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A Novel Image Searching/Retrieving Approach using Sample Image and Text

Apurva S. Gomashe[1], R. R. Keole[2]

[1]Department of Computer Science & Engineering, HVPM's College of Engg & Tech, Amravati University, Maharashtra, India

[2]Professor, Department of Information Technology, HVPM's College of Engg & Tech, Amravati University, Maharashtra, India

Abstract: ***The current image searching approach is successful in retrieving images, using keyword based approach for image content based approach. This system are design to analysis the images from query log and its fail to retrieve the new query's which are not present in query log and in this system first user give input in the form of text and then system provide click-thorough session. Then user click on images to retrieve more similar, relevant images as an output, but this process was time consuming and its gives images from log history. This existing system have some limitations discuss in literature review, to overcome this limitations develop new search engine system. In this paper we see that how our new image searching approach works and what would be the results are gives to users.***

Keywords: Image Searching, Image Retrieval, Text Based Image Retrieval, Content Based Image Retrieval, Features Extraction, Re-ranking

1. Introduction

With the development of technology, more and more images come into view as and have become a part of our daily existence. There is a wide range of applications which require image processing tools. Some of its examples are crime prevention medicine, Fashion and graphic design, Architectural and engineering design, Publishing and advertising, research, law etc. Thus, there are many technologies have been developed to meet the requirement. There are two kinds of such technologies: text-based image retrieval and content based image retrieval, CBIR. In the text-based approach, images are usually manually searched by text descriptors. Its greatest merit is that when images are recorded correctly, good search results can be achieved. This approach has some limitations. The first is that a considerable amount of human labor for manual annotation is required. The second entry is inaccurate due to the subjectivity of human perception. To overcome the above drawbacks of text-based retrieval of images, CBIR was introduced and has become the predominant technology. Content-Based Image Retrieval (CBIR) has become an active research area [1]. CBIR refers to techniques used to index and retrieve images from databases based on their visual content. Visual content is typically defined by a set of low level features extracted from an image that describe the color, texture and/or shape of the entire image [2]. CBIR methods are capable of searching in large database collections. However, the present methods used in CBIR are neither fully reliable, nor fast enough to handle image databases beyond a closed domain and the techniques used are still subject to development. Various image retrieval systems [3], including Query By Image Content (QBIC), VisualSeek and Virage have been built, based on the low-level features for general or specific image retrieval tasks. However, effective and precise image retrieval still remains an open problem because of the extreme difficulty in fully characterizing images. Successful techniques have been developed for some specific applications, such as face and finger-print recognition [4]. An effective approach for querying and browsing images still remains elusive. Both the text and content based techniques have their own characteristics, advantages and disadvantages, limitations. To overcome these limitations existing system was developed by using text based approach for image content retrieval means in this system user gives the input in the form text query and then system will provide various images related to this text query for example user enter query apple, but the apple word is not represent actual goal or aim of user because they have Multi-concepts apple is a fruit, apple is logo of apple company, etc so this system was not understand what user want only in the basis of text so the system provide number of images like apple fruit, logo, mobile and allow user to click on image that they want to search more images related with this clicked image and this process was time consuming. In our proposed system is design in such a way to reduces searching time means we allow user to give input in both forms image with text for easy to searching and overcomes the limitations which occurs due to TBIR, CBIR, and existing systems. Existing system is design to reduce semantic gap but it's focused on analyzing a query appearing in the query log, this system not analyzed new query which not appeared in query log. So we design new proposed system for search engine can also be extend for a new query (not appearing in the query logs). In this paper is organized as follows. Section 2 Literature Review, In Section 3 Proposed Method, Section 4 discuss the result, Section 5 discuss the conclusion.

2. Literature Review

The field of image searching/ retrieval has been an active research area for several decades and becomes more and more interesting area in recent years. In recent years, the research on inferring user goals or intents for text search has received much attention. Many early researches define user intents as navigational and informational. Some works focus on tagging queries with more hierarchical predefined concepts to improve feature representation of queries. User search goals and the number of them should be arbitrary and not predefined.

Clustering search results [5] is an effective way to organize search results, which allows a user to navigate into relevant documents quickly. As a primary alternative strategy for presenting search results, clustering search results has been studied relatively extensively. The general idea in virtually all the existing work is to perform clustering on a set of top-ranked search results to partition the results into natural clusters, which often correspond to different subtopics of the general query topic. A label will be generated to indicate what each cluster is about. A user can then view the labels to decide which cluster to look into. Such a Such a strategy has been shown to be more useful than the simple ranked list presentation in several studies. However, this clustering strategy has two deficiencies which make it not always work well: i) The clusters discovered in this way do not necessarily correspond to the interesting aspects of a topic from the user's perspective. For example, users are often interested in finding either "phone codes" or "zip codes" when entering the query "area codes." But the clusters discovered by the current methods may partition the results into "local codes" and "international codes." Such clusters would not be very useful for users; even the best cluster would still have a low precision. ii) The cluster labels generated are not informative enough to allow a user to identify the right cluster. iii) Since feedback is not considered, many noisy search results that are not clicked by the users may be analyzed as well. Wang and Zhai clustered queries and learned aspects of these similar queries, which solves the problem in part. However, their method does not work if we try to discover user search goals of one single query in the query cluster rather than a cluster of similar queries. For example, in, the query "car" is clustered with some other queries, such as "car rental," "used car," "car crash," and "car audio." Thus, the different aspects of the query "car" are able to be learned through their method. However, the query "used car" in the cluster can also have different aspects, which are difficult to be learned by their method.

J. Carbonell and J. Goldstein, ACM [6] introduce the Maximal Marginal Relevance (MMR) criterion strives to reduce redundancy while maintaining query relevance in re-ranking retrieved documents but the limitation of this technique is MMR is not efficient to minimize redundancy when several documents are collected.

Zhangxu-bo, IEEE [7] improved K-means clustering and relevance feedback to re-rank the search result in order to remedy the rank inversion problem in content based image retrieval but the limitation is when the visual information is totally unreliable then the K- means algorithm fail.

Algorithmic steps for k-means clustering

Let $X = \{x_1,x_2,x_3,\ldots\ldots\ldots,x_n\}$ be the set of data points and $V = \{v_1,v_2,\ldots\ldots\ldots,v_c\}$ be the set of centers.

1) Randomly select *'c'* cluster centers.
2) Calculate the distance between each data point and cluster centers.
3) Assign the data point to the cluster center whose distance from the cluster center is minimum of all the cluster centers..
4) Recalculate the new cluster center using:

$$Vi = (1/Ci)\sum_{j=1}^{Ci} Xi$$

where, 'c_i' represents the number of data points in i^{th} cluster.
5) Recalculate the distance between each data point and new obtained cluster centers.
6) If no data point was reassigned then stop, otherwise repeat from step 3).

Disadvantages

1) Applicable only when mean is defined i.e. fails for categorical data.
2) Unable to handle noisy data and outliers.
3) Algorithm fails for non-linear data set.

Xiaoou Tang, Fang Wen, IEEE [8] proposed a novel Internet image search approach. It only requires the user to click on one query image with minimum effort and images from a pool retrieved by text-based search are re-ranked based on both visual and textual content. In this paper limitation is its retrieve the data from only database so semantic gap is cause the problem.

Zheng Lu, Xiaokang Yang, Senior Member, IEEE [9] introduced new approach using guidance of implicit user. It designs new method which searches the images only from log history to reduced semantic gap using spectral clustering with ε-neighborhood graph. But in this system there are limitations such as the e ε-neighborhood graph is usually considered as an unweighted graph and it's fail for weighted graph. It retrieves the data only from query log if users want images that not percent in the log history then that time this system was fail.

3. Proposed Methodology

In this paper for performing image searching, database of various images will be collected along with the label or text for images. This database will be saved locally for the further process. By using various feature of the database images will be found out, features will be edge map, color map, area, major access length, minor access length and other morphological feature. After that the features evaluated of each and every image along with the search text/ label will be store in the database so that it can be used for future evaluation. Then input text will be taking from user and a series of images also called as image search goal will be presented to the user so that the user can select one of them based on the input images will be retrieved and re-rank based on the features. The proposed system is an initiative to solve the above user and developer problem. The system is motivated from the literature survey of the search engine. This section describes the overall working of the system and methods which they are use. It describes all the phases that are present in the system. The system consists of several phases defined by an example that will make it easy for the analysis of the system. The phases are as follows:

Getting Query

In this phase user gives or submit the query means user gives the input to the system in the form of image and text both simultaneously. Because we want to give more relevant resulting images to user at very less time. If we take one

example suppose there are 3 users and first user want to search images of Eiffel Tower, after that second user search Toyota car, and third user search again Eiffel Tower.

Extracting Features

After getting a query it's important to extract the features of images like Image Visual features, because using these extracting features of input image match with this to our existing images features from query log as well as database to search and retrieve the image that user wants to search. In our example 1st extract the feature of Eiffel tower image which user gives as input, same procedure done for 2nd and 3rd users given input images. In Features extraction process we have to design our program to extract color descriptor, edge descriptor, area, eccentricity, grayscale.

Combining Information

After extracting image features information and text information by using rule mining find the relation between these two types of information and combines this information for finding/searching more new relevant images from database and query log. These two types of information combining by using association rule mining because association rule mining is find the main relation between these two kinds of information by using association rules are if/than statements, that help uncover relationships between seemingly unrelated data in a relational database or other information repository. An example of an association rule would be "If a customer buys a dozen eggs, he is 80% likely to also purchase milk." An association rule has two parts, an antecedent (if) and a consequent (then). An antecedent is an item found in the data. A consequent is an item that is found in combination with the antecedent. Association rules are created by analyzing data for frequent if/then patterns and using the criteria support and confidence to identify the most important relationships. In our example suppose consider for 1st user he gives input image of "Eiffel Tower" and in text box write only "Tower", so by using rule mining find the relations between these two types of input information and search the images of "Eiffel Tower in Paris".

Operations Perform

For searching more relevant images form query log and database before that various operations are perform on input information's like apply Semantic matching algorithm which identify semantically related information, means meaning full information and then apply support vector machine for classifying information, at last apply spectral clustering algorithms with rang of influences.

Semantic matching: It is used to identify information which is semantically related. Given any two graph-like structures, e.g. classifications, taxonomies database and ontologies, matching is an operator which identifies those nodes in the two structures which semantically correspond to one another. For example, applied to file systems it can identify that a folder labeled "car" is semantically equivalent to another folder "automobile" because they are synonyms in English.

Support Vector Machine (SVM): Support vector machine is a machine learning method that is widely used for data analyzing and pattern recognizing. We used SVM for classification of data because classifying data has been one of the major parts in machine learning.

Spectral Clustering with rang of influence: Spectral clustering algorithm is used to construct the semantic similarity graph, basically spectral clustering finds a partition of the similarity graph. We used this spectral clustering algorithm with rang of influence for equally clustering group of data.

Re-ranking: Re-ranking is used to re-arrange the sequence of resulting images means most relevant images are display first on the list of output. In our proposed system re- ranking is used on the basis of scored.

4. Result and Discussion

In this paper we discuss the result of our proposed system. In above section we take one examples now by using this example we see that how we get the result or output. In our example 1st user get the images of Eiffel tower from database and result of this 1st user stored into query log as log history of pervious user. For 2nd user the system was search the image from query log if it is present in query log then it was shown in result, but it was not present in query log that time the system was search images from database means here 2nd user give input as an Toyota car but it was not present in log history still the user get output because we design our system which search the data from both query log as well as database, here 2nd user getting result i.e., Toyota car which is not present in query log but present in database and this 2nd user result also stored in query log. And when 3rd user give input as an Eiffel tower which already search by previous user at that time system search and retrieve the previous user data from query log as well as new images which related to this input image stored in database such images are also shown in result for 3rd user.

This section presents the screenshots of the Image searching/retrieving system in order to demonstrate the complete process.

The first screen after starting the system shown to the user is display below in the screenshots. System provide three click button Create Database: To create data collection for admin/user, Apply Retrieval: To search and retrieve relevant images form data collection, Clear Database: To clear data collection

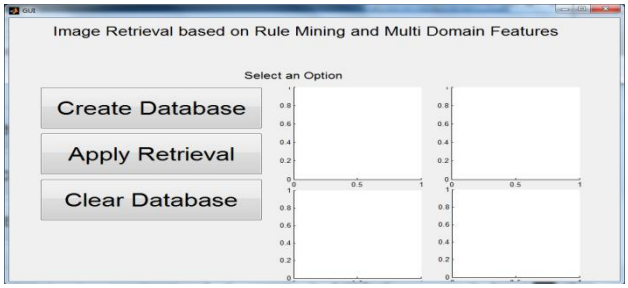

Figure 1: Home page of Image Searching and Retrieving System

According our example first users enter query for Eiffel tower by click on apply retrieval button, they gives input

image and text both means adding image enter text in text box using this two types of inputs our system work further process using rule mining and semantic matching, SVM, spectral clustering with rang of influence search images into data collection like main database or query log which is also one type of database but in query log stored only history of previous user, so for first user system search images from database. Fig 2 shows input enter by 1st user and Fig 3 shows resulting images now these images are stored in query log as history of 1st user.

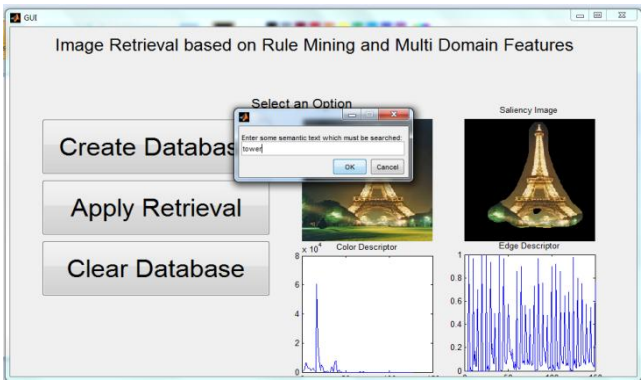

Figure 2: Give the input in the form of image and text

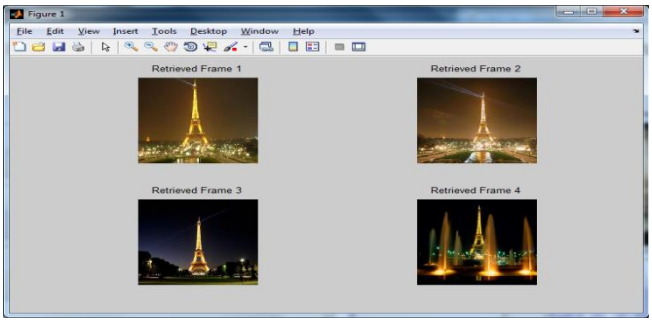

Figure 3: Display the output for first user

Same process done for 2nd user and 3rd user, 2nd user get the resulting image from main database because they enter new query which is not present in query log and its result show in Fig 4. The 3rd user enter the same query like 1st user only they gives different image of Eiffel tower and in this case images are search/ retrieve from both query log as well as new images related to input image from main database and its output or result shows in Fig 5.

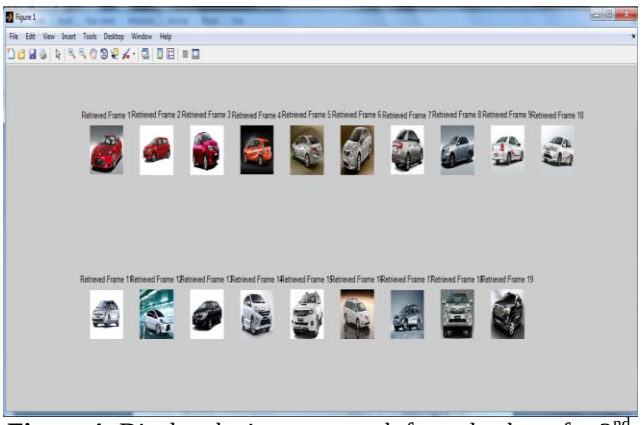

Figure 4: Display the images search from database for 2nd user

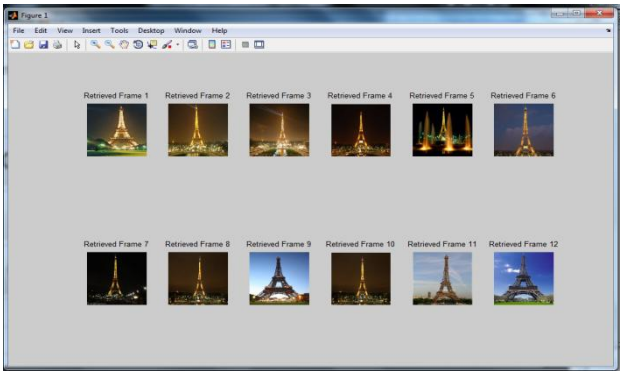

Figure 5: Display the images search from query log as well as database

5. Conclusion

In this paper we propose a new image retrieval approach which combines text, content and interactive based retrieval. We designed a hybrid image retrieval system with the method proposed, which successfully achieves the demands with respect to the system requirements i.e., allows the users to retrieve their desired images based on the text and sample image query.

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