Available Online at www.ijcsmc.com

International Journal of Computer Science and Mobile Computing

A Monthly Journal of Computer Science and Information Technology

ISSN 2320–088X

IJCSMC, Vol. 4, Issue. 2, February 2015, pg.33 – 37

SURVEY ARTICLE

A Survey on Face Matching and Retrieval of Images

Christina Joy[1], Roshlin Anie Abraham[2], Raji S[3]

[1]Student, Department of CSE & MBC College, Kerala, India

[2]Student, Department of CSE & MBC College, Kerala, India

[3]Assistant Professor, Department of CSE & MBC College, Kerala, India

[1] christinajoy31@gmail.com; [2] roshlinann@gmail.com; [3] poornimaraji@gmail.com

Abstract— The increasing popularity of social networks raises critical issues regarding privacy and protection of personal information. Many applications including face verification use face image retrieval method. It's a challenging technique since all the faces will be similar due to its similar geometrical configuration of face structure. This paper introduce an android application named Secure Me which take the combinations of high level attribute and low level features in face image retrieval that will provide accurate result in extraction of similar face. It provides secure data storage facilities by using authentication techniques.

Keywords— Face verification, Face image retrieval, High level attributes, Low level features, Secure Me

I. INTRODUCTION

Most of us have are to sharing personal photos on the social services (or media) such as Flickr and Facebook. Due to the popularity of digital devices and the rise of social network/photo sharing services, there are largely growing consumer photos available in our life. Among all those photos, a big percentage of them are photos with human faces (estimated more than 60%). The importance and the sheer amount of human face photos make manipulations (e.g., search and mining) of large-scale human face images a really important research problem and enable many real world applications [1], [4]. Secure Me is an application designed to work on the android based devices, which will give the user the power of creating an account in any websites without typing any details of his or her.

In this paper, introduction section is followed by Secure Me in section II. Section III discusses the existing systems. Related works is explained in section IV which is continued by conclusion in section V.

II. SECURE ME

Secure Me is an android application, which provide more security for storing data as well as the access of various site and auto fill. Here we will done three type authentications, that make the application more secure and give privacy. More advanced security methods are used in this android application. Face retrieval is the most modern technique which will help us to keep more privacy. It's a challenging method, because all the face will be similar due to some low level appearances. By avoiding this, Secure Me take the Combinations of high

level attribute and low level features in face image retrieval will provide accurate result in extraction of similar face. Secure Me is an application designed to work on the android based devices, which will give the user the power of creating an account in any websites without typing any details of his or her. The user will be able to manage their accounts with the details he provided.

Our goal in this paper is to address one of the important and challenging problems – large-scale content-based face image retrieval. Given a query face image, content-based face image retrieval tries to find similar face images from a large image database. It is an enabling technology for many applications including automatic face annotation, crime investigation, etc. In this work, we provide a new perspective on content-based face image retrieval by incorporating high-level human attributes into face image representation and index structure. Face images of different people might be very close in the low-level feature space. By combining low-level features with high-level human attributes, we are able to find better feature representations and achieve better retrieval results. We combine automatically detected high-level human attributes and low-level features to construct semantic code words. To the best of our knowledge, this is the first proposal of such combination for content-based face image retrieval. To balance global representations in image collections, we propose two orthogonal methods to utilize automatically detected human attributes to improve content-based face image retrieval under a scalable framework. Figure 1 shows how Secure Me works.

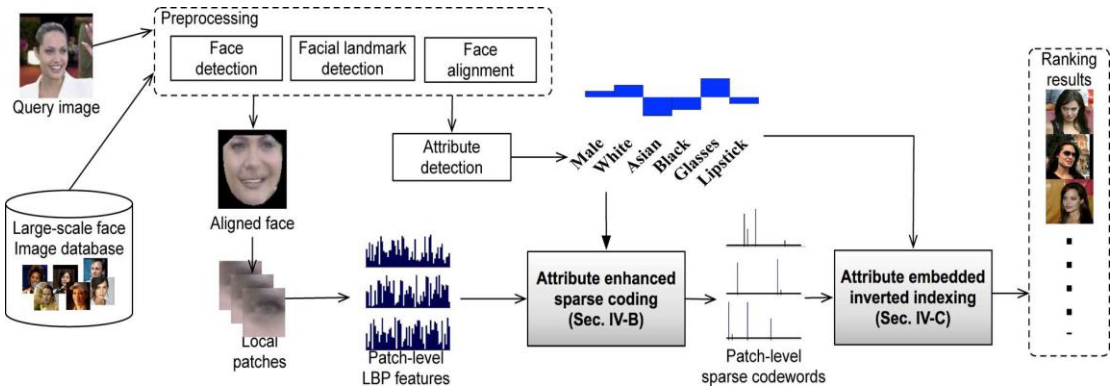

Fig. 1 Working of Secure Me

III. EXISTING SYSTEM

In existing system, face recognition was implemented using Feature Extraction [2]. Here, no secure way to auto fill user data, store user data such as passport details, licence details etc. Existing user has to re-enter his/her details every time for registration or for login. This system doesn't uses modern mobile technology so it is not user friendly because no face detection technology is provided for user [8].

IV. RELATED WORKS

Alexis Mignon et.al, 2013 [1] describes the reconstructing faces from their signatures. Face matching technologies have become powerful enough to discover the links between people through faces and, thus, are able to aggregate the information scattered at different places. Such databases use and store face signatures as keys for organizing the data. One important question related to privacy is to know if the information encoded by such templates might be reverse engineered, revealing the identities of the persons in case the database is stolen. This is also a topic of interest for biometric applications where the way templates are encoded is critical. Indeed, stolen templates should not allow reconstruction of images that can be used to break in a system. In this context, the objective of this paper is twofold i.e., to propose a simple but efficient method for reconstructing face images from face templates with unknown identities and to show these reconstructed images allow the recognition of people and can fool modern face algorithms. In proposed approach, each time a new method for representing faces is there to evaluate how anonymity is preserved by the encoding.

This mapping minimizes the reconstruction error of the eigenface representations of the training images. The mapping can then be used directly to reconstruct faces from their signatures. In addition of showing reconstructed images and comparing them with the original ones, the proposed approach is experimentally validated on the two aforementioned datasets, i.e., LFW and FERET. For these two datasets reproduced the standards protocols of evaluation defined by the datasets, with the difference that instead of using original images, they used reconstructed images. Author's shows that the drop in performance is rather low, allowing us

to conclude that the signatures do contain enough information to reconstruct face images that can fool – with a good chance - an automatic face recognition system. This approach allows learning efficiently non-linear relationships between faces and templates and does not need to build an intermediate euclidean space since, it models directly the transformation from templates to images in the eigenspace, leading to a much more efficient reconstruction framework.

R. Sureshkumar et.al, 2013 [6] proposed generates attribute-enhanced sparse code words to retrieve image from large image database. Main goal of system is to retrieve the image from large scale content based image retrieval. They give an image as input to retrieve the image to find the similar image. It shows that image retrieved from the large scale database. A single image given as input to that system and then extract the features from the image. Match the features with the features database and display the retrieved images. Human attributes are high level semantic description about the person. 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 code word 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, they 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 they can improve the image retrieval up to 43.55% combine the low level features and high level human attributes to construct the sparse coding. Using the automatically detected human attributes authors 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 they 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. They 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.

Dayong Wang et.al, 2011 [4] explained retrieval-based face annotation by weak label regularized local coordinate coding**.** This paper investigate the retrieval-based face annotation scheme by proposing a novel Weak Label Regularized Local Coordinate Coding (WLRLCC) technique to tackle the retrieval-based face annotation problem, which attempts to boost the annotation performance by a unified learning scheme, which exploits the local coordinate coding in achieving more effective features and makes use of the graph-based regularization to enhance the weak label simultaneously. They firstly search for a short list of top-n most similar facial images from a weakly labelled web facial image database. After that, they apply the proposed WLRLCC algorithm to obtain a more discriminative local coordinate coding representation and an enhanced label matrix as well. Finally, apply an effective sparse reconstruction scheme for the final facial name annotation. In this section, authors briefly introduce the proposed Retrieval-based Face Annotation (RBFA) paradigm. Among vast digital images and photos shared on the internet, a considerable amount of them are related to human facial images because they are closely related to social activities of human beings. The rapid growth of facial images has created many research problems and opportunities for a variety of real-world applications. An important technique in this area is automated face annotation, which aims to tag human names to a novel unlabelled facial image automatically. Auto face annotation is beneficial to a number of real-world applications. For example, using auto face annotation techniques, online photo sharing sites or social networks can automatically annotate users' uploaded photos to facilitate online photo search and management tasks.

Kalaivani.J et.al, 2014 [5] proposed scalable face restitution via attribute enhanced sparse code words. To balance global representations in image collections and locally embedded facial characteristics, they propose two orthogonal methods to utilize automatically detected human attributes to improve content Based face image retrieval under a scalable framework. Two orthogonal methods are attribute enhanced sparse coding and attribute embedded inverted indexing which can effectively retrieve index with more than one million face photos can be done in less than one second. Reduce memory usage by many compression techniques in information retrieval, reduce the quantization error and achieve salient gains in face retrieval, improve content based face retrieval by constructing semantic code words for efficient large scale face retrieval. In 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. In 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. Automatically detected high-level human attributes and low-level features are combined in the proposed work to construct semantic code words. To the best of our knowledge, this is the first application proposal of such combination for content-based face image retrieval. In

this application Viola-Jones face detector method is applied to find the locations of faces in the image present in the every database.

Timo Ahonen et.al, 2010 [7] studied face recognition with local binary patterns**.** In this work, they introduced a new approach for face recognition which considers both shape and texture information to represent the face images. As opposed to the EBGM approach, a straightforward extraction of the face feature vector (histogram) is adopted in their algorithm. The face image is first divided into small regions from which the Local Binary Pattern (LBP) features are extracted and concatenated into a single feature histogram efficiently representing the face image. The textures of the facial regions are locally encoded by the LBP patterns while the whole shape of the face is recovered by the construction of the face feature histogram. The idea behind using the LBP features is that the face images can be seen as composition of micro-patterns which are invariant with respect to monotonic grey scale transformations. Combining these micro-patterns, a global description of the face image is obtained. Face images can be seen as a composition of micro-patterns which can be well described by LBP. We exploited this observation and proposed a simple and efficient representation for face recognition. In their approach, a face image is first divided into several blocks (facial regions) from which we extract local binary patterns and construct a global feature histogram that represents both the statistics of the facial micro-patterns and their spatial locations. Then, face recognition is performed using a nearest neighbour classifier in the computed feature space with $\chi 2$ as a dissimilarity measure. The proposed face representation can be easily extracted in a single scan through the image, without any complex analysis as in the EBGM algorithm. Face images can be seen as a composition of micro-patterns which can be well described by LBP. They exploited this observation and proposed a simple and efficient representation for face recognition. In their approach, a face image is first divided into several blocks (facial regions) from which authors extract local binary patterns and construct a global feature histogram that represents both the statistics of the facial micro-patterns and their spatial locations.

Yin-His kuo et.al, 2012 [9] addressed unsupervised semantic feature discovery for image object retrieval and tag refinement. The primary contribution of the paper includes: Observing the problems in image object retrieval by conventional BOW model. Proposing semantic feature discovery through visual and textual clusters in an unsupervised and scalable fashion, and deriving semantically related visual and textual features in large-scale social media. Investigating different optimization methods for efficiency band accuracy in semantic feature discovery. Conducting experiments on consumer photos and showing great improvement of retrieval accuracy for image object retrieval and tag refinement. In particular, they augment each image in the image collections with semantic features—additional features that are semantically relevant to the search targets. Aiming at large-scale image collections for serving different queries, author's mine the semantic features in an unsupervised manner by incorporating both visual and (noisy) textual information. They construct graphs of images by visual and textual information respectively.

V. CONCLUSIONS

From survey, we concluded that, Face retrieval is the most modern technique which will help us to keep more privacy. It's a challenging method, because all the face will be similar due to some low level appearances. For avoiding this issue, we suggest an android based application, Secure Me, that take the combinations of high level attribute and low level features in face image retrieval will provide accurate result in extraction of similar face. During the survey, we also studied certain informative attributes for face retrieval across different datasets and these attributes are also promising for other applications. Current methods treat all attributes as equal. In future, we will investigate methods to dynamically decide the importance of the attributes and further exploit the contextual relationships between them.

REFERENCES

[1] Alexis Mignon, Frederic Jurie, "Reconstructing Faces from their Signatures using RBF Regression", GREYC – CNRS UMR 6072, University of Caen Basse-Normandie, Caen, France, 2013.

[2] Bor Chun Chen, Yan Ying Chen, Yin Hsi Kuo, and Winston H. Hsu ,"Scalable Face Image Retrieval Using Attribute-Enhanced Sparse Code words" Senior Member, *IEEE TRANSACTIONS ON MULTIMEDIA*, VOL. 15, NO. 5, AUGUST 2013 1163.

[3] D. Wang, S. C. Hoi, Y. He, and J. Zhu, "Retrieval-based face annotationby weak label regularized local coordinate coding," in *Proc. ACM, Multimedia*, 2011.

[4] Dayong Wang, Steven C.H. Hoi, Ying He, Jianke Zhu, "Retrieval-based face annotation by weak label regularized local coordinate coding", *MM'11,* November 28–December 1, 2011, Scottsdale, Arizona, USA.
[5] Kalaivani. J, Suganthi.V, " Scalable Face Resitution Via Attribute- Enhanced Sparse Code words", International Journal of Research in Engineering and Science (IJRES), Vol.2, pp. 14-18, July 2014.
[6] R.Sureshkumar, N.Arthi," generates attribute-enhanced sparse code words to retrieve image from large image database", *International Journal of Engineering Science Invention, Vol.2,* pp. 71-74, 2013.
[7] T. Ahonen, A. Hadid, and M. Pietikainen, "Face recognition with local binary patterns," European Conference on Computer Vision, 2004. [7] L. Wu, S. C. H. Hoi, and N. Yu, "Semantics-preserving bag-of-words models and applications," Journal of IEEE Transactions on image processing, 2010.
[8] 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.
[9] Yin-Hsi Kuo, Wen-Huang Cheng," Unsupervised Semantic feature discovery for image object retrieval and tag refinement", IEEE TRANSACTIONS ON MULTIMEDIA, VOL. 14, NO. 4, AUGUST 2012.

