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A Proposed System for Satellite Image Retrieval

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ABSTRACT
Today, Image retrieving is a big issue to discuss. Retrieving satellite image is important to get knowledge for weather forecasting or any atmospheric disturbance such as typhoon, hurricanes etc . We can compare the images from the stored images to early detect atmospheric disturbance so that we can protect the world from large damages. This paper includes a proposed system for retrieving the satellite images. This system works on comparison method.
Keywords:- Image retrieval techniques, Satellite image retrieval.

I. INTRODUCTION

Through Internet and satellite, in every second we are getting lots of satellite images. To store, organize and retrieving useful information from these images is big issue and necessity [1]. The traditional methods for retrieving images from geodatabases are: geographic location, date of acquisition and spectral / spatial properties of acquisition devices [2].Our needs from the satellite scenes are specific contents. Therefore we need to retrieve images that contain our intended contents.

There are other challenges in the field of satellite images itself [4].These images are georeferenced images; this means that all images form in reality a huge continuous image covering the entire earth surface. It is not always proper to deal with such content as isolated images.

The problem of image retrieval needs attention on the robust feature extraction as well as efficient indexing method. The success of a solution to this problem crucially depends on the stability and scalability of the image features used and the characteristics of the index similarity calculation method used for comparing the image features. This chapter, presents the proposed method of image retrieval. The proposed method discussed with each aspects of the performance in the retrieval system at each visual feature which are extracted for the unique identification of the image investigated. It focus and investigate different shape and color based features for the identification of the image. In image retrieval system, each image that is stored in the database has its features extracted and compared to the features of the query image. Basically it involves two process feature extraction and feature matching. The first step in the process is extracting image features to a distinguishable extent and the second one i.e. matching involves matching these features to yield a result that is visually similar.

Satellite Images are of three types:

a) **Visible Image:** This type of satellite pictures, clouds reflects the light from the sun so these images can only be viewed during the day. In these images, clouds show up as white, the ground is normally grey, and water is dark. In winter, snow-covered ground will be white, this makes difficult to distinguish between cloud and ground. To differentiate between clouds and snow, looping pictures can be helpful. Clouds will move while the snow won't. Snow-covered ground can also be identified by looking for terrain features, such as rivers or lakes. Rivers will remain dark in the imagery as long as they are not frozen. If the rivers are not visible, they are probably covered with clouds. Visible imagery is also very useful for seeing thunderstorm clouds building. Satellite will see the developing thunderstorms in their earliest stages, before they are detected on radar.

b) **Infra-Red Image** Clouds are visible in both day and night in Infrared satellite images. The clouds are identified by satellite sensors that measure

heat radiating off them. The sensors also measure heat radiating off the surface of the earth. Clouds will be colder than land and water, so they are easily identified. Infrared imagery is useful for determining thunderstorm intensity. Infrared imagery can also be used for identifying fog and low clouds. The fog product combines two different infrared channels to see fog and low clouds at night, which show up as dark areas on the imagery.

c) **Water Vapor Image** Water vapor satellite pictures indicate presence of moisture in the upper atmosphere (approximately from 15,000 ft to 30,000 ft). The highest humidity will be the whitest areas while dry regions will be dark. Water vapor imagery is useful for indicating where heavy rain is possible. Thunderstorms can also erupt under the high moisture plumes.

II. ARCHITECTURE OF PROPOSED SYSTEM

The architecture of proposed system as shown in the figure 1 suggests that the system must have two functional components. The first component is the visual content extraction and feature vector calculation. Each image in the image database is analyzed based on their feature vectors. The obtained features are stored in a feature database and organized in an efficient way for query retrieval. The second component is the query engine which consists of a query user interface and a query processing subcomponent. Query by example image is supported in the system. When a user issues a query through the query user interface, the query processing subcomponent computes the similarity measure between the query image and each image in the search range. All the feature vectors, such as color and the shape, are used in the search scale. At the end top 10 images similar to the query image are displayed on the user interface according to the ranking from one to ten in their distance from query image. Features, focusing mainly on how they are extracted and compared in the earlier proposed work.

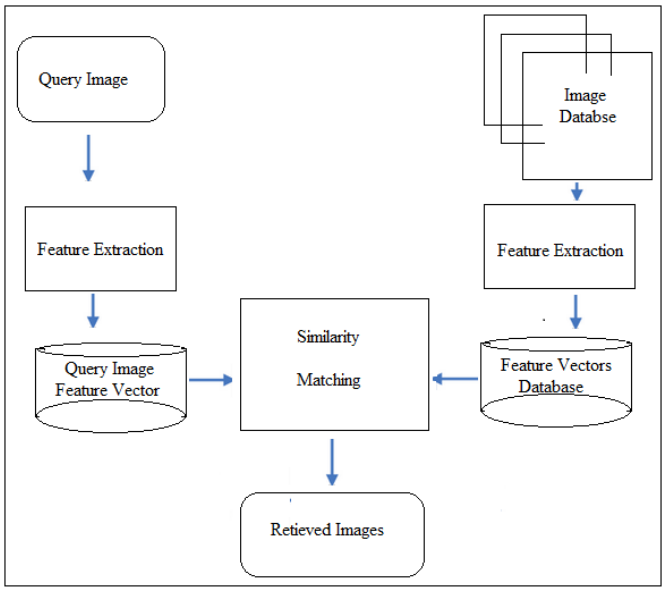


Fig. 1: Architecture of Proposed system

The main objective of this paper is to develop a Satellite image retrieval system for the Indian satellite archival. The target system can be achieved through few sub phases of the process such as to extract the features which characterizes the satellite images or remote sensing images. Another phase is the storage of the images and corresponding feature vectors to compare the similarity between the query image and the stored images archived. At last evaluate the performance of the system on different environment for the Indian satellite images.

For the solution to this problem, we proposed a multi-feature image retrieval system. The best well-known shape features and color based features being used for the similar image retrieval. In this paper we focused on shape based features of images and aimed both to improve retrieval performance and help users to express their queries efficiently.

Core of the system is the image feature extraction process in which all the selected combination of feature vectors (FV) are extracted and calculated for the similarity measurement. The feature extractor executes for both inputs as well database images. The relationship between the user and the system is two-way the user can make a query request to the system; the system returns the query results based on the query requirements. A content-based image retrieval process has two key steps first is Image Selection, Feature extraction and indexing based on the visual features of the image and another is Feature vector similarity-based image retrieval

processing. The search is usually based on similarity rather than on exact match and the retrieval results are then nearest indexed image.

III. IMAGE RETRIEVING PROCESS

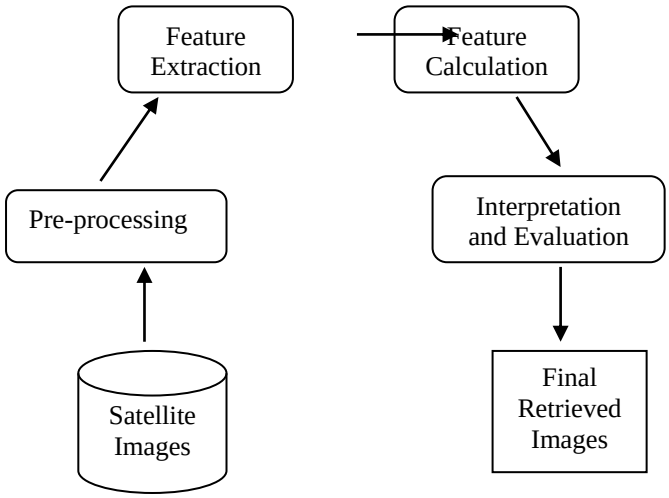


Fig. 2: Image Retrieval Process

Figure 2 shows the complete image revrieving process. The images from an image database are first preprocessed to improve their quality. These images then undergo various transformations and feature extraction to generate the important features from the images. With the generated features, retrieval can be carried out using data mining techniques to discover significant patterns. The resulting patterns are evaluated and interpreted to obtain the final return output, and can be applied to applications.

IV. FEATURE EXTRACTION

A novel framework for combining the entire modules for an efficient image retrieval system gives desired outcomes by end users as shown in the figure 3. In this complete system two different modules as feature extractor and image indexing with similarity measurement work together for the desired outcomes. Image database and query image processed for the feature extraction in the feature extractor engine and their corresponding feature vectors compared with distance calculation with desired ranking in the output screen. The most nearest or less distance feature vector's image retrieved at the desired screen then next image comes and so on.

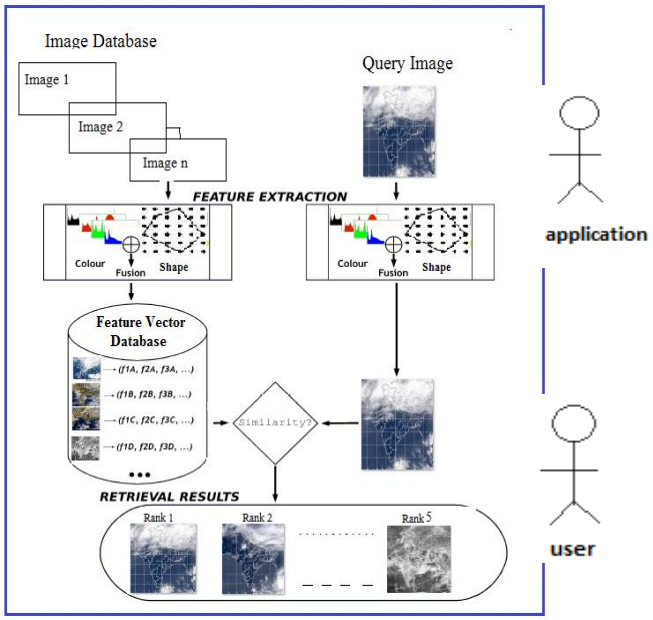


Fig. 3: Model for System

In Image retrieval system front end consists of a query image segment and corresponding retrieved image segment. Another important part is back end which has logical content i.e. functional components works for the user.

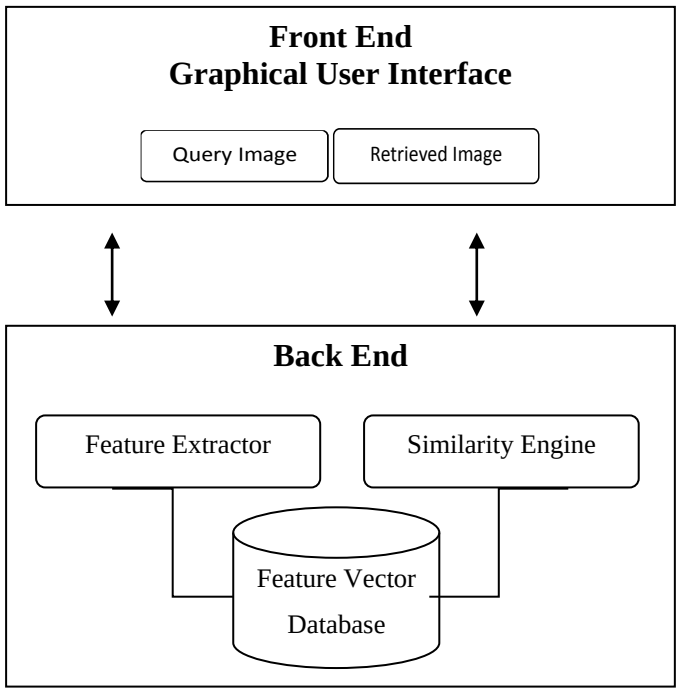
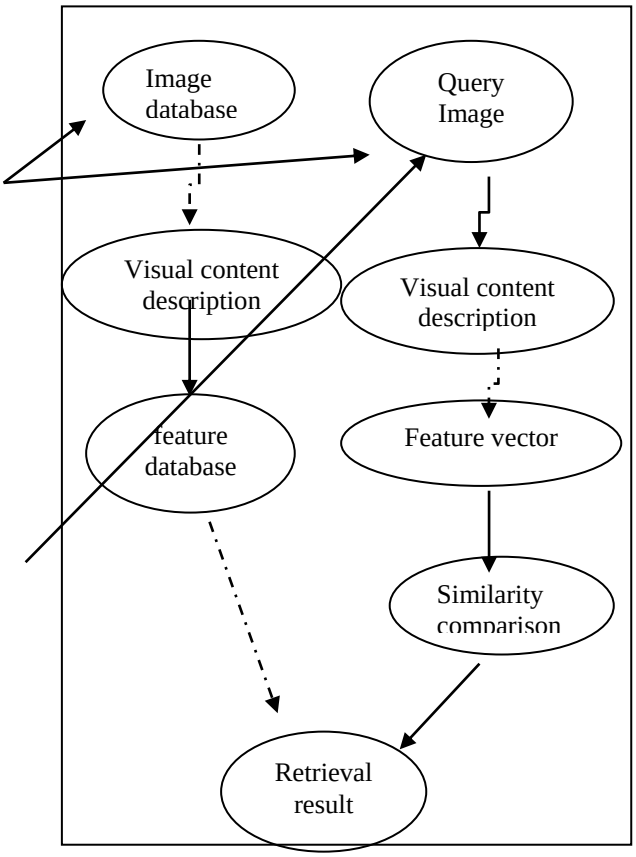


Fig. 4: Image Retrieval Process Model

As shown in the figure 4 front-end of the system consist query and retrieved image segment whereas in back end has two logical functions as well as a feature vector database are there. In order to evaluate the effectiveness

of colour and texture features, both separately and jointly, an experimental image retrieval system for an image is developed.

V. USE CASE DIAGRAM



Proposed system has two actors as user and application. User will select the query image. System will find visual content description, feature vector. Now system will compare the query image with stored databases images. And get the final retrieval result.

VI. CONCLUSION

This paper includes a proposed system for satellite image retrieving. This proposed system works on feature extraction system and then on comparison system. System consists of two modules first one is feature extraction and second one comparison with stored images.

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