A NEW UNSUPERVISED ALGORITHM FOR TEXTURE SEGMENTATION

Dr. V. Vijaya Kumar	A. Nagaraja Rao, Research scholar	V.V.Krishna	Dr. A. Damodaram
Associate Professor SIT, IPGS&R, JNT University Masab Tank, Hyderabad-500 028. Email:vijay_jntu_cse@yahoo.co.in	MGNIRSA, Hyderabad	Head Dept of CS & IT, MGIT, Hyderabad	Associate Professor SIT, IPGS&R, JNT University Masab Tank, Hyderabad-00028. Email:damuavula@rediffmail.com.

Abstract:

A new unsupervised algorithm for texture segmentation is proposed in this paper. The new scheme is based on the idea that texture features changes abruptly near boundaries. The image is first looked as regions of 5 x 5 masks and an edge detection algorithm based on all four directions with respect to central pixel is applied and primitive morphological concepts are proposed to change the central pixel. The validity of the proposed method is also considered by experimental results.

INTRODUCTION:

Texture segmentation is the first step in natural texture analysis. It plays an important part in image interpretation and understanding. Most natural image textures do not consist of only one type of texture. Texture segmentation is defined as a division of the whole image into homogeneous regions characterized by the same texture. In general the number of texture types present in an image is not known in advance. An unsupervised or an automatic segmentation method is therefore preferred.

Texture segmentation can be performed in two ways- as grey level segmentation or as feature segmentation. The former usually deals with the so-called object identification[1-3] or object extraction from a textured background. In this case, abrupt changes in an image are interpreted as grey level changes which usually appear near the boundaries between the objects and the background. The latter[4,5]deals with the identification of different textural regions using their textural feature differences and not the grey level differences. In this paper the more general feature segmentation method is addressed on a 5 x 5 neighborhood mask.

METHODOLOGY:

A 5 x 5 neighbor hood mask is shown in the Table1. The absolute difference of central pixel value $P_{i,j}$, with its vertical pixels P_3, P_8, P_{18}, P_{23}, , with its horizontal pixels P_{11}, P_{12}, P_{14}, P_{15}, and , with its two diagonal sets are calculated. From these 4 values, 4 new sets of images can be obtained by substituting a new value for central pixel, which can be maximum, minimum, average and difference of maximum and minimum of these sets. Out of these, the difference of maximum and minimum resulting as a good segmentation algorithm. And this process is applied on the entire texture by convolution. The original textures and the resultant textures after the segmentation are shown in the following figures.

P_1	P_2	P_3	P_4	P_5
P_6	P_7	P_8	P_9	P_{10}
P_{11}	P_{12}	$P_{i,j}$	P_{14}	P_{15}
P_{16}	P_{17}	P_{18}	P_{19}	P_{20}
P_{21}	P_{22}	P_{23}	P_{24}	P_{25}

Table1. 5 x 5 neighborhood mask.

Fig.1. The original image

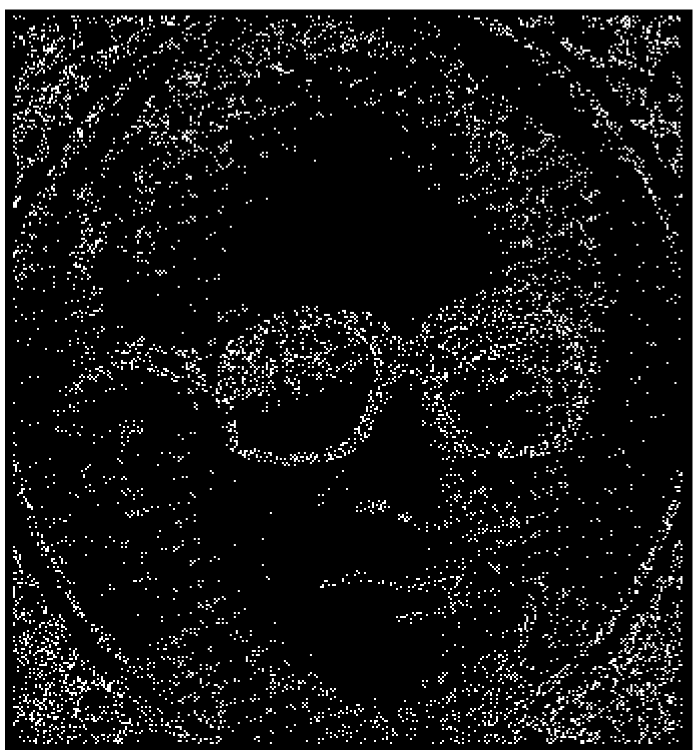

Fig. 2. Segmented image of the original image.

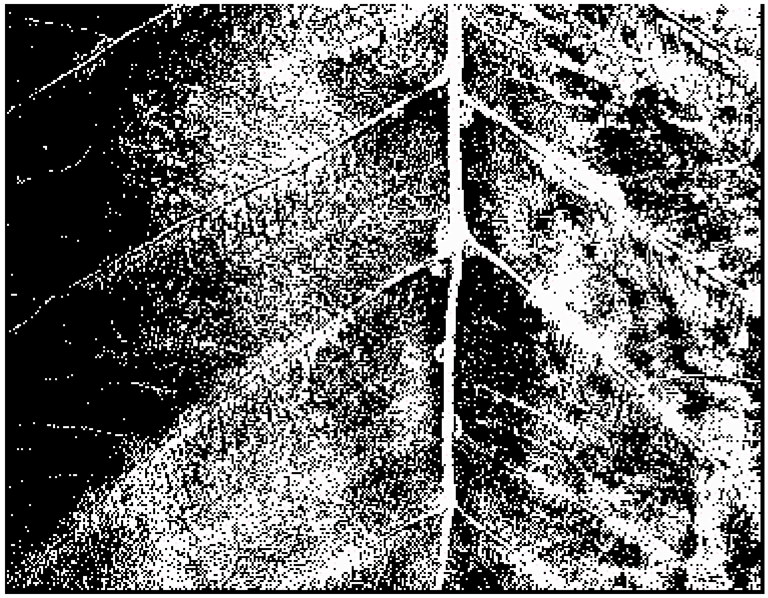

Fig. 3. Original image of leaf texture.

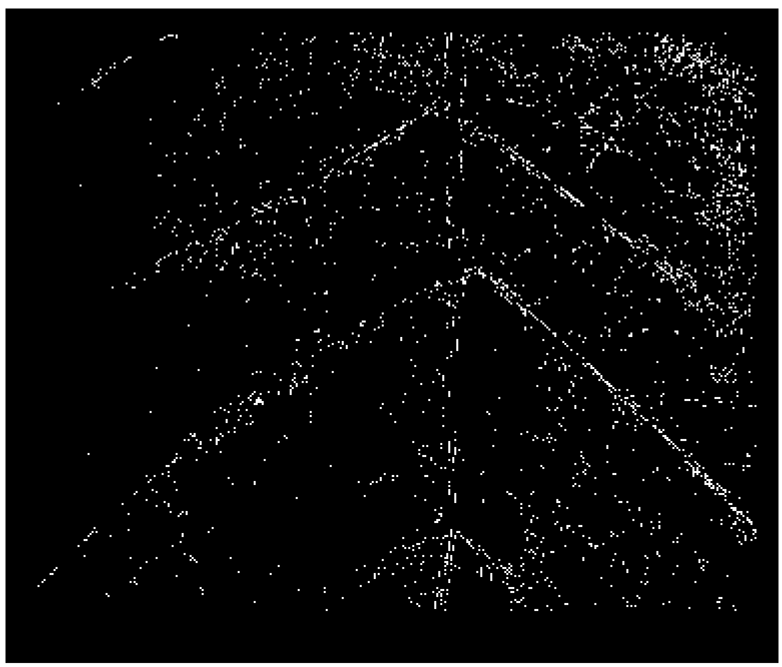

Fig. 4. Segmented image of leaf texture.

CONCLUSIONS:

The experimental results and their analysis given above prove that our new segmentation method is quite efficient for the segmentation of texture features. This method uses all 4 direction measures i.e. Vertical, horizontal, and two diagonal directions. And that's why the proposed segmentation scheme is a more general one. This method is unsupervised, and it is also based on primitive grey level morphological operations dilation and erosion. The experimental results on the above figures shows the validity of the algorithm.

REFERENCES:

1. J.L.C.Sanz, Fast object segmentation in textural background, IEEE Proc. Int. Conf. ASSP, pp. 905-908(1985).
2. L.S.Davis, Region extracting by averaging the thresholding, IEEE Trans. Mach. Man. Cybern. 5, 383-388(1975).
3. Kan-Min Chen, Shu-Yuan Chen, Color texture segmentation using feature distributions, Pattern Recognition Letters 23, pp. 755-771 (2002).
4. R.L.Kashyap, A stochastic model based technique for texture segmentation, Proc. Int. Conf. Pattern Recognition. Pp. 1202-1205(1984).
5. W.B. Thompson, Textural boundary analysis, IEEE Trans. Comput. C-26, 272-276(1977).