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IDENTITY BASED STATE MULTI REFERENCE AND IMAGE RETRIEVAL SYSTEM FOR RECOGNIZATION

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Abstract:

Due to the exponential growth of the social media like facebook, flicker etc. photos of people became one of the highly interested area. Dealing with human faces are more challenging because most of the human faces are similar in the low level appearance. The content based face image retrieval using the low level attributes like posing, expression etc. Thus the retrieval results are unsatisfactory. This problem can be solved by combining low level features with high level features. Two methods named attribute enhanced sparse coding and attribute embedded inverted indexing are proposed to achieve a better retrieval results.

Keywords: Content based face image retrieval; Attribute enhanced sparse coding; Attribute embedded inverted indexing;

1. INTRODUCTION

In imaging processing, the input is an image such as a photograph; the output may be either an image or a set of characteristics or parameters related to the image. Many of the image-processing techniques involve treating the image as a two- dimensional signal and applying standard signal-processing techniques to it. Given a query face image, content-based face image retrieval tries to find similar face images from a large image database. Content based face image retrieval (CBIR) techniques use content of image like shape, color, texture and gradient to represent images. These low level features are inefficient to correctly retrieve a face image because these characteristics have semantic gap between them. The scalable face image retrieval based on attribute enhanced sparse coding provide a new method on content based face image retrieval by incorporating high-level human attributes into face image representation and index structure. The human attributes automatically detected by attribute detectors for improving content-based face image retrieval, two methods named attribute-enhanced sparse coding and attribute-embedded inverted indexing are used. Attribute-enhanced sparse coding exploits the global structure of feature space and uses several important human attributes combined with low- level features to construct semantic code words in the offline stage. On the other hand, attribute-embedded inverted indexing locally considers human attributes of the designated query image in a binary signature and provides efficient retrieval in the online stage. By using these methods retrieval results can improve efficiently compared to content based face image retrieval.

2. IMAGE RETRIVAL

Content-based image retrieval (CBIR) is a technique to automatically index images by extracting their (low-level) visual content, such as color, texture, and shape, and the retrieval of images is based solely

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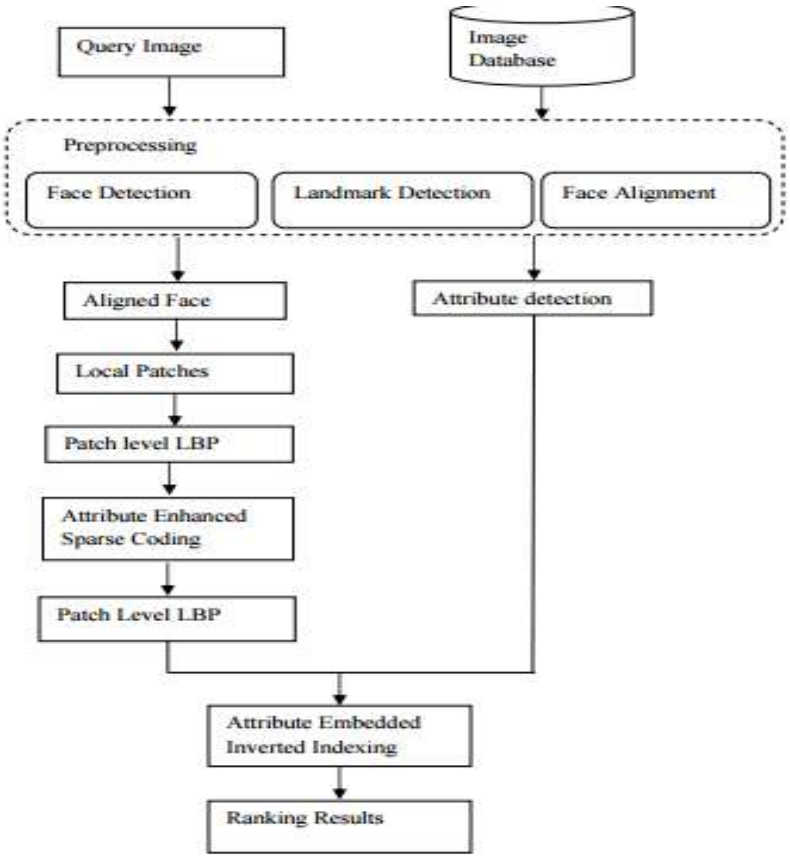

Fig.1.General block diagram

upon the indexed image features. Mainly two kinds of indexing systems are used, to deal with large scale data. Many studies have move with inverted indexing or hash-based indexing combined with bag-of-word model (BoW) and local features like scale- invariant feature transform (SIFT), to achieve efficient similarity search. The bag-of-words model is a well-known and popular feature representation method for image categorization and annotation tasks. The key idea is to quantize high-dimensional local features into one of visual words, and then represent each image by a histogram of the visual words. For this purpose, a clustering algorithm (e.g., K-means), is generally used to generate a codebook (or vocabulary) by converting the visual features to codewords or visual words. However, traditional BoW-like methods not succeed to address issues related to noisily quantize visual features and also problems related to variations in viewpoints, lighting conditions, etc., commonly observed in large-scale image datasets.These methods can achieve high precision on rigid object retrieval, but they suffer from low recall rate due to the semantic gap. In recent times, some researchers have focused on bridging the semantic gap by finding semantic image representations to improve the CBIR performance**.**

3. ATTRIBUTE DETECTION

Human attributes are high-level semantic descriptions about a person (e.g., gender, age, hair style, skin color). The recent work shows automatically detected human attributes have achieved promising results in different applications. The advantages of a describable human attributes are manifold: they are composable; they are generalizable, as from large image collections one can learn a set of attributes and then apply them to recognize new objects or categories without any further training; and attributes

are also efficient. N. Kumar et al. [3] propose a learning framework to automatically detect describable aspects of visual appearance. In their approach, an extensive vocabulary of visual attributes is used to label a large data set of images, which is then used to train classifiers which measures the presence, absence, or degree to which an attribute is expressed in images and then these attribute classifiers can automatically label new images. First large number of images are collected from Internet using various online tools which having vast variations. Then, commercial face detector used to extract faces and fiducial points from downloaded images and stored in the Columbia Face Database. Facial images from Columbia Face Database are submitted to the Amazon Mechanical Turk (MTurk) service, for labelling images with attributes and identity. From these attribute and identity labels and face database, two publicly available face data Sets created, namely FaceTracer and PubFig data sets, respectively which have been publicly released for non- commercial use. A set of labeled positive and negative images for each attribute are requires for training attribute classifiers. For that purpose, all types of low-level features from the whole face are extracted and automatic, iterative selection procedure designed to select best features from a rich set of low-level feature options. The selected features are used to train the attribute or simile classifier. Using automatically detected human attributes with the help of attribute classifiers, they achieve excellent performance on face verification and keyword-based image search.

4. CONTENT BASED FACE IMAGE RETRIVAL

Now a days the rise of photo sharing/social network services (e.g. flickr, picasa, quickr etc.), needs for efficient large-scale content-based face image retrieval rises. Content-based face image retrieval task is closely related to face recognition task. The difference between face recognition and face retrieval is that face recognition requires completely labeled data in the training set, and it uses learning based approach to find classification result while in face retrieval task neither training set nor learning process is needed and it provides a ranking result. Face retrieval task focus on finding suitable feature representations for scalable indexing systems due to its high dimensionality. For now, facial images are more diverse and pose more visual variances (in poses, expressions, lighting effects etc.). Conventional methods for face image retrieval usually use low-level features to represent face images which have lack of semantic meanings and face images generally have high intra-class variance (e.g., expression, posing), so the retrieval results are not good enough. To deal with this problem, Z .Wu et al. [7] proposes to use identity based quantization scheme and multi-reference re-ranking for scalable face image retrieval. Using bag-of-words representation and Face images of two different people might be very close in the traditional low-level feature space, because low-level features are lack of semantic meanings. Existing system only using low-level features and hence, retrieval result was not satisfactory. B. C. Chen et al. [8] provide a new perspective on content-based face image retrieval by combining low- level features with automatically detected high-level human attributes, they find better feature representation.

5. SYSTEM DESCRIPTION

In image processing, only the face portion of an image is needed. Therefore Apply Viola-Jones face detection algorithm [1] to every images in the database to find the locations of faces. Then use method proposed in [2] to find 73 different attribute scores from that cropped image. Next locate 68 facial landmarks by using active shape model [3]. By using these facial landmarks, align every face with the face mean shape. Then the extracted face region is divided into different grids. Totally 175 grids are extracted from five components including two eyes, nose tip, and two mouth corners. On the

aligned image using similar methods proposed in [4]. From these facial grids the patch level LBP features are generated. The patch level LBP features are converted into sparse code words using method named attribute enhanced sparse coding. It describes how the human attributes are automatically detected and how the sparse coding of the attributes are done. To consider human attributes in to the sparse representation, use dictionary selection to force images with different attribute values to contain different code words. In the case of a single human attributes, divide the dictionary into two half, one with positive attribute score and other having negative attribute score. If the detected attribute is wrong, it will force images of a same person to be associated with totally different code words. Therefore associate a soft weight to attribute score. Thus assign Attribute embedded inverted indexing: It use the patch level sparse code words from attribute enhanced sparse coding and compare that code words with features extracted from the database to retrieve the images. When giving the query image, face detector detect the face region. After locating the landmarks, the facial region is divided into square patches. From the square patch generate the sparse code words using attribute enhanced sparse coding. All these code words are concatenated to generate a single pattern of code for image. The database images also will go through all these stages. Attribute embedded inverted indexing will be performed to check the similarity of the sparse code of database images and query image to retrieve the similar images from the database. Coding and classification, these are two phases of in sparse representation based classification. In first phase, the query image is collaboratively coded over a dictionary of atoms with some sparsity constraint, and then in second phase, classification is performed based on the coding coefficients and the learned dictionary. J. Wright et al. [10], propose a general classification algorithm for face recognition based on a sparse representation computed by l1-minimization. Their framework addressing two crucial issues in face recognition namely feature extraction and robustness to occlusion and achieve state-of-the-art performance. Although their sparse representation based classification (SRC) scheme shows interesting face retrieval results, the dictionary used in it may not be effective enough to represent the query images because training samples of all classes directly used as the dictionary to code the query face image and original training images may contain uncertain and noisy information. Coding complexity also increases due to very large number of atoms of such a dictionary. In addition, using the original training samples as the dictionary could not fully exploit the discriminative information hidden in the training samples.

CONCLUSION

Two methods are proposed to utilize the automatically detected human attribute to provide efficient image retrieval. To best of our knowledge this is the first proposal that combining low level features with automatically detected high level human attributes. Attribute enhanced sparse coding for image retrieval propose to use component-based local binary pattern (LBP), a well known feature for face recognition, combined with sparse coding and partial identity information to construct semantic code words for content-based face image retrieval. Sparse coding can exploit the semantics of the data and achieve promising results in many different applications such as image classification and face recognition. Attribute embedded inverted indexing uses the binary signature of the query image and produce a better result.

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