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A Survey on Image Retrieval Approaches with Features Utilization

M.Tech.Scholar Shalinee Jain
Shri Balaji Institute of Tech.& Management
Betul,Madhya Pradesh,India
shalineejain9958@gmail.com

Asst.Prof. Ravi Gedam
Shri Balaji Institute of Tech.& Management
Betul,Madhya Pradesh,India

***Abstract* – Image search refers to finding the precise images related to the user inquiry. Image re-ranking is an efficient way for web-based image search. In image re-ranking, users' intention is captured by one-click on the query image. This assists in providing better search results to the users. This paper presents survey of various techniques which are used for image identification was utilized uptil now is condensed with benefits and drawbacks of these prior proposed work. Here various visual image features are also explained for relevant image detection. Firstly it introduces the object queries which gives result images specific to some kinds of objects and retrieval models.**

***Keywords*- Digital Image Processing, Information Extraction, feature extraction, Tumor Detections etc.**

I. INTRODUCTION

With the universal popularity of digital devices embedded with cameras and the fast development of Internet technology, billions of people are projected to the Web sharing and browsing photos. The ubiquitous access to both digital photos and the Internet sheds bright light on many emerging applications based on image search. Image search aims to retrieve relevant visual documents to a textual or visual query efficiently from a large-scale visual corpus.

Although image search has been extensively explored since the early 1990s [1], it still attracts lots of attention from the multimedia and computer vision communities in the past decade, thanks to the attention on scalability challenge and emergence of new techniques. Traditional image search engines usually index multimedia visual data based on the surrounding meta data information around images on the Web, such as titles and tags. Since textual information may be inconsistent with the visual content, content-based image retrieval (CBIR) is preferred and has been witnessed to make great advance in recent years.

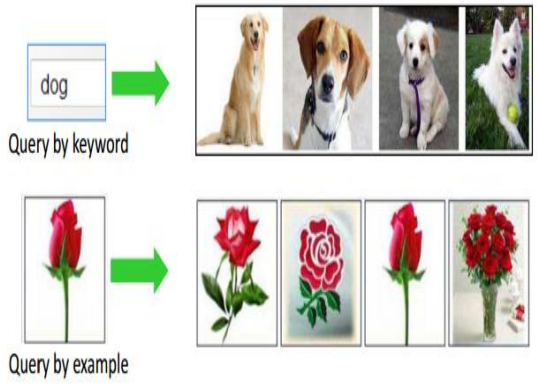

Fig. 1 Types of Image retrieval.

From the early 1990s to the early 2000s, there have been extensive study on content-based image search. The progress in those years has been comprehensively discussed in existing survey papers [5] [6] [7]. Around the early 2000s , the introduction of some new insights and methods triggers another research trend in CBIR. Specially, two pioneering works have paved the way to the significant advance in content-based visual retrieval on large-scale multimedia database.

The first one is the introduction of invariant local visual feature SIFT [8]. SIFT is demonstrated with excellent descriptive and discriminative power to capture visual con - tent in a variety of literature. It can well capture the invariance to rotation and scaling transformation and is robust to illumination change. The second work is the introduction of the Bag-of-Visual-Words (BoW) model [9]. Leveraged from information retrieval, the BoW model makes a compact representation of images based on the quantization of the contained local features and is readily adapted to the classic inverted file indexing structure for scalable image retrieval.

Image representation originates from the fact that the intrinsic problem in content-based visual retrieval is image comparison. For convenience of comparison, an image is transformed to some kind of feature space. The motivation is to achieve an implicit alignment so as to eliminate the impact of background and potential transformations or changes while keeping the intrinsic visual content distinguishable. In fact, how to represent an image is a fundamental problem in computer vision for image understanding. There is a saying that “An image is worth a thousand words”. However, it is nontrivial to identify those “words”. Usually, images are represented as one or multiple visual features. The representation is expected to be descriptive and

discriminative so as to distinguish similar and dissimilar images. More importantly, it is also expected to be invariant to various transformations, such as translation, rotation, resizing, illumination change, etc

II.RELATED WORK

Bindita Chaudhuri et. al. [2] letter presents a novel unsupervised graphtheoretic approach in the structure of district based recovery of remote detecting (RS) pictures. The proposed approach is portrayed by two primary strides: 1) demonstrating each picture by a chart, which gives district based picture portrayal joining both neighborhood data and related spatial association, and 2) recovering the pictures in the chronicle that are most like the inquiry picture by assessing diagram based similitudes.

In the initial step, each picture is at first portioned into particular areas and afterward displayed by a credited social diagram, where hubs and edges speak to area qualities and their spatial connections, separately. In the second step, a novel inaccurate diagram coordinating methodology, which mutually abuses a subgraph isomorphism calculation and an unearthly chart installing procedure, is connected to coordinate relating charts and to recover pictures in the request of diagram closeness.

In [3], the shading highlight is separated from the joint histogram in view of the blend of the tint and immersion and the surface element is extricated utilizing the GCLM include. The k-implies bunching is utilized to group the component of the picture. The ROC bend is attracted request to assess the execution of the element extraction. The chi-square is utilized to discover the comparability between the two pictures. The assessment comes about exhibit the exactness of the recovery in light of the accuracy and review false positive and negative proportion. The ROC bend is utilized to think about the proficiency of the shading, surface and the blend of both the shading and the surface.

Vadivel, An et. al., [5], did a point by point investigation of the properties of the HSV (Hue, Saturation and Intensity Value) shading space, laid accentuation on the visual impression of the shade of a picture pixel with the variety in tint, immersion and power estimations of the pixel. Utilizing the aftereffects of this examination, they decided the relative significance of tone and force in light of the immersion of a pixel and connected this idea in histogram era for substance based picture recovery (CBIR) from expansive databases.

In customary histograms, every pixel contributes just to one part of the histogram. In any case, they proposed a strategy utilizing delicate choice that adds to two parts of a histogram for every pixel.

Li Liu et. al. [6], Traditional worldwide portrayals assemble nearby components specifically to yield a solitary vector without the examination of the characteristic geometric property of neighborhood elements. In this paper, we propose a novel unsupervised hashing technique called unsupervised bilinear nearby hashing (UBLH) for anticipating neighborhood include descriptors from a high dimensional highlight space to a lower-dimensional Hamming space by means of minimized bilinear projections as opposed to a solitary vast projection network. UBLH takes the grid articulation of neighborhood.

III.IMAGE RETRIEVAL TECHNIQUES

Many image retrieval techniques have been developed by researchers and scientists, some of the most important and widely used image retrieval techniques are shown in Figure1.2.

1. A. Text Based Image Retrieval -Text-based image retrieval is also called description-based image retrieval. Text based image retrieval is used to retrieve the XML documents containing the images based on the textual information for a specific multimedia query. To overcome the limitations of CBIR, TBIR represents the visual content of images by manually assigned keywords/tags. It allows a user to present his/her information need as a textual query, and find the relevant images based on the match between the textual query and the manual annotations of images [1].

2. Content Based Image Retrieval-In content based image retrieval, images are searched and retrieved on the basis of similarity of their visual contents to a query image using features of the image. A feature extraction module is used to extract low-level image features from the images in the collection. Commonly extracted image features include color, texture and shape [10].

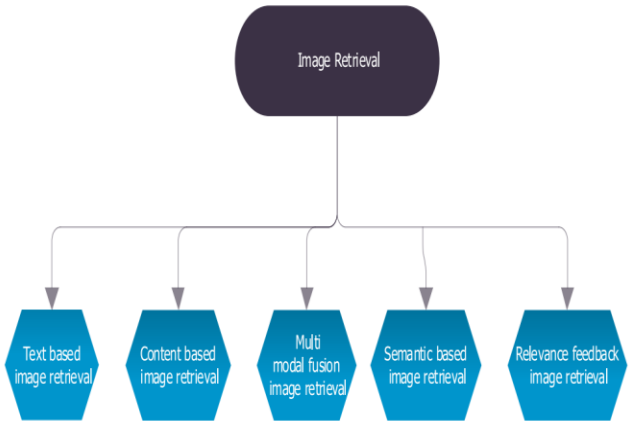

Fig.2 Various Image Retrieval Techniques.

3. Multimodal Fusion Image Retrieval-Multimodal fusion image retrieval involves data fusion and machine learning algorithms. Data fusion, also known as combination of evidence, is a technique of merging multiple sources of evidence. By using multiple

modalities, we can learn the skimming effect, chorus effect and dark horse effect [4].

4. Semantic Based Image Retrieval-Image retrieval based on the semantic meaning of the images is currently being explored by many researchers. This is one of the efforts to close the semantic gap problem. In this context, there are two main approaches- Annotating images or image segments with keywords through automatic image annotation or adopting the semantic web initiatives [15, 20].

5. Relevance Feedback Image Retrieval -The difference between the user's information need and the image representation is called the semantic gap in CBIR systems. The limited retrieval accuracy of image nuclear retrieval systems is essentially due to the intrinsic semantic gap. In order to reduce the gap, relevance feedback is very helpful into CBIR system. The basic idea behind relevance feedback is to integrate human perception subjectivity into the query and involve user to evaluate the retrieval results. Then depending upon user‟s integration the similarity measures are automatically refined. There are lots of CBIR algorithms has been proposed and most of them work on the finding effectively specific image or group of relevant image to that query image using similarity computation phase. But it is necessary to have user‟s interaction to get better results [11].

IV.FEATURES OF BRAIN TUMOR SEGMENTATION

As Image is collection or sequence of pixel and each pixel is treat as single value which is a kind of cell in a matrices. In order to identify an object in that image some features need to be maintained as different object have different feature to identify them which are explain as follows:

1.Color feature-Image is a matrix of light intensity values, these intensity values represent different kind of color. so to identify an object colure is an important feature, one important property of this feature is low computation cost .

Different Image files available in different color formats like images have different colure format ranging from RGB which stand for red, green, and blue. This is a three dimensional representation of a single image in which two dimensional matrix represent single color and collection of those matrix tends to third dimension. In order to make intensity calculation for each pixel gray format is use, which is a two dimension values range from 0 to 255.

In case of binary format which is a black and white color matrix whose values are only 0 or 1. With the help of this color feature face has been detected efficiently in [8].

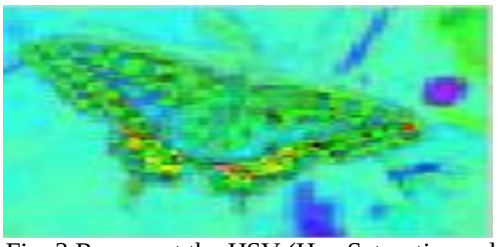

Fig. 3 Represent the HSV (Hue Saturation value) format of an image.

2. Edge Feature-As image is a collection of intensity values, and with the sudden change in the values of an image one important feature arises as the Edge as shown in figure 4. This feature is use for different type of image object detection such as building on a scene, roads, etc [5]. There are many algorithm has been developed to effectively point out all the images of the image or frames which are Sobel, perwitt, canny, etc. out of these algorithms canny edge detection is one of the best algorithm to find all possible boundaries of an images.

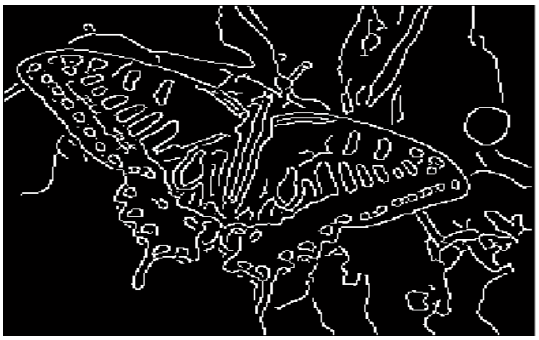

Fig. 4 Represent Edge feature of an image.

3. Corner Feature-In order to stabilize the video frames in case of moving camera it require the difference between the two frames which are point out by the corner feature in the image or frame. So by finding the corner position of the two frames one can detect resize the window in original view. This feature is also use to find the angles as well as the distance between the object of the two different frames. As they represent point in the image so it is use to track the target object.

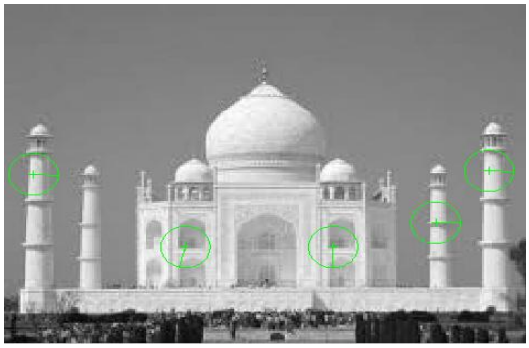

Fig 5 Represent the corner feature of an image with green point.

4. Texture Feature-Texture is a degree of intensity difference of a surface which enumerates properties such as regularity and smoothness [1]. Compared to color space model, texture requires a processing step. The texture features on the basis of color are less sensitive to illumination changes as same as to edge features.

5.CCM-The statistical approach for image analysis based on the matrix of co-occurrence (CCM Co-occurrence Matrix) is widespread in many fields, alone or synergistically with other analysis, to evaluate the images morphology. This one, better known as "texture" (an innate property of all the virtual surfaces), gives information on the disposition of the structures and their relations with the environment.

V.EVALUATION PARAMETERS

As various techniques evolve different steps of working for retrieving images from appropriate dataset. So it is highly required that techniques or existing work need to be compare on same dataset. So following are some of the evaluation formula shown in equation which help to judge the image ranking techniques.NDCG [6] as the performance evaluation measure.

The NDCG measure is computed as

$$NDCG@P = Z_P \sum_{i=1}^{P} \frac{2^{l(i)} - 1}{\log(i+1)}$$

where P is the considered depth, $l(i)$ is the relevance level of the i -th image and ZP is a normalization constant that is chosen to let the optimal ranking's NDCG score to be 1.

Table No 1 mention parameter

Actual	System	
	True	False
Positive	TP	FP
Negative	TN	FN

Precision = true positives / (true positives+ false positives)

Recall = true positives / (true positives +false negatives)

F-score = 2 * Precision * Recall / (Precision + Recall)

In order to evaluate results there are many parameter such as accuracy, precision, recall, F-score, etc. Obtaining values can be put in the mention parameter formula to get better results.

VI.CONCLUSIONS

With the popularity of picture in different fields specialists get pulled in for investigation. This paper have evaluated diverse properties of the picture that are utilized to depict the substance of a picture and different strategies for ordering in light of highlight vector. It is demonstrating that most content based picture retrieval framework manages low level elements. The conventional content based retrieval frameworks are ignorant concerning the genuine content of the pictures. So to enhance the accuracy of the recovery framework content based picture recovery framework was presented. CBIR recover pictures in view of the visual elements like shading, surface and shape. In future an impeccable calculation is required with great component mix which can retrieve pictures of various scenes.

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