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A Novel Approach to Search Based Face Annotation (SBFA) Using Weakly Labeled Web Facial Images

Seelam Visweswararao[1]& K S Kiran Kumar [2]

[1]PG Scholar,Dept of CSE, Rao & Naidu Engineering College, Ongole,Prakasam Dist,Andhra Pradesh
[2]Assistant Professor,Dept of CSE, Rao & Naidu Engineering College, Ongole,Prakasam Dist,Andhra Pradesh

Abstract:

Face annotation is related to face detection and recognition has many real world applications. To resolve the challenges in image processing and computer vision, recently research interests in mining weakly label web facial images has been done through automatic face annotation. This paper introduces a framework of search based face annotation (SBFA) by mining weakly labeled web facial image that are available on www. one challenging part of SBFA scheme is managing most similar web facial images and their weak labels. To avoid this problem, I propose an effective refinement of unsupervised label(RUL) scheme for refining the labels of web facial images. To speed up the proposed system, I also propose a clustering-based approximation algorithm which can improve the scalability.

Keywords: Face Annotation; Face Detection; SBFA

I. INTRODUCTION

Digital photo albums are growing explosively in both number and size due to the rapid popularization of digital cameras and mobile phone cameras in the last decade. These large collections require the annotation of some semantic information to facilitate browsing, manipulation and sharing of 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 .so the face annotation technology is important for photo management. Facial annotation also applied in video domain to identify the person who appeared in video. The model base annotation has more limitations i.e.it is more time consuming and more costly to collect large amount of human labeled 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 person is very more. The "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 in mining number of weakly labeled facial images on the web. The main objectives of search base face

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annotation is to assign correct name labels to a given query facial image.

II. LITURATURE SURVEY

In this overview we introduced the proposed framework of Unified transductive and Inductive Learning (UTIL) for auto face labeled facial images. For each and every weakly labeled image in database the pre-processing step is applied and no face detected images are removed. We applied the state-of-the-art Weak Label Regularized Local Coordinate Coding (WLRLCC) [4] algorithm from search based face annotation paradigm for "transductive learning" step. It aims to annotate the query image by fully exploring the top-n similar images and their corresponding labels. The two key factors affect its final annotation performance for this problem: (1) Generating more represented feature for re-ranking as all the top ranking images are close to each other in the original feature space; (2) Enhancing the initial weak label

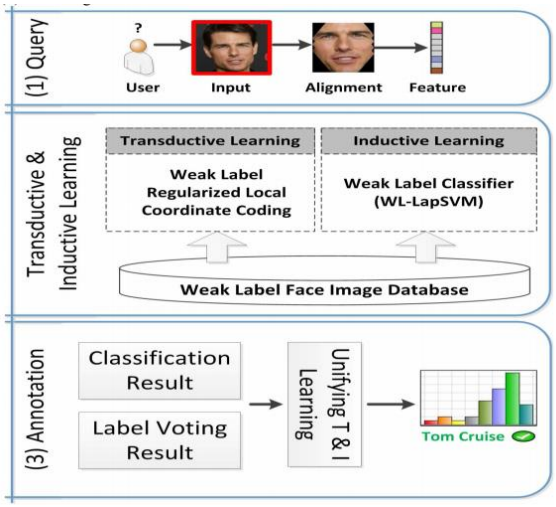

Figure 1: The Unifying Transductive and Inductive Learning (UTIL) framework for auto face annotation problem

Figure 1 illustrates the system flow of the proposed framework, which consists of the following three stages: (1) Preprocess the query facial image, including face detection, face alignment and facial feature extraction; (2) Apply "transductive learning" and "inductive learning" respectively on the weakly-labeled face image database; and (3) Combine the annotation results from the "transductive learning" and "inductive learning" steps, and output the final annotation. The details of each stage are described as follows.

The first stage, as shown in Figure 1 (1), is to pre-process a query facial image, including face detection, face alignment, and facial feature representation. For facial region detection and alignment, we adopt the unsupervised face alignment technique.

The second stage, as shown in Figure 1 (2), consists of two independent learning steps: (i) annotation by "transductive learning" and (ii) annotation by "inductive learning." Both are applied on the same web facial image database [5]. To build such a large-scale facial image database, we can choose a list of desired human names and submit them to some existing web search engine (e.g., Google in our approach) for crawling their related web facial images. As the Output of this crawling process, we obtain a collection of web facial images; each of them is associated with a human name. The third step is about the combination of the annotation results of the previous trasductive and inductive learning stages. To this purpose, we evaluate several last fusion schemes to merge the two annotation results. We also proposed entropy based weighting combination scheme, which achieve fairly good fusion result with less computation effort

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III. RELATED WORK

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

A. Face Recognition Algorithm

A straight forward idea for automatic/semi-automatic face annotation is to integrate face recognition algorithms which have been well studied in the last decade. Girgensohn et al. used face recognition technology to sort faces by their similarity to a chosen face or trained face model, reducing user workload to searching faces that belongs to the same person. However, despite progress made in recent years, face recognition continues to be a challenging topic in computer vision research. Most algorithms perform well under a controlled environment, while in the scenario of family photo management, the performance of face recognition algorithms becomes unacceptable due to difficult lighting/illumination conditions and large head pose variations[1]

B. Iterative Framework For Face Annotation

Recently, Riya developed an iterative framework for face annotation. In every iteration, the user was asked to manually label some faces, then the system used these labeled information to recognize faces that belong to the same person and proposed for user confirmation. Few technical details are available about iterative framework, but from experiments we can see that it still requires a lot of manual labeling to obtain final annotation results and also require user interaction for each iteration[7].

C. Pose Adaptive Matching Method

Pose adaptive matching method that uses pose-specific classifiers to deal with different pose combinations (e.g., frontal v.s. frontal, frontal v.s. left) of the matching face pair. It is comparable with the state-of-the-art methods on the labeled face in wild (LFW) benchmark (achieve 84.54% recognition rate), while maintaining excellent compactness, simplicity, and generalization ability, across different datasets. But in this work, the face micro-pattern encoding is learned but pattern sampling is still manually designed. Automating this step with learning techniques may produce a more powerful descriptor for face recognition[5].

D. Graph Based Approach

Ozkan and Duygulu 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. 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 introduces 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. proposed to iteratively update the assignment based on a minimum cost matching algorithm. In their follow-up work Guillaumin et al. they further improve the annotation performance by using distance metric learning techniques to gain more distinguish feature in low dimension space[6]

E. Content Based Image Retrieval

Active learning has been shown as a key technique for improving content-based image retrieval (CBIR) performance. Among various methods, support vector machine (SVM) active learning is popular for its application to relevance feedback in CBIR. However, the regular SVM active learning has two main drawbacks when used for relevance feedback. First, SVM often suffers from learning with a small number of labeled examples, which is the case in relevance feedback. Second, SVM active learning usually does not take into account the redundancy among examples, and therefore could select multiple examples in relevance feedback that are similar (or even identical) to each other[3],[10].

F. Search Based Face Annotation

Dayong Wang, Steven C.H. Hoi et al. 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 The unified learning scheme .Adopted locality sensitive hashing . Adopted unsupervised face alignment technique extract the GIST features. Despite the encouraging results, the work is limited in several aspects, First, assume each name corresponds to a unique single person. Duplicate name can be a practical issue in real –life scenarios[2].

G. Unsupervised Label Refinement

Finding the weakly labeled facial images from the World Wide Web and enhance the efficiency and scalability of the images. Use a unsupervised label refinement (ULR) approach for refining the labels of web facial images. We formulate the learning problem as to develop effective optimization algorithms to solve the large-scale learning task efficiently. to further speed up the proposed scheme, we also propose a clustering-based approximation algorithm which can improve the scalability and efficiency[2].

IV.APPLICATIONS

Face annotation can be used in various applications fields are as follows

- Identity verification (electoral registration, passports, drivers‟ licenses, employee IDs)
- Criminal justice systems (forensics),
- Wild landmark face annotation,
- Online photo album management, and

- Social media sites like Facebook (In case of Facebook face annotation can be termed as „tagging‟.)

V. CONCLUSION

This paper presents a survey on face annotation techniques for web facial images. Currently, many new methods are proposed in the field of auto face annotation. This paper shows that many research problems have been highlighted and direction for future work has been suggested in existing works. Many open issues have been highlighted by the researchers such as dealing with auto face annotation on large scale databases by different techniques. From overall study of this paper suggests that use of unsupervised labelled refinement (ULR) approach with clustering based approximation algorithm improves efficiency and scalability of search based scheme. Evaluation of auto face annotation on large scale database is depending on voting schemes implementing for system

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