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A Novel Technique for Image Recognition and Retrieval with Binary Pattern Using Support Vector Machine

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Abstract— Today, data mining involves into various fields, but till it is struggling in recognition issues. Recognition and retrieval developed into a very active research area specializing on how to extract and recognize within images. The recognition and retrieval is a widely used biometric application for security and identification concern. The various methods have been proposed for recognition and each method has advantages and drawbacks. The complexities in process will affects performance of existing system makes insufficient. In this paper presents recognition and retrieval with geometrical feature vector to calculate the threshold value separately and stored in feature database. The feature is generated and matching is done by Support Vector Machine (SVM) distance classification is used to measure a distance between two images. The experimental result shows that CMBLP method provides better recognition rate when compared with the existing methods such as Local Binary Pattern, Local Directional Pattern Method.

Keywords— LBP, LDP, CMBLP, GFE, Biometric, SVM.

1. INTRODUCTION

Data mining fixates on the computerized revelation of new actualities and connections in officially existing information. The different methods of information mining incorporate affiliation, relapse, forecast, bunching and characterization. Bunching is the division of information into gatherings of comparative articles.

Cluster is a case of unsupervised learning as it learns by perception. Classify is a data mining capacity that function that assigns items in a collection to target classifications or classes. Data mining is the procedure of programmed grouping of cases taking into account information examples acquired from a dataset. Various calculations have been produced and actualized to concentrate data and find information designs that may be valuable for choice backing.

2. RELATED WORKS

BTC [1] proposed approach for image classification strategies with diverse shade areas. Average color areas had been explored which incorporates RGB coloration space for making use of BTC to the feature vector in content material based image type strategies. The common success fee of sophistication dedication for every of the shade areas has been computed.

Young H. Kwon et al. [2] presented visualized classification from facial photos and the number one capabilities of the face are computed the usage of ratios to pick out young adults, and many others. The secondary function evaluation the wrinkle index computation is used to differentiate seniors from teens and babies.

The multiresolution approach [3] are gray-scale and rotation invariant texture classification based on local binary patterns and nonparametric discrimination of sample and prototype distributions. The method is based on recognizing that certain local binary patterns, termed uniform.

An efficient method [4] for a Multi-scale Block local Binary pattern (MB-LBP) is primarily based operator for robust picture illustration. The local Binary pattern (LBP) has been proved to be elective for picture illustration, but it's far too local to be sturdy. The Multi-scale Block nearby Binary styles (MB-LBP) uses sub-location common grey-values for contrast rather than unmarried pixels.

Huang et al. [5] commented that LBP can only reflect the first derivation information of images, and cannot represent the velocity of local variations. So they proposed an extended LBP by applying the LBP operators to both the gradient magnitude image and the original image.

Jin et al. [6] pointed out that LBP could miss the local structure information under some circumstances.

One of the variations of this original LBP code is known as uniform pattern. This uniform pattern introduced from the observation of Ojala et al. [7]

Sun et al. [8] used variant of LBP patterns which have at most two transitions for their gender classification task using FERET database. This variant of LBP is still sensitive to random noise and non monotonic illumination variation.

Zheng et al., [9] proposed a hybrid edge detector with the combination of gradient and zero-crossing based on Least Square Support Vector Machine (LS-SVM) with the Gaussian filter. It is reported that it takes lesser time than the Canny's detector with similar performance on edge extraction. In the earlier works, the threshold is chosen on heuristic basis for edge detection. Even in the Canny's edge detector the default value of the upper limit is suggested to be 75th percentile of the gradient strength.

3. METHODOLOGY

The image processing includes several image-processing techniques such as filtering, feature extraction and classification of image.

3.1 LOCAL BINARY PATTERN (LBP)

Texture is a term that characterizes the contextual property of an image. A texture descriptor can characterize an image as a whole alternatively it can also characterize an image locally at the micro level and by global texture description at the macro level. LBP method is used to label every pixel in the image by thresholding the eight neighbors of the pixel with the center pixel value. If a neighbor pixel value is less than the threshold then a value of 0 is assigned otherwise it is 1.

3.2 LOCAL DIRECTIONAL PATTERN (LDP)

LBP operator tries to encode the micro-level information of edges, spots and other local features in an image using information of intensity changes around pixels. Some researches have replaced the intensity value at a pixel position with its gradient magnitude and calculated the LBP code trivially by following the same approach as that of intensity value. A LDP code which computes the edge response values in different directions and encodes the texture. Local Directional Pattern (LDP) is an eight bit binary code assigned to each pixel of an input image

3.3 EDGE DETECTION

Point and line detections are important in image segmentation. Edge detection is far most common approach for detecting many discontinuities in intensity values. Canny edge detection finds edge by looking for local maxima of the gradient of f(x, y). The gradient is calculated using the Directionals of Gaussian filter. The method uses two thresholds to detect strong and weak edges and includes the weak edges in the output only if they are connected to strong edges, i.e., to detect true weak edges.

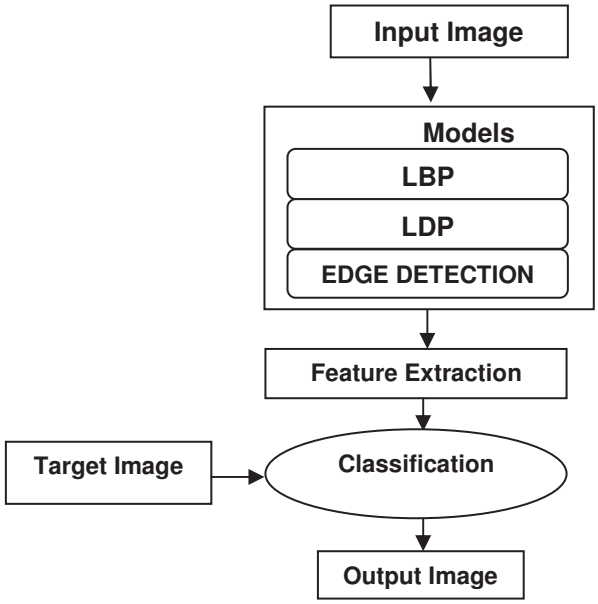

Fig.1 Process flow

4. FEATURE EXTRACTION

The features are located to compute the feature vector for classification. Here four feature vectors are calculated for geometrical image feature extraction. The Feature vector of face is rotated in depth and measure needs to be adopted to compensate for rotation, before the feature sets are computed. Feature vector 1, Feature vector 2, Feature vector 3 and Feature vector 4 is computed.

5. ALGORITHM

The process of the images takes place in two phases and defined as algorithm I.

ALGORITHM I

// generating feature sets //
Input : Input image of size (M x N) from IDB.
Output : Feature database.

Begin

Step 1 : Read an image from the image database (IDB) of size.
Step 2 : Partitioning the input image into k non-overlapped blocks.
Step 3 : Procedure edge_orientation ( )
Step 4 : Perform procedure_ threshold ( )
Step 5 : Repeat Step 3 through Step 4 for all blocks of the input image.
Step 6 : Generate feature set Fv={Fv1,Fv2,Fv3,Fv4} as calculated.
Step 7 : Store the feature vector into the feature database
Step 8 : Repeat Step 1 through Step 7 for all the images in IDB.

End

ALGORITHM II

//Retrieve top m relevant images corresponding to the target image //
Input : Target Image (Ti) of size (M x N) and images from IDB
Output : List the top m relevant images corresponding to the target image.

Begin

Step 1: Read the Target image.
Step 2: Partitioning the Target image by k non-overlapped blocks of size .
Step 3: Procedure edge_orientation ( )
Step 4 : Perform procedure_ threshold ( )
Step 5: Repeat Step 3 through Step 4 for all blocks of the target image
Step 6: Generate feature set Fv= {Fv1, Fv2, Fv3, Fv4} as mentioned.
Step7: Perform procedure SVM_ dist ( )
{
Compute the distance measures for number of images from IDB with the target image using the equation 5.1.
}
Step8: Retrieve the top m relevant images from the image database.

End

Procedure _ threshold ( )

{

Step 1: input M, N //size of input image
Step 2: Read the image with even row and column
Step 3: Convert gray scale values into matrix format.
Step 4: Apply sorting method for an array by using step 3.
Step 5: To find out the middle gray scale values of lower range and upper range.
Step 6: To find out the average value of middle gray scale values and take whole number in sorted array and also known as threshold value.
Step 7: Convert binary matrix by using threshold value.
Step 8: Repeat step 3 to step 7 for all images in the database.
Step 9 : Return

}

Procedure edge_orientation ( )

{

Step1: Divide the edge map of the input image into k blocks of size
Step2: for i= 1 to k
for all k blocks
{
Accumulate 3-D edge orientation histogram by considering the Center pixel position of block
{
for j=1 to 4
Accumulate 1-D orientation histogram by considering the center pixel position of block.
}
}
Step 3: Establish the feature set of the input image with the histogram sequences of edge orientation.

}

6. EXPERIMENTATION AND RESULTS

The proposed feature extraction is experimented with the images collected from the standard database consisting of 1000 images and generated feature vector images considered for this experiment are of the size (m x n). From the below Table.1 shows that recognition percentage of images EDGE gives the experimental results the EDGE produces higher recognition accuracy of 92.44% for image recognition. It shows the selected image from the database. The performance was evaluated using the SVM classification by analysis of the values in the table the EDGE method is better for recognition and retrieval of images.

Table.1 Comparison Values

Methods	Percentage in recognition
LBP	91.29%
LDP	90.53%
EDGE	92.44%

7. CONCLUSION

In this paper, the image recognition and retrieval with geometrical feature extraction images based on LBP, LDP models has been presented. The experimental result proves the effectiveness of the EDGE methods provides good recognition rate when compared to existing methods. The performances of EDGE method when compared to existing methods such as Local Binary Pattern and Local Directional Pattern methods are investigated independently. The EDGE method produces better results with 92.44% accuracy compared with existing methods gives 91.29% accuracy for Local Binary Pattern and Local Directional Pattern with 90.53%. The computational cost of the algorithm is very low also used for recognition and retrieval.

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