DIRECTIONAL BINARY BARCODE FOR IMAGE RETRIEVAL

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ABSTRACT

This paper proposes a novel scheme for image annotation. In recent years, advances in image processing lead to massive database in all the fields especially in medical field. Because of this an efficient abstraction and retrieval technique is necessary. The mainstay of this paper is to use directional binary algorithm for feature abstraction. Apart from retrieval and abstraction technique memory also plays a major role. Since number of images is more, storing it efficiently is necessary. Feature abstracted from images are converted into barcode and stored to save memory space. Retrieval technique used in this paper is hamming distance. To find the most discriminative Directional Binary barcode for a given query image, the effects of employing Directional binary algorithm with different parameters, i.e., different sets of scales and orientations, are investigated, resulting in different barcode lengths and retrieval performances.

Keywords: - *abstraction ,feature ,retrieval ,massive;*

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1. INTRODUCTION

Recent developments in medical imaging and widespread use of picture archiving and communication systems (PACS), have provided unique opportunities for image-based diagnosis, inter-patient comparisons, and searching for the images, sharing characteristics similar to the region of interest (ROI), i.e., tumours. According to, a single average size radiology department represents tens of terabytes of data every year. The massive databases have heightened the need for efficient data storage (for long-term archiving) and retrieval methods.

At present majorly used method for image-based diagnosis and inter-patient comparisons is CBIR (content based image retrieval).Any CBIR system essentially consist of two modules: 1) a feature extraction module that derives a set of features for characterizing and describing images and 2) a retrieval module that searches and retrieves image similar to the query image. For this two modules one of the major challenge is efficient algorithm must be used. Even though efficient algorithm is used for retrieval and abstraction but processing remain slow due to image size,(ie) features abstracted from image will be large so that processing remain slow. Some of the algorithms used for feature extraction are sift algorithm, gabor algorithm etc. information retrieval is done by using algorithm hamming distance. Above methods have some disadvantages which are over come in this paper

In this paper directional binary algorithm is used is used for feature extraction. For information retrieval algorithm used in this paper is hamming distance. To overcome the problem of slow processing in this paper we introduce a technique called barcode technique. In barcode technique, feature extracted from images are converted into binary code and stored while displaying it is displayed in the form of barcode. Since features are stored in the form of binary code memory space occupied will be slow because of which processing speed is increased. In this paper performance of gabor algorithm and directional binary algorithm are compared.

2. RELATED WORK

Dengsheng Zhang, Aylwin Wong. Gabor wavelet proves to be very useful texture analysis and is widely adopted in the literature. In this paper we present a image retrieval method based on Gabor filter. Texture features are found by calculating the mean and variation of the Gabor filtered image. Rotation normalization is realized by a circular shift of the feature elements so that all images have the same dominant direction. The image indexing and retrieval are conducted on textured images and natural images. Experimental results are shown and discussed.

Ralf Reulkea, Artur Lippokb: Traffic observation from airplane platforms using digital cameras is a fairly new application of Video Image Detection Systems (VIDS). These systems are also particularly interesting for observations at major events or in catastrophe situations. Applied systems are small or medium-sized panchromatic cameras. In order to concentrate on road image processing algorithms were applied to distinguish between urban and surrounding vegetation areas. Therefore, texture-based segmentation seems to be an adequate approach, because of the panchromatic images. Attention is focused on MRF, which are examined concerning their use for texture-based extraction of street space in aerial photographs.

Ani1 K. Jain, Farshid Farrokhnia: We present a texture segmentation algorithm inspired by the multi-channel filtering theory for visual information processing in the early stages of human visual system. The channels are characterized by a bank of Gabor filters that nearly uniformly covers the spatial-frequency domain. We propose a systematic filter selection scheme which is based on reconstruction of the input image from the filtered images. Texture features are obtained by subjecting each (selected) filtered image to a nonlinear transformation and computing a measure of “energy” in a window around each pixel. An unsupervised square-emr clustering algorithm is then used to integrate the feature images and produce a segmentation. A simple procedure to incorporate spatial adjacency information in the clustering process is also proposed. We report experiments on images with natural textures as well as artificial textures with identical 2nd- and 3rd-order statistics.

B. S. Manjunat : This paper presents an overview of color and texture descriptors that have been approved for the Final Committee Draft of the MPEG-7 standard. The color and texture descriptors that are described in this paper have undergone extensive evaluation and development during the past two years. Evaluation criteria include effectiveness of the descriptors in similarity retrieval, as well as extraction, storage, and representation complexities. The color descriptors in the standard include a histogram descriptor that is coded using the Haar transform, a color structure histogram, a dominant color descriptor, and a color layout descriptor. The three texture descriptors include one that characterizes homogeneous texture regions and another that represents the local edge distribution. A compact descriptor that facilitates texture browsing is also defined. Each of the descriptors is explained in detail by their semantics, extraction and usage. Effectiveness is documented by experimental results

Yossi Rubner and Carlo Tomasi Image segmentation is not only hard and unnecessary for texture-based image retrieval, but can even be harmful. Images of either individual or multiple textures are best described by distributions of spatial frequency descriptors, rather than single descriptor vectors over presegmented regions. A retrieval method based on the Earth Movers Distance with an appropriate ground distance is shown to handle both complete and partial multi-textured queries. As an illustration, different images of the same type of animal are easily retrieved together. At the same time, animals with subtly different coats, like cheetahs and leopards, are properly distinguished**.**

3. EXISTING METHODOLOGY

The effectiveness of various texture analysis and classification methods such as dyadic wavelet, wavelet frame, Gabor wavelet, and steerable pyramids, and have observed that the Gabor-based methods outperform the others on textured images. Moreover, the performance of Gabor wavelet features for texture analysis is investigated, and compared with other features, i.e., tree-structured wavelet transform, showing that Gabor features provide the best pattern retrieval accuracy compared to other multi resolution texture features on the Brodatz texture database.

4. PROBLEMS IN THE EXISTING SYSTEM

Now a days due to fast moving world even nano seconds matter in algorithm. In existing system time taken by the algorithm is more when compared to proposed system.

5. PROPOSED WORK

In this proposed work ,directional binary algorithm is used, DB is applied on image to encode the directional edge information. It captures the spatial relationship between any pair of neighborhood pixels in a local region along a given direction. It reflects the image local feature. It extracts more spatial information than LBP. Let $Z_{i,j}$ be a point in a cell, four directional derivatives at $Z_{i,j}$ are given

$d=1,$

$I'_{0,d}(z_{i,j})=I(z_{i,j})-I(z_{i,j-d});$

$I'_{45,d}(z_{i,j})=I(z_{i,j})-I(z_{i-d,j+d});$

$I'_{90,d}(z_{i,j})=I(z_{i,j})-I(z_{i-d,j});$

$I'_{135,d}(z_{i,j})=I(z_{i,j})-I(z_{i-d,j-d});$

The resized image of size 50*50 is partitioned into 100 cells of 5*5 matrixes. Table 1 shows a 3*3 neighborhood Centre on I i,j taken out of 5*5 cell size, where each cell contributes one coefficient. ref(fig 1)

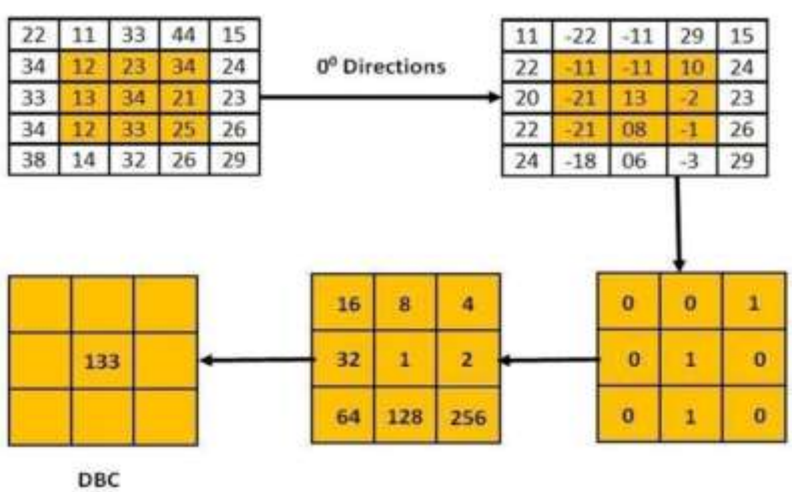

Fig1- DBC

All the images in the database are converted into features using dbc ant it is converted into binary value and stored. (Ref fig 2)

Fig 2 -Architecture diagram

5.1. MODULES:

Module I:

Feature extraction: The Gabor feature vectors with the samelength, images should be resized into RN × CN images, i.e., RN = CN = 2n ∈ N+ (in this study 32 × 32 images). To generate the Gabor Barcode (GBCm) for the query image Im, after obtaining the magnitude of each filtered responses (ψABS−u,v(x, y)), for every u and v in the Gabor filter bank, the 2-D matrices of ψABS−u,v(x, y), are first downsampled with the coefficient factor of 4, and transformed to the row vectors of real-value Gabor feature (Gabor-ABSu,v,m).(ref fig 3(a) 3(b))

Module II:

Barcode generation:

For each (Gabor-ABSu,v,m vector, the median (Tu,v,m) is calculated and employed as a threshold to binarize the corresponding feature vector and obtain Bu,v,m (same approach to binarize Radon barcodes). The final GBCm extracted for Im is obtained by concatenating all u×v binary vectors. the same way database images features are extracted and it can be stored.(ref fig 4)

Module III:

Information Retrieval:

In this module feature extraction is carried out using directional binary code and gabor algorithm. Barcode is generated and information is retrieved using hamming distance algorithm. Both abstraction algorithm are compared and efficiency is measured. (Ref fig 5(a),5(b))

6. SIMULATED OUTPUT

In first module gabor filters used to extract features from the image .In this gabor filter the features are separated into magnitude and real values are shown in fig3(a) 3(b). In second module extracted features are converted into barcode is shown in fig 4. In third module information retrieval is carried out using hamming distance and retrieved image of two algorithm dbc & gabor are compared with database is shown in fig5(a),5(b)&6.

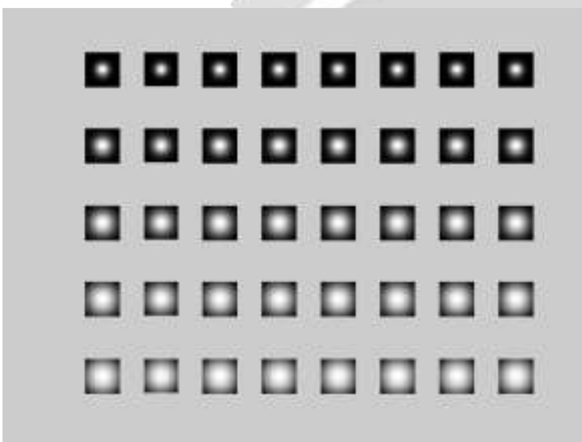

Fig 3a

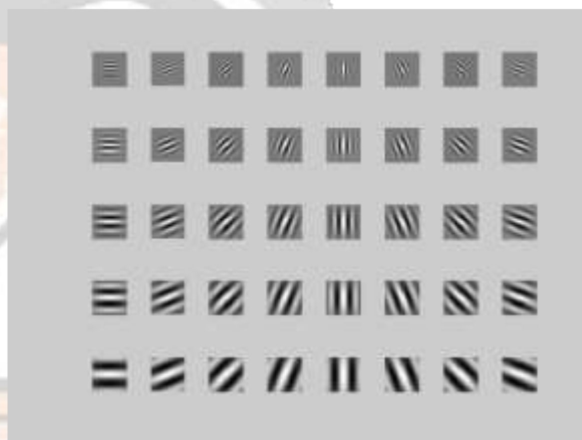

Fig 3b

Fig 3 – feature abstraction of image using gabor filter (a)-magnitude of gabor filters (b) - real part of gabor filters

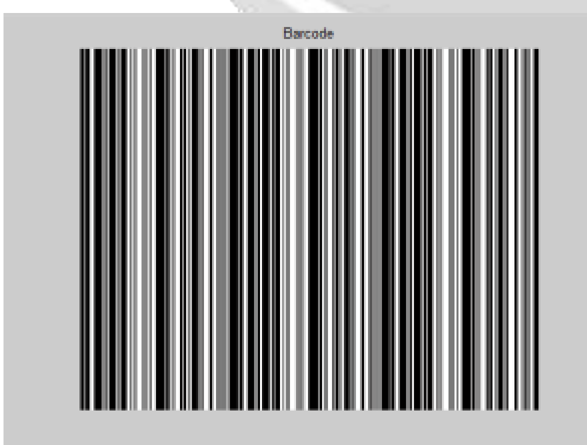

Fig 4-barcode generation

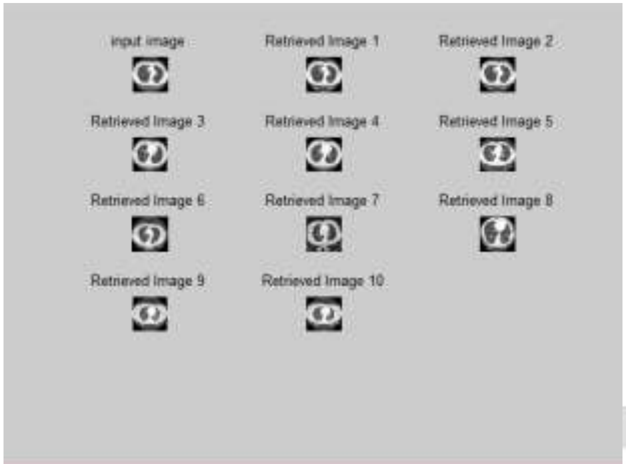

Fig 5a

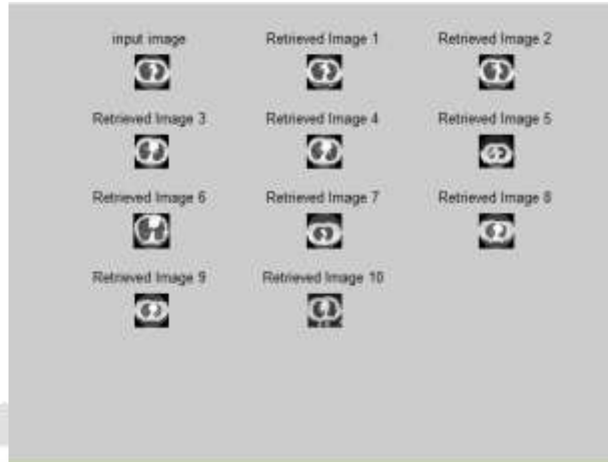

Fig 5b

Fig 5 Image retrieval (a)- gabor barcode retrieval image (b) – directional binary barcode image retrieval

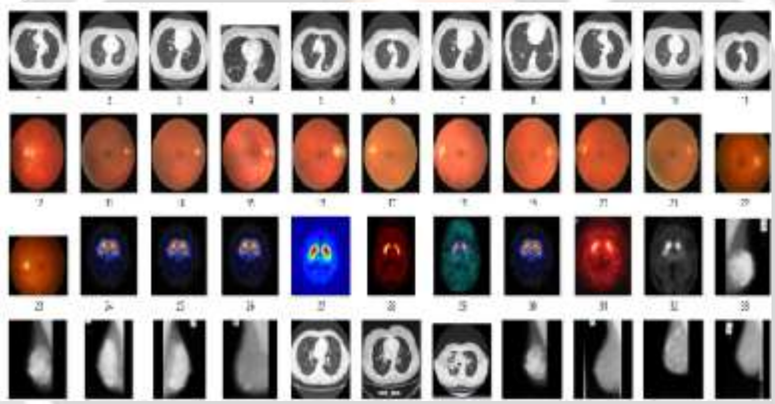

Fig 6

7. CONCLUSION & FUTURE WORKS

In this paper directional binary code was introduced for feature abstraction. Features which are abstracted by this algorithm are converted into binary code to save memory. This binary code is converted to barcode and displayed. This conversion is carried out through barcode generation technique simultaneously all the images in the database converted into barcode. Query image and database image are compared using hamming distance and similar images are displayed. In future efficiency of the retrieved images can be increased and processing speed can be reduced to increase the overall performance.

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