Content Based Image Retrieval and Its Ranking Using K-NN and SVM Classifiers

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Abstract

Image retrieval is the process of searching relevant images on web search engines. There is a vast amount of research work which provides information about image search re-ranking. The web image search usually depends on the surrounding text of the image. It is very difficult to understand the user purpose only by query keywords and this leads to irrelevant image search results. The various information is need to be gathered for getting more and more information in this area. In this paper we presents the novel method for querying of images with image as an input using K-NN and SVM algorithm. Proposed method outperforms K-NN method and SVM achieves 100% accuracy while searching for query images.

Keywords— *Object queries, image Re-ranking , Image Retrieval, query image , image search.*

I. INTRODUCTION

Image retrieval is the process of searching relevant images on web search engines. A vast amount database has been maintained to be stored and retrieval of images is done at the server side. The image search engine has become a very important feature of multimedia. It plays a very important role in day-to-day life. There are some images which helps to search query results are satisfactory and some of them are unsatisfactory.

The web image search usually depends on the surrounding text of the image. It is very difficult to understand the user purpose only by query keywords and this leads to irrelevant image search results. In this paper the survey on different researches in the field of web image search. These methods vary from content information search to user feedback. Also there are some methods which are depending on the visual similarities between the images. Therefore, to improve the result of web image search, strategies like keyword expansion, active re-ranking is also used. This paper focuses on the methods introduced.

A. Traditional Image Re-ranking Framework

Most of the web image search engines have adopted some strategies. A query keyword input by a user a pool of images relevant to the query keyword are specifically retrieved by the search engine. As a result to this is according to a stored word-image index file by the user to select a query image which detect the user's search goal, from the particular set, the remaining images in the set are re-ranked based on the visual features are not selected as well as similarity scores of images are stored whenever a new image gets added into the datasets and we have to compute its similarities with existing images, then the visual features need to be computed one more time and so on.

If the visual features are discarded and only the similarity scores of the images have been stored, whenever a new image is added into the dataset and we have to solve its similarities with existing images, then the visual features need solve again. It is very popular in all variety of search engines. But it may give ambiguous result.

For example user has entered some query 'sony', therefore as the entered query is not upon the classified system can retrieve images like 'sony logo', 'sony TV' information about query keyword else he can't get useful the images. The semantic meaning of query keyword may be distinct than intended. The search engine gives additional text keyword suggestion when user enters some query, hence it is a great advantage but it may possible that user may get distract from its way e.g., 'sony Mobile', 'sony company images' etc.

Now-a-days, Image Search Re-ranking approaches are mainly focus on two most important aspects Feature Extraction and Indexing.

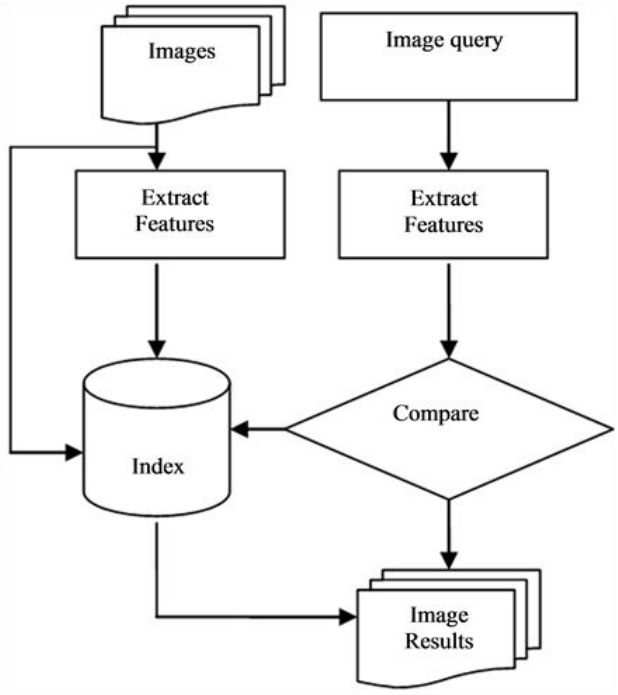

Fig. 1. Traditional Image Retrieval System

Visual features always play a fundamental role in Image Search Re-ranking and other image search applications where a lot of approaches have been imply and developed for example local and multimodality fusion features in Image Search Re-ranking, respectively. Here, Query-dependent re-ranking features for a query-dependent re-ranking model, which are usually based on the exploitation of the visual context, initial ranking, etc. To make effectively fuse multiple modalities, a graph-based re-ranking algorithm is proposed that can effectively integrate the learning of relevance scores, weights of modalities, and distance metric into a unified scheme.

II. LITERATURE SURVEY

Bin Lin [1], focused on an effective query adaptive re-ranking method using deep convolutional neural network feature. In the feature extraction and description stage, the DCNN feature is utilized to help describing the image in a more informative way. In the re-ranking model stage, query difficulty estimation technique is applied to help us select the query-adaptive parameters for re-ranking model. Experiments are conducted on a Web image dataset, which demonstrate the effectiveness of our method.

Josip Krapac [2], how to construct query-relative features that can be used to train generic classifiers, and rank images for previously unseen search queries without additional model training. The features combined textual information about the occurrence of the query terms and other words found to be related to the query, and visual information derived from a visual histogram image representation. Author applied our image re-ranking method to the topranked images returned by a web search engine.

Yushi Jing [3], focused on VisualRank algorithm presents a simple mechanism to incorporate the advances made in using link and network analysis for Web document search into image search. Although no links explicitly exist in the image search graph, we demonstrated an effective method to infer a graph in which the images could be embedded. The result was an approach that was able to outperform the default Google ranking on the vast majority of queries tried, while maintaining reasonable computational efficiency for largescale deployment.

Rong Yan [4], presents an algorithm for video retrieval by fusing the decisions of multiple retrieval agents in both text and image modalities. While the normalization and combination of evidence is novel, this paper emphasizes the successful use of negative pseudo-relevance feedback to improve image retrieval performance. While the results are still far from satisfactory, PRF shows great promise for multimedia retrieval in very noisy data.

Linjun Yang [5], In this paper, we introduced a supervised learning paradigm into the visual search re-ranking concept to create a more robust re-ranking model. The idea leverages the advantages of both supervised concept-based search and unsupervised visual search re-ranking, while it does not suffer from scalability issues characteristic for concept-based search. To realize this idea, Author proposed and formally defined a learning-to re-rank framework, which we implemented using the adapted Ranking SVM algorithm and 11 lightweight re-ranking features that encode the relevance between the textual query and visual documents.

III. METHODOLOGY

In this section the proposed methodology is discussed in details. The proposed workflow is presented in fig. 2. It consists of several different modules.

1. Image Dataset Collection
2. Training of Datasets
3. Load Dataset
4. Select Image
5. Query Image
    a. K-NN Classification
    b. SVM Classification

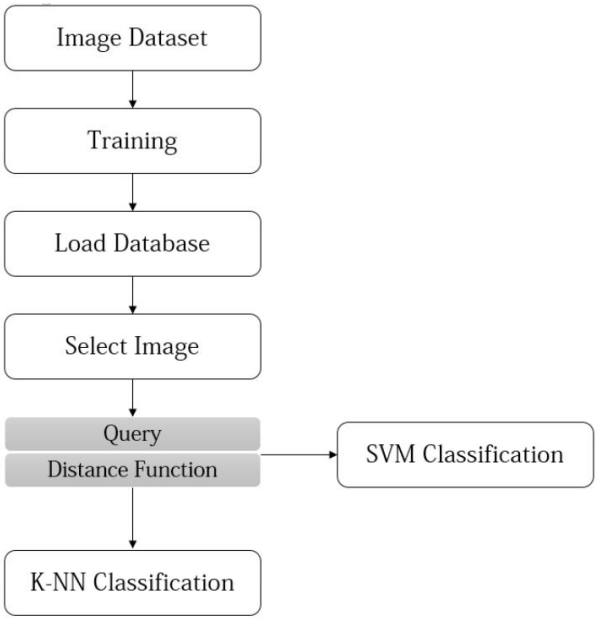

Fig. 2. Proposed workflow

A. *Image Dataset*

The image dataset is used for training. The collection of images are trained firstly to extract features.

B. *Training*

In this step the features are extracted from each of the image. These feature are used for querying image. Steps involved in feature extraction are:

a. Quantization
b. Compute Auto Correlogram
c. Compute Mean and Standard Deviation
d. Gabor Filtering
e. Transformation
f. Vector Computation

C. *Load Database*

After the feature extraction step the images features are stored into the database. For querying from database the image features are loaded.

D. *Image Selection*

The image are selected for query. The user has to select one image for querying into database. The image features are extracted for query image also and compared with existing database.

E. *Similarity Function*

The similarity function is used for comparing the query image with the database. The distance function like L1, L2 and Euclidean Distance may be used for similarity measure. We have used L1 similarity measures.

F. *K-NN Classification*

The K-NN classifier is used for the classification of different images. The K-NN is simple but has some limitation.

G. *SVM*

SVM classifier is used for classification of images from the databases. The SVM outperforms the K-NN algorithm. SVM smartly classify the query image and identify the similar types of images with highest accuracy.

IV. RESULTS

This section deals with the various outcomes of the SVM and K-NN classifier. The beach image collection is used for classification of images.

The query image is presented in fig. 3.
The output of KNN and SVM model are presented in fig. 4 and 5.

Fig. 3. Shows the query image to knn and svm classifier

Fig. 4. Output of K-NN Classifier

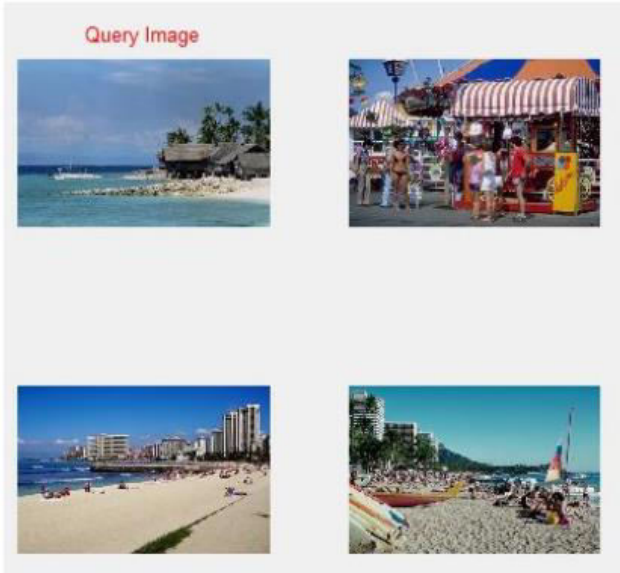

Fig. 5. Shows the output of SVM classifier

V. CONCLUSION

Image retrieval is the process of searching relevant images on web search engines. There is a vast amount of research work which provides information about image search re-ranking. The web image search usually depends on the surrounding text of the image. It is very difficult to understand the user purpose only by query keywords and this leads to irrelevant image search results.

It is clearly visible from fig. 4 and 5 that the SVM outperforms K-NN classifier. The K-NN produces image of mountain but the SVM produces result with 100% accuracy. SVM also produces the beach image which is not matched with the searched image but it is an image of beach.

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