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AUTOMATIC SKIN LESION CLASSIFICATION USING HYBRID FEATURES EXTRACTION AND ARTIFICIAL NEURAL NETWORK

S.Penchala Prasad Department of Electronics & Communication Engineering, Narayana Engineering College, JNTUA, Nellore, AP, India

K.Murali Department of Electronics & Communication Engineering, Narayana Engineering College, JNTUA, Nellore, AP, India

ABSTRACT

This work classifies the melanoma skin lesion with hybrid spatial features extraction and Radial Basis (RB) type net work classifier. Here, two different types of classifiers are utilized to extract the characteristics from several skin lesions the new approached probabilistic neural network to classify with higher accuracy. There are five different type of skin lesions classifications are "Melanocytic nevus / mole(ML)", "Basal Cell Carcinoma (BCC)", "Actinic Keratosis (AK)","Squamous Cell Carcinoma (SCC)", "Seborrhoeic Keratosis (SK)". The CAD(Computer Aided Diagnosis) system will be used to classify the abnormal images automatically in the starting stage of skin lesion classification. For this approach, the PNN classifier withRBFis to be used for classifying training samples of each stage. Here, the color features from HSV space and discriminatetexture features such as gradient, contrast, kurtosis and skewness are extracted. The skin lesion diagnosis systeminvolves two stages which are training and classification. An artificial neural network Radial basis type is used here as classifier. In feature hierarchy frame work, each node chooses it as most relevant feature subsets. The proposed neural scheme accuracy is higher in discriminating cancer and we get the higher accuracy classification of the those five common classes of skin lesions and including two non-melanoma cancer types.

It is the most accurate result on melanoma skin cancer classification in the colour images achieved by a standard camera (non-ceroscopy). Final experimental result shows that the texture descriptors and classifier yields the better classification accuracy in all skin lesion stages.

KEYWORDS : Melanoma, CAD System(Computer Aided Diagnosis), KNN(K-Nearest Neighbor) classifier, PNN (Probabilistic Neural Network)classifier, Color and Texture, Segmentation.

I.INTRODUCTION

There are so many publications about classification of Methods related to this diagnosis of this working condition.Since 1987 the number of published papers has and the important progress that has been occurred in this domain. It should be established by the number of journal. However that the Computerized analysis of skin lesion images are to be implemented and classified in the medical field. There are few different techniques for segmentationi.e., feature extraction and classification should be classified. Classification method ranges from discriminate analysis to neural networks and support vector machines. These methods are mainly developed for images to acquirewith a good quality. There are two common types of skin cancer (Squamous Cell Carcinomas(SCC) and Basal Cell Carcinomas(BCC)).In this we have to focus on five common types of skin lesions: Actinic Keratosis (AK), Basal Cell Carcinoma(BCC), Melanocytic Nevus /Mole(ML), Squamous Cell Carcinoma(SCC), Seborrhea Keratosis (SK). Moreover, this type of skin cancers are mostly deadly skin lesions, around 76690 peoples are effected from this disease. Around 9500 peoples are dying in the year of 2013. It is not easy to find out these types of skin lesions in starting stage. The schemes for combining multi pleto architecture:

1) Parallel
2) Cascading
3) Hierarchical.

In the hierarchical architecture, few classifiers are combined into a single structure format which should be like tree form. There are many advantages of this classifier which are higher efficiency and good flexibility that exploit the discriminate power and improving differentfeatures with a higher accuracy. Normal approach is to divides and classifies the task. It can be split into a set of smaller classification for corresponding problems. There are different types of classifiers using different sets of training images. So each classifier has touse different features to optimize those images. This involves each classifier having its own independent information. We all know that Hierarchical classifiers are commonly used for document and texture classification including a hierarchical K-NN classifier. Hierarchical systems have to be used in medical image classification tasks for better accuracy inorder to find out the image classification.

II.LITERATURE SURVEY

The Computerizedanalysis of the Melanoma classified images areobtained from ELMand has been developed to find out starting stage andthe early recognition of the melanoma classification.The KNN based classifier is used to identify the disease classification, HighComputational load and poor discriminatory power. It has less accuracy inclassification [1],[2] and [3]. The computerized analysis of skin lesion images is the detection of the lesion borders. TheInformation for accurate diagnosisis achieved by border detection structure [4] and [5]. The color and texture format images are in black and white and the pixels quality is very poor [6]. The Neural Network based compression is also common research work considering by many references [7].

EXISTING METHOD

This method is used forclassifying and testing the image is inblack and white format and the result should be in the same manner. There is K-nearest neighbor classifier used for identifying various types of diseases.The drawbacks of Existing method are: High Computational load, poor discriminatory power and less accuracy in classification. In thismethod it is more complex and very difficult to identify the disease and has less accuracy in classification which means it may identify the wrong classification some times.

To overcome these draw backs, we are going to implement the new proposed system.

PROPOSED METHOD

Skin lesion classification for Computer Aided Diagnosis (CAD)system based onHybrid spatial features which involves colour features and texture descriptors, New probabilistic neural network(RBN type) classifier. This work presents melanoma skin lesion classificationwith hybrid spatial features representation and radial basis type classifier. This is the most deadly skin cancer and is difficult to find out in starting stage. Here, the CAD system will be used to find out the disease in starting stage without a doctor, based on texture feature extraction and characterization of abnormality to classify the 5 different types skin lesions. In this, the PNN classifier isused for the better classification to find out what type of skin lesion is

affected. To use the CAD system, it should classify the stage of abnormalityin skin lesion classification with high accuracy of 97.9%.

Fig.1: Classification of Skin Lessons through CAD system.

Before testing the image,the training of the system that involves the entire information will give the CAD system the skin lesion classifications. To give input image to the system for testing, it should be in colourformat.Then the CAD system compares the input image with reference images whether it is normal or abnormal. The input image is converted from RGB to HSV plane. Colour is the most used feature in pattern recognition.The color space is suitable since it reflects human perception and identification of color image HSV.

Hue: The Identity of a colour as it relates specifically to the spectrum. Saturation: It is the purity or clarity of the colour.
Value: It indicates brightness and darkness of the colour.

RGB to HSV conversion:
The HSV colors are in triangle. It should be defined by the three primarycolors in RGB space.

The hue point P can be measured with Respect to angle from the RED axis. The saturation is to be the measured length of the vector.

The value (intensity) of all colors in any of these planes is given by the position of the plane on the vertical intensity. The grayscale conversion formula is as follows

Fig.2: Obtainable HSV color from RGB color space

$V=\frac{1}{3}(R+G+B)$

Texture features:
Energy: It should measure the strength of image, homogeneity changing, and the image gray-scale uniformity of weight and texture.

Contrast: Contrast is the main diagonal near the moment of inertia, It should be the measure of brightness of the Image.

Entropy: It measures image texture randomness, when the space co-occurrence matrixes for all values are equal. It achievesa minimum value.

Correlation Coefficient: Measures to compare both the images of the joint probability occurrence of the specified pixel pairs.

Correlation =sum(sum((x- μx)(y-μy)p(x , y)/σxσy))

Homogeneity: Measures the difference of the both Image elements.

Sum=(sum(p(x , y)/(1 + [x-y]))

The statistical features such as mean and covariance will be extracted from hue andsaturationplane as one part of feature vectors.The feature extraction has Color and Texture features. The colour property includes mean and variance. The mean can be determined by the average of all pixels and variance should be defined as overall average of mean. The texture features should define the image of Energy, contrast, correlation and homogeneity. These features involve the feature extraction. We are going to test the image before we give the training to the system which means to give the entire information to the system about all the skin lesion classification . Then we have to give the Input image to the system in the colour format and it should be converted to RGB to HSV plane in colour space conversion. Then it should be extract the colour and texture features. The CAD system will comparesthe given input image with reference image.If it is normal then directly shows the output normal image. In case, if it is abnormal then we have to find out the type of skin lesion classification the image is going to. So we use the PNN classifier to find out the type of disease attacked. The PNN classifier classifies with high accuracy and it should finds out theexact skin lesion classification .The segmentation is to locate where the abnormal pointer in the image exactly is. Finally we can identify the exact disease with 97.9% accuracy.

Thebelow figureshowsthe steps to learn the representative texture distributions and calculate the TD metric.

Advantages
Low complexity, better features discriminationandbetter classification accuracy.
Applications
Skin diagnosis support system in medical research.

III.RESULTS

Fig.3: classified skin lesion images

IV.CONCLUSION

The entire proposed system classifies the segmentation of melanoma skin lesion classifications with hybrid extraction spatial features using a CAD system and radial basis type probabilistic neural network and segmentation. To use this type of classifier , this proposed system is better with classification accuracy and Low complexity. We found out the exact pointer locate where theabnormal place in image with high accuracy of97.9%.

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