Re-ranking of Images Using Text Query And Attribute Of Images

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Abstract- *Existing system displays the images according to text query. User required images are not displayed sometimes, due to different understanding of human and machine. For example, if user provide 'baby' as a text query then the result will contain the images related to human babies, movie named 'baby' etc. If here user requires images particularly of 'human baby' then images of movie named 'baby' are irrelevant and they should not get displayed in result. Giving user precise result by overcoming this we provide option to user to click on the image according to his intention. To implement this, we use algorithms named as Hyper-sphere based relevance preserving projection (HRPP), Reversed KNN(Reversed k-nearest neighbour), H-Rank (Hyper-sphere-based ranking) which all together form a new algorithm named as 'H-Re-ranking algorithm'. This proposed algorithm have great practical significance as user's intent is captured by only getting the features of clicked image to rank the images , so that the user will get his required images.*

Keywords- H-Rank, Hyper-Sphere Learning, HRPP : Hyper-sphere based Relevance Preserving Projection, Image Retrieval, One class classification and SVDD (Support Vector Data Description),Reversed KNN : K-Nearest Neighbour.

I. INTRODUCTION

Image Search Re-ranking based on user provided test query and attributes of images. When user is going to choose or click on any image based on the images provided after firing the query for the first time, the relevant images should be displayed using attributes of selected image. Feature extraction and ranking function design are two key steps in ISR. Human interactive systems have attracted a lot of research interest in recent years, especially for image retrieval systems. Contrary to the early systems, which focused on fully automatic strategies, recent approaches have introduced human computer interaction. Here focus on the retrieval of concepts within a large image collection. We assume that a user is looking for a set of images, the query concept, within a database. The aim is to build a fast and efficient strategy to retrieve the query concept. In image retrieval, the search may be initiated using a query as an example. The top rank similar images are then presented to the user.

II. OBJECTIVES

1.To identify a ranking problem in web image retrieval. 2. To provide the narrow search based on the query image Filtered result set which will save the time of user. 3. System to re-rank images returned by image search engine Re-ranking images by incorporating- Visual aspects, Visual similarity , An Attribute based searching.

III. REVIEW OF PAPERS

1. Paper name and Year - Harvesting Image Databases from the Web, 2007

Author - A. Zisserman ,F. Schroff, A.Criminisi.

Description - This paper develop simple concept of retrieval of images simply using the text based search. It gives the metadata about the images. The images are gives the number of images instead of proper images searching. Therefore the images are classifier using some name. The main advantage is that, it simply improve the accuracy of visual re-ranking. It also uses the low level feature extraction of about the images. The Multiple Instance Learning methods have large applicability. A numerous learning problems which are challenging in computer vision, those are object recognition, object detection, object tracking, image and scene classification etc. It uses multiple instance learning method. The advantages of this is recognition of human interaction.

Limitations - The disadvantages is to extract several candidate object regions and identifying related objects.

2. Paper name and Year - Image Retrieval via Probabilistic Hyper-graph Ranking, 2010

Author - Yuchi Huang , Qingshan Liu, Shaoting Zhang, Dimitris N. Metaxas

Description - Probabilistic Hyper-graph is used to represent the relevant relationship among vertices (images) from the which similarity matrix is computed on

complementary image features. In this each image is taken as centroid vertex forming a hyper-edge by a centroid and its k nearest neighbours. The task of image retrival with relevance feedback is converted to transductive learning problem which is solved by the hyper-graph ranking algorithm.

Limitations - The algorithm used probalistic hyper-graph ranking and manifold ranking are time consuming.

3. Paper name and Year - Image Ranking and Retrieval based on Multi-Attribute Queries, 2011

Author - Behjat Siddiquie, Rogerio S. Feris2,Larry S. Davis

Description - This paper develop applications involving images and text can beneficial for an understanding of which images are specific and which images are ambiguous. Here the two mechanisms used to measure specificity given multiple details of an image are an automated measure and relies on human judgmental measures. In this an automated measure and measure human judgments method are use. The advantage is to improve in text based image retrieval.

Limitations - The drawback is complexity occur due to human judgments.

4. Paper name and Year – IntentSearch:Capturing User Intention for One-click internet image search, 2012

Author - Xiaoo Tang, Ke Liu, Jingyu Cui,Fang Wen, Xiaogang Wang.

Description - Adaptive weight technique is used to categorize query image and based on image selected by user and through image clustering , query keywords are expanded.This keywords are used to enlarge the image pool. Expanded keywords are used to expand the query image from which new query specific visual and textual similarity matrix are learned to improve image reranking.

Limitations - Duplicate images are shown as similar images to query.

5. Paper name and Year - Bayesian Video Search Re-ranking, 2012

Author - Xinmei Tian, Linjun Yang, Jingdong Wang Yichen Yang, Xian- Sheng Hua

Description - The existing system is working on the integrating the visual features and the attribute to the image searching. The system review in recent literature, and the quite knowledge about the hyper graph learning theory. It uses Low level feature extraction method. The advantages of this is to improve the accuracy of visual re-ranking.

Limitations - The Disadvantages is searching methodology is not efficient.

6. Paper name and Year - Learning query specific distance functions for large scale web image search ,2013

Author - Yushi Jing, Michele Covell, David Tsai, and James M. Rehg.

Description - Scalable solutions to learn query specific distance functions are proposed by adopting a simple large margin learning framework, using the query logs of text based image search engine to train distance functions used in content based system

Limitations - Query specific distance functions can be applied to only the most popular search queries.

7. Paper name and Year - An Attribute assisted re-ranking model for web image search, 2014

Author - Junjie Cai, Zheng-Jun Zha, Meng Wang, Shiliang Zhang, and Qi Tian.

Description - Semantic attributes are used to narrow down the semantic gaps between low level visual feature and high level semantic meanings. A hypergraph is used to model the relationship between images by integrating low level visual features and semantic attribute features.

Limitations - This algorithm only proposes the ranking of image but not necessarily the images are relevant. Only visual based images are displayed.

8. Paper name and Year - Efficient image retrieval by leveraging click data, 2014

Author - Shusheng Cen, Lezi Wang, Yancho Feng, Hongliang Bai, Yuan Dong.

Description - The previous scheme of textual search algorithm is simplified by using cluster based scoring method and SVM classifier, where cluster based scoring method is used to access the relevance of query image pair and linear SVM classifier is adopted abreast of cluster based method.

Limitations - The performance of linear SVM does not match the expectations and visual feature used is to weak.

9. Paper name and Year - Image search reranking with query dependent click based relevance feedback, 2014

Author - Yongdong Zhang, Xiaopeng Yang, and Tao Mei.

Description - A novel reranking algorithm called click based relevance feedback is used. This algorithm emphasizes the successful use of click through data for identifying user search intention while leveraging multiple kernel learning algorithm to adaptively learn the query dependent fusion weights for multiple modalities.

Limitations - Image diversity is not considered in reranking of images, only image search relevance is considered.

10. Paper name and Year –Relevance Preserving projection and ranking for web image search reranking, 2015

Author - Zhong Ji, Yanwei Pang, Xuelong Li.

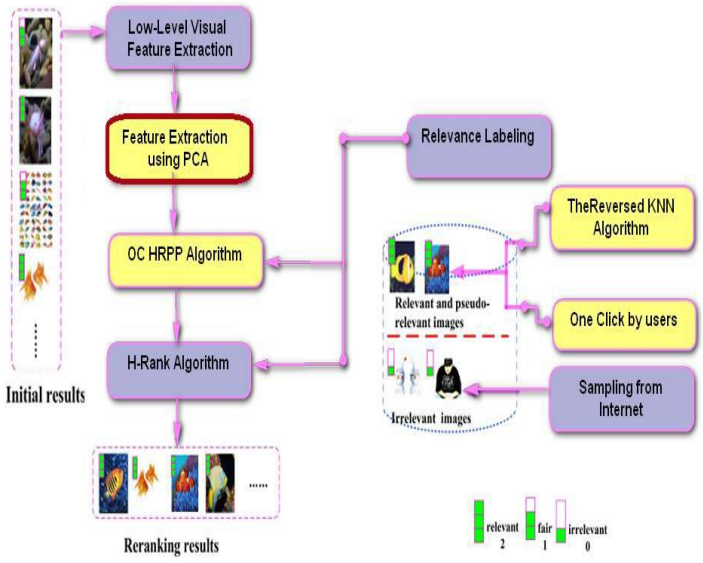
Description - Based on hypersphere idea in one class classification, the feature extraction and reranking function problems in image search reranking is proposed using HRPP, H-Rank and KNN algorithm.

Limitations - We have used linear method i.e. one class classification. So our future scope is that nonlinear methods should be used.

IV. PROBLEM STATEMENT

Text query for images taken from user. Based on click image by user,match the attributes of images, rank the images and display only user relevant images using HRPP(Hyper-sphere Based Relevance Preserving Projection),Reversed KNN(K-Nearest Neighbour), H-Rank and One class Classification.

V. PROPOSED SYSTEM



Drawback of existing system is overcome by giving precise result ,for this we provide option to user to click on image according to his intention. To implement this, we use algorithms named as Hyper-sphere based relevance preserving projection (HRPP), Reversed KNN(Reversed k-nearest neighbour), H-Rank(Hyper-sphere based ranking) which all together form a new algorithm named as H-Re-ranking algorithm. This proposed algorithm have great practical significance as users intent is captured by only getting the features of clicked image to rank the images , so that the user will get his required images.

VI. ALGORITHMS

Idea of hyper-sphere :

- In hyper-sphere based approach, the basic idea is to perform feature extraction and designing of a ranking function.
- In this method, initially searched images are considered as distributed essentially in a hyper-sphere. Relevant images are inside the hyper-sphere and irrelevant are outside of it. (Zhong Ji, Yanwei Pang, Xuelong Li have proposed method for construction of hyper-sphere) which is based on one-class classification in which relevant images are treated as target data and irrelevant are outliers. It is assumed that relevant images are close to the centre of the hyper-sphere while irrelevant and fair are away from it.
- Hyper-sphere based relevance preserving projection (HRPP) focuses on both, data locality constraints which preserve diverse structure of data and relevance constraints which protects the relevance relation of hyper-sphere distribution.

A] *HRPP Algorithm :(*Hyper-sphere-based Relevance Preserving Projection)

- This algorithm first examines the image transformation matrix to understand locality and relevance constraints on image. This is necessary to preserve the original structure of image data and to preserve the relevance relationship of hyper-sphere distribution.
  THE MAIN PROCEDURE OF THE PROPOSED HRPP ALGORITHM:
- Input: Obtain training examples: [X_1,...,Xr , X_{r+1},...,.., X_{r+h}] ,
- parameters: reduced dimensionality *d* , *labeled number r for the relevant* examples, and labelled number *h for the irrelevant examples.*
- Output: Projection vectors : W=[$W_{1,....,}$ W_4]€R^{D*d}

1.Indexing

A(2,2) VCS can be described by the following 2*2 Boolean matrices.

$$M_0 = \begin{bmatrix} 1 & 0 \\ 1 & 0 \end{bmatrix}, M_1 = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$$

2.coloring

If the given pixel P is white, we use M0 to encrypt the pixel by setting the first row to s1 and setting the second row to s2, s1=(1,0) and s2=(1,0).If the given pixel P is black, we use M1 to encrypt the pixel by setting the first row to s1 and second row to s2, s1(1,0),s2(0,1).

3.color layout

For white pixel The Hamming weight is H(V)=1, where V = s1+s2=(1,0).
For black pixel the Hamming weight is H(V)=2, where V =s1+s2=(1,1).

4.Shaping

A pixel P is interpreted by the visual system of the users as white if the Hamming weight H(V)=1 and as black if H(V)=2.

B] Reversed KNN algorithm :

- Reversed KNN algorithm is used to select only relevant images by harvesting number of pseudo-relevant images.
- The steps of the reversed KNN algorithm are as follows:
  1) The user clicks one relevant image that satisfies his/her intent from the initially searched results. This image is then put into a relevant-image pool.
  2) The nearest neighbour of the clicked images is chosen as a pseudo-relevant image from the top *N initially searched* images by the *k-Nearest Neighbour (KNN) algorithm, and this* image is also put into the relevant images pool. Now, there are two images in the pool.
  3) Find the next pseudo-relevant image by calculating the minimum average distance between the images in the pool and the remained top *N initially searched images.*
  4) Repeat the step of 3 until the total image number in the pool reaches the predefined threshold T_c .

C] Hyper-sphere based ranking :

The Proposed H-rank Function

- After finalizing only relevant images it's time to rearrange them. This proposed algorithm re-ranks the images by sorting them by their distances from hyper-sphere centre. After feature embedding, the transformed features are assumed to be distributed in a hyper-sphere space, where the relevant examples lie inside the hyper sphere while the irrelevant examples lie outside the hyper-sphere.
- Euclidean distance is adopted in the H-Rank algorithm, thus the distance is defined as:
- Dist(X_1, X_2) = √(X_2 – X_1)²

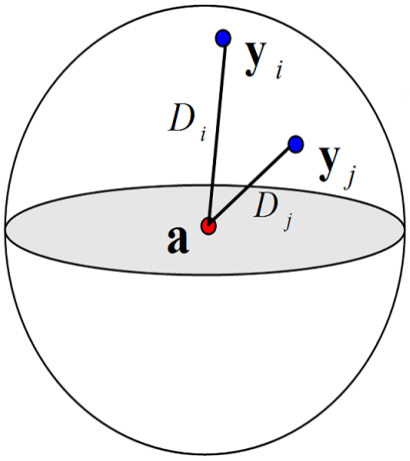


Fig. Examples close to the centre a are ranked ahead. y_j *is closer to a* than y_i , *thus* y_j *is ranked ahead of* y_i

So in this case user clicked image becomes centre of Hyper-sphere and relevant and pseudo relevant images are positioned in Hyper-sphere.

VII. CONCLUSION

The feature extraction and ranking function problems in image search re-ranking have been addressed, with the help of hyper-sphere based one-class classification .The proposed HRPP algorithm converts the original visual features into an intrinsically low-dimensional space without disturbing the relevance relationship among the images. In H-Rank algorithm, sorting of the images is done according to their distances from the hyper-sphere centre . User gives single click on initially searched images which is used to know the user's intent which makes strong practical significance of H-Rank.

VIII. FUTURE SCOPE

We will work on leveraging a proper kernel to make method nonlinear. We will also exploit the effective utilization of click-through data to mitigate the intent gap between the representation of users' query and the real intent of the users automatically. Moreover, ISR can also be regarded as an outlier removal procedure. How to transfer the ISR methods to solve the outlier removal problem is an interesting research direction. At last, deep learning has shown its promising successes in image classification and CBIR, however, it has little significant influence on TBIR. How to employ it in TBIR and ISR is also a challenging direction.

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