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Retrieval Based Face Annotation By WLRLCC With Supervised Learning

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Abstract—Retrieval based face annotation is a gifted model in mining huge web facial images for automated face annotation. A new method for naming the faces of images is proposed. Weak labels of images are used for this purpose. The WLRLCC (Weak Labels using Rise Local Coordinate Coding) method is used for annotating the facial images. Initially extract the features from all the images of the image database and then from the face to be annotated. Then calculate the Euclidian distance for the b suitable name. The extracted features are known as the RISE descriptor. The first challenge is how to competently retrieve a short list of most equivalent facial images from facial image databases, and the second challenge is how to efficiently achieve annotation by exploiting these similar facial images and their weak labels which are repeatedly noisy and unfinished.

Keywords— weak labels, face annotation, content based image retrieval

I. INTRODUCTION

In the digital time today, people can simply capture a photo by all means of digital devices, and distribute it through the internet by a variety of online tools, such as web photo sharing portals (e.g. Flickr) or social networks (e.g. Facebook). Typically, face annotation is formulated as an extensive face recognition problem, in which face classification models are accomplished from a collection of well-controlled labeled facial images using supervised machine learning methods. Recent studies have attempted to explore a capable retrieval based annotation model for facial image annotation by mining the world wide web (WWW), where a mass number of weakly labeled facial images are liberally available. Instead of training explicit classification models by the usual model-based face annotation approaches, the retrieval-based face annotation (RBFA) pattern aims to deal with the automated face annotation task by exploiting content-based image retrieval (CBIR) methods in mining huge weakly labeled facial images on the web.

In broad, there are two main challenges faced by the promising retrieval-based face annotation (RBFA) technique. The first challenge is how to efficiently get back a short list of most analogous facial images from a big facial image database, which typically relies on a successful content-based facial image retrieval solution. The second challenge is how to effectively exploit the short list of candidate facial images and their weak label information for the face name annotation job, which is vital because the associated labels of web facial images are often noisy and incomplete due to the nature of web images.

In this project, we explore the retrieval-based face annotation scheme by mainly addressing the second challenge. In particular, we propose a novel Weak Label Rise Local Coordinate Coding (WLRLCC) technique to tackle the retrieval-based face annotation problem, which attempts to boost the annotation performance by a unified feature extraction scheme, which exploits the local coordinate coding in achieving more effective features. In particular, given a query facial image for annotation, we firstly search for a short list of top-n most similar facial images from a weakly labeled web facial image database. After that, we apply the proposed RISE algorithm to obtain a more discriminative local coordinate coding representation.

II. RELATED WORKS

This work is mainly related to several kinds of research work. The first group is face recognition and verification and which is mainly related to the classic research problems in image processing and pattern recognition. Though traditional face recognition models are extended for automatic face annotation [1]. For instance, they mainly require high quality facial image databases collected from well-maintained surroundings.

The second group is mainly related to generic image annotation [2], [3]. These common methods mainly apply to existing object recognition methods to train classification models. Nowadays the retrieval based image annotation paradigm by mining web images has gained more and more attention. [4], [5]. A less number of studies in this area have tried to build up efficient content-based indexing and search techniques to assist annotation/recognition tasks.

The third set is face annotation on the collections of personal/family unit photos. Many studies have mainly paying attention on the annotation work on collections of personal/family images [6], [7], which may sometimes contain information like personal/family names, social context, time stamps etc. Apart from this, the number of people/classes is typically quite small, making such annotation task less challenging.

The fourth group is mainly deals with face annotation by mining weakly labeled facial images available in the web. Only a less number of researches consider a human name as an input query.

Model

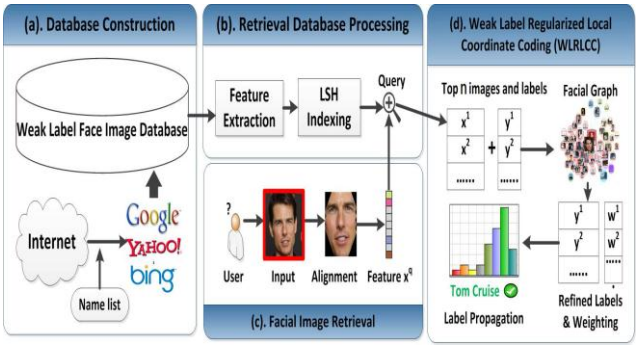

Fig 1: Existing model

The first stage, as shown in Figure 1, is to gather a database of weakly labeled facial images, which can be obtained from WWW. In particular, we can select a list of desired human names and submit them to existing web search engines (e.g., Google) for swarming their related web facial images. As the output of this crawling process, we obtain a group of web facial images; each of them is related with some human names. Given the nature of web images, these facial images are typically noisy; this may be wrong or incomplete. We thus submit to such web facial images with noisy names as weakly labeled facial images. The second stage, as shown in Figure 1, is to pre-process the weakly label facial image database, with face detection, face alignment, facial feature representation, and high dimension feature indexing. For facial feature representation, we take out the GIST features to represent the extracted facial regions. Finally, we apply the Locality-Sensitive Hashing (LSH) to index the GIST features in our solution. As shown in Figure 1, given a query facial image, we perform a similar face retrieval procedure to locate a short list of most related faces (e.g., top-n similar faces) from the indexed face databases using the LSH technique.

After obtaining the top-n most analogous faces, the last stage is to apply the proposed Weak Label Regularized Local Coordinate Coding (WLRLCC) algorithm for name annotation, as shown in

Figure 1. In particular, the proposed WLRLCC algorithm learns local coordinate coding for each of the analogous facial images and enhances the weak label matrix via an iterative optimization process. Based on the learning results, a sparse reconstruction algorithm is applied to do the final face name annotation.

III. PROPOSED WORK

The proposed scheme works the following way:

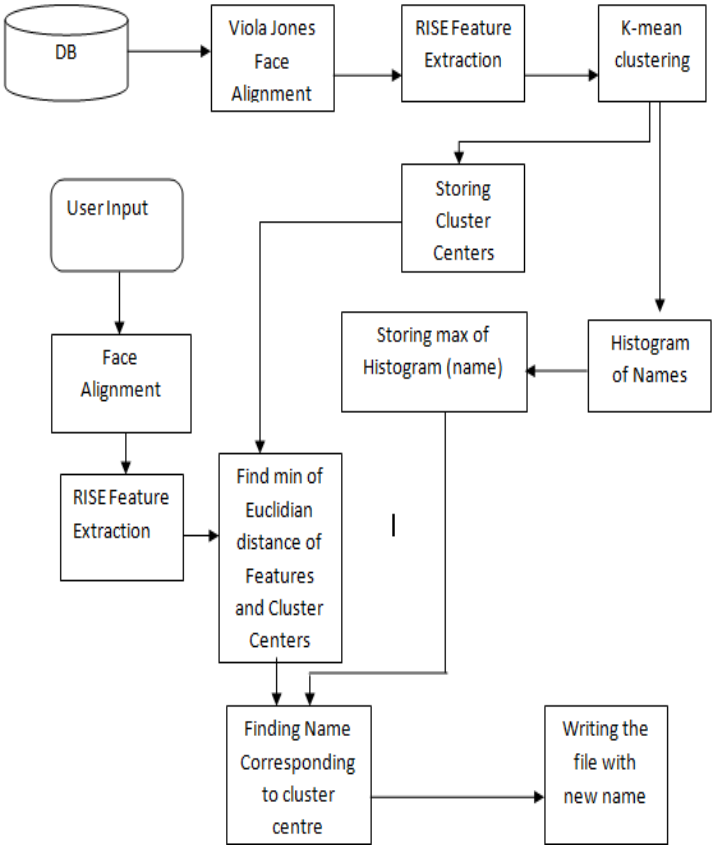

Fig 2 : Proposed architecture

Initially we create a large facial database consisting of facial images of different people. The image size can be of any number. After that we use Viola Jones automatic face detector for aligning the face of the image which means we are cropping the image. The RISE method is used for feature extraction of these images. Then by using k-mean clustering the images are clustered based on the similarity. We store the cluster centres for the further use. The histogram equivalent of the name of images is also taken. The maximum of histogram equivalent name is also stored and that name is given to the clusters.

The user gives an input image for annotation. The image is aligned using Viola Jones face detector for extracting the features, the RISE algorithm is used. Then by calculating the minimum of Euclidian distances between the features extracted and the cluster centres we got the correct name. With the help of this name and the maximum of histogram equivalent we annotate the image with the right name.

ALGORITHM

Data: Preprocessed RGB-D image, *Irgb*, denotes the color image and *Id* denotes the depth map

Result: The RISE descriptor for the given RGB-D image *F*

for *i* ← 1 ***to*** 2 **do**

Ei = Entropy map of patch *Pi* of *grayscale(Irgb)*;

end

for *i* ← 3 ***to*** 4 **do**

Ei = Entropy map of patch *Pi* of *Id* ;

end

S = Saliency map of *Irgb*;

*E*5 = Entropy map of *S*;

for *i* ← 1 ***to*** 5 **do**

Fi = HOG of *Ei* ;

F = Concatenation of *Hi* ;

End

IV. RESULTS

The results of the system are given below. Initially we process the database and then the image to be annotated is given as the input.

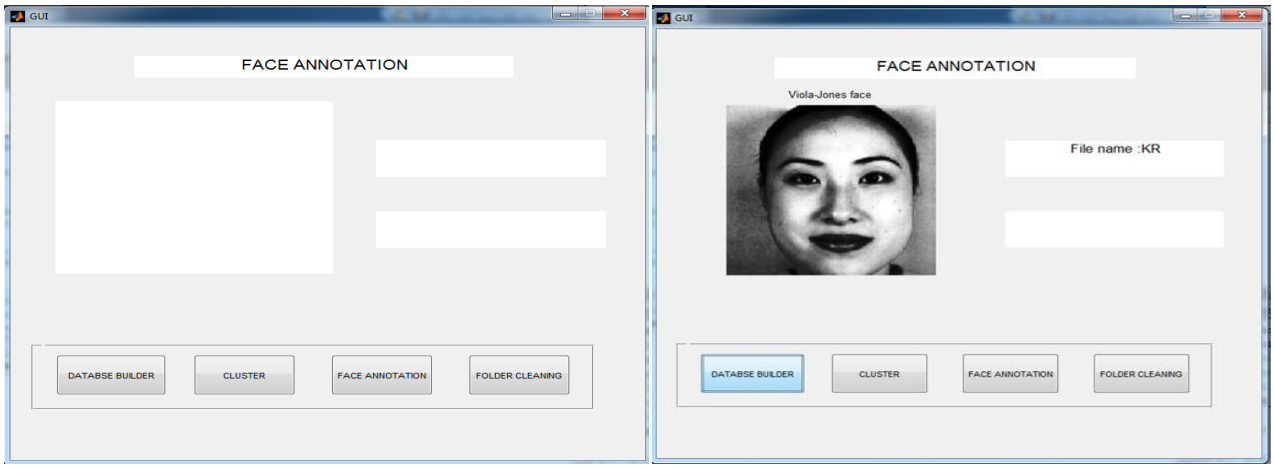

Fig.3 .Database Processing

Then the input image is given for annotation. The features are extracted using the RISE method and the distance is calculated. The shortest distance with the cluster name is given to the image.

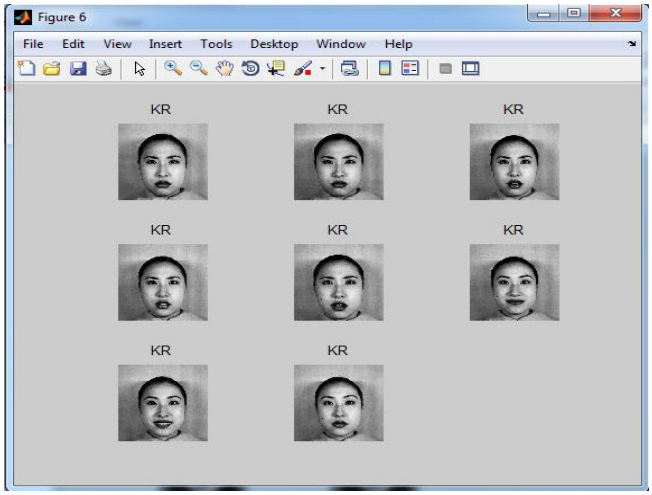

Fig.4.Clusters

Fig. 5. Input image

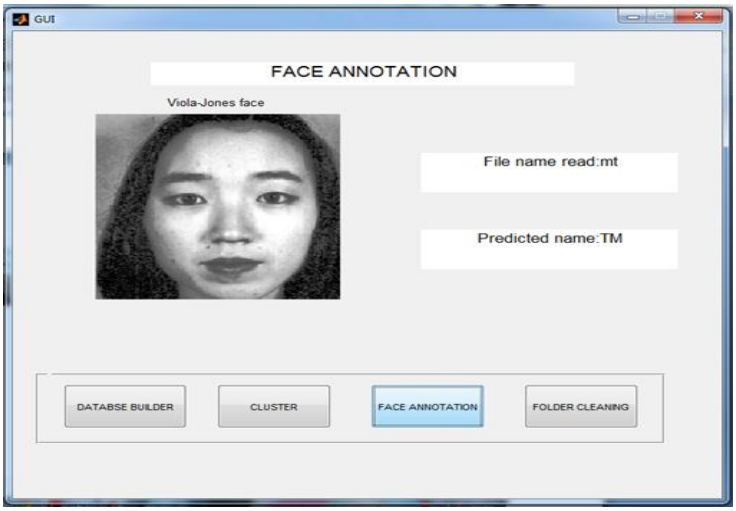

Fig. 6. Annoted image

V. CONCLUSION

This project investigates the retrieval-based face annotation problem and presented a promising framework to attack this challenge by mining massive weakly labeled facial images freely available on WWW. To improve the annotation performance, a novel Weak Label using Rise Local Coordinate Coding (WLRLCC) algorithm is proposed, which effectively exploits the principles of both local coordinate coding and entropy and saliency. We conducted extensive experiments and found that the proposed WLRLCC algorithm achieved encouraging results on a large-scale web facial image test bed. The proposed retrieval-based face annotation scheme can be applied to many real-world applications. For example, it can be used to examine if a user uploads a celebrity's photo as his/her own avatar in a real-name social network. It can also be used for personal photo management in photo sharing web sites, where millions of unlabeled images are uploaded every day.

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