PSORIASIS DETECTION USING COLOR AND TEXTURE FEATURE

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Abstract— Psoriasis is a chronic disease that mainly affects the skin. Red, scaly patches - is commonly found over the surfaces of the scalp, around or in the ears, the elbows and knees.Skin quickly builds up in the affected area, because of skin production is faster than the body's ability to shed it. Psoriasis varies in severity - some patients may only have minor localized patches, while others are affected all over the body.The diagnosis test of psoirasis involves biopsy and scarpings which are painful to patients.hence computer aided skin disease diagnosis system would be developed.Here we have extracted color and texture features of psoirasis image. Feature database is created and applied to Neural network for classification

Index Terms — energy, entropy, homogeneity, contrast, ANN.

I. INTRODUCTION

Skin disease diagnosis involves test such as Biopsy, Scrapings, Diascopy. Tzanck testing etc. This requires patients history and physical examination.The diagnosis is very long-term process because it requires large number of features clinical as well as histopathological for analysis and to provide further treatments.The laboratory test such as skin biopsy, scrapings are painful to patients. Because In biopsy, tubular punch (diameter usually 4 mm) is inserted into deep dermal or subcutaneous tissue to obtain a specimen, which is snipped off at its base. More superficial lesions may be biopsied by shaving with a scalpel or razor blade. The disease diagnosis becomes difficult as the complexity and number of features of the disease increases. Hence computer aided diagnosis system is introduced.which will reduce the pain andalso provides faster diagnosis than a human physician. For the implementation of computer algorithm certain steps are involved like image processing, image feature extraction and data classification. For data classification we have used artificial neuralnetwok . The artificial neural network is a branch of artificial intelligence and also a research domain of neuro informatics. They are made of simple processing units (artificial neurons) that are strongly interconnected and that work in parallel. The artificial neurons are conceptual model of biological neurons that are part of human nervous system. Therefore, these networks can be considered a simplified form of a human brain. Their aim is to interact with the environment the same way a biological brain would do this. They have some properties that bring them very close to this aim: the ability to perform distributed computations, to tolerate noisy inputs, and to learn patterns of symptoms

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II .Literature review

The artificial neural networks can be successfully used to work with medical images in correct disease diagnosis. Dr. J. Abdul Jaleel , Sibi Salim and Aswin R.B. proposed a Computer based early skin cancer detection system. It proves to be a better diagnosis method than the

conventional Bioscopy method.The diagnosing methodology uses Digital Image Processing Techniques and Artificial Neural Networks for the classification of Malignant Melanoma from other skin diseases. The unique features of the segmented images were extracted using 2-D Wavelet Transform. Based on the features, the images were classified as Cancerous and Non-cancerous[3]. In diagnosis of skin diseases using image processing the important task is to detect the skin. Michael J. Jones and James M. Rehg compare the performance of histogram and mixture of gausian models in skin detection and find histogram models to be superior in accuracy and computational cost for skin detection [4]. Another work in skin detection is done by Jason Brand and John S. Mason. They compared three approaches for skin detection. They use simple ratios and color space transforms and numerically efficient approach based on a 3-D RGB probability map [5]. Along with color, texture features are also play important role in classification of skin diseases. Anal Kumar Mittra and Dr. Ranjan Parekh proposed low cost and effective automated system for recognizing disease conditions of human skin by analyzing skin texture images using a set of normalized symmetrical Grey Level Co-occurrence Matrices [7]. Catarina Barata, Margarida Ruela, Mariana Francisco, Teresa Mendonça, and Jorge S. Marques compared two different strategies for the detection of melanomas in dermoscopy images based on local and global features. They showed that color and texture features play important role in classification of disease [8]. Brijesh Verma and John Zakos presented a Computer aided diagnosis system for detection and classification of microcalcification in digital mammograms. They investigated and analyzed a number of feature extraction techniques and found that a combination of three features, such as entropy, standard deviation, and number of pixels, is the best combination to distinguish a benign microcalcification pattern from one that is malignant[9]. Nidhal K. Abbadi, Nizar Saadi Dahir, Muhsin A. AL-Dhalimi and Hind Restom developed system for psoirasis detection using color and texture features. The aim of this works it to evaluate the ability of the proposed skin texture recognition algorithm to discriminate between healthy and infected skins and they took the psoriasis disease as example[10].

III.Methodology

The Design and implementation of skin disease diagnosis will be done in modules. The modules will be interconnected as shown in the flow graph.

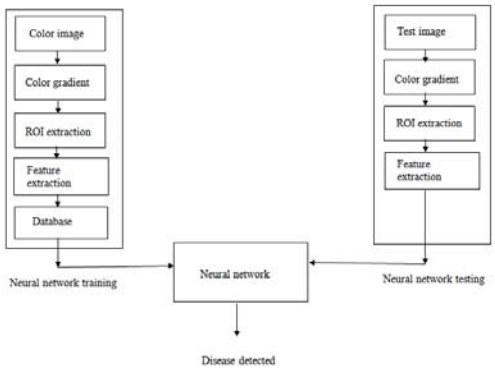

Fig.1. flow graph of implementation

I] Neural network training

a) Image database collection module:

Collection of image database from internet or from skin clinic of healthy and diseased patients for following disease 1) Acne 2) Psoriasis 3) Vitiligo

b) Color gradient module:

Color gradient generation using modified sobel operator based on color image instead of gray image.

c) ROI extraction module:

ROI of image is extracted using active contour method .This method accurately detect irregular shapes of the diseased skin.

d) Feature extraction module:

Following features will be extracted from image.

- Mean and Standard Deviations of ROI of 3 color channel (R, G and B) of diseased skin.
- Mean and Standard Deviations of 3 color channel(R, G and B) of healthy skin.
- Distribution (scattering of the ROI-s).
- And texture features like Energy, Entropy, Contrast in each color channel

e) Database creation module:

Database creation of above mentioned features for healthy and diseased skin.

II] Neural network testing:

a) Image of diseased skin will be input to the algorithm.

b) Generate Color gradient of test image.

c) Extract ROI of test image using active contour method.

d) Feature extraction

Following features will be extracted from test image.

- Mean and Standard Deviations of ROI of 3 color channel (R, G and B) of diseased skin.
- Distribution (scattering of the ROI-s)
- And texture features like Energy, Entropy, Contrast in each color channel.

e) Disease detection is done by Comparing feature of test image with trained database using neural network.

IV RESULTS

Fig.2.ROI extraction of Psoriasis

Fig.3. Feature extraction of Psoriasis

Fig.4. Polar to Cartesian conversion

Here we have extracted the color and texture features of image and results obtained are as shown

Feature	Psoriasis
Mean	210.4 to 220.7
Standard deviation	9 to 15.2
Energy	0.0334 to 0.0337
Contrast	285.3 to 293.9

Table 1: color and texture features of psoriasis

By using these features the database is created and the back propagation neural network is trained to detect the disease. Here we have collected Psoirasis images from Dr. Mali skin clinic. We performed experiments on 20 images of normal and diseased patients the results are shown in configuration matrix

Confusion matrix showing 100% accuracy

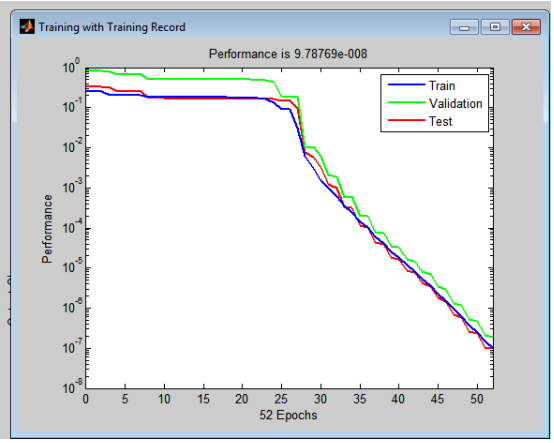

Fig 5. Training, validation and testing performance

V. CONCLUSION

The diagnosis of skin disease is very long term and time consuming process,. Convetional diagnostic test are painful to patients. Hence we have developed computer aided psoriasis disease diagnostic system using artifitial neural network which provides better accuracy and faster diagnosis than human physician. The colour and texture feature plays important role in classifying particular disease.

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