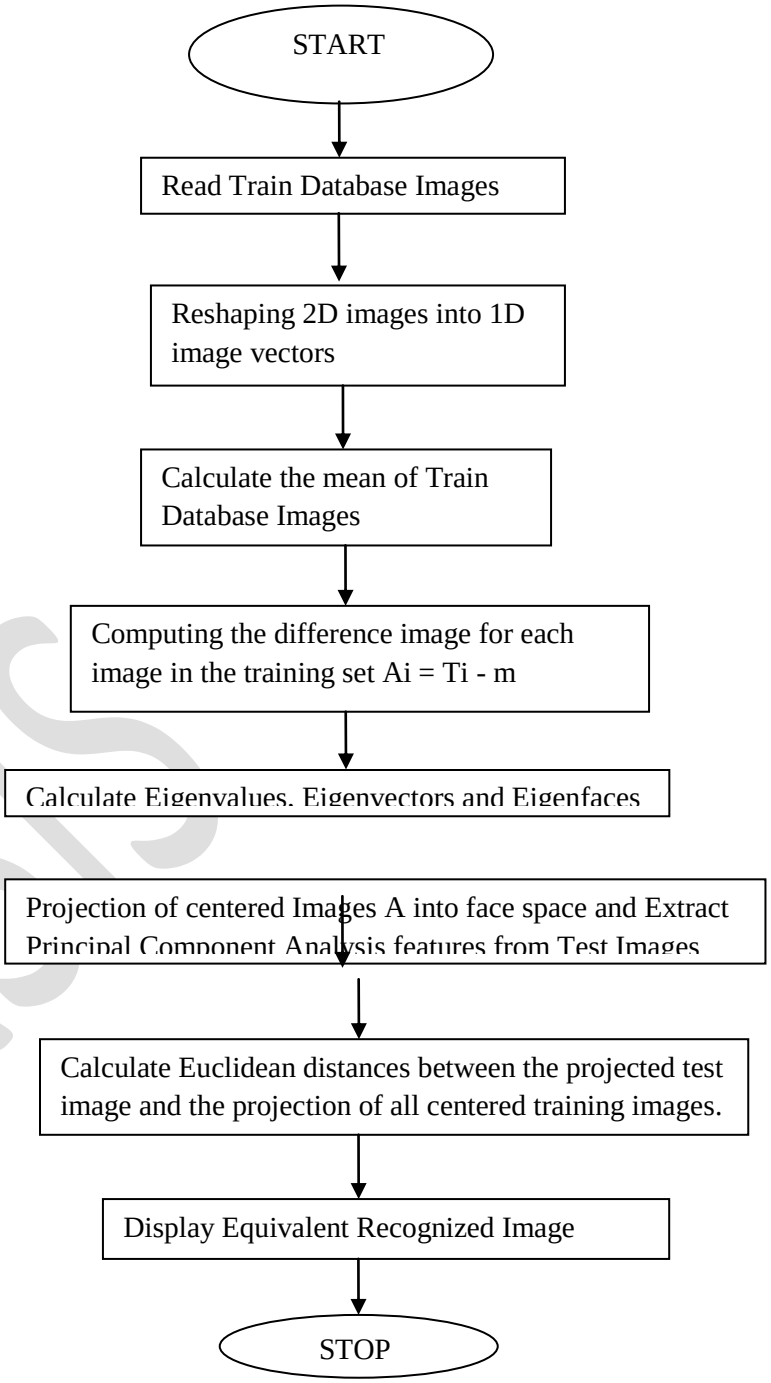
4. Select that image from train image which has minimum Euclidean distance to test image.

III. COMPARISON

- Earlier work on this was only for similar faces without expression is 90%, but now we move further for facial expression.
- Result for Facial expression is 72 % in our research.

We have taken maximum expression for person while in earlier research only test data base image is matched with trail data base image

Flowchart:



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