Image Retrieval by Using Sketches

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Abstract—We know that content based image retrieval (CBIR) is one of the most well known and rising research approach of digital image processing. The basic aim of CBIR is to extract the visual content of an image, so these extracted content can be shape, color, and texture.

This paper aims is to creation of the content based image retrieval system (CBIR) by using sketches that is sketch based image retrieval. The main difference between the existing system and proposed system is that we are taking feedback from the user after the retrieval of the image, so that the user can get the exact image.

The application of the Sketch based Image Retrieval (SBIR) is in photo sharing sites, digital libraries, crime prevention and also any illiterate person can use this system very effectively.

Keywords—canny edge detection algorithm, K-means clustering algorithm

I. INTRODUCTION

Image Retrieval is very active research topic having two research communities that is database management and computer vision. We know that there are three techniques for retrieving the image. First is the text based image retrieval. The text based and visual based are two searching method in which text based is popular from 1970’s. The image retrieval was originated from information retrieval. Before the spreading of information technology a huge number of data had to be managed, processed and stored. It was also textual and the visual information. To manage the large amount of database we have to increase the appearance and quick evolution of computers. The eventual growth in the size of data storages and revolution of internet had changed the world. In case of texts based method flexible search can be made by the use of keywords, but if we use images, we cannot apply dynamic methods. Two questions can come up. The first is who yields the keywords. And the second is an image can be well represented by keywords. Second method for retrieving the image is Content Based Image Retrieval i.e CBIR. In most of the cases if we want to search efficiently then some data have to be recalled. In this case we search using some features of images, and these features are the keywords. At this moment unfortunately there are not frequently used retrieval systems, which retrieve images using the non-textual information of a sample image.

As we know that content based image retrieval is also called as query based search. A typical CBIR system consists of three major components:

I. Feature extraction — Here analyze image and extract the feature of image like text, shape, etc.
II. Feature storage — In this step we provide memory for storing the extracted features.
III. Similarity measure — This is the final step in which we compare the similarity between two images.

Our purpose is to develop the content based image retrieval system by using sketch, which can retrieve images from the database. This is the third method for retrieving the image. Here we provide the drawing area where user have to draw those sketches, which are the retrieval method base. After getting the sketch from user then we are extracting the feature of that image, so these extracted feature can be shape, texture or pixel. From that content we draw the Histogram of sketch and match that histogram with all histogram of image stored in the database. After matching histogram system will retrieve the related images stored database as output to user. If user is not satisfying that output then we will take feedback from the user that which image actually he/she want and again update the query means user have to draw sketch on that platform.

This process is perform until user get the correct image. Using a sketch based system can be very important and efficient in many areas of the life. Also this sketch based search is used in finding analog circuit, criminal investigation. It can also useful in photo-sharing sites. To improve and measure the performance of our system we are using precision and recall.

II. LITERATURE SURVEY

In early days, image retrieval from large image database can be done by using following ways:

1. Automatic Image Annotation and Retrieval using Cross Media Relevance Model.
2. Concept Based Query Expansion
3. Query System Bridging The Semantic Gap For Large Image Database
4. Ontology-Based Query Expansion Widget for information Retrieval

III. PROPOSED SYSTEM

Proposed Algorithm

Canny Edge Detection –

Edge Detection algorithm is used to detect the edges of the object in the given image. This algorithm is used to determine corners of object, lining of object or shape of object. Following are the steps of this algorithm:

1. Convolve with gradient filter
\[ G = \sqrt{(G_x)^2 + (G_y)^2} \]

Where,
Gx and Gy are gradients in x and y directions respectively.

2. Compute response magnitude
\[ \Theta = \arctan(G_y/G_x) \]

3. Compute local edge orientation

4. Peak detection

5. Non maximum suppression though scale, hysteresis thresholding along edges.

K-Means Clustering –

K-means is one of the simplest unsupervised learning algorithms that solve the well known clustering problem. The procedure follows a simple and easy way to classify a given data set through a certain number of clusters (assume k clusters) fixed a priori. The main idea is to define k centroids, one for each cluster.

Following are the steps of this algorithm:

1. Enter no of data points into cluster
2. Find centroid of cluster
3. Determine distance of each object to centroid
4. Use Euclidean Distance for measuring distance

Euclidean distance formula:

\[ d(x, u) = \sqrt{\sum_{i=1}^{n} (x_i - u_i)^2} \]

REFERENCES


