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Image Retrieval Efficiently Using Search Engine-Visual Intelligence

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ABSTRACT

In today's world Internet plays a major role. We have witnessed great interest and a wealth of promise in image retrieval. There are times and situations when we imagine what we desire, but are unable to express in precise wording. Take, for instance, a desire to find the perfect portrait from a collection. In some sense, it may be easier to find such an image by looking through the collection of pictures and making unconscious "matches" than to use textual descriptions that fail to capture the very essence of perfection. Tag Based image search is an important algorithm for retrieving images based on the description given to the images stored in the database. Another algorithm for retrieving images based on the number of times the image has been clicked is the Click Based algorithm. It also includes the count of the view i.e. the number of times the image has been viewed by the user. This count is used for re-ranking the images in order to meet the user requirements. The above algorithms are being used in search engines. There are few disadvantages in terms of time and speed efficiency. We aim at re-ranking images using a hybrid algorithm, which is a combination of tag based and click based algorithms. First images are sorted using tag and click based algorithms where the initial results will be contributed by the social users. Finally retrieval is done by the hybrid algorithm where matrix is constructed with the results obtained from the click and tag based algorithms. These selected images compose the final retrieved results.

Keywords: Visual Intelligence, Search Engine, NDCG

I. INTRODUCTION

Image processing is a process of performing some operations on an image, in order to get an enhanced image or to extract some useful knowledge from it. With the improvement of science and technology, amounts of images and videos rebound everywhere on the Internet. This fact has brought great test to multimedia memory and savage. Generally speaking, tag-based image search is more regularly used in social media than content based image retrieval and context-and-content based image retrieval. In current years, the re-ranking issue in the tag-based image retrieval has increased researchers' extensive attention. On the other hand, the following tests block the way for the improvement of re-ranking technologies in the tag-based image retrieval.1) Tag variance. Social tagging necessitates the entire consumer in the social network to tag their uploaded images with their own description and contribute with others. Diverse from ontology based image explanation; there is no predefined ontology in image cataloging. Every consumer has his own pattern to tag images. Even for the same image, tags donated by different users will be of great difference. Thus, the same image can be deduced in several ways with several tags with reference to the background behind the image. Thus, many apparently immaterial tags are introduced. 2) Query vagueness. Users cannot exactly describe their demand with single words and tag recommend system always recommend words that are highly associated to the accessible tag set, thus add little information to a users' donate. Besides, polysemy and synonymy are the other causes of the inquiry ambiguity. Thus, a elementary predicament in the re-ranking of the tag-based social image retrieval is how to consistently solve these problems. As far as the "tag mismatch" problem is disturbed, tag refinement, tag significance ranking and image relevance ranking advance have been committed to conquer these problems. As for the "query vagueness" problem, an efficient approach is to offer varied retrieval results that cover multiple query. Currently, image clustering and replicate removal are the major

approaches in settling the variety problem. However, the spirit of social images is unnoticed. The social images uploaded and labeled by users are user-oriented. These user-oriented images which share the same user and tagged with same query are always taken in a fixed time interval at a exact mark. It is well-known that, images taken in the same time distance and preset spot are quite similar.

II. METHODS AND MATERIAL

1. Existing System

In the existing system there are many search engines which are used for various purposes with different algorithms such as tag based, click based, sketch based, hash based. In tag based image retrieval directly rank the raw photos without undergoing any intermediate tag processing Xueming Qian [1] "utilized an optimized framework to routinely rank images based on their importance to a given label. Visual evenness between images and semantic information of labels are both measured". Xiaopeng Yang [2] "Successfully blend multiple modalities, a grid-based reranking algorithm is projected that can effectively combine the knowledge of relevance scores, weights of modalities, and distance metric into a unified scheme."Begum Demir [3] proposed a hyper graph learning method, which aims to estimate the consequence of images. They examine the bag-of-words and bag-of-image, which are extracted from both the visual and textual information of image. Each search engine possesses different algorithms and each of them reduces some sort of noise and increases time and space efficiency. And there is no system with the various algorithms implemented in a single search engine.

2. Proposed System

Millions of images are shared and also generated over internet .So it is necessary to retrieve images faster, easier and with higher relevancy. The browsers available today performs only sketch based and feedback based algorithm which is not that much time and space efficient compared to Visual Intelligence. Not only retrieves images with higher time and space efficiency but also visually understand and analyze the mindset of the users and also retrieve images without displaying irrelevant images.

A) Implementation of click based algorithm to the search engine for efficient retrieval based on social ranking:

The click based image retrieval is one of the algorithms, which is used for retrieving images based on the number of times the image has been clicked and viewed by others. To mine implicit feedbacks from users, i.e., click-through data, for reducing intent gap, we develop twoclick-basedAssumptions (assumption 1 and 2), and combine them with the traditional assumption (assumption 3) as follows:

- ✓ Images with more clicks have higher typicality than the
- ✓ ones with no or relatively less clicks,
- ✓ Clicked images are more similar with each other than a clicked image with an unclicked one, and
- ✓ Visually similar images should be present only once in the ranking list.

Click based algorithm works as follows:

- ✓ Based on the input text query, the initial list will be ranked based on the clicks.
- ✓ Clusters are formed which includes two re-ranking approaches
  a. Learning click based similarity and
  b. Learning click based typicality

Algorithm-Click based similarity and typicality

Input-Given: query Q, initial ranked list n based on the click information and M different cluster pairs are formed.

1) Select the clicked pairs J
2) Sort the clicked pairs based on the similarity and typicality of the attributes
3) Select click based triplets s
4) Calculate click based local typicality within each cluster and sort the images

Output- Re-ranked list of query Q

To measure performance Normalized Discounted Cumulative Gain (NDCG) is used in information retrieval when there is more relevance levels .Given an initial ranked list, NDCG at the depth l is defined as

NDCG *@l = zi summation limit l to i=1 2^ r^ I -1/log (1+i)* Where *r i* is relevance score of the *i th image*, and Zl is a Normalization constant to guarantee that a perfect ranking's NDCG@*l* is equal to 1.

B) Implementation of tag based algorithm to the search engine

Tag based image retrieval is another algorithm that is being used in all the image search engines, that retrieves the relevant image based on the description given to the images. The figure 3.1 shows the working of tag based algorithm. Initial step is to specify the user required text query which performs text based image search based on the text length and the name of the image that is stored in the database.

1) Active re-ranking is done for more satisfactory result
2) To avoid ambiguity via learning users intension

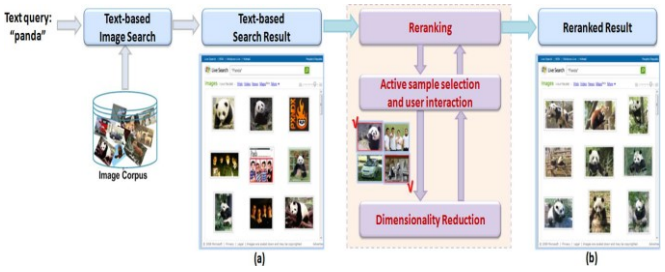

Figure 1. Flow of tag based search

A similarity matrix W whose element Wij is introduced to measure the visual distance between the two images *i* and *j*, with their visual features V_i and V_j. Here, can be directly calculated using Gaussian kernel function with a radius parameter σ as follows:

$$W_{ij} = \exp(- ||V_i - V_j||^2 / (2 \sigma^2))$$

Where W is denoted as matrix, I and j as images, V_i and V_j as visual features of the image and sigma represents the radius parameter which is set to be the mean value of all distance between the images.

III. RESULTS AND DISCUSSION

Integration of modules

This paper introduces an algorithm which combines both the click based and tag based image retrieval algorithm as a matrix. The matrix algorithm is implemented for finding the relevancy of images. The image is said to be more relevant if the value of attributes of both the algorithms (i.e. the tag based and click based) are high. After learning the similarity metric for multiple features, we conduct spectral clustering to group visually and semantically similar images into same clusters. We calculate the cluster typicality based on the click-based initial cluster confidence and relative cluster similarity, and then re-order clusters by cluster typicality in descending order. The final re-ranked list is obtained by computing the within-clusters images typicality, which is determined by the click-based initial image confidence and local density.

Algorithm-Click based similarity and typicality

Input-Given: queries Q, final ranked list X_i, based on the click information and tag information Y_i different cluster pairs are formed using learning image similarity and typicality. I be the set of images where I= 1,2,…N and N be the number of images.

1) Let M be the matrix, where Xi and Yi are the rows and columns of the matrix M and T is the threshold value.
2) The row value R includes the results of tag based re-ranking and the column value C includes the results of click based re-ranking and user intensions.
3) With the given T, if both Xi and Yi >=T, then the i^{th} image is the most relevant image.

Output- Image

To measure performance Normalized Discounted Cumulative Gain (NDCG) is used in information retrieval when there is more relevance levels .Given an initial ranked list, NDCG at the depth l is defined as

NDCG *@l = zi summation limit l to i=1 2^ r^ I -1/log (1+i)* Where *r i* is relevance score of the *i^{th} image*, and Zl is a Normalization constant to guarantee that a perfect ranking's NDCG@*l* is equal to 1.

The below figure shows the architecture of Visual Intelligence. Image query from the user is the stage 1 of this VI architecture. The queries collected from n number of users are taken into consideration to know the frequently accessed images and these images are then

stored in a database which is referred as frequently accessed images database in Visual Intelligence architecture. The image query is checked every time with the frequently accessed image database, if the query matches any of the images in the database, it retrieves the image. The flow of the search engine is displayed in figure 3.2. If the query does not match the frequently accessed image database, then the VI searches the images database by matrix

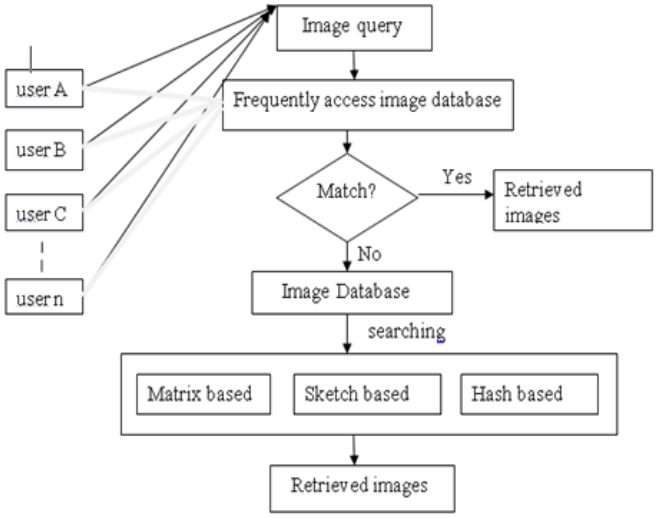

Figure 2.

Figure 2. Architecture of visual search engine based, sketch based and hash based algorithms and finally retrieves the image. In most of the image search engine, the commonly used techniques are content based image retrieval, tag based image retrieval, click based image retrieval, etc. This project aims in proposing a matrix algorithm which generates a matrix whose values constitutes the attribute results of the click based and tag based image retrieval. Usually, several interaction rounds are performed to achieve a satisfactory performance.

IV. CONCLUSION

Thus the "Visual Intelligence" is used for retrieving images with high time and speed efficiency with the implementation of the hybrid algorithms which includes tag based and click based algorithms. Multiple searches and Ranking are done for the best search experience for the user with the matrix constructed during the search

V. FUTURE ASPECT

The Future enhancements are made in such a way that matrix is constructed not only with two algorithms but with three to four highly efficient algorithms such as sketch and hash based algorithms to improve the performance of the retrieval which can be used in E-Commerce sites to achieve better user experience in searching for the product.

VI. REFERENCES

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