



[Manjarekar**et al.*, 5(6): June, 2016]
ICTM Value: 3.00

ISSN: 2277-9655
Impact Factor: 4.116



INTERNATIONAL JOURNAL OF ENGINEERING SCIENCES & RESEARCH TECHNOLOGY

TRADITIONAL INDIAN PAINTING RETRIEVAL SYSTEM BASED ON CURVELET TRANSFORM AND COMPARISON THE RESULT USING GABOR FILTER

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ABSTRACT

Today the technology in which relevant images from a large databases are searched according to the user's interest is famous by the name of Content based Image Retrieval or CBIR. Since last two decades it has become an active and fast advancing field amongst the researchers. Last decade is witness of the progress achieved in both theoretical as well as in system development. However this area of technology is still full of challenges that researchers from multiple disciplines are being continuously attracted to work with.

As we are well known about the hierarchy of spectral methods of texture feature extraction starting from Fourier Transform (FT) to the latest Gabor filter transform, which became very popular for many useful applications still was found to lag the curved point singularities or can say curve lines along the edges of images. In this paper to overcome this problem we have chosen to work with Curvelet transform. The dataset of retrieval system we are presenting here is made up of three Indian traditional paintings named as Warli, Madhubani and Fadd. As mentioned earlier Curvelet transform will be applied to get the result. In the second part of this paper we shall also compare the result with Gabor transform.

KEYWORDS: CBIR, Texture feature extraction, Gabor filter, Curvelet transform.

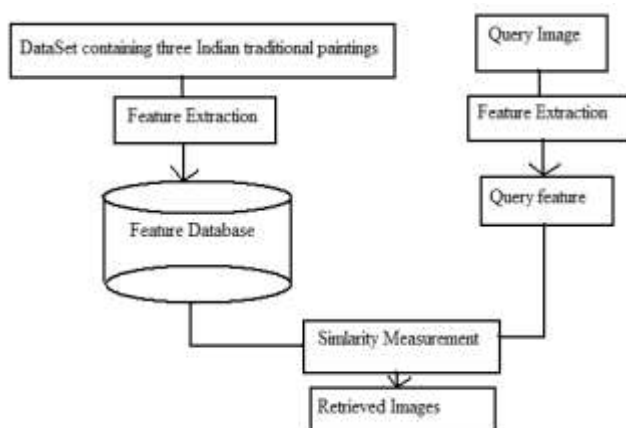
INTRODUCTION

In an image, feature's edge is one of the important characteristics, which can be described as a discontinuity in the local domain of the image. Gray, color and texture are the results of these discontinuities. In the domain of image processing and computer vision, edge detection has broad applications. Consequently, as accurate this process will be as accurate will be the classification. Texture is one of the promising low level features. From past to current time many methods are available for texture feature extraction, amongst some are GLCM in which texture properties are being calculated by calculating statistical features like contrast, mean, standard deviation, uniformity, variance and inertia moments. Spectral methods refers to the frequency domain where features are related to the filter responded statistics. Extraction of features in spatial frequency has several advantages.

Filter is selective i.e. only certain features are enhanced while the others are suppressed. Secondly the periodicity structure of texture can be explicitly represented in a certain spatial frequency in the spectral domain. Filter banks or image pyramids are usually used by Spectral methods for converting an image from the spatial domain to frequency domain and vice-versa. Spectral methods suffer from ill-posed problems as selection of filters is most of the time heuristic and depends on specific tasks. The resultant feature descriptions are usually over complete hence causes mixing of important as well as irrelevant features. Lastly as the selected filters are non-orthogonal, the extracted information from the response of filters is correlated and needs to be separated for a precise texture description.

- Fourier transforms poorly in practice due to lack of spatial localization.
- In Gabor filter transform, a better localization has been provided, however their usefulness is limited as no single filter resolution at which one can localize a spatial structure.
- While in Wavelet transform, varying the spatial resolution allows it to represent textures at the most suitable scale. A lot many choices are available for wavelet function, so we have choice to select wavelets best suited for texture analysis according to specific applications.
- In 1-D: Wavelets are well adapted to abrupt changes or Singularities.
- In 2-D: Separable wavelets are well adapted to point-singularities (only). But, there are (mostly) line- and curved-singularities...

The schematic diagram presents our work in project.



RELATED WORK

Priyanka C. Wankar et.al. [1] In this method a fake detection method was presented that can be used in multiple biometric systems to find out different kinds of fraudulent access attempts. As Biometric detection and authentication generally deals with non-ideal scenarios like blurred images, off-angles, and reflection and expression changes. The motive of the proposed system is to detect fraudulent biometric samples. The approach presents a low degree of complexity, for this reason makes it suitable for real-time applications by using Gabor wavelet feature extraction. Low pass filter has been used for processing. Classification is done by SVM. This paper concluded that the biometric systems vulnerable to different types of attacks have become the interesting field of research in the recent year. Visual inspection of an image which belongs to real biometric trait and a fake image of the same trait can be so similar that even human eye may find it difficult to make a difference. Also the paper opens the opportunities for future work like 1 further evaluation on other modalities like face, palm, and vein and hand geometry. 2 with new quality measures extension can be done for quality measures 3 use of video quality measure for video attacks.

Manali Jain et.al. [2] This paper is based on classification of satellite images for better understanding images. Five different types of satellite images have been selected such as residential area, agriculture, desert, mountain and forest. The objective of this paper is to use of texture, color, as the features of image for retrieval purpose. Gabor filter has used for feature extraction and SVM as a classifier. The proposed work is quite useful and can be used for the applications like government planning commission, national environment mission and residential purposes. The paper concludes the better performance of SVM up to 98.5% over DCT Gabor based classification.

Sanjay J. Bagul et.al. [3] The motive of this paper is to improve compression ratio at the same time minimizing the degradation in quality of images. Today the use of graphical data is increasing exponentially in the field of

computing application such as games, education graphical designing and many more. The quality of images is severely affected by high compression ratio. The paper presents the use of Log-Gabor filter for compression of images that reduces redundant information from a given image. The filter used here tries to maintain the quality of image while reducing storage requirement. The result concluded that the use of log- Gabor filter helps in improvement of compression ratio prior to compression techniques.

G. P. Stachowiak et.al. [4] In machine failure analysis and condition monitoring the diagnosis of worn and damaged surface is an important issue. Image classification based on feature classification has most of the time proven to be particularly useful of many other approaches used. Accurate classification is dependent on the fact that feature parameters vary with scale and orientation. To determine which parameters are both scale and orientation invariant. The paper presents a performance evaluation of feature extraction methods. The performance is each method is evaluated on the datasets K-nearest neighbors and linear based normal densities classifiers. It was concluded by the combined feature extraction method produced robust and accurate results.

CONCLUSION

By the survey of so many literature surveys about CBIR and feature extraction methods, we can conclude that how researchers are eager to work with this technology. They are continuously working hard to make new and improved applications. Through this paper we can summarize the use and power of Gabor filter. Still its limitation to represent curved and line singularity a new approach named as Curvelet transform has been decided to work with. The dataset we are using is full of three traditional Indian paintings. The result of this retrieval system is also compared with its predecessor Gabor filter.

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