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Retrieving Non Rigid Configuration for Image Matching

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Abstract
Now a day we are finding vast and fast development in every field. Specifically in computer field where every day you can find new technology and its various applications. These technologies provide us the easy and secure way to live a better life. We provide here the approach to identify human being. As the image recognized by the software gives the freedom and security for daily life. The poor quality image will be smoothen and then used by the software. Accessing image capture at different angles should be used as our need. The image not having the frontal view of face still it will be used to detect the human being and identify him. It gives the liability to tag a parson, identify him/her. It decreases the limitation for the controlled setting image capture.
Keywords— recognition, face angle, security, trained image, feature extraction, face localization and image pattern matching.

I. INTRODUCTION

Biometric-based techniques have emerged as the most promising option for recognizing individuals in recent years since, instead of authenticating people and granting them access to physical and virtual domains based on passwords, PINs, smart cards, plastic cards, tokens, keys and so forth, these methods examine an individual's physiological and/or behavioural characteristics in order to determine and/or ascertain his identity. The face detection techniques is used for gender classification, expression recognition and facial feature recognition and tracking. [1]

Computer technology provides better way to live life. It makes our life easy by doing most things on internet. Give us accurate results by using calculator like things. In same way, it provides us the security by identifying the people. Yes, the face recognition is important in way to secure our life, our confidential work, etc. For example, if have you confidential

data in an cupboard, but you cannot stop the access of various people in same room that time you can use the system which give you an information that who was in that room at what time on which day.

For example, consider if facial feature detection used when a person doesn't follow the traffic signal or rules while driving the vehicle. Another example will encounter as, if any person working under stress then he/she can't give the accurate result as some mistake happens. By monitoring the workers condition while working will improve the output of work [2]

The non rigid recognition system is for identifying a person from a digital image. To do this we need to compare the facial features from an image with the face database. Extracting features means locating the landmarks from the face image like eyes, nose, and mouth. These features are then used to search for other images with matching features. If the person's face is partially visible, the software is less reliable.

Facial recognition capacities include image tagging and other social networking integration purposes as well as personalized marketing. It useful as it identifies the gender, ethnicity and approximate age of passerby to deliver targeted advertising.

II. LITERATURE SURVEY

Here illustrate the method for generic recognition tasks, detecting faces and recognizing people. For faces, the parts are features such as the eyes, nose and mouth, and the spring-like connections allow for variation in the relative locations of these features.

A. Pictorial Structure

The pictorial representation introduced by Fischler and Elschlager, where an object is modeled by a collection of parts arranges in a deformable configuration. [3]

Here the pictorial structure shown by the collection of parts arranged in distort manner. Each part is presented separately and the relation between the parts is shown by the spring like connection. The part encode the local properties and the distort part encodes connection between related parts. The matching of image gives the best solution by calculation the match cost. This cost is depend on the match cost of each part and the cost of distort pair. The calculation this cost using energy function i.e. minimizing the energy function.

But certain problem arises for the models as the result is the single match image where the similar images may be available. Another is the, many parameters are to be consider and energy minimization problem cannot be solved efficiently. These limitations are removed in part based model by the Felzenszwalb and Huttenlocher.

B. Part Based Model

For finding people the author take into account the pair of eyes, nose and mouth. While for estimating the poses contribution are of limbs, torso and head part. This model stores the complete part of human body not just its corner points. The relative parts are joining by the edges to give significant search result.

Author introduce the three fold contribution provide an efficient energy minimization function having acyclic graph. Learn the model using the training examples. The method developed for finding the good hypothesis for the location of parts. [4]

Here the matching cost is calculated as the how much he image matches and how much relative location will be match. This relative location is important as it is not changes to global transformation. It present as the articulate object, with different parts of human boy connected with joints which is flexible. The body structure represents in tree like structure which makes optimal solution in polynomial time. This method finds an optimal solution without any initialization.

C. *Iterative Process*

As in articulated object many positions are possible with different angles. Finding position of a body is hard in case of articulated object. Here the used methodology is iterative parsing, where one sequential learns better and better features tuned to a particular image [6].

In other methods contribution is the return the set of poses from which the appropriate one should be selected manually. But in iterative paring the calculation is the probability of observed pose. So that no needs to select the manual one. For matching the poses different approaches are used like top down approach. In top down approach the set of various parts are match against each other. While in bottom up approach after detecting the body, the part of body will search its place. But in tree structure approach the body parts are match one by one and it allows efficient inference i.e. sum and product inference algorithm.[5] It is used to passing the signal from a node to its parent node and vice versa.

For getting the human body from the image the background must be removed. For removing the background here used the edge based deformable model, in which tree structure conditional random field is used as probabilistic model. Using edge based deformable model the torso will detect in whitish and background will detect in greenish. Now our human body is detected, it is ready to detect its body parts.

For detecting the body parts here used the region based deformation model. For body parts build a region based model for each part. The features of part are extracted and it will give clues for the probable position of part in an image.

In this survey the aim has been to study different methods of face recognition. Every model has some disadvantages which try to remove in another advance model. But still it suffers from problem of local and global features, feature selection, techniques used. We need a method to improving the accuracy, speed and the feature component selection method for face detection and recognition.

III. PROPOSED METHOD

In Fig.1, the Phase I describing about the preprocessing part of the input image. Phase II describe the feature extraction and the normalization of image while in Phase III the actual image matching and reliability coefficient is calculated.

1) PHASE I :

A. Smoothing

For smooth operation we use the Gaussian filter. A Gaussian blur which is also known as Gaussian smoothing is the result of blurring an image by Gaussian function. It is a widely used effect in graphics software, typically to reduce image noise and reduce detail. The visual effect of this blurring technique is a smooth blur resembling that of

viewing the image through a translucent screen, distinctly different from the effect produced by an out of focus lens or the shadow of an object under unusual illumination. Gaussian smoothing is also used as a pre-processing stage in computer vision algorithms in order to enhance image structure.[7]

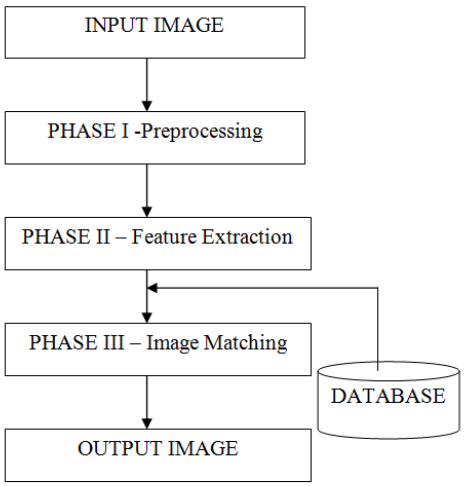

Fig. 1 Face Recognition System

B. Detect Human

Take an image as input. It may access from the target database or capture with a camera. Here will be the input is an image which can be capture through a camera or use any image from a document. Use Global Face Detector for detecting human which may available in input image [8]. Sometimes it happens that in an image May there is background of something which we don't require in our module. We required only face as our region of interest. So, we first ignore each and everything by detecting face. Now we will access only that part of an image which contains only face.

2) Phase II :

A. Extracting Features

Now we have image which is noise free and containing only region of interest i.e. face. For extracting the features from image like nose, mouth, and eye; we are using STASM i.e. extended Active Shape Model [9]. Extracting feature is nothing but a locating the position of features.

We also trained it on sample images from the image sets used. It is further worth noticing that, if one obtains good results with an imprecise location technique, the whole system, which is our challenge, can only get better with a better location module. [10]

B. Calculating the Distortion

We need to calculate the distortion present in the image because to get more quality image. After getting the distortion we have to correct it using correction techniques i.e. normalization. We may have distortion in human pose. Here the input are those landmarks which we got using STASM. Lower the distortion more the quality of image. By normalizing the image we can use matching techniques to it. Pose distortion is inversely proposed to the roll, yaw and pitch.

Roll is approximated as the angle θ between the line passing through the centers of the eyes and the *x* axis

$$\text{roll} = \min\left(\frac{2\theta}{\pi}, 1\right) \text{ - eq 1}$$

Yaw is the left distance dl and right distance dr between the external corner of each eye and the nose tip

$$\text{yaw} = \frac{\max(dl, dr) - \min(dl, dr)}{\max(dl, dr)} \text{ - eq 2}$$

pitch is the distances of concern are eu and ed which are, respectively, the distances to the root of the nose and of the chin from the nose tip

$$\text{pitch} = \frac{\max(eu, ed) - \min(eu, ed)}{\max(eu, ed)} \text{ - eq 3}$$

All the three factors range from 0 (almost no distortion) to 1 (worst situation, corresponding to higher distortion). The SP index is defined as a weighted linear combination of values computed from them as follows:

$$Sp = \alpha \cdot (1 - \text{roll}) + \beta \cdot (1 - \text{yaw}) + \gamma \cdot (1 - \text{pitch}) \text{ - eq 4}$$

with $\alpha + \beta + \gamma = 1$.

We used training data to estimate how much each kind of deviation may contribute to the need for normalization. [11] This is how the pose distortion will be getting calculated.

C. Normalization

Normalize process helps to improve the result of classification. Here we concentration on the right side of a face as for pose normalization. We will stretching the features of right side and make the whole face. As we know sometimes a small part of face can get capture, that time stretching option is

used very well. We are dividing the landmarks in horizontal and vertical bands. The same landmarks will be located at other side of face. This way we will reconstruct the whole face.

3) Phase III

Till now we are done with the improving image quality, then calculating the distortion and at the end normalize the image. All this operation is done on the input image. But now for matching we need the image from the database. Here the first time we are accessing the database. Now we will find the matching image to that of the input image and calculate its reliability measure for getting the correct output.

A. Matching Algorithm

We propose here to perform image matching by a localized version of the spatial correlation index. [10]

For matching the image part we need to process it separately. We have is one as input image and anther as target image which is taken from the database. We need to find its correlation.[13] We find its s (A, B) and S(A,B) as global correlation. We consider here the small window having a part of image. Now part by part we match input image verses the target image. All the images having the matching template will appear in the beginning of the result. We will get the output images but need to find that the output we got here is correct or not. For checking our result we need to calculate the confidence i.e. the reliability measure.

B. Reliability Measure

Here we will calculate the reliability of our output i.e. at what extends it is giving the correct result. We will make decision based on reliability measure that whether the authentication will accept or not and filter out the unreliable outputs. Reliability is computed starting from the relative distance i.e. computed starting from the distance between the scores of the first two retrieved distinct identities. [10]

Reliability measure will be less for those images which are difficult to classify whereas reliability measure will be high for easily classify outputs. We need to compute the similarity. The similarity is computed starting from the relative distance (distance between the score of the first two retrieved distinct identity). Reliability evaluates the reliability of the assignment performed by the classifier. The acceptance threshold which defines the minimum required similarity between probe and retrieved identity, and reliability threshold, which defines the minimum required reliability for both accept (recognize) or reject response. [10]

IV. EXPERIMENT

Now In this section, we represent first the database having different images of person with different angle. The face angle of a person changes in every image. The change in the angle of face is as left oriented; right oriented, upward, downward, smiley face, etc.

Fig. 2 Examples as different angel of same person

The images are collected from the Google website where image databases are freely downloaded. We now have to filter the image first using Gaussian filter. Gaussian filter blurs the image, remove noise from the image. First of all, we have to extract the red, green, blue colour pixel from the image. Calculate the Gaussian pixel value and have the image with more clear vision.

Fig. 3 Output of the original image after Gaussian filter

Now we have an image without noise. In some images the background may contain the building, tree or any object which is useless thing for our software. We need to access those pixels only which have our needed features i.e. eyes, nose and mouth. Now we have to detect the only face features part of input image. Here we use the Principal component analysis to reduce the variability in the image. It detects the facial feature part of human by comparing the similarity between the ground truth image and the target image. The facial features will be located in the rectangular shape box. Only on this rectangular box the future processing will be done.

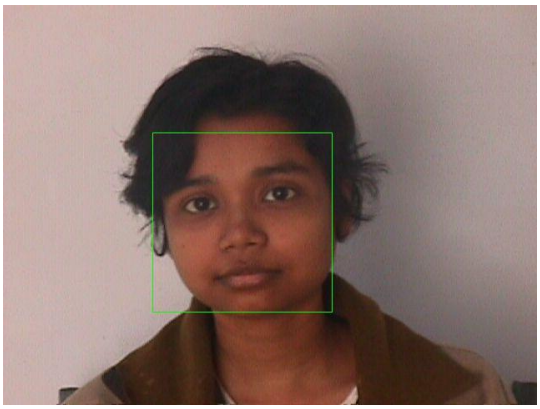

Fig. 4 The output image shows the facial feature area where we need to process further.

Now we have only useful area to be work with. Now we have to process the face recognition process only on the output pixel of the previous stage.

For face recognition, the spatial correlation index is used.[10] The output of it is the all those images which are available in database. It shows the database information of that person also like name, college id , address, email id , etc.

It gives the user the authentication for access on confidential matter, reorganization in case of unknown person i.e. provide security, etc. It gives all information of recognized person and all available information which is retrieved from the database.

V. CONCLUSION

We have proposed here better and shorter way for face recognition. We start with an input image; make it smooth by removing noise from an image. Then detect the face from an image by ignoring the other things from an image. Access the features of face, calculate its distortion and normalized it. Matched the image with a target image from database and calculate its reliability. Finally we will get an output as the recognition person with all its available data from database.

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