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AN INNOVATIVE APPROACH FOR REPRESENTATION OF SHAPE SIGNATURE BY USING PROBABILITY DISTRIBUTION FUNCTION

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Abstract

The object recognition is found to be crucial for various applications includes face recognition, numeral recognition, character recognition etc. Among all the applications, the efficient representation of shape is the crucial stage for the overall procedure of object recognition. So, the present paper focuses on the representation of the input image based on the shape. The shape of the input image is represented with the statistical parameters of the input image and further they are represented with the probability based distribution (PDF). The proposed PDF based Shape Signature (PDFSS) is applied n four different types of images and the results indicate the efficacy of the proposed method.

I. Introduction

The Eigen vectors [1] are found to be prominent for representing the signature of the input image. The complex coordinates [2] are used for representing the signature of the image and are further described with the Fourier Descriptors. The Homo topic Deformation [3] features are used for representation of image signature. It uses the concept of minimum circle to deform the input image into template. The skeletal articulations [4] are used for designing the pose obvious shape signature. It uses the histograms and scalar functions. The curve matching [5] algorithms are well suited for offline

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signature based matching algorithms. These algorithms use Euclidean distance measures for estimation of similarities.

The Edge based information [6] is also found to be efficient for representation of the shape with signature. These signatures uses Laplacian transformations. Multi level shape signatures [7] are found to be prominent to analyze the shape at multiple scales of abstraction. The multi scale signature can be constructed with the contour fragments [8] and are used to capture the curvature dynamically. The estimated signatures are further processed with thinning algorithm [9] with KMM and are coupled with various distance measures. The discriminative shape signatures [10] are widely used for shape matching and analysis. The global and local features will be combined [11, 12] to estimate the shape signature.

II. Methodology

The representation of the input image is found to be crucial stage for the object recognition. During the representation, the dominant points should be represented with the signature. So, the present paper proposes a probability based distribution (PDF) based Shape Signature (PDFSS) for the representation of the input image.

The PDFSS uses the first order statistical parameters for representation of the input image with the signature by using the Equation (1) and (2).

$$mean = \frac{I}{I - 2} \tag{1}$$

$$S(z \mid x, y) = \frac{\Gamma[(x + y)/2]}{\Gamma(x/2)\Gamma(y/2)} (x/y)^{x/2} \frac{z^{(x-2)/2}}{[1 + (v_1/v_2)z]^{(x+y)/2}}. \tag{2}$$

III. Results and Discussions

The present proposes an innovative approach for PDF based Shape Signature (PDFSS) to represent the input image. The PDFSS algorithm is applied on various images shown in Figure 1. During the initial stage, the signature of the image is represented with the first order statistical parameters of mean and covariance. The result of the signature for the four images is shown in Figure 2. Then, during the next stage, the Probability

Distribution Function is applied on the signature for the extracting the better representation of the input image as shown in Figure 3.

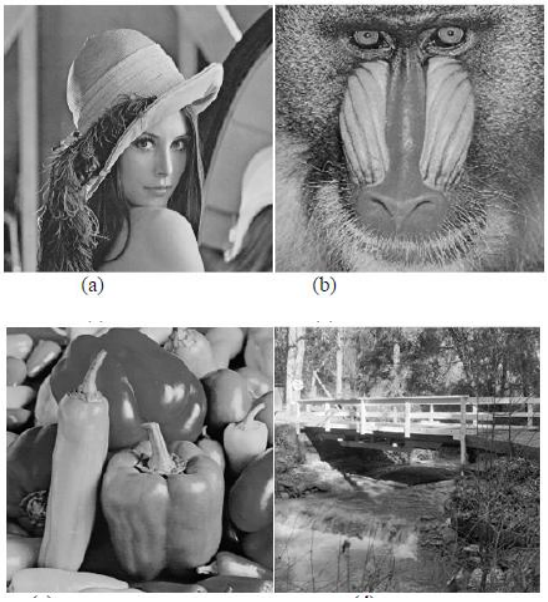

Figure 1. Input Images (a) Original Image 1 (b) Original Image 2 (c) Original Image 3 (d) Original Image 4.

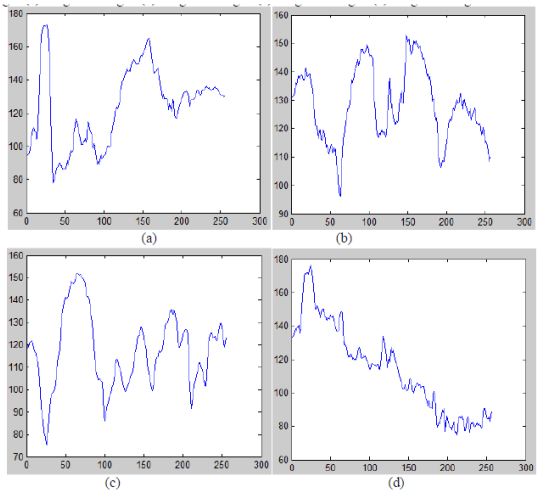

Figure 2. Shape Signature of (a) Original Image 1 (b) Original Image 2 (c) Original Image 3 (d) Original Image 4.

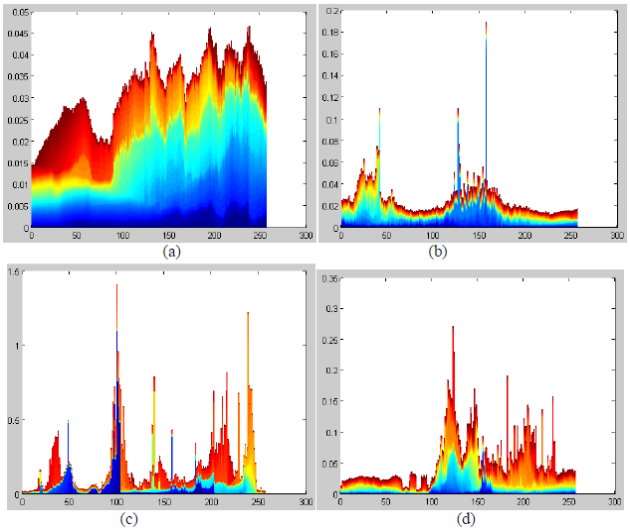

Figure 3. PDF based Representation of (a) Original Image 1 (b) Original Image 2 (c) Original Image 3 (d) Original Image 4.

IV. Conclusions

The present proposes an innovative approach for PDF based Shape Signature (PDFSS) to represent the input image. The PDFSS algorithm uses the first order statistics to represent the input image with signature. The signature is further represented with the Probability Distribution function. The PDFSS is applied for four different types of images and the results indicate the efficacy of the proposed method.

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