ISSN: 2321-7782 (Online)
Volume 3, Issue 1, January 2015
International Journal of Advance Research in Computer Science and Management Studies
Research Article / Survey Paper / Case Study
Available online at: www.ijarcsms.com

A Review on Scalable Face Image Retrieval based on Attributes Enhanced Sparse Code Words

Jeena Y S[1]
PG Scholar, Department of Computer Science
College of Engineering Perumon
Kerala, India

Surya S R[2]
Assistant Professor, Department of Information Technology
College of Engineering Perumon
Kerala, India

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; Dictionary selection; Local binary patches.

I. 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.

II. FACE RECOGNITION VIA ATTRIBUTE ENHANCED SPARSE CODING

There are number of methods presented for image retrieval system, however every of this method suffered from many limitations. These methods ignore strong, face specific constraints. The proposed method used the high dimensional face attributes such as gender, age etc. These attributes are automatically detected by attribute detectors. In the processing the query image and database images will go through same steps that include face detection, face alignment, attribute detection and LBP feature extraction. The idea is implemented in fig1.

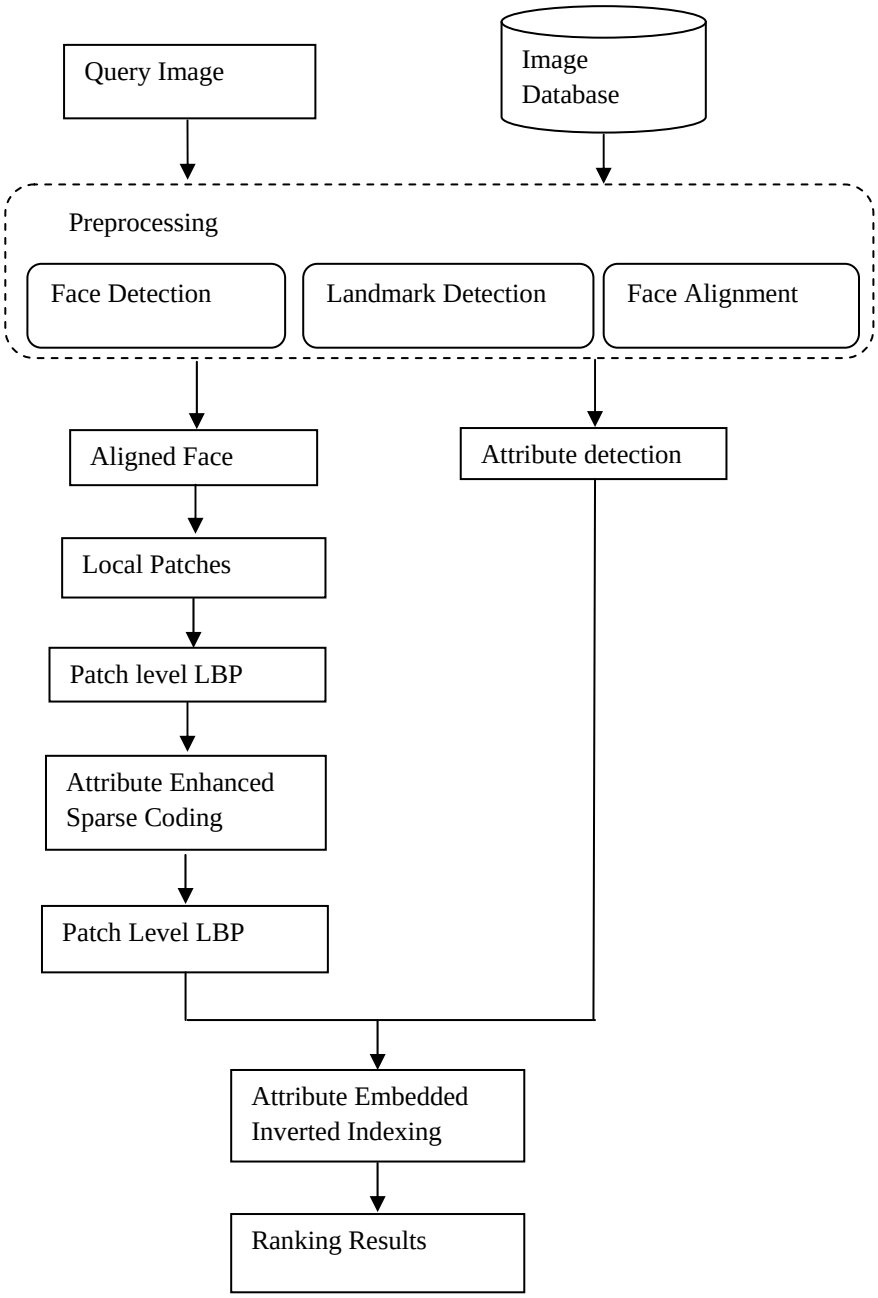

Fig 1: Attribute enhanced Sparse coding based face retrieval

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

first half of dictionary centroid with +1 and other half with -1. After that use the distance between attribute scores of the image and the attribute scores assigned to the dictionary centroids as the weights for selecting code words.

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.

III. 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.

References

1. P. Viola and M. Jones, “Rapid object detection using a boosted cascade of simple features,” IEEE Conference on Computer Vision and Pattern Recognition, 2001.
2. N. Kumar, A. C. Berg, P. N. Belhumeur, and S. K. Nayar, “Describable visual attributes for face verification and image search,” in IEEE Transactions on Pattern Analysis and Machine Intelligence (PAMI), Special Issue on Real-World Face Recognition, Oct 2011.
3. S. Milborrow and F. Nicolls, “Locating facial features with an extended active shape model,” European Conference on Computer Vision, 2008.
4. Z. Wu, Q. Ke, J. Sun, and H.-Y. Shum, “Scalable face image retrieval with identity-based quantization and multi-reference re-ranking,” IEEE Conference on Computer Vision and Pattern Recognition, 2010.

