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ATTRIBUTE ENHANCED SPARSE CODING FOR FACE IMAGE RETRIEVAL

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ABSTRACT: Content based face image retrieval is an emerging technology. It's mainly used for face image verification technique. It's a challenging technique since all the faces will be similar due to its similar geometrical configuration of face structure. In this paper we discuss about two types of face image retrieval technique: Attribute enhanced sparse coding and Attribute embedded sparse coding. In attribute enhanced sparse coding enhancement of attributes is done. Attribute enhanced sparse coding is online technique and while the other is offline method. These techniques can achieve above 43.5% improvement by comparing with existing techniques.

Index Terms – Face image, human attributes, content-based image retrieval, content based image retrieval, attribute enhanced sparse coding ,attribute embedded sparse coding, high level features

1. INTRODUCTION

Photos are used widely in our day to day life. Social media network are used widely in our day to day life. Human faces are used for the social media network .These images are stored in a database where we use content based image retrieval method. Due to same images the retrieval is troublesome .So here we discuss new concept such as retrieving of the images from large database. The new techniques are: Attribute Enhanced Sparse Coding an attribute embedded sparse coding. In the traditional content based image retrieval, low level features are only used. Low level features do not distinguish these images. So in the new technique both low level and high level features are used. Low level attributes consists of pose, expression, style etc .High level attributes consists of gender, race, hair color. By incorporating both high level and low level attributes, the new technique helps to retrieve images from image database.CBIR is also known as QBIR(query based image retrieval). Image retrieval system usually use low level features (e.g., color, texture) to represent face images. We consider the problem of retrieving human faces from using low level features with varying expression and illumination, as well as occlusion and disguise. New theory from sparse signal representation offers the key to addressing this problem. If sparsity on facial features is properly addressed, the choice of features is no longer critical. Various image feature descriptors such as Local Binary Pattern (LBP), Scale Invariant Feature Transform (SIFT) are used to represent images. Index numbers are used to extract images from the database. The applications are in face annotation, criminal database detection.

2. RELATED WORKS

This work is closely related to several different research topics, including content-based image retrieval (CBIR), human attribute detection, and content-based face image retrieval. Traditional CBIR techniques use image content like color, texture and gradient to represent images. To deal with large scale data, mainly two kinds of indexing systems are used[5]. Many studies have leveraged inverted indexing or hash based indexing combined with bag-of-word model (BoW) and local features like SIFT , to achieve efficient similarity search. Although these methods can achieve high precision on rigid object retrieval, they suffer from low recall problem due to the semantic gap. Recently, some researchers have focused on bridging the semantic gap by finding semantic image representations to improve the CBIR performance. [4] propose[7] to use extra textual information to construct semantic code words; uses

class labels for semantic hashing. The idea of this work is similar to the aforementioned methods, but instead of using extra information that might require intensive human annotations (and tagging), we try to exploit automatically detected human attributes to construct semantic code words for the face image retrieval task. Automatically detected human attributes have been shown promising in different applications recently. It proposes a learning framework to automatically find describable visual attributes. Using automatically detected human attributes, they achieve excellent performance on keyword based face image retrieval and face verification. It further extend the framework to deal with multi-attribute queries for keyword-based face image retrieval. Scheirer et al. [8] propose a Bayesian network approach to utilize the human attributes for face identification. To further improve the quality of attributes, Parikh et al. propose to use relative attributes [5] and Scheirer et al. propose multi-attribute space [10] to normalize the confidence scores from different images.

3. PROPOSED SYSTEM

In this paper we can automatically detect the human attributes using two orthogonal methods named attribute-enhanced sparse coding and attribute embedded inverted indexing. 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 codeword 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 incorporating these two methods, we build a large-scale content-based face image retrieval system by taking advantages of both low level (appearance) features and high-level (facial) semantics. By using this method we can improve the image retrieval up to 43.55%. We combine the low level features and high level human attributes to construct the sparse coding. Using the automatically detected human attributes we can achieve excellent performance in keyword based image retrieval. The local binary pattern is used to segment the image into many parts. But it use textual descriptions the segmented image are assigned as 1s and 0s.Finally we can retrieve the list of image from the large scale image database. Viola – Jones face detection method used to fix the landmark on the face. We can obtain the 175 grid points including many facial high level human attributes. The attribute enhanced sparse coding method detects the high level attributes to retrieve the image. Only by including high level attributes we can gain the semantic description of the image. Each detected face is divided into multiple grids and from each grid image patch will be extracted and LBP feature descriptor is used to extract the local features that are local patches. And these local patches will be used to generate the sparse coding. All these steps are performed in attribute enhanced sparse coding algorithm. Attribute embedded inverted indexing will extract the sparse code words form the input image and database image and retrieve the similar faces from the database. Sparse coding is generated in offline stage and inverted indexing is performed in online stage. By incorporating these two algorithms with low level features (appearance) and high level attributes (gender) we can achieve the promising result in extracting similar faces from the large scale database. This will be an efficient procedure for extracting related faces from large scale database.

Attribute Enhanced Sparse Coding: It describes the automatic detection of human attribute from the image and also creates the different sparse coding. These collections of sparse coding represent the original image.

Attribute embedded inverted indexing: It collects the sparse code words from the attribute enhanced sparse coding and check the code words with the online feature database and retrieve the related images similar the query image.

For every image in the database face detector is used to detect the location of face region. 73 possible attributes can be taken. For example hair, color, race, gender etc. Active shape model is used to mark the facial landmarks and by using that land mark alignment of the face is done. For each face component 7*5 grid points are taken. Each grid will be a square patch. These grid components include eyes, nose, mouth corners etc. LBP feature descriptor is used to extract features from those grids. After extracting the features we quantize it to code words known as sparse coding. All these code words are summed and generate a single pattern for the image. These steps are obtained by using attribute enhanced sparse coding.

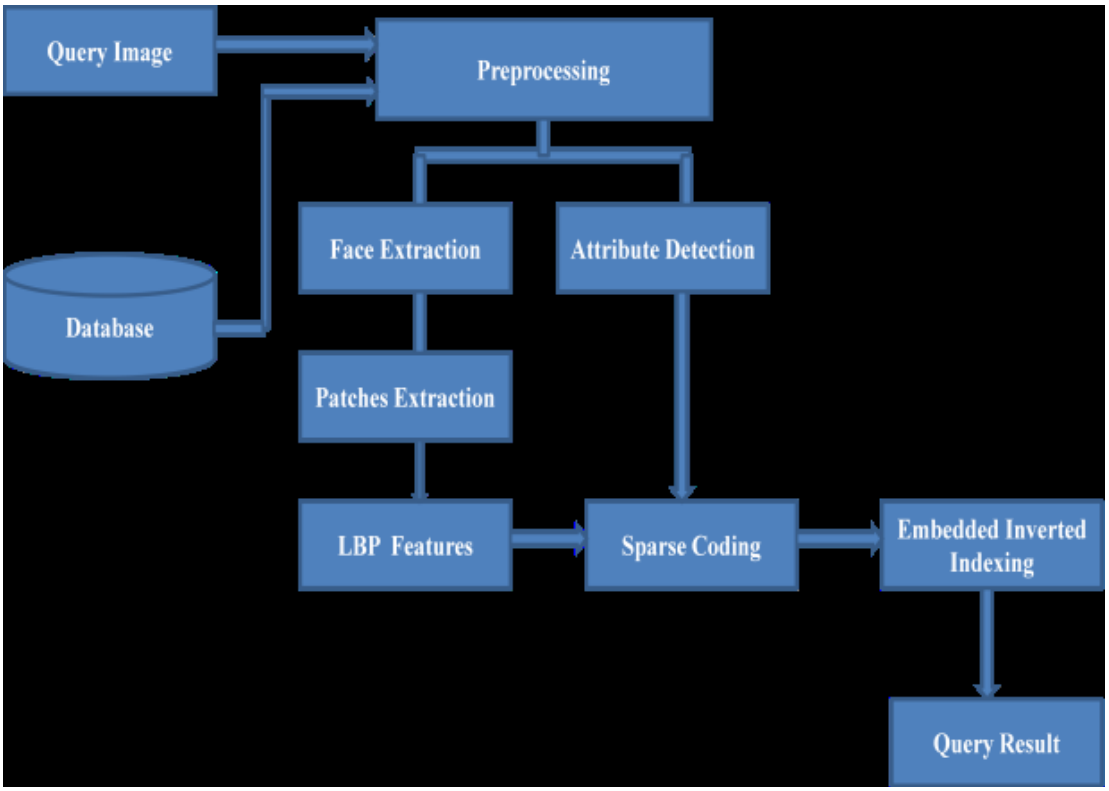

Fig. 1: PROPOSED SYSTEM

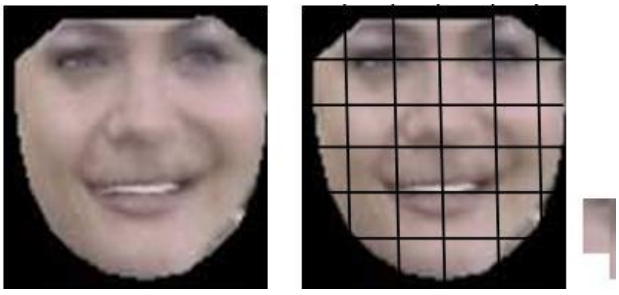

Fig 2: DIVIDING THE FACE INTO DIFFERENT GRIDS

In this diagram the image retrieval of video source. The source is converted into video frames. Then the point tracker assign the pointer to every video frame and then given to the model detector finally get the high level description of image. And then the description stored in the database. Fig 3 shows the neat dataflow diagram of the proposed system. The images are retrieved from the large image database. The images are converted into local patches and the features are turn into sparse coding. The embedded inverted indexing indicates the attribute embedded inverted indexing. It should be performed in the online storage.

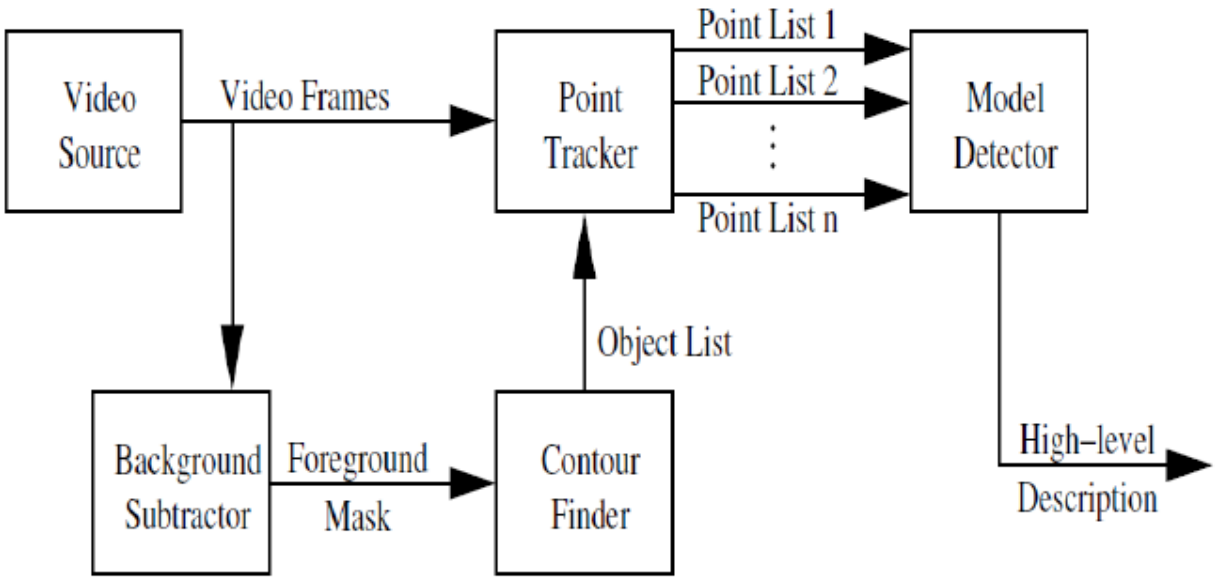

Fig 3: IMAGE OF VIDEO RETRIEVAL

4. CONCLUSION

In our proposed system we can get the high performance on the image retrieval in large scale image database. In the existing system we cannot use the human attributes only use the low level features of the human images. But in the proposed system we use the high level attribute. It increases the effectiveness of the image. Attribute enhanced sparse code words retrieve less number of images due to that we can get only the related images. From that we can obtain the main image from the large image database.

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