Criminal Face Identification System

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Abstract

Face recognition is one of the most challenging topics in computer viewing today. Contains applications ranging from security and surveillance to entertainment websites. Face recognitions for banks, airports and other customer testing centres. Germany and Australia have applied face recognition to the borders and customs of Automatic Passport Control.
A human face is a powerful object with a high degree of variation in its appearance which makes facial recognition a difficult problem in computer viewing. In this field, accuracy and speed of identification area major problem. There are many face-to-face challenges. The intensity of the program can be compromised by people changing their faces by wearing coloured lenses, growing a mustache, a lot of makeup, etc. Behavioural anxiety is also related to the process of recording, studying, and facial expressions. Most people do not accept surveillance programs that take large numbers of people who have not authorized this action.

The purpose of this paper is to explore face recognition and informative techniques provide a complete solution for gaining image recognition and known high accuracy, better response rate and the first step of video surveillance. The solution is proposed based on tests performed on various faces based on topics, posture, mood and lightness.

Introduction

The criminal record contains information about the person and photo Identification of any criminal who needs to be identified by that person, provided by eyewitnesses. Diagnosis can be made by finger printing, eye contact, DNA etc. Focusing on our first focus on social relationships plays a major role in communicating identity and emotions. Although it is difficult to put wisdom or character in a face, a person's ability to remember and know his face is amazing. photos and compare another photo against those to find a match, if any. For each facial image, the diagnosis can be made using RGB values of eye color, width and height of the face and using various measurements made by Kovashka and Martonosi [1].

The program is aimed at identifying criminals in any investigative department. In this program, we store images of criminals in our database and personal information, and these images are divided into pieces on the forehead, eyes, nose, and lips. These images are also stored in another data record to make the identification process easier. Eyewitnesses will select pieces from the screen and use them to locate a face image in the database. The system then provides a friendly environment for both operators and eyewitnesses to easily identify the culprit, if the criminal record is available. This project aims to identify the person using the previously taken photos.

RELATED RESEARCH ON FACE IDENTIFICATION TECHNIQUES AVAILABLE

Th, e main goal of computer vision researchers and, moreover, human performance in the end. To date, it is important for computer researchers to be aware of [1]. These findings provide insight into the nature of the elements associated with the human visual system that relies on its impressive performance and serve as a building block for attempts to mimic these skills skilfully. over twenty years. The methods proposed in the literature to date can be divided into two categories: model based and appearance based as described by Fu Jie Huang and Zhihua Zhou [5]. The model -based approach attempts to extract geometric parameters that measure the parts of the face while the model -based method uses size or power -based parameters such as eigenfaces coefficients to detect faces. As a result of changes in lighting, speech, body closure, rotation, etc., the appearance of a person 's face can change significantly than the existing methods of seeing the face under different conditions. The first is the Active Appearance Model proposed by Cootes [5], which disables the standard face model to match the input image and uses the control parameters as a feature vector to be assigned to the separator. The second method is based on converting the input image to the same state as the retained face and then using the direct image similarity to see the face , suggested by Beymer, Poggio and later extended by Vetter [5].

Two-dimensional and three-dimensional Strategies In the early years of the 21st century, we found ourselves moving further away from physical need human communication plays a major part in daily activities. To continue to draw closer to the automated community, we often work with machine operators, anonymous users and electronic sources of the World Wide Web, rather than the people we work with.

So, it is perhaps puzzling that self-esteem has become such a major issue in the 21st century. It can be seen that at a time when fraud costs millions of pounds annually and even the most powerful nations have no power to fight against the few activists who have a plane ticket, it is not those we care about, but rather, that we are the people we call ourselves. For these reasons, biometric verification has begun to grow rapidly in various market structures and will no doubt continue to do so, until biometric scanning is as common as a credit card swipe or signature signing [4].

Various categories of facial Identification algorithms:

•Neural networks.
•Feature analysis.
•Graph matching.

Biometrics has a number of disadvantages as compared to face recognition .While many biometrics require the interaction of topic and information in order to make identification or validation, such as seeking to scan the eye or put your hand on the subject information as defined by the NSTC Committee [4].

Face Identification Techniques

How to get face photos depends on the basic application. For example, surveillance systems can be better used for taking face pictures with a video camera while image data analysis may require solid images taken by a standard camera. Some applications, such as access to higher security domains, mayal sorequire the offended user to stand in front of a 3D scanner or infra-red sensor [4]. in two main categories: factor-based and scope. An overview of the known methods in these categories is provided below.
Face Identification from Intensity Images

Face recognition methods from the intensity images fall into two main categories which are feature-based and holistic. An overview of these categories is given below.

Featured-based

The input -based methods first process the input image to identify and measure (and measure) different facial features such as eyes, mouth, nose, etc
., and other gestures , and calculate the geometrical relationship between those facial points , thereby reducing the input image to the vector . they were hired to match faces using these scales..

Holistic

Holistic methods attempt to identify faces using global presentations, that is, descriptions based on the whole picture rather than local facial features. The seschemes can be divided into two groups: mathematical methods and AI.

Statistical

In a simple version of the complete method, the image is represented as a 2D set of comparative strength values between the input surface and all other faces in the database. Although this method has been shown to work under limited conditions (i.e., equal brightness, scale, position, etc.), it is extremely costly and suffers from general deficiencies in precise methods based on relative position, size, dynamic lighting conditions, frequency · noise and noise

Outstanding Methods

There are two main approaches to photometric surface (viewing supported). As the researcher's interest in the face grew, three of them studied well on the face (PCA
), Linear Discriminate Analysis (LDA), and Elastic Bunch Graph Matching (EBGM) [4].

PCA

Principal Components Analysis (PCA) PCA is a process that was pioneered by Kirby and Sirivich in 1988. With PCA, the probes and gallery images should be the same size and should beaccustomed to aligning the eyes and mouth of the topics within the images. The PCA method is then used to reduce the size of the data by compressing the data and to produce a much smaller formation of facial patterns. This reduction in size removes useless information and precisely decays the structure of the face into orthogonal (unrelated) parts known as eigen faces.

Each face image can be represented as the mass (vector element) of the eigen face, which is stored in 1 D sequence. The probe image is compared to a gallery image by measuring the distance between their vectors. The PCA method requires that a full-face surface be exposed each time, otherwise the image results in poor performance.

Let A be an A-training image of a person with a pixel resolution of M £ N (M rows, columns N). To extract PCA A's features, you will first convert the image into a pixel vector ÁA by consolidating each M line into a single vector. The length (or, size) of vector ÁA will be M £ N. In this project, you will use the PCA algorithm as a size reduction process that converts vector ÁA into vector A in size d. For each training image i, you should calculate and maintain these carriers of factor I. Diagrams1.

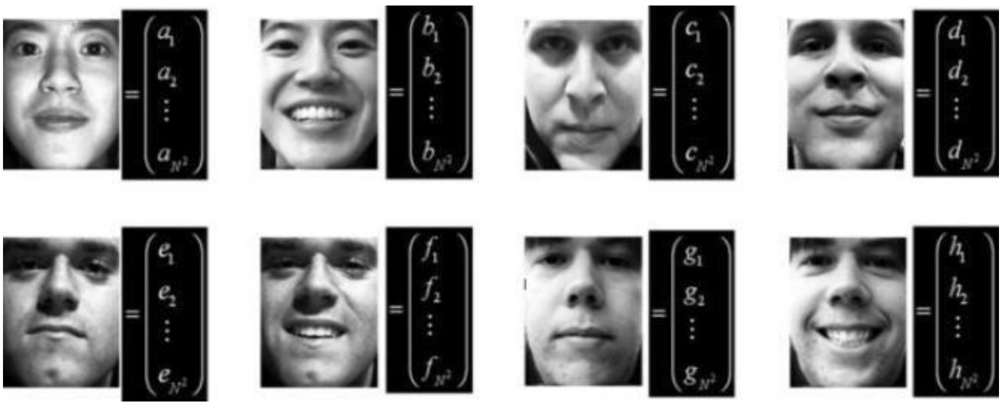

Fig1. Faces with their eigen vectors

The faces and their gene vectors are given a J-image image of a known person. Let J be the identity of this person . As in the training phase, you must calculate the characteristic vector of this person using a PCA and get a J .To see J , you must calculate the similarities between J and all the vector elements in the training set. Similarities between feature vectors can be calculated using the Euclidean range . The most similar identity I would be the product of our facial expressions . If I am J =, it means we have correctly identified the person J, if not me ! = J, It means we have misjudged someone

LDA: Linear Discriminant Analysis

Linear Discriminant Analysis LDA is a method for classifying unknown class samples based on training samples with some known categories. (Figure 2) This approach aims to maximize intermediate (i.e., for all users) diversity and reduce within the category (i.e., within the user) diversity. In Figure where each block represents a class , there are significant differences between classes, but small differences within classes. When faced with large face data, this method deals with the problem of small sample size from where there is a small number of available training samples compared to the dimensionality of the sample space Fig 2. Examples of Six Classes using LDA.

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EBGM: Elastic Bunch Graph Matching Elastic Bunch Graph Matching relies on the assumption that real facial images have many non- linear features that are not considered through the specific analytical methods mentioned earlier, such as lighting variations (external light versus internal fluorescents), posture (vertical versus lectures) and self-expression (a smile explodes on

the face). Gabor wave modification creates the formation of a powerful facial printer connection on an extended grid.

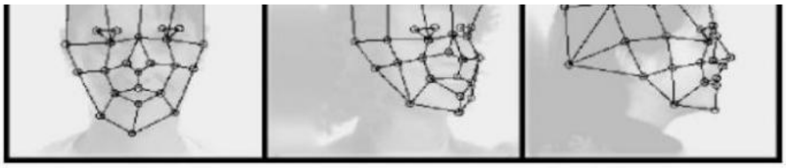

Fig3. Elastic Bunch Graph Matching

The Viola-Jones face detector

Viola-Jones Face DetectorThe basic goal of the Viola-Jones algorithm is to scan a subcutaneous window that can find a face across the input image provided as shown by Ole Helvig Jensen [2]. A common way to process an image would be to resize the image in various sizes and use a fixed size detector with these images. This method turns out to be time consuming due to the calculation of images of different sizes. Contrary to popular belief, Viola- Jones saves the detector instead of the input image and uses the detector several times with the image - each time with a different size. At first one may suspect that both methods are time-consuming, but Viola-Jones has developed an obsolete detector that requires the same amount of arithmetic regardless of size. The detector was built using an image called a combination of simple rectangular objects reminiscent of Haartsvele [2]. We use this algorithm to separate various aspects of Face from Image. We also store these features in a compatible Database.

The scale invariant detector

The first step in the Viola-Jones face recognition algorithm is to convert the input image into an important image. This is done by making each pixel equal to the sum of all the pixels above and to the left of the affected pixel. This is shown in Figure

1	1	1
1	1	1
1	1	1

Input image

1	2	3
2	4	6
3	6	9

Integral image

Fig5. Transform Input image to Integral image

This allows us to calculate the sum of all pixels within any given rectangle using only four values. These numbers are the pixels in the merging image that correspond to the rectangular corners in the input image. The Viola-Jones Face Detector analyzes the provided floor window using features with two or more sides. Each element results in a single number calculated by subtracting the sum of the white (white) rectangles from the value of the black rectangle. Viola -Jones found that with a clinic with a basic solution of 24 * 24 pixels it provides satisfactory results. With the consent of all possible sizes and positions of approximately 160,000 different features can be created. Thus the number of possible features significantly exceeds the 576 pixels contained in the detector in basic resolution. Following pictures Screenshots from our corresponding.

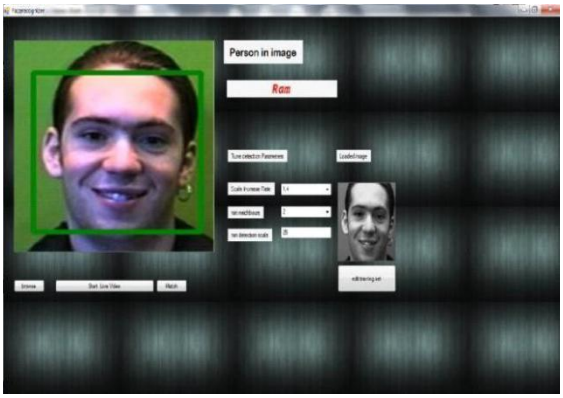

Fig7. Face Identification with Image

Conclusion

This program uses our implementation of face colors, features and distances. Using two degrees of freedom, our system allows for two modes of operation, one resulting in very few false benefits and the other resulting in a few false positives. We have shown it as light and backgrounds where face photography is taken. Our system can be improved in the future with the introduction of a face detection, algorithm that is prone to imperfections, failures and efficiency regardless of skin color. A wide feature set will also prevent the possibility of cheating the system with a change of face.

REFERENCES

[1] Adriana Kovashka Margaret Martonosi - Feature- Based Face

[2] Ole Helvig Jensen "Implementing the Viola-Jones Face Detection Algorithm" 2008.

[3] R. Jafri and H. R. Arabnia, "A Survey of Face Recognition Techniques," Journal of Information Processing Systems, vol. 5, no. 2, pp. 41-68, 2009. DOI: 10.3745/JIPS.2009.5.2.041.

[4] Face Recognition - NSTC Committee on Technology Committee on Homeland and National Security Subcommittee on Biometrics.

[5] Fu Jie Huang, Zhihua Zhou, Hong-Jiang Zhang and Tsuhan Chen, "Pose invariant face recognition," Proceedings Fourth IEEE International Conference on Automatic Face and Gesture Recognition (Cat. No. PR00580), Grenoble, France, 2000, pp. 245-250, doi: 10.1109/AFGR.2000.840642.