International Journal of Advance Research and Innovation
Vol. 3(1), Jan-Mar 2015, pp. 57-60
Doi: 10.51976/ijari.311510
www.gla.ac.in/journals/ijari

Article Info
Received: 10 Feb 2015 | Revised Submission: 15 Feb 2015 | Accepted: 28 Feb 2015 | Available Online: 15 Mar 2015

Face Annotation with Weakly Labeled Web Facial Images

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ABSTRACT

Auto Face annotation is playing an important role in Many real-world applications. Search-based face (SBFA) annotation is aim to begin the automated face annotation task by employ the Content Based Image Retrieval (CBIR) techniques. CBIR is used as a query by image content and automatically detect the faces from photo, assign that face to corresponding human name. Searching and mining are massive weakly labeled facial images are available in World Wide Web. Weakly labeled facial images are often noisy and incomplete. To overcome this trouble move onto the unsupervised label refinement (ULR) and Clustering based approximation techniques (CBA), to improve the accuracy, performance and scalability. By combining textual and visual features, it manages to pick "good" features that reflect users' perception, and therefore is effective for search.

Keywords: *Face Annotation; Search Based Face Annotation; Content Based Image Retrieval; Web Facial Images.*

1.0 Introduction

Due to the rapid growth of popularities in large number of images are captured and stored by users. Among these images, only few photos are tagged properly, but many of them are not tagged properly. To improve this problem, automated face annotation is motivated. Face annotation is used to detect the face from photo, assign that faces to corresponding human names. Search-based faceannotation [1] is how to efficiently perform the face annotation by Content based image retrieval techniques (CBIR) with weakly labeled facial images in the World Wide Web.

CBIR is used to given a query as input; it will retrieve the correct labeled as an output. CBIR research efforts have not resulted in practical solutions to automatic family photograph management. To automatically annotate faces in images, face detection and recognition are two essential steps.

The face recognition algorithms, the efficiency of available algorithms are still limited to images of mug shots in which faces are mostly forward and with reasonably homogenous light conditions and small variation in facial expressions [2].

SBFA paradigm is how to effectively utilize the fine facial images from weakly label for the face name annotation task. To tackle this problem move onto unsupervised label refinement techniques (ULR) and Clustering based approximation (CBA). ULR is used to find the facial images in weakly labeled data without human manual effort. CBA is used toimproving the scalability.

2.0 Related Work

Choi, J.Y et.al [3] suggested a method Face recognition system is an automatically identify the face from digital image. It's comparing selected facial features from facial database. To eliminate Manual face annotation, computer based face detection and recognition used to detect the face automatically. FR mostly used in military surveillance, Airport and Nationalize Bank. To propose the collaboratively face recognition, improving the accuracy of face detection. The two keys issues for Personalize FR engines to produce the high quality results for query images from the corresponding owners. Merging of Multiple Personalize FR engine to single FR result. It may not be optimal when manually tagged photos do not clearly the name tagging and non reliable.

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To tackle this problem is using to Unsupervised FR as a Deformable Lucas-Kanade to fitting a task and graph clustering algorithms. J. Zhu, S.C.H et.al [4] Image alignment or registration is essential to many vision tasks. These include depth extraction, mosaicking, and motion analysis, but also object tracking and recognition. Facial alignment is the task of finding a transformation between two facial images so that they can be matched as good as possible. Facial appearance changes with different poses and expressions. In previously unsupervised alignment approaches not assuming a rigid affine transformation for alignment. Extract a nonrigid mapping between facial images. Based on a regularized face model, that Frame unsupervised face alignment into the Lucas-Kanade algorithm registers the face images across different individuals, pose variations, and various expressions. Propose a robust optimization scheme to handle appearance variations.

Arnold W.M. Smeulderset.al [5] Image search engines become indispensable tools for users who look for images from a large-scale image collection and World-Wide Web. Its key technique is content-based image retrieval (CBIR) having the ability of searching images via automatically derived image features, such as color, texture or shape. Features for retrieval are discussed next, sorted by: accumulative and global features, salient points, object and shape features, signs. Similarity of pictures and objects in pictures is reviewed for each of the feature types, in close connection to the types and means of feedback the user of the systems is capable of giving by interaction.

3.0 Search Based Face Annotation

Facial Annotation is used to detect face from photo and assign that photo to corresponding human names. To crawl a collection of facial images from an existing web search engine according to the names of persons to be collected from a name list. As a result, collection of facial images, assign that face to corresponding human name. Searching and mining are massive weakly labeled facial images are available in World Wide Web. Weakly labeled facial images are often noisy, which do not always correspond to the right human name.

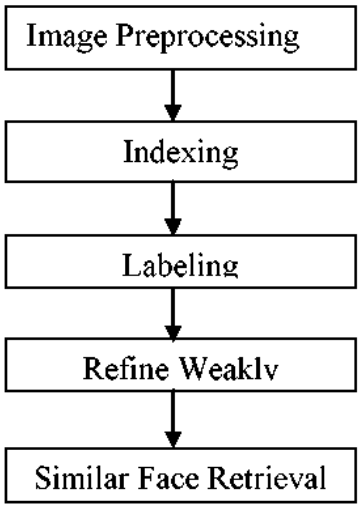
Preprocessing the image involves series of steps. Viola-Jones algorithm to Identify the face in the given image. Then Face is aligned / Registered based on Deformable Lucas Kanade Algorithm[4] to extract the image's GIST features to represent the extracted faces. As a result extracted GIST features are high dimensional data of the image.The indexing of high dimensional data is done. These data are indexed and a hash table is generated.Locality Sensitive Hashing (LSH) a proved algorithm in indexing is employed and performing probabilistic dimension reduction of high-dimensional data.

ULR(Unsupervised Label Refinement) to enhance the labels from weakly labeled data. The quality of the labels are enhancing through a graph based operation. The low-rank graph based learning approaches to refine the label quality. The refined label are mapped for helping the search operation. Labeling faces by corresponding names, image databases can be organized by presence of individuals.

The given input image is preprocessed before entering the search phase. The preprocessing involves face identification, face registration and extracting the GIST features. The extracted GIST features are used for recognizing the similar images in the dataset. The high dimensional data of the input image is compared with the dataset hash table and labels. The Top K results are provided for user validation/annotation.

The main objective of SBFA is to assign correct name to the corresponding given query facial image. To retrieve a short list of top k similar facial images from weakly labeled facial images and then annotate the images by performing voting on label with top k similar facial images.

Fig 1: Search Based Face Annotation Steps



4.0 Locality-Sensitive Hashing

Locality-Sensitive Hashing (LSH) is a promising approach to similarity search in high-dimensional spaces, it has not been measured practical partly because its search quality is sensitive to several parameters that are moderately data dependent. The K Nearest Neighbor (K-NN) problem is as follows: given a metric space h M, di and a set S £ M, maintain an index so that for any query point v G M, the set I(v) of K points in S that are closest to v can be quickly identified. LSH as a probabilistic technique suitable for solving the approximate K-NN problem. The original LSH hash function families were suitable only for Hamming space, but more recent families based on stable distributions and suitable for Lp, p G (0, 2] have been devised. LSH, though obtained in-retesting asymptotic results, provides little guidance on how these parameters should be chosen, and tuning parameters for a given dataset remains a tedious process.

5.0 Unsupervised Label Refinement

ULR to enhance the labels from weakly labeled data. The quality of the labels are enhancing through a graph based operation. The low-rank graph based learning approaches to refine the label quality. The refined label are mapped for helping the search operation. Labeling faces by corresponding names, image databases can be organized by presence of individuals. As a result, large and realistic face databases can be built from many semi-supervised datasets available on the world wide web.

6.0 Multi - Step Gradient Algorithm

It is an accelerated multi-step gradient algorithm to solve the QP iteratively. The total number of variables is n*m. This is huge, e.g., our Database with n=40000 facial images and m=400 unique Names, results in a total of 16 million variable.

7.0 Clustering-Based Approximation

The number of variables in the problem is n *m, where n is the number of facial images in the retrieval database and m is the number of classes. The clustering based algorithm method is used to captioned new images and automatically link name to improve the performance clustering process. The clustering strategy could be applied in two different levels:

- Image-level can be used to directly separate all the n facial images into a set of clusters.
- Name-level can be used to separate the m names into a set of clusters, and then to split the retrieval database into different subsets according to the name-label clusters.

8.0 Conclusion

The main idea behind this search-based face annotation framework, in which we focused on tackle the critical problem of enhancing the label quality and proposed a ULR algorithm. To further improve the Performance. Future work will address the issues of duplicate person names and investigate supervised/semi-supervised learning techniques to further improve the label quality with affordable human manual refinement efforts.

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