A Survey on Mining Weakly Labeled Web Facial Images for Search-Based Face Annotation

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***Abstract* — Auto face annotation is playing important role in many real-world knowledge management systems and multimedia information. Auto face annotation can be beneficial to many real world applications. Face annotation related to face detection and recognition Recently research interests in mining weakly-labeled facial images on the internet to resolve research challenge in computer vision and image understanding. This paper provides various techniques or methods that are used to annotating facial images**

***Keywords*— Face annotation, web facial images, search base face annotation, content-based image retrieval, weak label, Search based facial annotation.**

I. INTRODUCTION

Day by day the digital media devices are increasing so the different social media tools used for sharing photos. The large number of human facial images shared over the different social real world application some of this images are tagged properly but many of images are not tagged properly so the facial annotation are came.

Facial annotation also applied in video domain to identify the person who appeared in video [1]

The model base annotation has more limitations i.e. it is more time consuming and more costly to collect large amount of human labelled training facial image. It is more difficult to generalize the models when new persons are added, in which retraining process is required and last the annotation performance is become poor when the number of persons is very more. To address the challenges "Auto face annotation" is important technique which automatically gives name of relevant person. This technique is more beneficial to different real world application for (e.g. facebook) which annotates photos uploaded by the users for managing online album and searches the photos. Recently search base annotation are used for facial image annotation by mining the World Wide Web (WWW), where large number of weakly labeled facial Images are freely available. The search-based face annotation paradigm aims to tackle the automated face annotation task by exploiting content-based image retrieval (CBIR) techniques [2], [3] in mining number of weakly labeled facial images on the web. The main objective of search-based face annotation is to assign correct name labels to a given query facial image.

II. RELATED WORKS

Different studies are perform on face annotation in mining weakly labelled facial images which are present over internet in this human name are treated as input query and aim is to refine the text-based search results by achieving consist facial images

A. Clustering Algorithm with Possibility Model

Berg et al. [4] presents the combination of a possibility model with a clustering algorithm. This combination is to present the relationship between the facial images and the names in their captions for the facial images and the detected names in the same document. The simply clustering method is used to captioned new images and automatically link name. For improving the performance clustering process are combine with possibility model .combining this two methods there are accurate labeled set of faces.

The result of this work shows that by analyzing language carefully can produce much better clustering and also learn a natural language classifier to determine who is pictured from text alone. This method works on particular data set we further more improve for free text on webpage using simple image representation and context model.

B. Graph Based Approach

Ozkan and Duygulu [5] proposed a graph-based model for finding the densest sub-graph as the most related result. Proposed a method to associate names and faces for querying people in large news photo collection

In most cases the number of same faces of queried person will be large so the faces are more similar to each other. They proposed the graph based method to find the similar subset with possible set of faces with query person name. Similarity are represent by SIFT describers. Then apply a greedy graph algorithm.

Guillaumin et al.[6] introduced a modification to incorporate the constraint that a face is only depicted once in an image. There are two scenarios of naming persons in database for finding face of person and assigning name to all faces

The text based result is not greatly improved. To improve a resent graph based approach introduce the constraints when optimizing the objective function .generative models have

previously been proposed to solve the multi-person naming task .by comparing generative and graph based methods the most significant method is graph based method .in future extends the graph based method to multi-person naming
Guillaumin et al. [6] proposed to iteratively update the assignment based on a minimum cost matching algorithm. In their follow-up work Guillaumin et al. [7], they further improve the annotation performance by using distance metric learning techniques to gain more distinguish feature in low-dimension space.

C. Query Expansion

T. Mensink and J.J. Verbeek [8], by using ideas from query expansion the performance of name-based scheme can be further improved. In this paper they are interested to finding images of people on the web and more clearly labeled the new images. The text base initial results are not perfect. The performances are depending on the assumptions. To improve such poor performance proposed "query expansion". They applied this idea on early proposed method on which filter the initial result set. Using Gaussian mixture modeling and logistic discriminant model. The query expansion is improving the performance in both of method. The research suggest the model learned from caption based supervision

D. Purify Web Facial images

This aims to correct noisy web facial images for face recognition applications [9], [10]. These works are proposed as a simple preprocessing step in the whole system without adopting sophisticated techniques.

T.L. Berg, A.C. Berg et al. [9] applied a modified k means clustering approach for cleaning up the noisy web facial images.

Zhao et al. [10] propose system that can learn and recognize face by combining weakly labeled text, image and video. Consistency learning proposed to create face model for popular person .the text images on the web as a weak signal of relevance and learn consistent face model from large and noisy training sets. Effective and accurate face detection and tracking is applied. Lastly key faces are selected by clustering to get compact and rebust representation. The effective ness is increase due to reperesent key face and removes duplicate key face. They used the unsupervised machine learning techniques and propose a graph-based label refinement algorithm to optimize the label quality over the whole retrieval database.

Z. Wu, Q. Ke, J. Sun, and H.-Y. Shum [11] mainly addressed the face retrieval problem, by using local and global features which propose an effective image representation. Future Work is to design a supervised learning algorithm to automate this process to further improve the visual word vocabulary for face. This system is highly scalable, and they plan by using a computer cluster to apply on a web-scale image database.

E. Retrieval Based Face Annotation

D. Wang, S.C.H. Hoi, Y. He. And J. Zhu [12] the WLRLCC algorithm is focused on learning more features for the top retrieved facial images for each query. By weak label regularized local coordinate coding. Retrieval based face annotation is used in mining massive web facial images for automatic face annotation .there are two challenges first is how effectively retrieve most of similar facial images. Second is how to effectively perform annotation. They proposed weak label regularised local coordinate coding (WLRLCC) technique. They also proposed the optimization algorithm i.e.WLRLCC algorithm .This algorithm boosts the performance of the retrieval based face annotation approach on a large scale web facial image

D. Wang, S.C.H. Hoi, and Y. He et al. [13] this proposed system investigated a unifying learning scheme by combining both transductive and inductive learning technique to mine web facial images for face annotation. They proposed Weak label Laplacian support vector machine (WL-LapSVM) algorithm by adopting WLRLCC algorithm

F. Search Based Face Annotation

Dayong Wang, Steven C.H. Hoi et al. [14] Propose an effective unsupervised label refinement for refining the web facial images. For improving the performance they also propose optimization algorithm to solve large-scale learning effectively i.e. clustering based approximation the propose system improve the performance of search based face annotation scheme. The work are different form all previous work by two things. To solve general content based face annotation problem using search based where face image as query image. They unsupervised label refinement algorithm which enhanced new label matrix. This work also related recent work of the WlRLCC method [12].The unified learning scheme [13].Adopted locality sensitive hashing [15]. Adopted unsupervised face alignment technique [16].extract the GIST features [17].

III. APPLICATIONS

Face annotation finds its application in the field of:

- Face annotation at macro scale and micro scale
- Wild landmark face annotation
- Online photo album management

IV.CONCLUSION

This paper presents an extensive survey on face annotation techniques for web facial images. Currently, many new approaches are proposed in the field of Auto Face Annotation. Many research issues have been highlighted and direction for future work has been suggested. Many open issues have been highlighted by the researchers such as dealing with auto face

annotation on large scale databases by different technique future work will be on duplicate person name and learn different learning technique

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