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Detection of Skin Diseases using Resilient Neural Network (RNN)

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Abstract:- *Dermoscopy is an important tool in the early detection of melanoma, increasing the diagnostic accuracy over clinical visual inspection in the hands of experienced physicians. A pigment network whose structure varies in size and shape is called an irregular or a typical pigment network (APN). Melanoma is one of the lethal skin cancers causing death to thousands of people every year. Early detection of melanoma is possible through visual inspection of pigmented lesions over the skin, treated with simple excision of the cancerous cells. A technique based on CNN (convolution neural network) and FCM (Fuzzy C-mean) clustering for efficient precise and automated Melanoma region segmentation within dermoscopic images. In the proposed system segmentation model is designed henceforth the classification is further done by resilient neural network (RNN) to improve the quality of classification. By using the neural network it will display the types of disease and will determine accuracy increased compared to existing system.*

I. Introduction

The Dermatology remains the most uncertain and complicated branch of science because of its complicity in the procedures involved in diagnosis of diseases related to hair, skin, nails.

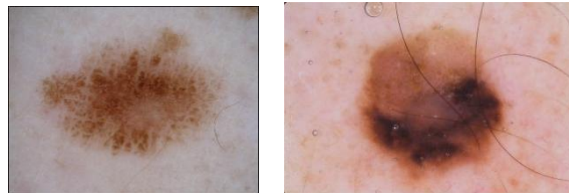
The variation in these diseases can be seen because of many environmental, geographical factor variations. Human skin is considered the most uncertain and troublesome terrains due to the existence of hair, its deviations in tone and other mitigating factors. The skin disease diagnosis includes series of pathological laboratory tests for the identification of the correct disease. For the past ten years these diseases have been the matter of concern as their sudden arrival and their

complexities have increased the life risks¹. These Skin abnormalities are very infectious and need to be treated at earlier stages to avoid it from spreading. Total wellbeing including physical and mental health is also affected adversely. Many of these skin abnormalities are very fatal particularly if not treated at an initial stage. Human mindset tends to presume that most skin abnormalities are not as fatal as described thereby applying their own curing methods.

This paper proposes a system which will enable users to detect the skin disease. Machine learning algorithms are widely used in medicine. Various disease diagnosis MATLAB algorithm have been developed to provide high accuracy for detecting disease. Many machine learning algorithms are developed for detecting various types of disease at early stages after examining the various attributes of the disease. The algorithm are widely applicable in breast cancer, kidney diseases, thyroid disease, diabetes, other cancer, skin diseases and many more. Here we are going to present detection of skin diseases for analysis. Machine learning algorithm and methods are applied in this study. Another approach using feature selection is applied with these MATLAB algorithm to obtain the accuracy of the detection, for application to develop an expert system.

II. DATASET

In our work, we used publicly available kaggle dataset for detecting the skin diseases to train and test our model. The images in the dataset was split into training and test. We used 70% of the images in the dataset for training and the remaining 30% of the images for testing. The images in the dataset are unbalanced and contains noises. Hence pre-processing is done to resize the images to achieve optimal results. The images were centered and cropped to a size of 200x200 pixels as the resolution was found to retain almost all the features of fundus.



III. PROPOSED SYSTEM

In the proposed system segmentation model is designed henceforth the classification is further done by resilient neural network (RNN) to improve the quality of classification. A morphological study is been developed here for deep understanding of the image features etc. By using neural network it will display the type of skin diseases.

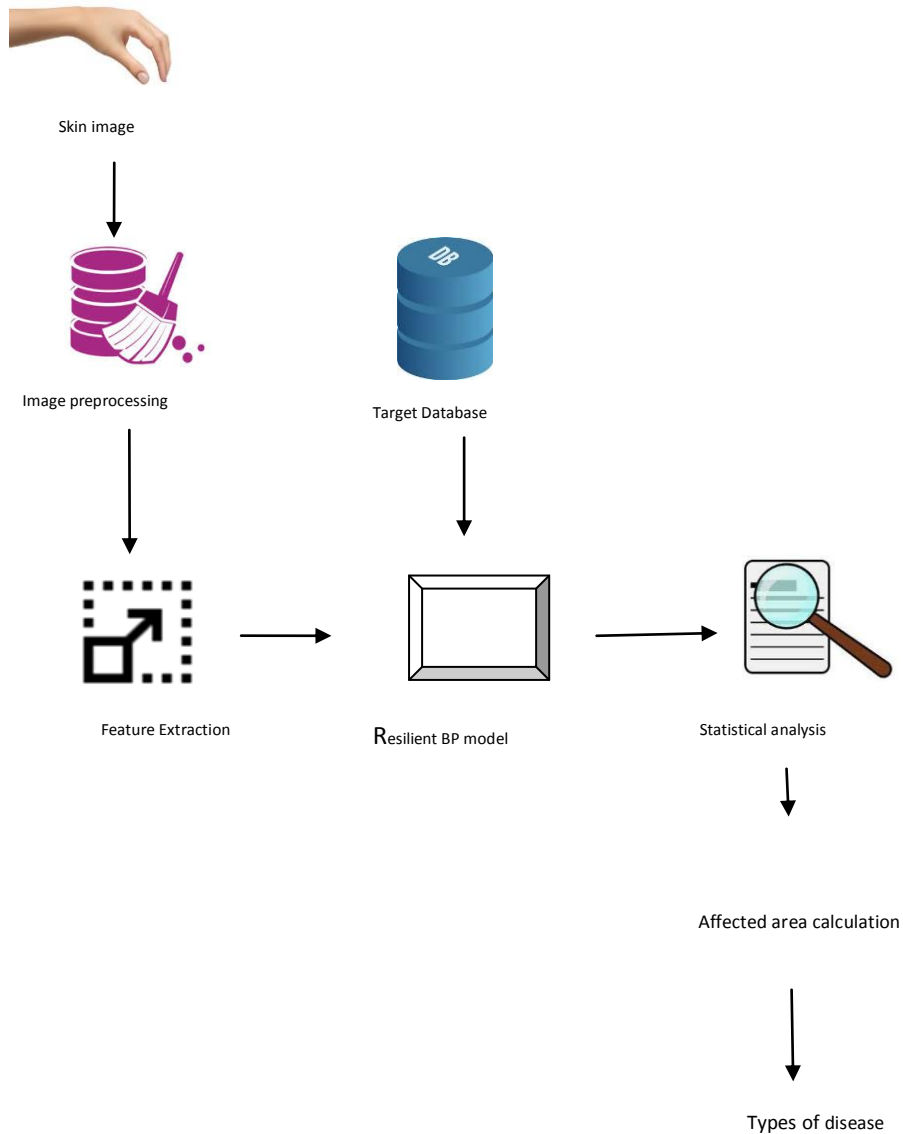


Fig. 1.1 Architecture diagram

IV. ALGORITHMS

K MEANS SEGMENTATION:

Image segmentation is an important preprocessing operation in image recognition and computer vision. We use *K*-means image segmentation method, which generates accurate segmentation results with simple operation. The basic idea of *K*-means algorithm is to cluster the objects closest to them by clustering the *K* points in the space.

RESILIENT NEURAL NETWORK (RNN):

A Resilient Neural Network (RNN) is an information processing paradigm that is inspired by the way biological nervous systems, such as the brain, process information. The key element of this paradigm is the novel structure of the information processing system. It is composed of a large number of highly interconnected processing elements (neurons) working in unison to solve specific problems.

V. IMPLEMENTATION

Module 1: Preprocessing

If the input images are color images means we have to convert to gray scale from that color images. In the complement of a binary image, zeros become ones and ones become zeros; black and white are reversed. In the output image, dark areas become lighter and light areas become darker.



Fig 1. Original image

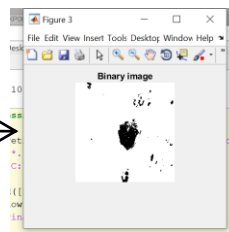


Fig 2. Binary image

Module II: Feature Extraction

The image features like color, weight, and depth and pixel information to apply before the classifier. Here we used the segmentation algorithm is used in order to segment the portion of defected areas.

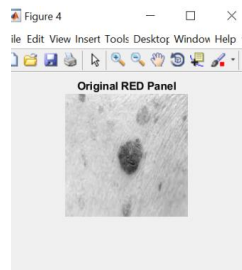


Fig 3. Red panel

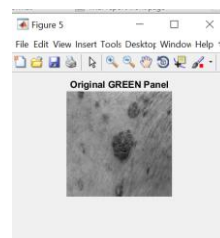


Fig 4. Green panel

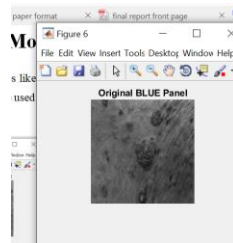


Fig 5. Blue panel

Module 3: Classification

In this module the image data are being stored up in an array, and channel values of the images are being compared and stored in temporary arrays. Then these images are processed and the type of disease is detected.

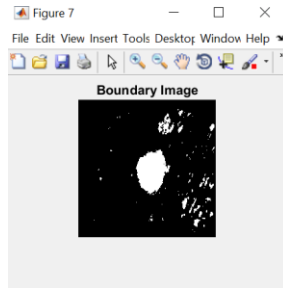


Fig 6. Boundary image

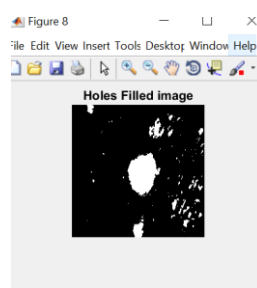


Fig 7. Holes filled

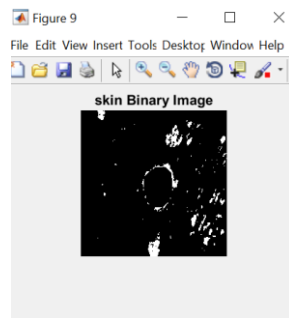


Fig 8. Skin binary image

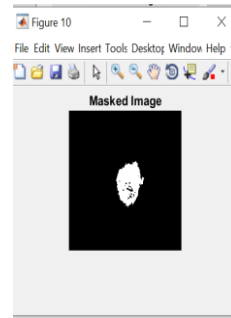


Fig 9. Masked image

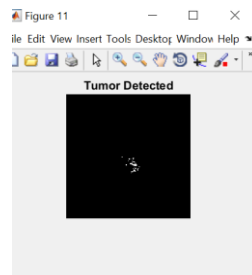


Fig 10. Tumor detected

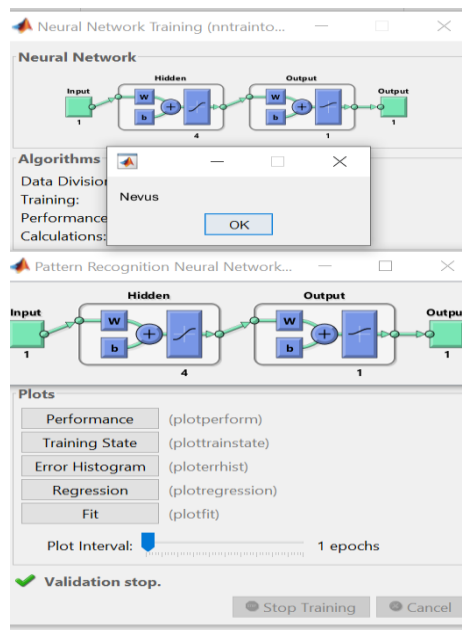


Fig 11. Disease detected

VI. CONCLUSION

We propose a health care solution for melanoma detection, using mobile image analysis. The main characteristics of the proposed system are a K means segmentation scheme suitable for the resource constrained platform a new set of features which efficiently capture the color variation and border irregularity from the smart phone image, and a new mechanism for selecting a compact set of the most discriminative features. In this module the image data are being stored up in an array, and channel values of the images are being compared and stored in temporary arrays. The enhanced values are used to compare the feature extracted images. . This project will have 89% accuracy when compared to existing system. Finally the resilient neural network is classified then the message box will be display the types of disease name.

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