

A Review on Content Based Image Retrieval with Combined Color and Texture Based Features Extraction

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Abstract- Content-Based Image Retrieval approach allows the user to extract images from a huge database based upon a query image. An efficient and effective retrieval performance is achieved by choosing the best transform and classification techniques. Many transformation techniques are available in many research papers but selecting best transformation and classification technique is bigger challenge now days. Fourier Transform, Cosine Transform, Wavelet Transform etc. are the transformation techniques which suffer from discontinuities such as edges in images. To overcome this problem, we have presented Gabor wavelet transform (GWT) approach which widely concentrated on the combination of features of plane wave and Gabor function to form non-orthogonal functions. We have presented comprehensive reviews on image retrieval techniques. The proposed approach of the Gabor wavelet transform will give excellent results in terms of efficiency of image retrieval also will achieves the improvement in precision and recall, respectively, in comparison with existing methods.

Keywords: Content-based image retrieval (CBIR), Gabor wavelet transform (GWT), Manhattan distance measure, feature extraction, PSNR.

I. INTRODUCTION

The internet contains a large amount of information. The World Wide Web has been grown too much considerably in size as well as increasing extremely. Content Based Image Retrieval (CBIR) has several Challenges to retrieve the images based on features like color, texture and shape from different databases. In the world of internet content of the training samples has different variations. Nowadays different methods for CBIR have been dynamically improved. In pattern recognition community, these methods are used to extract the features based on partitioned method of different database training set [1]. A numerous search engines now days are available for retrieving relevant information. Such information contains of data, flow charts, maps, images, logos, etc. However locating and finding the relevant information is always a difficult task [2].

Currently many color based and textual-based search engines are available in market, but presently very few images search engines through which searched from the collection of images available on web[3]. The main contributions of the existing CBIR systems are related to feature extraction methods and similarity measures. Color

and texture features are among low-level features which are extensively used in CBIR [4]. The color is widely used in CBIR systems since its extraction is usually easy as well as its performance is relatively high for retrieving task. Texture features are extracted and described from statistical, structural, and spectrum methods. Many CBIR systems have been proposed based on color and texture features [5]. There are some more special significant features based on information such as model parameters. Examples of these parameters are human matching methods (HMM), auto regressive moving average (ARMA), condition random feature (CRF), weight and tempo. In this paper, we have presented the approach to image retrieval with feature extraction of Gabor Wavelet Transform (GWT) with appropriate classification technique. Manhattan distance measure techniques will be used for similarity matching [1].

II. LITERATURE REVIEW

This section presents the review on different techniques applied for image retrieval and also scope and limitations of the techniques.

Anusha Yalavarthi, K Veeraswamy, K Aneetha Sheela [1] proposed content based image retrieval using enhanced Gabor wavelet transform for increasing the retrieval efficiency. Gabor wavelet transform (GWT) is widely concentrated on the combination of features of plane wave and Gabor function to form non-orthogonal functions. The challenge property of the training database images using GWT is decomposed into different scaling and orientation with different filters to reduce the unwanted information of the images. GWT transform is a popular and powerful tool to decompose all the images of training set at different levels of scaling and dilation. The response of primary visual samples of Gabor wavelet filters are plane wave avoids by using Gabor wavelet transform. The major causative of the Gabor wavelet transform is not only applicable for spatial frequency domain but also applicable for spatial relevant of the given input image. GWT identifies the visual features based on different illumination of the database like orientation and frequency selectivity.

Swati Agarwal, A. K. Verma, Preetvanti Singh [2] presented an efficient algorithm for Content Based Image Retrieval (CBIR) based on Discrete Wavelet Transform (DWT) and Edge Histogram Descriptor (EHD) feature of MPEG-7. The proposed algorithm is explained for image retrieval based on shape and texture features only not on the basis of color information. Here input image is first decomposed into wavelet coefficients. These wavelet coefficients give mainly horizontal, vertical and diagonal features in the image. The combination of DWT and EHD techniques increases the performance of image retrieval system for shape and texture based search.

Nivya Sasheendran, C. Bhuvanewari [10] described a recent technique called Ripplet Transform (RT) has been implemented along with the Neural network based classifier called Multilayered perceptron (MLP) for finding an effective retrieval of image. The Ripplet transform is a higher dimensional generalization of the Curvelet Transform, designed to represent images or two-dimensional signals at different scales and different directions and therefore resolves two-dimensional (2D) singularities. Classification using Multilayered perceptron (MLP) with the Manhattan Distance measure showed varying experimental results for different sets of Images.

Jianqing Liang, Qinghua Hu, Wenwu Wang,[11] proposed method is a multistage algorithm consisting of feature selection, selective ensemble learning, active sample selection, and triplet generation. The novel aspects of this work are the introduction of classification confidence to evaluate the labelling process and select the reliably labelled images to train the metric function, and a method for reliable triplet generation, where a new criterion for sample selection is used to improve the accuracy of label prediction for unlabeled images. Proposed method offers advantages in challenging scenarios, in particular, for a small set of labelled images with high-dimensional features.

Syed Sameed Husain, Mirosław Bober [12] paper presented a novel method for deriving a compact and distinctive representation of image content called Robust Visual Descriptor with Whitening (RVD-W). It significantly advances the state of the art and delivers world-class performance. In this approach local descriptors are rank-assigned to multiple clusters. Residual vectors are then computed in each cluster, normalized using a direction-preserving normalization function and aggregated based on the neighbourhood rank. Importantly, the residual vectors are de-correlated and whitened in each cluster before aggregation, leading to a balanced energy distribution in each dimension and significantly improved performance. They also proposed a new post-PCA normalization approach which improves separability between the matching and non-matching global descriptors. This new normalization benefits not only our

RVD-W descriptor but also improves existing approaches based on FV and VLAD aggregation.

According to the way about how to generate hash function, existing SFVH can be further categorized into two major families: data-independent [13], and data-dependent hashing [14], [15]. Locality sensitive hashing (LSH) [16] is one of the most typical data-independent hashing schemes, which is based on random vectors from specific distribution, e.g., standard Gaussian distribution, to map similar points into Hamming space with high probability. On the other side, data-dependent hashing schemes are proposed to learn the hash functions according to the characteristics of underlying data distribution by using machine learning methods.

An important component of a clustering algorithm is the distance measure between data points. The problem arises from the mathematical formula that are used to combine the distances between the single components of the data feature vectors into a unique distance measure that can be used for clustering purposes: different methods leads to different clustering. The most popular distance measure are Euclidean distance Manhattan distance, Chebyshev distance function etc.

In Manhattan Distance, The distance between two points measured along axes at right angles. In a plane with p_1 at (x_1, y_1) and p_2 at (x_2, y_2) , it is $|x_1 - x_2| + |y_1 - y_2|$.

This is easily generalized to higher dimensions. Manhattan distance is often used in integrated circuits where wires only run parallel to the X or Y axis. It is also known as rectilinear distance, Minkowski's [17] [18] L1 distance, taxi cab metric, or city block distance.

III. PROPOSED METHOD

After finalizing the problem statement and their feasible solution, this paper presents proposed approach which can provides efficient retrieval of the images from the datasets.

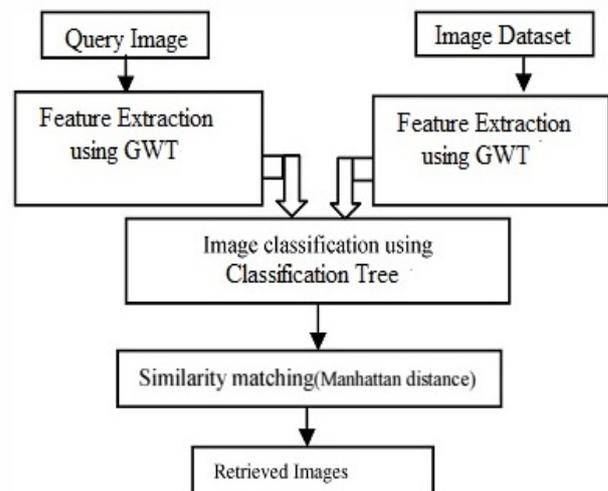


Figure. Block diagram of proposed image retrieval system.

To achieve an effective and efficient methodology for extraction features by using on Gabor wavelet transform (GWT) and image classification is performed using Classification Trees. The concept of Manhattan distance used for similarity matching. This paper provides the complete details about movements on the conventional approaches. Below block diagram shows proposed retrieval system for image.

IV. CONCLUSION

We have presented a comprehensive review on Content Based Image Retrieval with combined Color and Texture based Features Extraction. Many research scholars have been implemented various feature extraction techniques for image retrieval to retrieve the images from the training database. We have presented Gabor Wavelet Transform approach with classification tree for the classification. We will use distance measure techniques for content based image retrieval to measure the distance. Proposed approach will give efficient results in terms of efficiency and computational rates as compared to existing techniques.

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