Retreive Similarly Facial Images Using Unsupervised Label Refinement

K Boopalan[1] A Helen Sharmila[2] Dr.A Rajesh[3]
[1]Research Scholar [2]P.G Scholar [3]Professor
[1,2,3]Department of Computer Science & Engineering
[1]Bharath University, Selaiyur, Chennai [2,3]C.Abdul Hakeem College of Engineering and Technology

Abstract— Auto face annotations is an important technique that aims to annotate facial images automatically. Search based face annotations (SBFA) is data – driven and model – free. This SBFA can be done by mining the facial images that are weakly labeled these can be taken from World Wide Web (www). One challenge faced by such SBFA paradym is how to effectively exploit .the short list of candidate facial image and their weak labels. This problem can be solved by using unsupervised label refinement (URL) scheme by exploring machine learning technique to enhance the label purely from the weakly labeled data without human manual efforts. We also propose a clustering – based approximation algorithm which can improve the scalability.

Key words: Auto face annotations, SBFA, Face Annotation

I. INTRODUCTION

Now-a-days the digital cameras and social media tools are very popular for internet –based photo sharing. By the help of these digital cameras , people are capturing more digital photos and these photos are shared by users on internet most of these photos are human facial images. In these facial images , some are tagged with names and many are not tagged properly. This has been solved by auto face annotation. This will annotate facial images automatically. In many real world applications auto face annotation is used .for example , online photo – sharing sites such as face etc… can annotate the user's uploaded photos automatically to facilitate online photo searching and management. We can also apply face annotation in news video domain to detect the important persons who are appeared in videos to facilitate the retrieval of news video. There is a problem in face annotation that is nothing but face recognition problem. The machine learning techniques that are supervised or semi supervised are recognized[2][6][7]. The name technique is accomplish here. Name – it'basic function is to which name in given news videos. [2].The use of name- it demonstrated successful result and revealed the importance of combining image and text information. In face annotation , there is model face annotation. But this techniques are limited because collecting of human labeled facial images will be more expensive and time consumption.

So that we can eliminated these drawbacks by exploring search based face annotation by mining the world wide web (WWW). So, we can take weakly labeled images that are freely available on internet. And the another method for retrieving facial images by Web camera. We can also detect facial images using web cameras. These captured images are stored in database.

After names and faces are detected some seed name – face pairs are sought. These can be manually selected, are automatically selected relying on some confident alignments, for example, we apply our face naming methods on BBC news broad- casts[6] . often the anchor person is shown and is named in the beginning of the brosdcast. The name- face pairs corresponding to the anchor can be separately identified.

II. RELATED WORK

The related work is recognition and verification of facial images .a new approach for face recognition is insensitive to large variations in lighting and facial expressions .the lighting variability includes not only intensity ,but also direction and number of light sourcesthe same person from a same view point can appear dramatically different when light sources illuminate the face from different direction .

The human face recognition system utilizes a broad spectrum of stimuli,obtained from many ,if not all,of the senses .these stimuli are used either individually or collectively for storage and retrieval of face images.

There are a large number of face database available to research in face recognition .A non-exhaustive list can be found .these database range in size ,scope and purpose .the photographs in many of these database were acruired by small teams of research specifically for the purpose of studying face recognition.

Recent years have seen an increased demand for multimedia application including video on demand , digital libraries,video editing authoring etc. [2].this multimedia data has so much of images ,video audio and text information into which a text information into which a modicuam of essential content has been absorbed.

Name-It technique[2] is used to associates names and faces in basic function is to guess "which face corresponds to which name " in given news videos .the use of Name-It demonstrated successful result and reaveled the important of combining image and text information .this Name-It by in coporating advanced image and natural language processing technique .this includes face candidate retrieval by name,and vice versa, automated video indexing by the persons name automated creation of thousands of face-name correspondences database from thousands of hour of news videos.

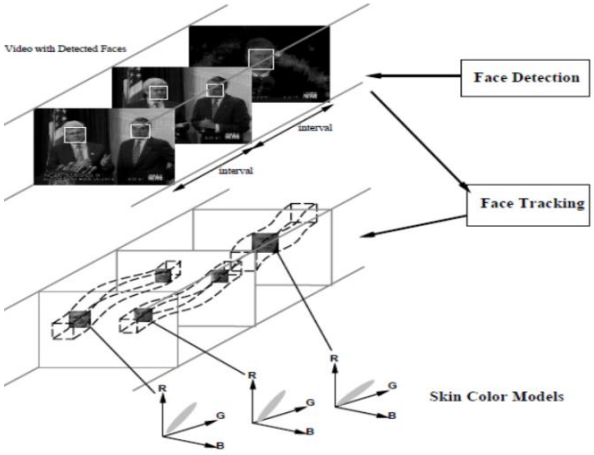

Fig. 1: Face tracking

Face tracking consist of face detection, skin color model extraction and skin color region tracking.

Fig. 2: Face Detection

The face detector[5] can detect faces in a range of orientation as the top row shows . Before clustering the face images we rectify them to a canonical pose bottom row. Face detector detects the set of face and non-face images is used to determine the probability of a new image being in a face,here we have collected the data set consisting of a approximately half a million news pictures and captions from yahoo news over a period of roughly two years using this face detector can extract 44,773 face images.

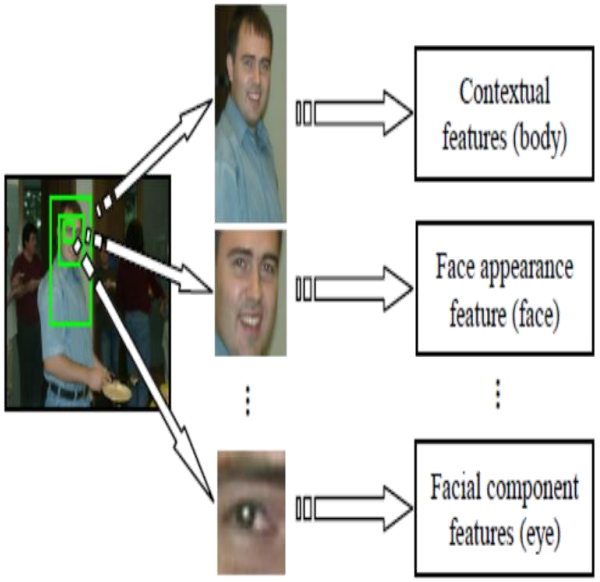

Fig. 3: Face Annotation

Bayesian face annotation [4] has the multi view face detector is used to detect faces in news uploaded images or images already in album.The facial features are extracted from aechdetected face area as well as the contextual features to derive the similarly measure a large set of training samples are collected offline to train the probability model are integrated face representation is considered as face annotation can be considered as a pure face recognition problem.

III. ARCHITECTURE

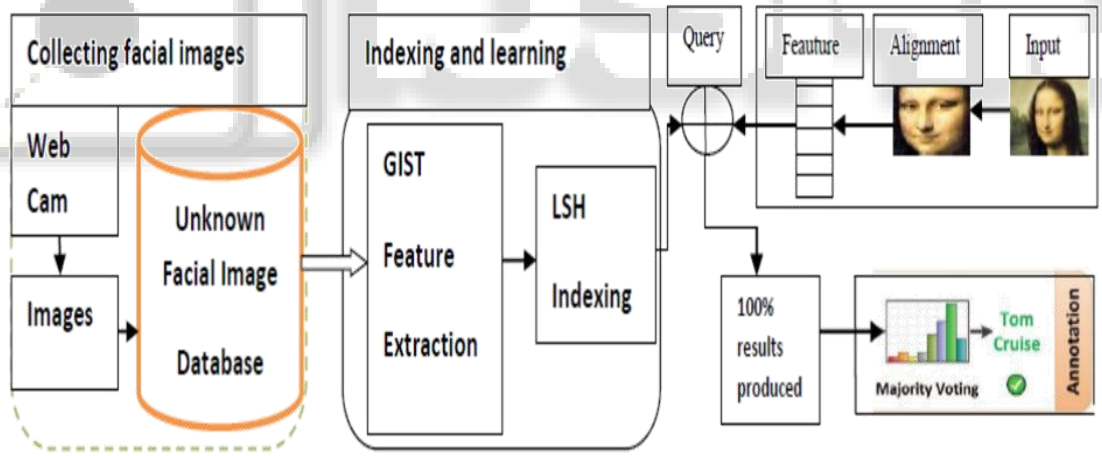

Fig. 4: Architecture

A. Architecture Description:

First we are retrieving the images with the help of Web cam. Particularly we are retrieving only weakly labeled images. This is section facial image collection.

Indexing and learning has main catagories such as GIST feature, LSH and ULR. By this help of GIST features,we can calculate the minute attributes of images such as pixels, colour, intensity, direction, angel, edge detection. The LSH stands for locality sensitive hashing. Locality sensitive hashing will split the information by ranging.RGB helps to display thecolour values. Intensity will calculate the total amount of black pixels. Edge detection will detect the shape of face. Face alignment represents the face angel. Gabor value is used as gaber filter. Gabor filter's pixels, angel, wavelength are calculated and submit there values.

IV. SEARCH BASED FACE ANNOTATION

A. Collecting Images from Web Cam:

In first step we are collecting images from web cam these images that are collected from web cam will be saved in database and otherwise from world wide web (WWW) like google search engine. We want to search according to the name list. Retrieve images by copying URL from google. We are collecting noisy images. Noisy images is nothing but

weakly labeled facial images. Weakly images means the images that are not having information.

B. Extracting and Detecting the Facial Images:

Here we are detecting and aligning the facial images. Face detection is nothing but detecting only the face region, because the images that are standing images or passport size images. We can crop the facial images alone so the images are extracted. GIST feature is used to extract these files.

Then, the important thing is extracting the face related information. This also includes face detection and alignment, facial region extraction and facial feature representation.

C. Indexing the Facial Images by High Dimentional Indexing:

Here high dimensional indexing technique is used to facilitate the similar face retrieval.

In this process we are introducing a very popular and very effective high dimensional indexing technique called locality sensitive hashing (LSH). Indexing is done by splitting the information by ranging.

D. Learning To Refine Weakly Labeled Data:

Refining the weakly labeled data. The labeled is a main process of search based annotations. Another technique is unsupervised label refinement (ULR). This will enhance the label quality of weakly labeled data.

E. Retrieval of Similar Facial Images:

Similar faces can be retrieve by voting. Top k similar faces are retrieved from the database. Here we are searching the subset of most similar faces.

F. Face Annotation by Majority Voting On the Similar Faces with the Refined Labels:

This is to annotate the facial image with a label by voting process that joins the set of labels associated with top k similar images (facial images)

V. UNSUPERVISED LABEL REFINEMENT BY LEARNING ON WEAKLY LABELED DATA

A. Preliminaries:

Extracted facial image features can be extracted by $Y \in IR^{m \times d}$ this can be denoted by Ω={m1,m2,m3……..mn}

This is the list of human names for annotation ,m is the total number of human names . denoted by $Y \in [0,1]^{m \times n}$
The loss function Ds(A,B)

B. Problem Formulation:

The formulation of a label smoothness principle is the equation called Ds(A,B)

$Ds(A,B)=1/2\sum^{n}_{i,j=1} B_{ij} ||A_{i*}-A_{j*}||^2 A=tr(A^t lA)$ -------1

B is the weight matrix of sparse graph Constructed From the n facial images L=D-B.
L=D-B denoted the laplacian matrix
D is a diagonal matrix.

To achive the optimal solution we want to update the two type of sequence called {A(k)} and {B(k)} as recursively k is the iteration and variance is B(k)

The equation for a approximation A(k) to solve the optimization is

$A^{(k+1)}=\arg\min p_t(A,z^{(k)})$ s.t $A \geq 0$ ----------2

$Min\ t^{+}\backslash 2||A\text{-}V||^2$ s.t $\sum_{k=0}^{m-1} A_{k.n+I \leq \epsilon, i=1\ldots,n,}$ ----------3

We can also include the optimize to search foeA,we can also avoid the solution of A.by being deviated from X.unsupervisedlable refinement has the term Dp(A,B) to reflect the process called,

$A^*=\arg\min D_s(A,B+\alpha.D_p(A,X)$ --------4

The regular approximation is applied to a nonzero elements of X.

$Dp(A,X)=||(A\text{-}X)oS||^2_{A,}$ ----------5

S is a "sign" matrix s=[sign Xij] where sign(x)=1,if X>0 and otherwise, o denoted the hadamard product.

VI. ALGORITHM

A. MULTI-STEP Gradient Algorithm for ULR:

INPUT: S~~ϵ~~$\mathbb{N}$(n.m)×(n.m),c~~ϵ~~$\mathbb{N}$n.m,t~~ϵ~~$\mathbb{N}$
OUTPUT:X*

1) begin
2) $\alpha 0=1;J=1;X(0)=S(0)=S(-1)=0;$
3) repeat

Case SRF:Achieve S(J) with Eq.(2);
Case CCF:Achieve S(J) with Eq.(3);

$\alpha J=\sqrt{\frac{1+4\propto 2k-1+1}{2}};$

$X(j)=S(j)+\frac{\propto j-1-1}{\propto j}(S(j)\text{-}S(j\text{-}1));$

J=J+1;
Until CONVERGENCE;

To solve a optimization iterative process we can use the coordinate descent approach .this can improve the scalability. While solving a very –scale problem, power of parallel computation is the main advantage .

VII. CLUSTERING BASED APPROXIMATION

The number of variables is denoted as n*m, n is the number of facial images .m is the number of distinct names .To solve this we are introducing a efficient technique called MGA-based algoriths.This MGA-based algorithm(SRF-MGA or CCF-MGA).is for small problem.For a large problem we are implementing the CDA-based algorithms.

The number of variables in subproblem is n.n denotes extremely large .the CDA-based algorithms.The CDA-based algorithms will be computationally intensive when n is Extremely large.

There are two different levels in clustering,

- Image level
- Name level

A. Image Level:

image level can be used to separate all facial image directly into a set of clusters.the number of facial images n is larger than number of names m,this means the the clustering image level will be much more time-consuming than that on "name level.

B. Name Level:

this name level will be used to separate the m names into a set of clusters.next step is to split the retrieval database into different subsets according to the name list. This is for scalability and efficiency.

VIII. EXPERIMENTS

A. Evaluation of Auto Face Annotation:

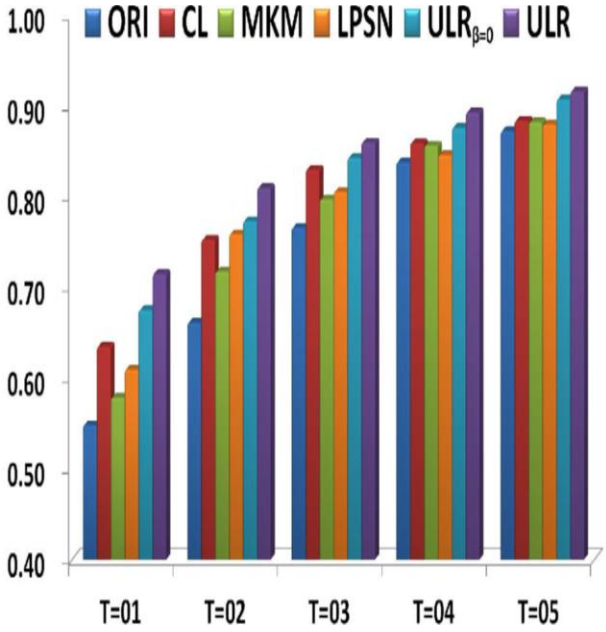

Fig. 5: Evaluation of auto face annotation

Auto face annotation is evaluated and performed based on search based face annotation scheme.so we are evaluating the ULR Algorithm first.

In the above diagram we can see the ULR which employs unsupervised learning to refine labels .this ULR performs better than ORI Baseline Technique.

ORI Implies the baseline which using the original weak label.

CL Implies the Existing Algorithm. These ORI, MKM, LPSN algorithms are used and this ULR algorithm can efficiently exploit the data. this ULR is to improve the performance of search based face annotation.

IX. CONCLUSION

In this paper we solved a critical problem of enhancing the label quality and we proposed an effective algorithm called unsupervised label refinement (ULR).so,this has a promising framework for a search based face annotation. In future, to improve the scalability, we can use the clustering based approximation solution.

So by this technique we are getting excellent results. In future Work, the duplicate human names can be addressed.

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