



## **Satellite Image Retrieval Based On Sensitive Content Method**

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**Abstract:** -The satellite cloud image is a valuable source of information in weather forecasting and early prediction of different atmospheric disturbances such as typhoons, hurricanes etc. Due to the increased number and resolutions of the Earth imaging sensors and image acquisition techniques, the satellite image data is growing enormously which makes it difficult to store and manage. The traditional image retrieval technique is inefficient in retrieving these images.

Content-based image retrieval is an approach from data mining community which provides the solution of managing this huge quantity of data. In this research, a Content-Based Image Retrieval (CBIR) system has been applied on Geospatial Images of fire and forest, Clutter and water, cyclone and water etc. Geospatial images are processed using K-means clustering algorithms to obtain a high-dimensional feature vector. The Feature vectors include HSV Histogram, LAB features, color autocorrelation, color moments, Gabor features. Then Train a KNN classifier using those features using different distance metrics.

The images and the extracted feature vectors are stored in the database. Distance metric is used to compute the similarity between the images. The system is robust as it provides search based on the multiple features. The performance of the system was evaluated by analyzing the retrieval results using precision. Many past result was evaluated and based on that results and method the aim was to find the best outcome among all.

**Keywords—***SIR*

### **I. INTRODUCTION**

India has been traditionally vulnerable to natural disasters due to its unique geo climatic conditions. Cyclones, earthquakes, floods, droughts and landslides have been recurrent phenomena. About 8% of the total area is prone to cyclones. In the decade 1990-2000, an average of about 4344 people lost their lives and about 30 million people were affected by disasters every year [1]. Through the early prediction of the cyclones the casualties and the property loss can be minimized.

Earth observation (EO) is based on the recording of electromagnetic (EM) energy reflected back from the surface of the earth. Due to the increased number and resolution of earth observation imaging sensors, the acquired data volume and the information contents in the images have been significantly improved. This also increases the number of applications in which these data can be used, ranging [2] from weather forecasting over monitoring and managing of earth resources to navigation. With such a diverse set of applications, building a satellite image database becomes important [3].

The problems with creating satellite image database are the fast retrieval of useful images from remote sensing archives. To overcome this problem and to retrieve relevant images rapidly there is a strong need for highly efficient search tools for EO image databases. Meteorological satellites operated by the Indian Space Research Organization (ISRO) have been collecting meteorological image data for over twenty-five years with the launch of INSAT-1B in the year 1983. Furthermore, METSAT renamed Kalpana-1 on February 5, 2003 satellite uses three spectral bands for

meteorological applications with the frequency of 30 minutes. These are visible band in the wavelength  $0.55\mu\text{m}$ - $0.75\mu\text{m}$  with the resolution of 2 km, thermal infrared band and water vapour band in the wavelength  $10.5\mu\text{m}$ - $12.5\mu\text{m}$  and  $5.1\mu\text{m}$ - $7.1\mu\text{m}$  respectively with the resolution of 8 km. This results in about 1500 Megabytes of image data per day and the manual search over this huge quantity of data is impractical.

## **II. HISTORY OF EXISTING**

Image Classification using Color Feature Extraction proposed by Sandhya R. Shinde (2015). It used Color features of an image to form a feature vector. These features are then used by machine learning classifiers to classify the images. Some techniques perform well for certain classes of data and poorly for others. Texture and shape features are not considered. Experimental results show that the maximum Accuracy of 81.25%.

Ammar Huneiti concentrated on Content-Based Image Retrieval Using SOM (Self Organizing Map) and DWT (Discrete Wavelet Transform) by using CBIR method. Similarity measure which is the Euclidean distance and shape features are not considered.

Princy Shakta wat and V K Govindan (2015) proposed model Novel Scheme for Image Retrieval Using Combination of Color-Texture Features. It includes CBIR technology based on color and another two feature computed by applying the texture feature using Gabor wavelet and Discrete Cosine Transform coefficients of the image. For similarity matching between the images. Retrieval time and efficiency can be further increased by considering other features also.

Content based image retrieval using integration of color and texture features proposed by Aditi Giri and Yogesh Kumar Meena (2014). It Used color and texture based techniques for achieving efficient and effective retrieval of images. Euclidian distances are calculated of every feature for similarity measures.

Ashwani Kr. (2014) concentrated on to separate the color feature, color moment (CM) is utilized on color images and to remove the texture feature, local binary pattern (LBP) is performed on the grayscale image. Joined methodology gives exact, effective system.

K. Haridaset (2014) concentrated by Organized Content based Image Retrieval System in RGB Color Histogram, Tamura Texture and Gabor Feature. RGB Color Histogram, Tamura Texture and Gabor Feature. Parameters like Precision value, Recall value and accuracy. The Gabor Feature 81.7% Accuracy in Content Based Image Retrieval system.

An Integrated Approach to Content Based Image Retrieval proposed by Agarwal (2014). It includes novel algorithm for content based image retrieval based on color edge detection and Discrete Wavelet Transform. The proposed algorithm generates feature vector that combine both color and edge feature.

Fast Feature Extraction, Multi codebook Approach and Multi-core SVM Training Author proposed by Thanh Nghi. It introduced Concept of Fast Feature Extraction, Multi-codebook Approach and Multi-core SVM. It does not apply for large scale image database. It does not apply for large scale image database.

Visual Feature Extraction for Content- Based Image Retrieval proposed by Saadet al. (2013). It includes the design of an image database and retrieval of specific features from the images for the

CBIR, then the analysis of the CBIR system performed by using color histogram and the Euclidian distance measurement and combination of features is not considered.

Performance Analysis of Integer Wavelet Transform for Image Compression proposed by L Zhang (2013). Color histogram Semantic subspace learning method. Having Good results with automatic rule learning.

Bodhkeet (2012) concentrated on Content Based Image Retrieval System. It Uses color image which is uniformly divided into 8 parts as a first step, the centroid of each partition is selected. Texture of an image is obtained by GLCM and It proposes partial shape matching and the retrieval time is more. Content Based Image Retrieval System by Majid Fakheri which includes Texture semantics is retrieved using Gabor wavelets. Shape feature is extracted using Gradient Vector Flow fields. It shows an accuracy of 60.7%. It has very low accuracy.

Zhi-chun Huang (2010) concentrated on content based image retrieval using color moment and Gabor texture feature which includes combination of color moments of the HSV color space and Gabor texture descriptors with Euclidean distance used for distance measure. It has accuracy of 63.6%.

### **III. PROBLEM STATEMENT**

The problems with creating satellite image database are the fast retrieval of useful images from remote sensing archives. To overcome this problem and to retrieve relevant images rapidly there is a strong need for highly efficient search tools for EO image databases. Meteorological satellites operated by the Indian Space Research Organization (ISRO) have been collecting meteorological image data for over twenty-five years with the launch of INSAT-1B in the year 1983. Furthermore, METSAT renamed Kalpana-1 on February 5, 2003 satellite uses three spectral bands for meteorological applications with the frequency of 30 minutes. These are visible band in the wavelength 0.55 $\mu$ m-0.75 $\mu$ m with the resolution of 2 km, thermal infrared band and water vapour band in the wavelength 10.5 $\mu$ m-12.5 $\mu$ m and 5.1 $\mu$ m-7.1 $\mu$ m respectively with the resolution of 8 km. This results in about 1500 Megabytes of image data per day and the manual search over this huge quantity of data is impractical.

### **IV. PROPOSED IDEA**

-Image Retrieval of Geospatial Images with the places having

- 'water & forest'
- 'water & clutter'
- Fire & Forest'
- 'smoke & Forest'
- 'Forest & clutter'
- 'cyclone & water'

-Used Distance Metrics for similarity metrics such as

- euclidean
- cityblock
- chebychev
- cosine
- correlation

-Image Features Extracted such as

- Colour Features: RGB color moments, HSV color histogram and moments, Lab features, Auto Correlogram features
- Texture Features: Gabor scale and orientation, and Gabor wavelet features
- Shape Features: None

## **V. EXPECTED RESULTS**

### **Classifier Training:-**

Geospatial Images of fire and forest, Clutter and water, cyclone and water etc.

Geospatial images are processed using K-means clustering algorithms to obtain a high dimensional feature vector.

The Feature vectors include HSV Histogram, LAB features, color autocorrelation, color moments, Gabor feature.

Train a KNN classifier using those features using different distance metrics.

### **Image Retrieval:-**

Provide a query image and extract the same features from earlier.

Select the number of images you want to retrieve.

Select what type of distance metric you want.

Feed those query features to the classifier and retrieve the images in the dataset with the least distance is displayed.

## **REFERENCE**

- I. D. Zhang, J. W. (2010). Self-taught hashing for fast similarity search. *IR Research and Development in Information Retrieval* (pp. 18-25). New York, NY, USA: Association of computing Machinery.
- II. F. Dell'Acqua, P. G. (2001, January). Query-by-shape in meteorological image archives using the point diffusion technique. *IEEE Transactions on Geoscience and Remote Sensing*, 1834-1843.
- III. J. Wang, S. K. (2010). Semi-supervised hashing for scalable image retrieval. *IEEE Computer Society Conference on Computer Vision and Pattern Recognition* (pp. 3424– 3431). San Francisco, CA, USA: IEEE.
- IV. M, R. T. (2014, September 9). Class Based Image Search with Hash Codes. *International Journal of Innovation Research & Development*, 9.
- V. Marie Liénou, H. M. (2010). Semantic Annotation of Satellite Images Using Latent Dirichlet Allocation. *IEEE Geoscience And Remote Sensing Letters*, 28 - 32.
- VI. Shijun Xiang, J. Y. (2012). Block-based image hashing with restricted blocking strategy for rotational robustnes. *EURASIP Journal on Advances in Signal Processing* volume.
- VII. Tang, a. H. (2007). Contented-Based Satellite Cloud Image Processing and Information Retrieval. *Springer-Verlag Berlin Heidelberg 2007*, 767-776.
- VIII. Wei ShangGuan, Y. H. (2007). The Research and Application of Content-Based Satellite Cloud Image Retrieval. *ICMA- International Conference on Mechatronics and Automation*, 3864-3869.
- IX. Y. Alemu, J.-b. K.-K. (2009). Image Retrieval inMultimedia Databases: A Survey. *2009 Fifth International Conference on Intelligent Information Hiding and Multimedia Signal Processing* (pp. 681-689). Kyoto, Japan: IEEE.
- X. Y. Mu, J. S. (2010). Weakly-supervised hashing in kernel space. *IEEE Conf. Computer Vision and Pattern Recognition*, 3344–3351.