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Climbable Face Image Retrieval from Sparse Impute

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***Abstract*—People in the photos are of major interest for users. This exponentially increasing photos, large-scale content-based face image retrieval is an enabling technology for many emerging applications. Here, aim is to utilize automatically detected human attributes that contain semantic cues of the face photos to improve content based face retrieval into efficient large-scale face retrieval by using semantic codeword's. For this, two orthogonal methods are proposed named attribute-enhanced sparse coding and attribute embedded inverted indexing in-order to improve the face retrieval during offline and online stages.**

***Index Terms* – Face image, human attributes, content-based image retrieval.**

I. Introduction

Popularity of digital devices and the network/photo sharing services (e.g. Facebook,Flickr,orkut), is growing enormously with consumer photos been available. From this photos, a big percentage of them are photos with human faces expected to exceed 60 percent with the human faces only. Because of the similar face images of different people leads to problem to retrieve for similar face a really important research problem and enable many real world applications [1], [2]. Our goal in this paper is to address the important problems – large-scale content-based face image retrieval. On considering a query face image, content-based face image retrieval nd similar face images from a large image database. This technology is used in many applications including automatic face annotation [2], crime investigation [3]. In existing system for face image retrieval we use the low- level features to detect human face. By using low-level features we can't detect human face automatically this problem can be solve by using the low level features and high level attributes. In low level features we can't get an exact idea about whether the given image is similar or different face. To overcome this problem we have to use the high level attributes to get promising results.

In the content-based face image retrieval by using high-level human attributes into face image representation and index structure. As shown in Fig. 1, In the low-level feature space face image of different people may be similar. By combining low-level features with high-level human attributes, we nd better feature representations and retrieval results.

Content-based image retrieval (CBIR), also known as query by image content and content-based visual information retrieval. The recent work show the automatic detection for

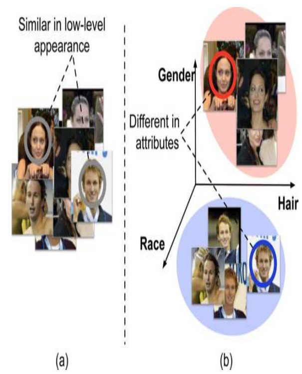

Figure 1. (a) Similarity by using low-level attributes. (b) Feature presentations from high-level attributes.

that it uses the high level human attributes like gender,hair style.by using the high level human attribute the researcher achieved good result in face verification,face identification. For improving content based face image retrieval using automatic detector we propose two methods attribute -enhanced sparse coding and attribute- embedded inverted indexing.the semantic codewords are find in the attribute-enhanced sparse coding in offline stage.the semantic codewords are find from the global structure of feature space and uses several human attribute combined with low level features. attribute-embedded inverted indexing it consider the binary signature for query image in online stage.by combining this two method we build the content based face image retrieval system.

II. Literature Survey

There are many survey related to different research topics, like content-based image retrieval (CBIR), human attribute detection, and content-based face image retrieval. To represent images,traditional CBIR use colour, texture and gradient as image content. To work with large scale data, two type of indexing systems are used. Inverted indexing [14] or hash-based indexing combined with bag-of-word model (Bow) and Scale-Invariant Feature Transform (SIFT) , to get similarity search. These methods can achieve high precision on rigid object retrieval, there is problem because of the semantic gap[18].To improve the CBIR performance some researchers have focused on the semantic gap by retrieving semantic image representations.

To use extra textual information to construct semantic code-words and propose additional textual information to generate semantic codewords for face image retrieval Auto-matically detection of human attributes have been used.

Using automatic detection researchers find excellent results on keyword-based face image retrieval.[9] find the framework with multi-attribute queries for face identification . In propose system for scalable face image retrieval we combine low-level features and automatically detected face attributes.

Photo increases on network services there is need for large scale content -based but the focuses on human attributes for scalable indexing system.

III. DISSERTATION WORK

A. Mathematical Model

The proposed system accesses image as query and gives search results in form of similar images from Stored database. Mathematical model for the system: -The proposed system S is defined as–

S= {I, FD, LBP, SC, II }

Where,

I= {I1,I2.....................In} set of N input images.

LBP= {IF1,IF2.......IFn} LBP features for each local patches.

SC= {SC1,SC2.......SCn} set of attribute enhanced sparse code for face Image.

II= {II1,II2.............IIn} set of attribute embedded inverted Indexing.

FD=Face Detector to find Location of face.

The system design includes main functions which are given below:

1. Function f1 takes image as input and find the face from image by using viola-jones. F1 (I) →FD
2. Function f2 takes the selected face area from the image. F2 (FD)→LBP
3. Function f3 find the local patches for the face and for each patch local binary patterns find. F3 (LP)
4. Function f4 sparse codeword are find for each patch and all the codeword's get combine and form sparse codeword for the image. F4(SC)
5. Function f5 utilize the human attributes by arranging the inverted index structure. Use the f4(SC) and F5(Si , Sj) to retrieve the image in index system.

B. Data Flow Diagram

1) Level 0- Data Flow Diagram

Level 0 DFD for image search is as shown in the figure given bellow. The images in the database are given as the input to the system. And this system is responsible to generate output search result.

2) Level 1 - Data Flow Diagram

Level 1 data flow diagram gives a detailed view of the flow of data in the proposed system, in which all the function,database needed for the system are shown. Feature extraction,LBP features sparse coding,inverted indexing are

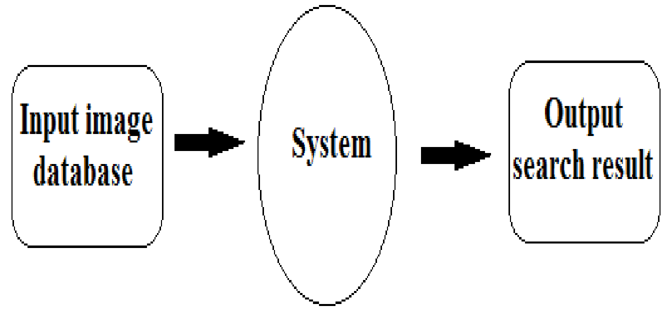

Figure 2. Level O DFD

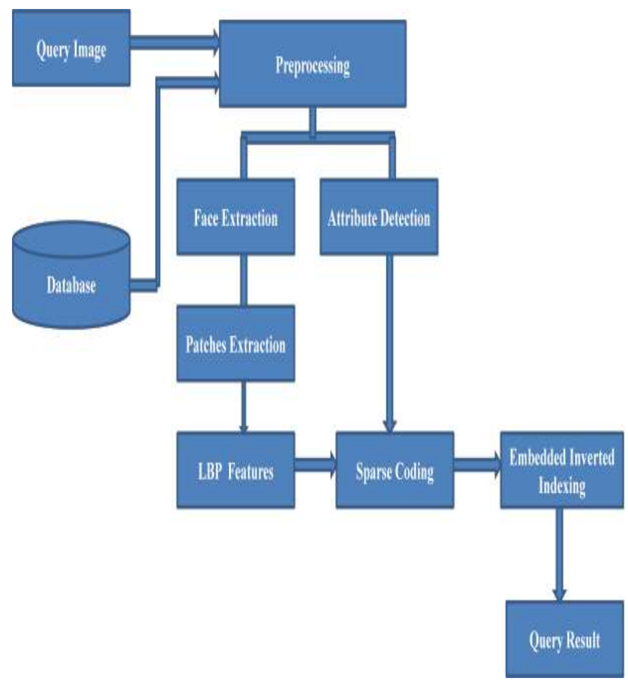

Figure 3. Level 1 DFD

the main functions of the proposed system.

C. Process Block Diagram

The System architecture is as shown below:

In this paper automatically detect the human attributes using two methods called attribute enhanced sparse coding and attribute embedded inverted indexing which contain semantic cues of the face photos to improve content based face retrieval by constructing semantic cues for efficient image retrieval in offline and online stages respectively. Attribute enhanced sparse codeword combines the low level and high level attributes to form sparse codeword's. Whenever

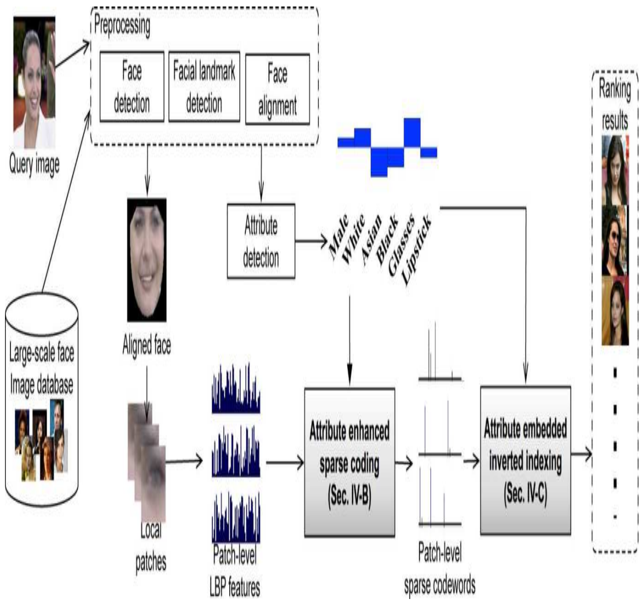

Figure 4. System Architecture

we are giving the query image as input image it get converted into grey scale image after converting grey scale image it automatically detect the face region. It selected into square box .then the face region is divided into multiple grids. From that grid we find the landmark of facial features and from that features we find out local binary patterns by that we generate sparse codeword from attribute enhanced sparse coding. Attribute embedded inveted index compares the sparse codeword from database and retrieve the similar face image.this is efficient procedure for extracting face from large scale database.

The Architecture Explain the processing of sparse coding and inverted indexing. Query image is given as input to system. We apply viola-Jones face detector. After applying algorithm we find the location of faces. Query image go through pre-processing. The pre-processing stage remove the background and identifies the face region. In pre-processing stage noisy data also get removed. We extract face region and divided into grid points, local patches are extracted for each grid by using local binary patterns. In face reorganisation technique mostly we crop face region only. The semantic cues are ignored so in pre-processing stage we can't get correct description about image. In post processing stage face is an centred point we can gain extra information about the face. Pre-processing extract face patterns that are sparse code post processing is extract face attribute such as hair, its colour and size etc.

For each image rst apply Viola-Jones face detector to nd the locations of faces. We then nd 73 different attribute scores. 68 different facial landmarks find by using Active shape model on the image. By Using facial landmarks, we align every face with the face mean shape by applying

Figure 5. Query image with detected face.

barycentric coordinate based mapping process. We extract 75 grids, for each component of detected face where each grid is square patch. For ve components including, nose tip, two eyes and two mouth corners we have 175 grids. We extract an image patch from each grid and find the uniform LBP feature descriptor. After finding the LBP feature as local feature descriptors, Every descriptor is converted into codeword's using attribute-enhanced sparse coding. Attribute-embedded inverted index use that codeword's with binary attribute signature to retrieve image in the index system in online stage.

Attribute-enhanced Sparse coding (ASC) It creates the different sparse coding for each patch and these collections of sparse coding represent the original image. In this method human attribute are detected automatically.

Attribute Embedded Inverted Indexing (AEI) It collects all 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.AEI considers human attribute of designated query image in binary signature. And provides retrieval image in online stage.

IV. RESULTS AND DISCUSSION

A. Dataset

Here we use two different public datasets i.e. (LFW and Pubfig) For the analysis.

B. Result set

Here we apply Viola-jones algorithm for each image in the database which detect the face As shown in the figure query image is selected then landmark detection is performed on the face.After detecting the face, face get croped from query and image patches are found.

Local binary patterns are find for each patch of image .It goes through sparse codeword's and human attributes

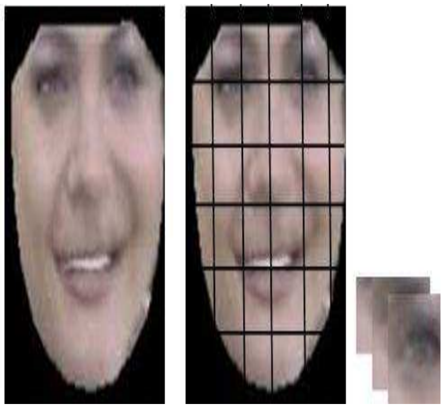

Figure 6. Divide the face into patches.

Figure 7. Retrieval result.

and use these codeword's with binary attribute signature to retrieve face image in the system.

V. CONCLUSION

We here conclude to combine two orthogonal methods to utilize automatically detected human attributes to improve content-based face image retrieval. Here is one of the best proposal of combining low-level features and automatically detected human attributes for content-based face image retrieval. Attribute-enhanced sparse coding uses several human attributes to construct semantic codeword's in the offline stage. Attribute-embedded inverted indexing considers the local attribute signature of the query image retrieval in the online stage with effective results The Results from the Experiment shows that using the codewords creted by proposed coding scheme resulting in reduction of quantization error and achieve Face Retrieval on the two Public datasets. In existing methods treat all attributes as equal. We will search methods to dynamically decide the importance of the attributes and utilize the contextual relationship between two.

REFERENCES

[1] Y.-H. Lei, Y.-Y. Chen, L. Iida, B.-C. Chen, H.-H. Su, and W. H. Hsu,, *"Photo search by face positions and facial attributes on touch devices",in Proc. ACM Multimedia, 2011.*, pp. 503-513, 1990.
[2] U. Park and A. K. Jain, *"Face matching and retrieval using soft biometrics",IEEE Trans. Inf. Forensics Security, vol. 5, no. 3*, pp. 406–415,Sep 2010.
[3] D. Wang, S. C. Hoi, Y. He, and J. Zhu, *"Retrieval-based face annotation by weak label regularized local coordinate coding","," in Proc. ACM Multimedia*, 2011.
[4] Z. Wu, Q. Ke, J. Sun, and H.-Y. Shum, *"Scalable face image retrieval with identity-based quantization and multi-reference re-ranking",n Proc. IEEE Conf. Computer Vision and Pattern Recognit*,2010.
[5] B.-C. Chen, Y.-H. Kuo, Y.-Y. Chen, K.-Y. Chu, and W. Hsu, *"Semi-supervised face image retrieval using sparse coding with identity constraint",in Proc. ACM Multimedia*,2011.
[6] M. Douze, A. Ramisa, and C. Schmid, *"Combining attributes and sher vectors for efcient image retrieval",in Proc. IEEE Conf. Computer Vision and Pattern Recognit*, 2011.
[7] N. Kumar, A. C. Berg, P. N. Belhumeur, and S. K. Nayar, *"Describable visual attributes for face verication and image search",IEEE Trans. Pattern Anal. Mach. Intell., Special Issue on Real-World Face Recognition*, vol. 33, no. 10, pp. 1962–1977, Oct. 2011.
[8] W. Scheirer, N. Kumar, K. Ricanek,T. E. Boult, and P. N. Belhumeur, *"Fusing with context: A Bayesian approach to combining descriptive attributes",in Proc. Int. Joint Conf. Biometrics*, 2011.
[9] B. Siddiquie, R. S. Feris, and L. S. Davis, *"Image ranking and retrieval based on multi-attribute queries",in Proc. IEEE Conf. Computer Vision and Pattern Recognit*, 2011.
[10] W. Scheirer, N. Kumar, P. Belhumeur, and T. Boult, *"Multi-attribute spaces: Calibration for attribute fusion and similarity search",in Proc. IEEE Conf. Computer Vision and Pattern Recognit*, 2012.
[11] 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.
[12] T. Ahonen, A. Hadid, and M. Pietikainen, *"Face recognition with local binary patterns",in Proc. Eur. Conf. Computer Vision*, 2004.
[13] J. Zobel and A. Moffat, *"Inverted les for text search engines",ACM Comput. Surveys*, 2006.
[14] A. Gionis, P. Indyk, and R. Motwani, *"Similarity search in high dimensions via hashing",in Proc. VLDB*, 1999.
[15] J. Sivic and A. Zisserman, *"Video Google: A text retrieval approach to object matching in videos",in Proc. Int. Conf. Computer Vision*, 2003.
[16] D. Lowe, *"Distinctive image features from scale-invariant keypoints,"* Int. J. Comput. Vision.
[17] O.Chum,J.Philbin,J.Sivic,M.Isard,andA.Zisserman,*"Totalrecall: Automatic query expansion with a generative feature model for object retrieval," in Proc. IEEE Int. Conf. Computer Vision*, 2007.
[18] L. Wu, S. C. H. Hoi, and N. Yu, *"Semantics-preserving bag-of-words models and applications," IEEE Trans. Image Process.*, vol. 19, no. 7, pp. 1908–1920, Jul. 2010.
[19] Y.-H. Kuo, H.-T. Lin, W.-H. Cheng, Y.-H. Yang, and W. H. Hsu, *"Unsupervised auxiliary visual "Unsupervised auxiliary visual words discovery for large-scale image object retrieval," in Proc. IEEE Conf. Computer Vision and PatternRecognit.*, 2011.

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