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Short Communication

A Comparative Face Recognition Algorithm for Dark Places

Reza Sadeghi*
Department of Electrical and Electronic Engineering, Science and Research Branch, Islamic Azad University, Kurdestan, IRAN

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Abstract

This research paper represents the ideas about face recognition and, what technology is contributing in face recognition and face detection. There are different methods of face detection which are used through technology and different software. This paper will also cover techniques and usage of face recognition applications in different sectors.

Keywords: Face recognition, face detection, face detection algorithm.

Introduction

Face detection is a field of computer vision of detecting a face in a human digital image. This is a specific case of object detection, where it is desired to detect the presence and precise location of one or more faces in an image. This is one of the areas of computer vision among the most studied, with numerous publications, patents, and conferences. Strong research activity in face detection has also led to the emergence of generic methods object detection. Face detection has many direct applications in video surveillance, biometrics, robotics, control of man- machine interface, photography, image indexing and videos, image search by content. It also facilitates full automation of other processes such as; face recognition or facial expression recognition. Face detection is desired to detect the presence and precise location of one or more faces in a digital image[1]. It is a subject that is difficult, especially due to the high variability of appearance of faces in unconstrained conditions. It helps in doing Intrinsic variability of human faces such as; color, size, and shape, presence or absence of specific characteristics such as; hair, mustache, beard, glasses, facial expressions changing the geometry of the face, occultation by other objects or faces other, orientation and pose face in profile, illumination conditions and image quality. Face detection must cope with a high intra-class variability, and most methods for object detection with rigid objects that are not suitable. Research methods and the first significant develop derived mainly from the 1990s. The increasing power of computers allows the use of statistical methods and learning more complex and larger volumes of data, which allows a net performance gain.

Material and Methods

It is particularly important because it differs from previous methods of object detection, previously limited to rigid objects, and therefore with less variability. An important step was taken in 2001 with the publication of the Viola and Jones method, the first method that can detect faces in real-time[2]. The method becomes standard and improved upon by many researchers. It is also from the 2000s, that appearance based methods, learning models face from a set of training images, generally prove superior to other approaches. The modular technology of detection and identification of persons on two-dimensional images, which includes three main modules.

Detection of persons indexing (coding and quick search) of persons in the database and identification (verification) of persons Scheme of technology. Modules are applied sequentially and, allocated to the current image frame persons entering the system of indexation, which in response points from 5 to 10 candidates of the stored database of face images, the most similar to the current image. After this identification procedure processes the images of faces found candidates for their accurate recognition. This approach allows for full featured live video streams for the isolation and identification of persons by the significant amount of image banks in near to real time scale[1]. Device to identify facial features was Face Detect Device and some protection systems such as; large airports and hotels rely on sophisticated protection systems, that use computer systems to recognize the people present and non grata like thieves and hooligans, acknowledge security men immediately and within a short period of arrest. These systems are based databases for pictures of people criminals and thieves, and the computer program compares images captured by surveillance cameras database to identify whether someone is undesirable in place or not[3]. The software configures a set of nodes in the image of the person to be identified based on these nodes to identify facial features then begins the process of creating the image that correspond with the owner of these nodes. Each face has several distinct features, that are in various meandering on the face[3]. Each human face has approximately 80 nodal points, the most famous features of the face, which is measured by the program.

Detection: This step is to capture a digital image by two-dimensional digital camera or even using a video camera.

Reordering values in specs nondecreasing order: (2 1 n x F x F x F≤ · · · ≤ ≤ where, ..., 2 1 n x x x is some permutation of) , ..., , 2 1 n x x x .

The integral is obtained by calculating the Choquet following expression: [ ] { } ( ) ∫ Σ = + - · - = · n i n i i i i x x x x F x F d F 1 1 1 , ...,), (μ μ).

The training of the classifier is to select the optimal set of actions that minimizes diffuse number of incorrectly classified data. Several possibilities for estimating equation measures the diffuse, but almost all strategies are based on soft- computing. In this work, we have followed a strategy based on neural networks to estimate the set of fuzzy measures. One feature of the Fuzzy Integral is, once the training has been done and has a estimating diffuse measures the sorting process is computationally efficient. The classifier based on Fuzzy Comprehensive maps the dataset features to a single input scalar real axis. It al depends on a threshold, this value is classified as a face or no face. In the following section details the proposed scheme, the Experiments conducted to evaluate the scheme and results obtained compared with the detection method Adaboost face.

Alignment: After capturing the image the system will locate the head and the size and direction[4]. The system can three-dimensional do this step even, if the picture was taken of the person image side any makes an angle of 90 degrees with the camera lens, while the systems two-dimensional cannot perform this step only if the person looks directly into the camera or in the direction so that no increase the angle between the face of the person and the camera lens of 35 degrees.

Measurement: The system calculates the curves and switchbacks on the face to an accuracy of parts of a millimeter and converts that information into a model of the face.

Loading Representation: The system in this step has to translate the form and turns it into code. The code for each unique model consists of a set of numbers.

Comparison Matching: In the case that the three-dimensional image and match with three-dimensional images and stored in the system database, the comparison between the images directly, but the challenge facing these systems is that most of the photos stored in databases are extraordinary images (two-dimensional), how vivid image can be compared to a person moves his head in front of the camera and picks up his three-dimensional image with millions of two-dimensional images[5]. This evolved a new technology support using three different points to get to know, and these points are outside of the eye and in the eye and tip of the nose and the these systems make precise measurements on the dimensions between these points of images three-dimensional, and begin to convert them to binary images dimensions through the application of mathematical algorithms complex. After the conversion process of this system starts the comparison work.

Verification or Identification: In Yum recognition step compared and matched with the photo database that sorting system in the previous step, but if the goal is to verify the result of the previous step, the system compares the image with all the pictures in the database and the matching results are displayed in percentages.

Results and Discussion

The significant features are called eigen faces, eigenvectors, or principal components and the set of faces. The projection characteristic facial image of an individual as the sum of the weights of all the different factions and, in the same way to recognize a given facial image and just need to compare these weights with those of previously known individuals. Ignores information which images belong to the same individual. It is very sensitive to changes in lighting conditions in different images of the same person. The LDA method allows information between members of the same class such as; images of the same person to develop a set of feature vectors where variations between the different faces are emphasized while changes due to illumination, facial expression and orientation of the face.

It maximizes variance between classes of samples, and between samples minimizes the same class. FLD technique is equivalent to LDA. The results obtained with FLD are far better than we can get with PCA, especially when lighting conditions vary between the set of training images and test, and also with facial expression changes, giving more weight to areas such as the eyes, nose or cheek to the mouth, they are unchanged areas in different expressions that a person can have[3]. Other methods instead of using facial subspaces follow a classification by neural networks and deformable templates, as EGM[6] (Elastic graph matching).

Techniques: Lately the trend has increased three-dimensional face recognition, where 3D images are used both in training and in the recognition[6]. This technique uses 3D sensors to capture information about the shape of the face. This information is then used to identify characteristic features of the face such as the chin, around the eyes, nose, cheekbones, and retaining spatial information of the texture and depth. An advantage of 3D facial recognition is not affected by changes in lighting, as happens in the case of other techniques. The problem is that it is difficult to obtain reliable 3D images in the recognition phase because the 3D sensors have to be well calibrated and synchronized to acquire the information correctly.

Conclusion

Depending on your application can control a whole society knowing at all times where they are and what they are doing. Given the large number of theories and techniques applicable to face recognition, that are necessary for a clear evaluation and comparison for these algorithms. To be feasible, they have to use large quantities of images for proper evaluation. It is also very important that they are statistically as similar as possible to the images that arise in the application being considered. The score has to be made to reflect the cost of recognition errors. Recall that the results depend heavily on the application we tried, so we cannot extrapolate the results to other applications.

Table-1

Database	Number of people	oses	Lighting	Facial Expressions	Time
AR	116	1	4	4	2
BANKING	208	1	?	1	12
CAS-PEAL	66-1040	1	9-15	6	2
Hyper CMU	54	1	4	1	1-5
CMU PIE	68	3	43	3	1
IR Equinox	91	1	3	3	1
FERET	1199	20	2	2	2
Harvard RL	10	1	77-84	1	1
KFDB	1000	7	16	5	1
MIT	15	3	3	1	1
MPI	200	3	3	1	1
HID ND	300 +	1	3	2	10/13
NIST MID	1573	2	1	?	1
ORL	10	1	?	?	?
UMIST	20	?	1	?	1
U. Texas	284	?	1	?	1
U. Oulu	125	1	16	1	1
XM2VTS	295	?	1	?	4
Yale	15	1	3	6	1
Yale B	10	9	64	1	1

References

1. Lienhart R., Liang L. and Kuranov A., A detector tree of boosted classifiers for real-time object detection and tracking, In IEEE international conference on multimedia & expo **(2003)**

2. Schwerdt K. and Crowley J.L., Robust face tracking using color, Proceedings of the fourth IEEE international conference on automatic face and gesture recognition (90), Washington, DC, USA: IEEE Computer Society **(2000)**

3. Yang J. and Waibel A., A real-time face tracker. Proceedings of the 3rd IEEE workshop on applications of computer vision (142), Washington, DC, USA: IEEE Computer Society **(1996)**

4. Seguier R., A very fast adaptive face detection system, In International conference on visualization, imaging, and image processing **(2004)**

5. Swain M.J. and Ballard D.B., Color indexing, *International Journal of Computer Vision*, **7(1)**, 11–32 **(1991)**

6. Wu B., Ai H., Huang C. and Lao S., Fast rotation invariant multi-view face detection based on real adaboost. In Proceedings of the sixth IEEE international conference on automatic face and gesture recognition, 79–84 **(2004)**

7. Soriano M., Martinkauppi B., Huovinen S. and Laaksonen M., Adaptive skin color modeling using the skin locus for selecting training pixels, *Pattern Recognition*, **36(3),** 681–690 **(2003)**

8. Vezhnevets V., Sazonov V. and Andreeva A., A survey on pixel-based skin color detection techniques, In Proceedings of Graphicon-2003, Moscow, Russia, 85–92 **(2003)**

9. McKenna S.J., Gong S. and Raja Y., Modeling facial color and identity with Gaussian mixtures, *Pattern Recognition*, **31(12)**, 1883–1892 **(1998)**