



## A Survey Over the Content Based Image Retrieval Techniques

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**Abstract:** *In this paper, we have proposed a more comprehensive survey on techniques used in content based image retrieval. Content based image retrieval is the heart favorite topic for many researchers. This paper proposes a review over common methods for the content based image retrieval. In these systems some transformation is used to decompose the image database into a feature database and in searching the image, the input image is also transformed into a feature data and then the retrieval strategy is used to extract the similar images on the basis of distance similarity metric.*

**Keywords:** *CBIR, K-Means Clustering algorithm, Feature Extraction (FE), Similarity Measurement (SM), Euclidian distance, Haar Transform.*

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### I. INTRODUCTION

In content based image retrieval the low level features of an image are used to make multidimensional feature vectors. These feature vectors in a database form a feature database. When a user query an image the process of feature extraction is carried out. Same feature extraction routine used to form feature database is applied to convert queried image into its internal representation of feature vector. Now both the query image and images in database have their corresponding feature vector representations. To find similar images in the database, the distance between feature vectors of queried image and the images in database is calculated. An indexing scheme is employed to retrieve result. User's feedback is also used in the process to increase the relevance of images. This allows producing semantically more meaningful images in the result.

A CBIR system is operated in two phases. In first phase a feature vector database is made. A process of feature extraction (FE) is carried out on all the images in database to make a feature vector database. This feature vector is smaller in size than the original image size. Basically, the feature vectors represent the visual content of the image.

In the second phase similar images are retrieved. It includes a process of similarity measurement (SM). In this process the distance between feature vector of query image and each image in database is calculated. The second phase gives the result of most similar images in the database compared to the query image. One problem with this approach is dependence on visual similarity to determine semantic similarity.

### II. LITERATURE SURVEY

Content Based Image Retrieval is a method to query an image by its content. The content of image is its visual features such as shape, color, and texture. These features are analyzed to search an image rather than the metadata associated with the image. CBIR is widely used because searches which are dependent on metadata such as tags or keywords many times produce misleading results. Traditional methods where human manually enter the keywords relating to image may not capture the completeness of image. Traditional method is time consuming and insufficient. In a CBIR system each image has its features extracted in the database. These features are compared to the features of the query image. There are many existing CBIR systems. In a region based image retrieval system a user can select an interested region, and can work on it to find the related images irrespective of considering the full image to be matched. In an object based system the physical appearances of the objects in the image is considered to work on. An object in an image can be things like buildings, signs, horses, or anything else which can be considered exclusively as an object. In an example based a user gives an example image and using it the system works to find out matching images. A feedback system can also be used to retrieve images. In this system the user provides a rating and based on that the system finds the matching images. This process can be repetitive. A method is also used in which the database is divided using a semantic gap. This is basically when using large databases. Content based image retrieval system based on similarity analysis of images [10] is based on user input. A graph of image or any other illustration can be given to. An extraction process than executes and extracts the image features and then comparison of images is done in the database. In the Color Selection exploited CBIR system [6], a query by color technique is used. This technique is based on color categories. Total 11 colors are used here which are used by us while perceiving and thinking of colors. In image Retrieval using low frequency DCT coefficients [7], the YUV color space is used here to transform low frequency DCT coefficients, which is then used for retrieval of images. A user can select here any dominant feature of the query image to get better results. Content based image retrieval using hierarchical and k-means clustering techniques [11] employed a method in which initially a hierarchical clustering is done. Then finding the most similar clusters and merging them. Improving the centroid and finding the most similar image.

In Region of Interest Image Indexing system [4], a user can select a region of the image to find the matching images in the database. A universal model for CBIR system [5] uses three extraction methods of the image which are color, feature and edge histogram descriptor. For image analysis work image processing algorithms and computer vision technique is used. Histogram of images is computed for color, co-occurrence matrix based entropy and energy is calculated for texture, and Edge Histogram Descriptor (EHD) is used for edge density. Greedy strategy is used to reduce computational complexity for retrieval of images. These existing technologies use a lot of computation time and also require large storage space.

### **III. COMPARATIVE STUDY**

In the Color Selection exploited CBIR system [6], a query by color technique is used. This technique is based on color categories. Total 11 colors are used here which are used by us while perceiving and thinking of colors. In image Retrieval using low frequency DCT coefficients [7], the YUV color space is used here to transform low frequency DCT coefficients, which is then used for retrieval of images. A user can select here any dominant feature of the query image to get better results. In Region of Interest Image Indexing system [4], a user can select a region of the image to find the matching images in the database. A universal model for CBIR system [5] uses three extraction methods of the image which are color, feature and edge histogram descriptor. For image analysis work, image processing algorithms and computer vision technique is used. Histogram of images is computed for color, co-occurrence matrix based entropy, energy is calculated for texture, and Edge Histogram Descriptor (EHD) is used for edge density. Greedy strategy is used to reduce computational complexity for retrieval of images. These existing technologies use a lot of computation time and also require large storage space.

In this paper, we have proposed a more comprehensive survey on content based image retrieval techniques. Content based image retrieval is the heart favorite topic for many researchers. This paper proposes a review over common methods for the content based image retrieval. In these systems some transformation is used to decompose the image database into a featured database and in searching the image, the input image is also transformed into a feature data and then the retrieval strategy is used to extract the similar images on the basis of the distance similarity metric.

### **IV. SUGGESTED IMPROVEMENT**

An efficient method for content based image retrieval can be achieved using color and texture features. We will achieve it in three steps. First step will be Image Decomposition where the image is decomposed using Haar wavelet transform.

Second step will be Image Indexing and Clustering where clusters are made on the bases of similar images and iteratively process is carried out.

Third step will be Image Search and Retrieval where images similar to the query image are searched.

Three color moments are used to extract color features. The block based DCT coefficients can be used directly in transform domain to extract texture features. Hence we can get rid of any complex computation for texture feature extraction. Suggested improvement will also help in solving the storage space problem.

### **V. CONCLUSION**

In this paper we have done a survey of some content based image retrieval techniques. The content based image retrieval technique can be used in various applications for example crime prevention, digital libraries, medical diagnosis, photograph archives and can be very helpful in identifying victims in forensics. It can be widely used in an application that requires image matching. This paper will help researchers in understanding issues related to content based image retrieval techniques. We have identified some common problems in existing CBIR systems. In our next research paper, we will propose a novel Haar Wavelet transform based technique for content based image retrieval. In the proposed method we will try to overcome all these common problems.

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