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A Survey Paper on an Efficient Approach towards Image Mining Using Association Rule with Fusion

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***Abstract*- The rapid growth of computer technologies and the advent of the World Wide Web have increased the amount and the complexity of multimedia information. Currently, most images search engines rely purely on textual metadata. That produces a lot of garbage in the results because users usually enter that metadata manually which is inefficient, expensive and may not capture every keyword that describes the image. Content-based image retrieval (CBIR) system has been developed as an efficient image retrieval tool, whereby the user can provide their query to the system to allow it to retrieve the user's desired image from the image database. However, the traditional relevance feedback of CBIR has some limitations that will decrease the performance of the CBIR system, such as the classification problem, limited information from user problem, and insufficient training-set problem. Therefore, in this study, proposed enhanced effective method to support the user query based on the representative image selection and weight ranking of the images retrieved. The support vector machine (SVM) has been used to reduce the semantic gap between the user and the CBIR system. From these experiments, the proposed learning method has enabled users to improve their search results based on the performance of CBIR system and saliency map technique for detecting foreground image.**

***Keywords*- CBIR, Association rule, SVM, Image Retrieval**

I. INTRODUCTION

Currently, most Web based images search engines rely purely on textual metadata. That produces a lot of garbage in the results because users usually enter that metadata manually which is inefficient, expensive and may not capture every keyword that describes the image. On the other hand, the Content Based Image Retrieval (CBIR) systems can filter images based on their visual contents such as colors, shapes, textures or any other information that can be derived from the image itself which may provide better indexing and return more accurate results. At the same time, these visual features contents extracted by the computer may be different from the image contents that people understand. It requires the translation of high-level user perceptions into low-level image features and this is the so-called "semantic gap" problem. This problem is the reason behind why the CBIR systems are not widely used for retrieving Web images. A lot of efforts have been made to bridge this gap by using different techniques. In [1], the authors identified the major categories of the state-of-the-art techniques in narrowing down the semantic gap one of them is fusing the retrieval results of multimodal features. Fusion for image retrieval (IR) is considered as very little achievements in the early days of research [2].

The proposed method is fusion method with re-ranking. Due to "semantic gap" problem of Content Based Image Retrieval (CBIR) systems, proposed method trying to enhance the image retrieval performance by fusing i.e. textual and visual features for retrieving and narrow the semantic gap problem. Here proposed work will use saliency map for detecting the foreground in the image which determine salient region in images using low-level features of luminance and color and extract low level features, morphological features and then along with the search label of the image as inputted then based on association rule mining algorithm (SVM), images will be retrieved based on ranking or score. This will results in improve accuracy, less memory space and fast speed. Saliency map technique identify salient regions as those regions of an image that are visually more conspicuous by virtue of their contrast with respect to surrounding regions and SVM gives higher better performance in classification of image than other data classification algorithm. It is mainly used in real world problem like voice recognition, tone recognition, text categories, image classification, object detection, handwritten digital recognition, and data classification. Image classification is the process of collecting similar type of images in a single set.

II. LITERATURE REVIEW

Early Techniques were not generally based on visual features but on the textual annotation of images. In other words, images were first annotated with text and then search using text based approach from traditional database management system [1]. Text based image retrieval system uses traditional database techniques to manage images [2]. Through text description, images can be organized by topical or semantic hierarchies to facilitate navigation and browsing base on standard Boolean queries. However since automatically generating descriptive text for wide spectrum of images is not feasible, most text based image retrieval system requires manual annotation of an images .Obviously, annotating images manually is a cumbersome as an expensive task for large image databases, and is often subjective, context sensitive and incomplete[8][9]. As a result it is difficult for traditional text based method to

support variety of task dependant queries. Numerous researches have been carried on this image mining. Literature paper presents a survey on various image mining techniques that were proposed earlier. Developments in area of image acquisition and storage technique have shown the way for incredible growth in extensively large and detailed image databases [3]. The images which are available in these databases, if examined, can provide valuable information to the human users. Image mining facilitates the extraction of hidden information, image data association, or other patterns not clearly accumulated in the images [6][10]. Image mining is an interdisciplinary effort that provides significant application in the domain of machine learning, image processing, image retrieval, data mining, database, computer vision, and artificial intelligence [4][5]. Content based tissue image mining was proposed by Gholap et al. (2005). Biological data management and mining are considerable areas of recent biology research. High throughput and huge information content are two significant features of any Tissue Microarray Analysis (TMA) system. Tissue image mining is resourceful and faster if the tissue images are indexed, stored and mined on content. A four-level system to exploit the knowledge of a pathologist with image examination, pattern identification, and artificial intelligence was proposed in this approach. At Image Processing and Information Level, information such as disparity or color is utilized. At Object Level, pathological objects, comprising cell constituents, are recognized. At Semantic Level, arrangement and configuration of individual cells into sheets in a tissue image are examined. At the uppermost level, Knowledge Level, supposition of the expert is specified. Sanjay et al. (2007) put forth an image mining technique using wavelet transform. The author proposed an image mining approach using wavelet transform. It uses common pattern identical, pattern identification and data mining models with the intention that a real life scene/image can be associated to a particular category, assisting in different prediction and forecasting mechanisms. It is a three-step procedure i.e. image gathering, learning and classification. Since wavelet transform uses time frequency association, it can be utilized for image mining as a substitute of Fourier transform [7]. The conception of image mining as a consequence can be competently used for weather forecasting so that one can know the natural disasters that may occur in advance. Late fusion strategies do not act at the level of one representation for all the media features but rather at the level of the similarities among each media. In the late fusion, the extracted features of each modality are classified using the appropriate classifier then each classifier provides the decision. Late fusion was used widely in image retrieval systems and there is diversity in the proposed methods. The most widely used technique is a rule-based method [12] [13] [14] [15] [16] [17] [18]. In [18], a Web application called MMRetrieval is proposed. It has an online graphical user interface system that brings image and text search together to compose a multimodal and multilingual query. The modalities are searched in parallel, and then the results can be fused via several selectable methods. Fusion process consists of two components: score normalization and combination. *Image Re-ranking* It is another level for fusing the visual and textual modalities. In image re-ranking, it needs first to perform the search based on the text query. Then the returned list of images is reordered according to the visual features similarity. In [14], the cross-reference re-ranking strategy is proposed for the refinement of the initial search results of text-based video search engines. While [19] method deals with the clusters of the modalities, [20] proposed a method that constructs a semantic relation between text (words) and visual clusters using the ARM algorithm. The method proposed in [11] is a Multimodal Fusion method based on Association Rules mining (MFAR). It is considered as a late fusion. This method combines two different data mining techniques for retrieving: clustering and association rules mining (ARM) algorithm. It uses ARM algorithm to explore the relations between text semantic clusters and image visual features clusters. The method gives the ability to retrieve images that are semantically related by using the extracted visual features of the query image and by exploring the related ARs from the mining. The results show that the precision value of MFAR is better than MMRetrieval system and the system without association.

III. PROPOSED WORK

By analyzing above mentioned survey problems ,proposed method trying to improve accuracy, less memory space and fast speed as compare to MFAR Proposed in [11].Proposed method input image will be processed and saliency map of the image will be found out to detect the foreground in the image. Saliency algorithms in content-based image retrieval are employed to retrieve the most important regions of an image with the idea that these regions hold the essence of representative information. Such regions are then typically analyzed and described for future retrieval/ classification tasks rather than the entire image itself thus minimizing computational resources required after that the low level visual features like color map and histogram of foreground and late fusion features like are eccentricity (shape type), major axis, minor axis, parameter and more features of the image will be found .In the database creation module, the database of various input will be created and trans-media features namely text label for the image will be found out and stored in database and in last database evaluation module features along with the search label of the image will be input and based on a classification association rule mining algorithm , images will be retrieved based on score.

Diagrammatic representations of two important phases are as follows:

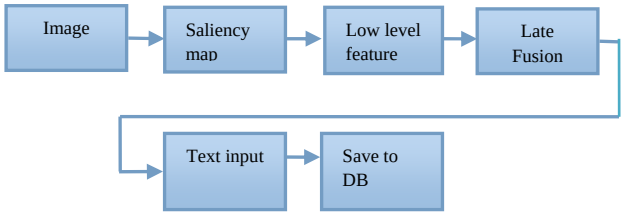

Fig.1 Database creation

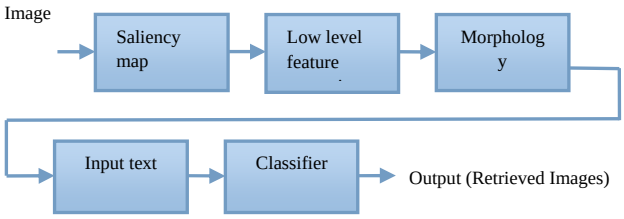

Fig.2 Database Evaluation

IV. CONCLUSION

An association based mining approach for retrieving image with re-ranking technique is presented in this paper, proposed method trying to enhance the image retrieval performance by fusing i.e. textual and visual features and narrow the semantic gap problem. The proposed method is trying to improve accuracy, speed and will provide less memory space.

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