CBIR using Speech, Text & Image Query for Mobile Device

Nikita Sancheti , Prof. Nagaraju Bogiri

Department Of Computer Engineering ,

KJCOEMR , Pune , India

ABSTRACT

The Image retrieval plays a key role in day-to-days world. This work is a review of various references of various image retrieval methods. This paper starts with discussing the working conditions of text based image retrieval then the content-based retrieval. We briefly discuss about various techniques of content based image retrieval such as retrieval by color, shape and the texture and the various algorithms involved in content based image retrieval. Then the semantic based image retrieval aspects are discussed using local content descriptors the regions are segmented and retrieved the semantic regions of image.

Keywords: *Mobile visual search, SBIR, 5-Nearest Neighbour, image re-ranking, figures similarity, Hadoop MapReduce , Perceptual similarity,CSD,EHD.*

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1. INTRODUCTION

Image retrieval (IR) has become an important research area in computer vision where digital image collections are rapidly being created and made available to multitudes of users through the World Wide Web. Tremendous increment in the collections of images from art museums, medical institutes, and environmental agencies, to name a few. In the commercial sector, Companies have been formed that are making large collections of photographic images of real-world scenes available to users who want them for illustrations in books, articles, advertisements, and other media meant for the public at large. Incredibly, the indexing of these images is all being done manually–a human indexer selects and inputs a set of keywords for each image. Each keyword can be augmented by terms from a thesaurus that supplies synonyms and other terms that previous users have tried in searches that led to related images. Keywords can also be obtained from captions, but these are less reliable. Content-based image retrieval research has produced a number of search engines. The commercial image providers, for the most part, are not using these techniques. The main reason is that most CBIR systems require an example image and then retrieve similar images from their databases. Real users do not have example images; they start with an idea, not an image. Some CBIR systems allow users to draw the sketch of the images which they wanted. Such systems require the users to have their objectives in mind first and therefore can only be applied in some specific domains, like trademark matching, and purchase of painting. Thus the recognition of generic classes of objects and concepts is essential to provide automated indexing of images for CBIR. However, the task is not easy.

Computer programs can extract features from an image, but there is no simple one-to-one mapping between features and objects. Earlier CBIR systems rely on global image features, such as color histogram and texture statistics. Global features cannot capture object properties, so local features are favored for object class recognition. For the same reason, higher-level image features are preferred to lower-level ones. Similar image elements, like pixels, patches, and lines can be grouped together to form higher-level units, which are more likely to correspond to objects or object parts. Different types of features can be combined to improve the feature discriminability. For example, using color and texture to identify trees is more reliable than using color or texture alone.

The context information is also helpful for detecting objects. A boat candidate region more likely corresponds to a boat if it is inside a blue region. While improving the ability of our system by designing higher-level image features and combining individual ones, to be prepared to apply more and more features since a limited number of features cannot satisfying the requirement of recognizing many different objects in ordinary photographic images.

2.LITERATURE SURVEY

2.1. Interactive Multimodal Visual Search on Mobile Device Houqiang Li, Senior Member, IEEE, Yang Wang, Tao Mei, Senior Member, IEEE, Jingdong Wang, Senior Member, IEEE, and Shipeng Li, Fellow, IEEE, APRIL 2013 :

In this paper author have studied the novel multimodal interactive image search system on mobile devices. The system, the Joint Search with ImaGe, Speech, And WordPlus (JIGSAW), takes full advantage of the multimodal input and natural user interactions of mobile devices. It is designed for users who already have pictures in their minds but have no precise descriptions or names to address them. By describing it using speech and then refining the recognized query by interactively composing a visual query using exemplary images, the user can easily find the desired images through a few natural multimodal interactions with his/her mobile device. The search procedure of our proposed system consists of the following phases:

1) The user speaks a natural sentence to describe the intended images,
2) The speech is recognized and further decomposed into keyword(s) which can be represented by exemplary images,
3) The user selects preferred exemplar(s) and composes a schematic collage as a composite image,
4) The composite image is then used as a visual query to search for similar images,
5)If possible, further information like GPS locations and image descriptions are provided to the user.

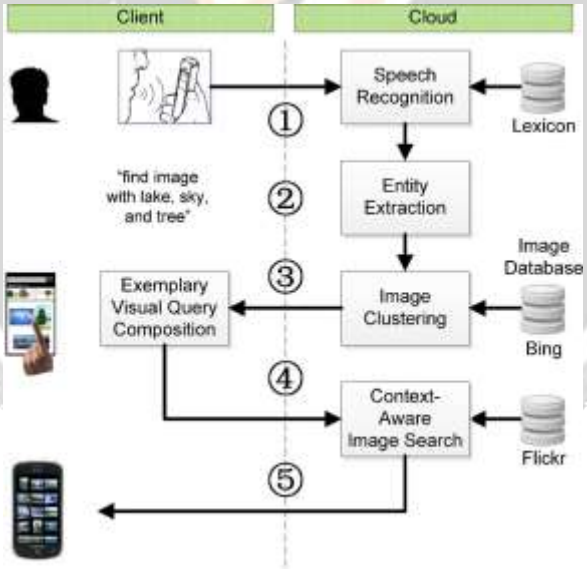

Fig. 1. The architecture of multimodal visual search system.

2.2 .Sketch4Match –Content-based Image Retrieval System Using Sketches B. Sz´ant´o, P. Pozsegovics, Z. V´amossy, Sz. Sergy´an O´ buda University/Institute of Software Technology, Budapest, January 29, 2011 :

In this paper author have introduce the problems and challenges concerned with the design and the creation of CBIR systems, which is based on a free hand sketch (Sketch based image retrieval – SBIR). . The used descriptor is constructed after such special sequence of preprocessing steps that the transformed full color image and the sketch can be compared. We have studied EHD, HOG and SIFT. Experimental results on two sample databases showed good results. Overall, the results show that the sketch based system allows users an intuitive access to search-tools.

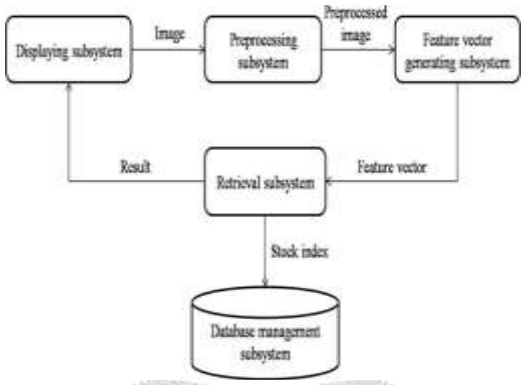

Fig.2. The global structure of the system.

2.3 Fusion of Colour, Shape and Texture Features for Content Based Image Retrieval Pratheep Anantharatnasamy, Kaavya Sriskandaraja, Vahissan Nandakumar, April 28, 2013.:

In this paper author have proposed a content based image retrieval system based on three major types of visual information: color, texture and shape, and their distances to the origin in a three dimensional space for the retrieval. We experimentally investigated several feature extraction methods and learning algorithms for content based image retrieval. The results show that 5-Nearest Neighbor yield the highest accuracy for the chosen feature extraction methods. The architecture of our proposed CBIR system can be divided into several components as follows:

1) Color feature extraction
2) Texture feature extraction
3) Shape feature extraction
4) Image classification
5) Combining the three extracted features
6) Similarity measure

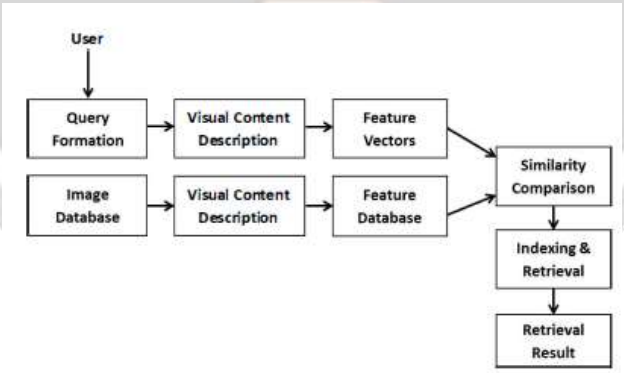

Fig.3. Block diagram of the CBIR system

2.4 Web Image Re-Ranking Using Query-Specific Semantic Signatures Xiaogang Wang, Member, IEEE , Shi Qiu, Ke Liu, and Xiaoou Tang, Fellow, IEEE , APRIL 2014 :

In this author have propose a novel image Re-ranking framework, which automatically offline learns different semantic spaces for different query keywords. The visual features of Images are projected into their related semantic spaces to get semantic signatures. At the online stage, images are re-ranked by comparing their semantic signatures obtained from the semantic space specified by the query keyword.

The proposed query-specific semantic signatures significantly improve both the accuracy and efficiency of image re-ranking. The original visual features of thousands of dimensions can be projected to the semantic

signatures as short as 25 dimensions. Experimental results show that 25-40 percent relative improvement has been achieved on re-ranking precisions compared with the state-of-the-art methods.

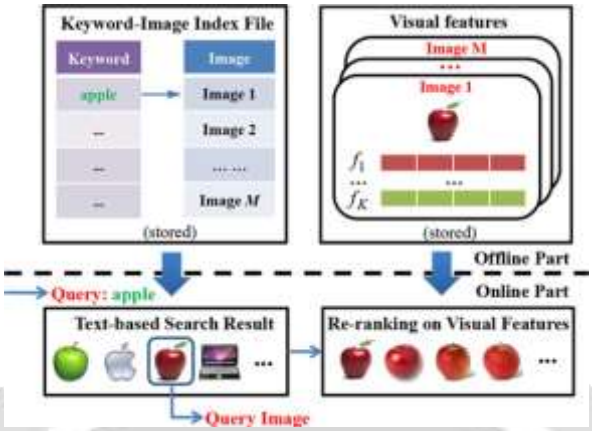

Fig. 4. The conventional image re-ranking framework.

2.5- Shape-Based Plagiarism Detection for Flowchart Figures in Texts Senosy Arrish, Fadhil Noer Afif, Ahmadu Maidorawa and Naomie Salim , February 2014:

In this paper author have is proposed a system to retrieve figures having certain characteristics based on the given query. The system should be able to retrieve figure with the most similarity value. Moreover, system returns similarity value lower than 1 when a partially match query is given by the user. When there is nearly unexact match of query in the system, as was indicated in the third query, the system returns similarity value close to zero.

The main goal of this project is to create a figure plagiarism system that is primarily based on shape. This system primarily focuses on flowcharts detection. The database contains flowchart images stored in a single folder. The system will retrieve and rank this database based on a given query by the user. The retrieval system works by detecting shapes in each figure and compare to the shape from the query.

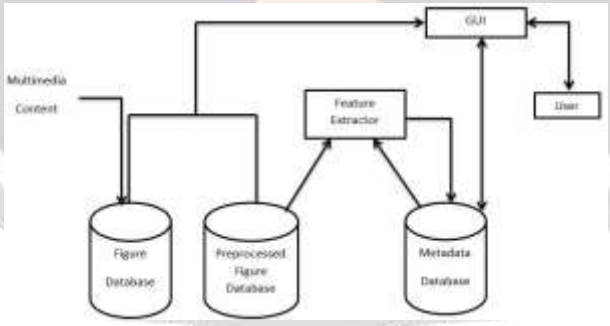

Fig. 5. Multimedia Information Retrieval System.

2.6. Improving Performance of Content-Based Image Retrieval Schemes using Hadoop MapReduce Wichian Premchaiswadi Graduate School of Information Technology in Business:

In this paper author have introduced a HadoopMapReduce framework is presented in order to perform parallel processing used for an online CBIR application. HadoopMapReduce framework is used with the intention of integrating an image analysis algorithm into the text-based image search engines without degrading their response time. As a result, the main objective of the study is a distribution of the image data over a large number of nodes.Some of the techniques used in the paper includes: image indexing and retrieval, parallel processing of downloading images, indexing, and comparing the similarity of retrieved images from various sources.

Author has given the details of the framework to perform parallel processing of online CBIR application as a result of applying a HadoopMapReduce processing method. We illustrated the method to apply the

"HadoopMapReduce" model on a CBIR application in more detail. In addition, the ACCC algorithm was proposed in order to reduce the processing time of feature computation.

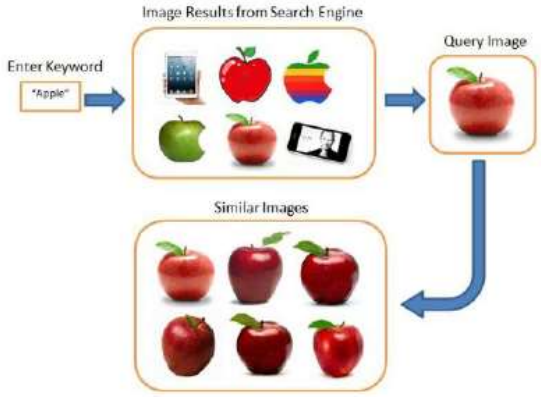

Fig. 6. Proposed image search scheme.

2.7- PRoSPer: Perceptual similarity queries in medical CBIR systems through user profiles $ PedroH.Bugatti a,n, DanielS. Kaster b, MarceloPonciano-Silva a, CaetanoTrainaJr.a, , 18 November 2013 :

In this paper author have presented a novel approach to perform similarity queries over medical images, maintaining the semantics of a given query posted by the user. Content-based image retrieval system relying on relevance feedback techniques usually requests the users to label relevant/irrelevant images. Thus, we present a highly effective strategy to survey user profiles, taking advantage of such labeling to implicitly gather the user perceptual similarity. Experiments on medical images show that the method is effective and can improve the decision making process during analysis. This paper contains details of two new measures to quantify the perceptual similarity of a user regarding a given query, called the Perception Factor (PF) and the Average Perception Factor (APF).

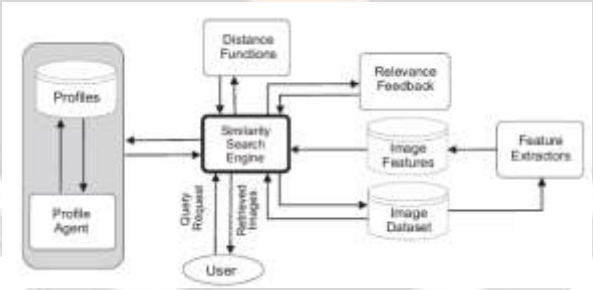

Fig.7.Integration of the profiling proposed approach with a typical CBIR system.

2.8- Efficient Content based Image Retrieval System using Mpeg-7 Features Swapnalini Pattanaik M.E. Electronics Student, RSCOE ,Pune ,India. , September 2012 :

In this paper author have described the efficient retrieval of images using different Mpeg-7 Features. Content Based Image Retrieval is a technique of automatic indexing and retrieving of images from a large data base. Feature Extraction and Similarity Matching are the two major steps for CBIR Systems. Color, Texture and Shape represent the three visual features for any image. Mpeg-7 Stands for Multimedia Content Description Interface.

The main objective of Mpeg-7 is to provide a standardized set of technologies for describing multimedia content. It has allowed quick and efficient content identification, and addressing a large range of applications. The visual descriptors are Classified according to the feature such as color, shape, texture, etc. These two features are also integrated to increase the performance of CBIR Systems. The efficiency of all methods are demonstrated with the help of results.

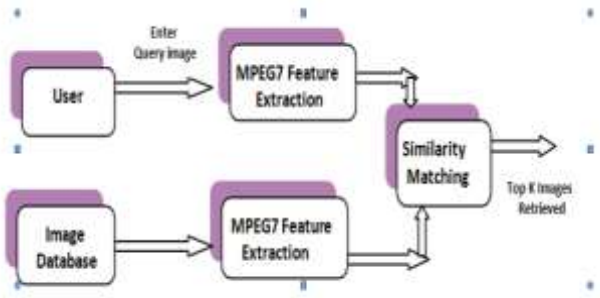

Fig. 8. Block Diagram

Sr. No	Paper Name	Technique / Algorithm	Advantages	Disadvantages	Results
1	Multimodal Visual Search On Mobile Device	The newly proposed algorithm is named JIGSAW, to distinguish from the algorithms in the previous work JIGSAW.	Easy to use and has advantage in speed. Proposed systemhas advantage in efficiency Better results than text if the database is large enough.	Visual structure within each exemplar not used. Usability of our systemis poor	An interactive mobile visual search system which allows the users to formulate their search intent Through natural multimodal interactions with mobile devices.
2	CBIR System Using Sketches	EHD, HOG and SIFT	Sketch based system allows users an intuitive access to search-tools It can be used in several applications such as digital libraries, crime prevention, and photo sharing sites.	Not invariant opposite rotation, Scaling and translation. The development of difficult and Robust descriptor was emphasized.	A content based image retrieval system, which can retrieve using sketches in frequently used Databases. The user has a drawing area where he can draw those sketches, which are the base of the retrieval method.
3	Fusion of Color, Shape and Texture Features	7-Nearest Neighbor 5-Nearest Neighbor 3-Nearest Neighbor	High Accuracy in feature extraction	Lack of consistency	Identified appropriate Extraction method in color, shape and texture feature and selected 5-Nearest Neighbor as the learning algorithm.
4	Re-Ranking Using Query-	Image re-ranking	Improve both the accuracy and efficiency of image re-ranking	Processing is complex.	A framework, which learns query-specific semantic

	Specific Semantic Signatures				spaces to improve the effectiveness And efficiency.
5	Shape-Based Plagiarism Detection	Figures similarity ,image comparison	Retrieve figure with the most similarity value.	Time required for processing is high	System is developed to retrieve figures having certain characteristics based on the given query.
6	CBIR using Hadoop Map Reduce	MapReduce, Parallel Processing, Image Processing	ACCC algorithm was proposed in order to reduce the processing time of feature Computation.	Lack of efficiency	Online CBIR application as a result of applying a Hadoop Map Reduce processing method.
7	Perceptual similarity queries in medical CBIR	PRoSPeR framework	CBIR for medical application capable of finding the distance function that best captures the user's intention.	It is extremely time consuming and wearisome.	A new approach aimed at bridging the semantic gap problem in CBIR systems for medical applications.
8	Efficient CBIR using Mpeg-7 Features	Color Structure Descriptor (CSD) Edge Histogram Descriptor(EHD)	Increased the performance of CBIR Systems	Very difficult to index the image by a proper word	Efficient retrieval of images using different MPEG-7 Features

3.CONCLUSION:

This papers Categorizes the various concepts in image retrieval techniques and a collection of 8 papers was studied and various image retrieval techniques and their types and methods are categorized such as the text based , speech based , sketch based , CBIR using Hadoop MapReduce ,CBIR for medical application , CBIR using MPEG-7 ,content based and the Semantic based image retrieval.

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5.REFERENCES:

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[3]Fusion of Colour, Shape and Texture Features for Content Based Image Retrieval Pratheep Anantharatnasamy, Kaavya Sriskandaraja, Vahissan Nandakumar, April 28, 2013.

[4]Web Image Re-Ranking Using Query-Specific Semantic Signatures Xiaogang Wang, Member, IEEE , Shi Qiu, Ke Liu, and Xiaoou Tang, Fellow, IEEE , APRIL 2014

[5]Shape-Based Plagiarism Detection for Flowchart Figures in Texts Senosy Arrish, Fadhil Noer Afif, Ahmadu Maidorawa and Naomie Salim , February 2014

[6]Improving Performance of Content-Based Image Retrieval Schemes using Hadoop MapReduce Wichian Premchaiswadi Graduate School of Information Technology in Business

[7]PRoSPer: Perceptual similarity queries in medical CBIR systems through user profiles $ PedroH.Bugatti a,n, DanielS. Kaster b, MarceloPonciano-Silva a, CaetanoTrainaJr.a, , 18 November 2013

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