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Review Article

A REVIEW ON DIAGNOSIS OF MALIGNANT MELANOMA FROM BENIGN LESION BY USING BPNN AND ABCD RULE PARAMETERS

Udayakumar E *, Yogeshwaran K, Ramesh C

Assistant Professor, Department of ECE, KIT-Kalaignarkarunanidhi Institute of Technology, Coimbatore, Tamilnadu, India

*Corresponding Author Email: udayakumar.sujith@gmail.com

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ABSTRACT

One of the most dangerous diseases is Human Cancer, it is caused by instability of the multiple molecular alterations in the genetic. The most common one among the different forms of human cancer is the skin cancer. With help of different techniques like segmentation and feature extraction the skin cancer can be identified and analyzed at the early stage. The malignant melanoma skin cancer which occurs due to the high concentration of the melanocytic cells present beneath the skin is demonstrated in this paper. In this paper, for detecting of the malignant melanoma skin cancer the ABCD rule dermoscopy technology is used. First, the Image Acquisition technique then the pre-processing, segmentation, skin Feature Selection determines lesion characterization and classification methods are the several techniques used to find melanoma skin lesion. By digital image processing methods like border detection, color, symmetry detection and diameter detection the feature extraction is done and for the extraction of the texture-based feature LBP is used. As a classifier ANN is used in this proposed method. Finally, to classify the benign or malignant stage the Back Propagation Neural Network is used.

Keywords: Malignant melanoma, ABCD Rule, Dermoscopy, LBP, Back Propagation Neural Network.

INTRODUCTION

Image process techniques like noise removal followed by (low-level) feature extraction to find lines, regions and probably area unit as with sure texture are the initial step for the identification of the item in a picture. Assortment of those shapes is taken as single objects area unit the clever plan, i.e. cancerous cells one slide. Once viewed from totally different angles or beneath different lighting the objects tend to seem different is one in every of the most issues. Deciding what feature belongs to what object and differentiating the background and also the shadows area unit then operation the pc and takes an excessive amount of process power. Through many techniques manipulating information in sort of a picture is completed. As a two-dimensional array of brightness values the image is taken and is most acquainted pictured by such patterns typically as those of a pic, slide, TV screen or motion-pictures show screen. With a personal computer the image is processed optically or digitally. A new procedure is presented to detect malignant melanoma from benign pigmented lesions using macroscopic images. The image is with one megapixel is captured with conventional digital cameras with high spatial resolution has no constraints and special conditions during imaging[9]. The non-uniform illumination, correction of the effect of thick hairs and large glows on the lesion effects are weaken in this proposed method, also present a new algorithm called threshold-based segment.

A wavelet transform based tree structure model is developed and executed for the classification of skin lesion images into melanoma and dysplastic nevus[8]. Sematic representation of the spatial-frequency information is utilized for the tree structure in which skin lesion is contained including textual information. The results show the effective discriminating melanoma from dysplastic nevus from the presented method. The result of the method, by which the tree structure is obtained by utilizing the maximum channel energy criteria with a fixed energy ratio threshold, is compared with the proposed method result.

SYSTEM DESIGN

To solve the well-known clump downside, one in every of the best unsupervised learning algorithms was used because the existing system which suggests K-means. To classify a given information set through a definite range of cluster (assume k cluster) fastened a priority an easy and straightforward procedure is followed. the most plan is shaping one k centre of mass for every cluster. because of amendment completely location it ends up in different result, thus the centre of mass ought to be placed within the crafty method. Fig. 1 shows BPN design. Inserting them the maximum amount as attainable distant from one another is that the more sensible.

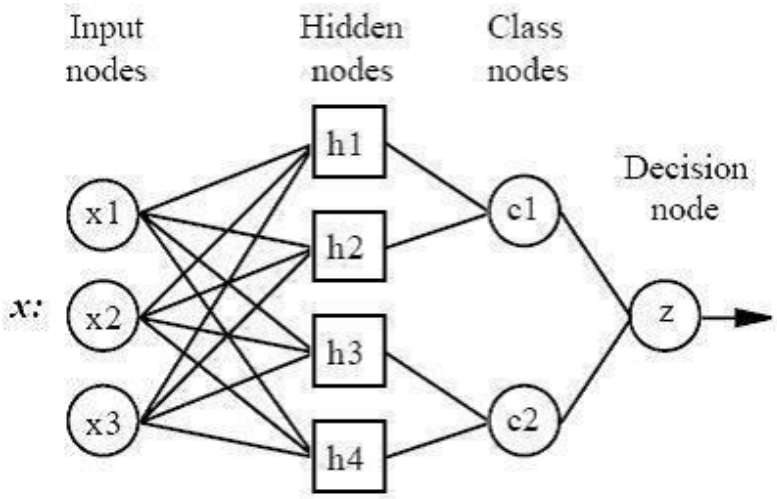

Fig. 1: BPN Architecture

Bases on Grey level co-occurrence matrix and Local binary pattern, Hybrid features involves color features and texture descriptors, ANN-Back Propagation Neural Network classifier, the classification for Computer Aided Diagnosis (CAD) on Skin lesion is done. Based on the action of biological neurons the neural networks are loosely predictive models. There are three layers in this network, input layer (on the left) with three neutrons, hidden layer (in the middle) with three neurons and an output layer (on the right) with three neurons. Fig. 2 shows the proposed block diagram. For each predictor variable there is one neuron in the input layer. N-1 neurons are used to represent the N categories of the variable in case of categorical variables[5]. A pit falls of the original perceptron's step function is avoided by a multilayer neural network with nonlinear but differentiable transfer function. For neural network, a reasonably effective training algorithm is also provided. A network with single real input x and network function F is considered.

In two phases, the derivative F'(x) is computed. In feed forward the input x is fed into the network. The primitive functions and their derivatives are evaluated at each node. Thereby the derivatives are stored. The output unit is fed with constant 1 and the network is run backwards in the back propagation. The information is added to the node and the result value stored in the left part of the unit is multiplied[6,7]. To the left of the unit the result is transmitted. The derivative of the network function with respect to x is the result collected at the input unit. After choosing the weights of the network randomly, to compute the necessary corrections the back-propagation algorithm is used. The algorithm is stopped, when the value of the error function has become sufficiently small.

Neural networks area unit prophetic models loosely supported the action of biological neurons. Feed-forward: the input x is fed into the network. The primitive functions at the nodes and their derivatives area unit evaluated at every node[8-10]. The derivatives area unit holds on. Back propagation: The constant one is fed into the output unit and also the network is run backwards. Incoming data to a node is supplementary and also the results increased by the worth hold on within the left a part of the unit. The result's transmitted to the left of the unit. The result collected at the input unit is that the by-product of the network operated with reference to x[14-16].

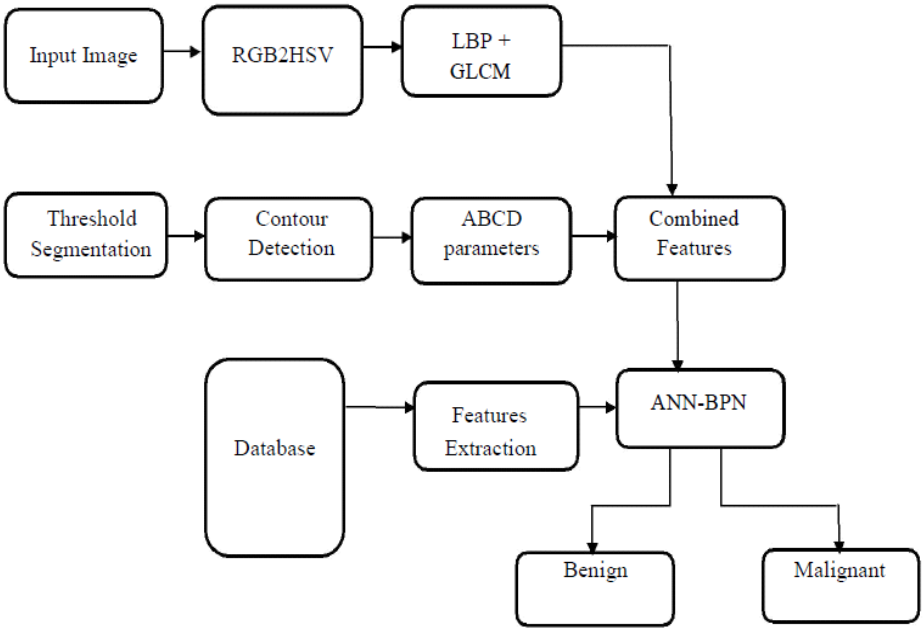

Fig. 2: Block diagram

The features of both input images and database images are extracted using local binary pattern (LBP). The threshold constant is used to threshold pixels into three values, LBP does not threshold pixels into 0 and 1. A novel method for extraction of features using Local Binary Pattern (LBP) and single bit multiplication, which uses central pixel for feature computation is proposed in this paper. The initial set of learning images (training set) are the main components of the extracted features[7]. By comparing its feature vector with other train vectors in database using ANN classifier, the images are classified once the features of the test images are extracted.

DISCUSSION

In MATLAB 2012 a version, skin cancer detection is simulated with 30 images as database. Feature extraction techniques are used and the neural network which classifies the skin cancer stages from the results shown. The sample input images used for screening is shown in the Fig. 3. The skin cancer detection process is shown in following image.

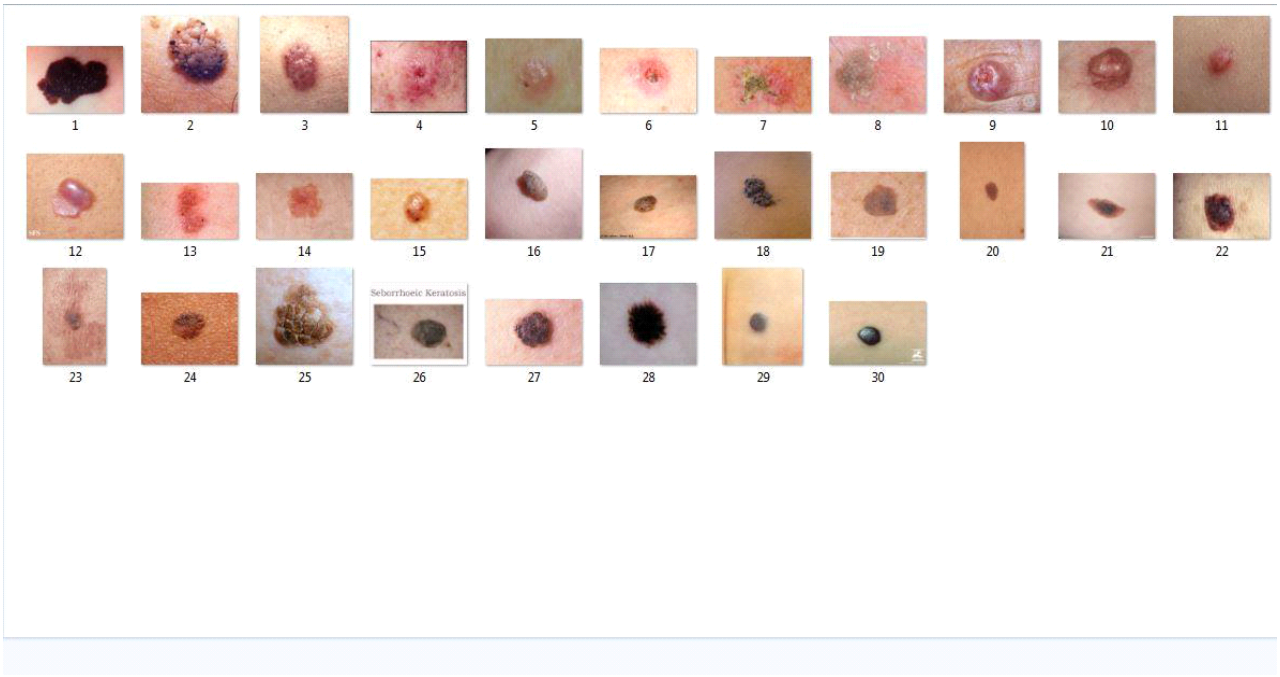

Fig. 3: Sample input images

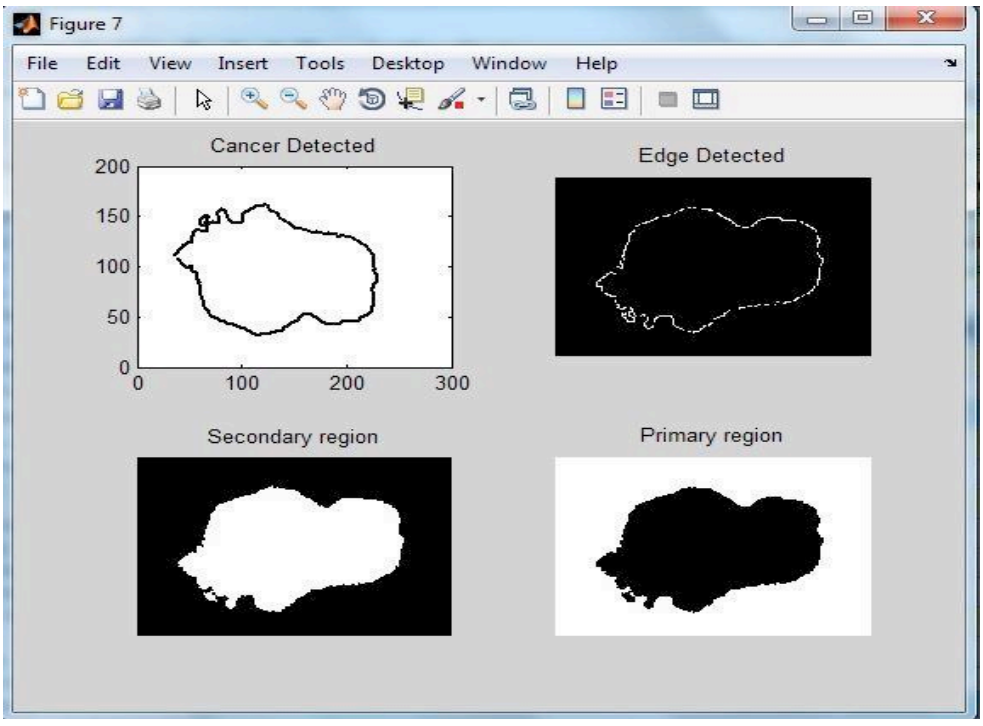

Fig. 4: Mask detection of primary and secondary region

Detection of mask in primary and secondary region is shown in Fig. 12 and symmetry calculation is shown in Fig. 5.

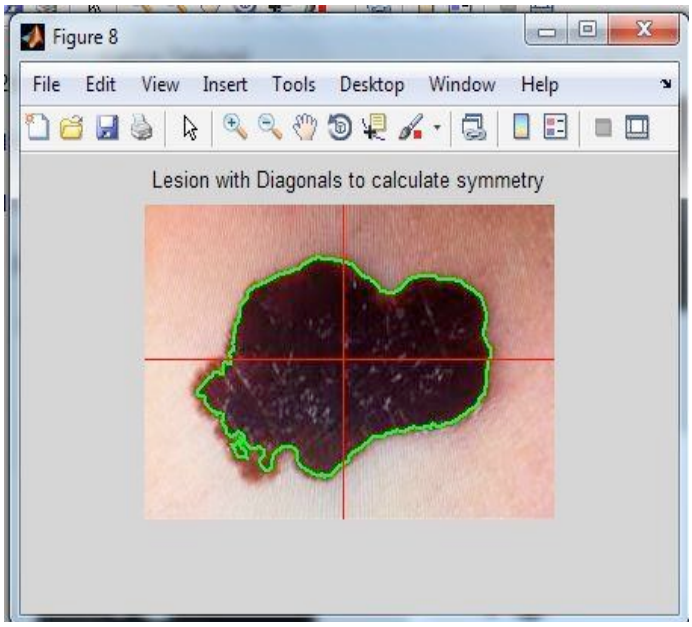

Fig. 5: Calculation of symmetry in lesion

Fig. 6: Completion of loading images in Database

Fig. 7: Completion of screening process

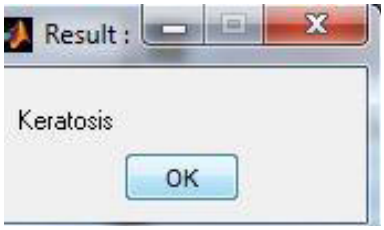

Fig. 8: Final output

Successful completion of screening process and decision of stages of growth is shown in Fig. 6, Fig. 7 and Fig. 8.

CONCLUSION

For automatic diagnosis of ABCD rule parameter and implementation of back propagation network to discriminate malignant melanoma from benign lesion the image processing techniques are used in this work. For an automatic melanoma detection algorithm, the experimental results show that the selected features are good. The improvement can be done primarily in the artifact steps and in structure detection in the future purpose.

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