HUMAN SKIN TEXTURE ANALYSIS TO FIND THE SKIN DISEASE CONDITION

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Abstract— The objective of the proposed framework is texture analysis using the image processing technique called Gray Level Co-occurrence Matrix is utilized to separate various skin features such as Contrast, Entropy, Energy, Homogeneity and correlation for the analysis of the image and also concentrates on calculating the rate of skin infection in the acquired test image in comparison with the reference image

KEYWORDS— HOMOGENEITY; FORMATTING; STYLE; STYLING; INSERT

I. INTRODUCTION

Texture is an important feature of objects in an image. Texture refers to visual patterns in images that have properties for homogeneity, which do not result from the presence of any single color or intensity. These regions may have unique visual pattern or spatial arrangements of pixels which may not be described by gray level or color values alone. Texture has either statistical and structural properties or only one of them. Texture is an important element to human vision. Natural texture properties are coarseness, contrast, directionality, likeliness, regularity etc. Texture analysis is one of the fundamental aspects of human vision by which we differentiate between surfaces and objects.. The regional intensity or color alone cannot sufficiently describe the skin diseases. Texture classification is concerned with identifying a given textured region from a given set of texture classes. Each of these regions has unique texture characteristics. Statistical methods are extensively used to determine the texture as a quantitative measure of the arrangement of intensities in a region.

II. EXSISTING SYSTEM

A practical skin color and texture analysis/synthesis technique is introduced for the E-cosmetic function. Shading on the face is removed by a simple color vector analysis in the optical density domain as an inverse lighting technique. independent component analysis, is used to analyze the image without shading, a previously introduced technique that extracts hemoglobin and melanin.. The comparison shows an excellent match between the synthesized and actual images of changes due to tanning and alcohol consumption. There also exists a technique to synthesize the change of texture in pigment due to aging or the application of cosmetics. [1]

Grain size and anisotropy are evaluated with proper diagrams. The possibility to determine the presence of pattern defects is also discussed. [2]

The skin colour image is decomposed to the four texture components by multi-resolution analysis using wavelet transform. A variety of skin images with different conditions of skin color and texture are created in a linear combination of the texture components. Experimental results show good separation of skin textures by wavelet analysis and realistic synthesized images. [3]

Texture refers to visual patterns or spatial arrangement of pixels that regional intensity or color alone cannot sufficiently describe. Researchers have proposed numerous methodologies to automatically analyze and recognize textures, from deriving texture energy measures using a set of simple masks to using Gabor filters, for several image analysis applications, including texture classification and segmentation. [4]

To be adaptive to the dynamic illumination and chrominance, face detection is used to customize the skin color model to each image. The proposed method has achieved promising performance over our dataset, which is a challenging set with a great part of hard images.[5]

III. TEXTURE ANALYSIS

Gray Level Co-Occurrence Matrix (GLCM) has proved to be a popular statistical method of extracting textural feature from images. According to co-occurrence matrix, Haralick defines fourteen textural features measured from the probability matrix to extract the characteristics of texture statistics of remote sensing images. In this paper four important features, Angular Second Moment (energy), (inertia moment), Correlation, Entropy, and the Inverse Difference Moment , standard deviation and contrast are computed for calculating the percentage increase or decrease in desease. Angular Second Moment is also known as Uniformity or Energy. It is the sum of squares of entries in the GLCM Angular Second Moment measures the image homogeneity. Angular Second Moment is high when image has very good homogeneity or when pixels are very similar.

GLCM is a popular statistical method of texture analysis. GLCM is the matrix defines the probability of gray level i occurring at a distance d in direction θ from gray level j in the texture image. These probabilities create the co-occurrence matrix

$$M(i, j \mid d, \theta)$$

GLCM texture considers the relation between two pixels at a time, called the referenceand the neighbor pixel. The neighbor pixel is chosen to be the one to the east (right) of each reference pixel. This can also be expressed as a (1, 0) relation: in the x direction 1 pixel, in the y direction 0pixel. Each pixel within the window becomes the reference pixel in turn, starting in the upper left corner and proceeding to the lower right. Pixels along the right edge have no right hand neighbor, so they are not used for this count.

From these directional GLCM a set of features are calculated from each directional GLCM. In this work contrast, homogeneity and energy are computed because this will give a better result to recognize different skin conditions. These features are extracted and averaged over the four directions. A set of features derived from four directional normalized symmetrical GLCMs are considered for texture characterization viz. GLCM Contrast (GC), GLCM Homogeneity (GH) and GLCM Energy (GN) as defined here.

Contrast: The difference in color and light between different parts of an image is known as contrast. Contrast is the difference in visual properties that makes an object (or its representation in an image) distinguishable or brighter from other objects and the background. In visual perception of the real world, contrast is determined by the difference in the color and brightness of the object and other objects within the same field of view. Contrast of a texture is defined as

$$\text{Contrast: } GC = \sum_{i=1}^{N} \sum_{j=1}^{N} S_{i,j} (i-j)^2$$

Homogeneity: Measures the closeness of the distribution of elements in the GLCM to the GLCM diagonal.

$$\text{Homogeneity: } GH = \sum_{i=1}^{N} \sum_{j=1}^{N} \frac{S_{i,j}}{1+(i-j)^2}$$

Energy: Energy provides the sum of squared elements in the GLCM. It is also known as uniformity or the angular second moment.

$$\text{Energy: } GN = \text{square root of } \sum_{i=1}^{N} \sum_{j=1}^{N} (S_{i,j})^2$$

Here Si,j represents the element (i, j) of a normalized symmetrical GLCM, and N the number of grey levels.

A texture class consists of a set of member images:
Ti = {t1,t2,…,tn}i.

For each member image, four directional GLCMs are computed.
{(tG0,tG45,tG90,tG135)1, (tG0,tG45,tG90,tG135)2,…, (tG0,tG45,tG90,tG135)n}i

For each directional GLCM, three feature values viz. GC, GH, GN are calculated.

IV. PROPOSED APPROACH

The under mentioned system named "Human Skin Texture Analysis to find the skin disease condition" is proposed to recognize different skin conditions by analyzing texture features. In case of different skin conditions the texture of the skin becomes different. Analyze those textures different skin conditions are recognized. Here we are proposing a system where we are using an image processing technique called Gray Level Co occurrence Matrix (GLCM), to extract various features such as contrast, energy, entropy, homogeneity, correlation of the skin and also to calculate the percentage of skin disease in the input skin image.

V. ALGORITHM OF SYSTEM

1. Read the image files from the source.
2. Convert the RGB image to Gray Scale image.
3. Convert the Gray Level values to its double precision value.
4. Calculate GLCM along 4 directions.
5. Compute GLCM based features to detect disease condition

VI. RESULT

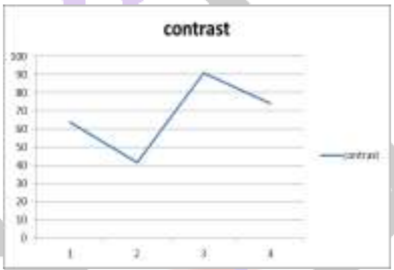

Image1

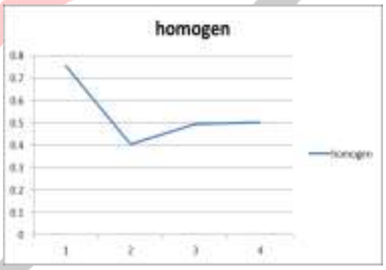

Image2

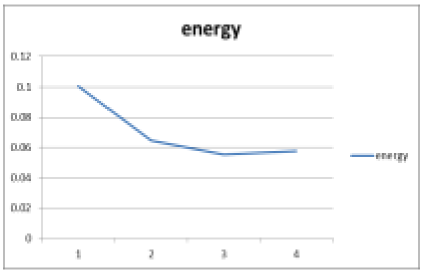

Image3


Image4

	Contrast	Homogen	Energy
img1	63.9284	0.7551	0.1006
img2	41.4836	0.4035	0.0644
img3	90.7933	0.4948	0.0554
Img4	73.9587	0.5028	0.0576







VII. CONCLUSION AND RESULT

The proposed system is used to design an automated system for recognizing different skin conditions. This system is based on texture analysis. Here GLCM istaken as a method of texture analysis. For analyzing texture, symmetrical normalized GLCM is computed along four directions. From this matrix texture features are calculated and averaged over 4 directions. There are many texture features but in this work contrast, homogeneity and energy are used for better result. The accuracy of the current system can be improved color features with texture.

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