SKIN DISEASE IMAGE RECOGNITION USING DEEPLEARNING TECHNIQUES: A REVIEW

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Abstract - *In the field of biomedical the skin cancer is one of the most common diseases. Melanoma is a dangerous form of skin cancer, but survival rates are high if detected and diagnosed early. This study has been undertaken to identify different methods of skin diseases detection and classification. To develop an EfficientB6 algorithm feature extracted values for improving the accuracy of melanoma classification using dermoscopic images. The classification is done by the accurate value of fully connected layers of CNN model. The main aim is to develop an efficient algorithm for improving the accuracy of melanoma classification, by applying suitable classifier and deep learning techniques.*

This paper proposed to do survey of some works review with my proposed system.

Index terms: *Deep learning, Dermoscopy, EfficientB6, Fully connected layer, Melanoma.*

1. INTRODUCTION

Skin diseases are more common than other diseases. Skin diseases may be caused by fungal infection, allergy, bacteria or viruses, etc. Dermoscopic images may contain artifacts, such as: moles, freckles, hair, patches, shading and noise.Melanoma can originate in any parts of the body that contain melanocytes. It is the deadliest type of skin cancer, if it is not detected and cured in early stages. Nearly 160,000 new cases found every year. Image processing is commonly used method for skin cancer detection. Here using machine learning techniques to classify the cancerous cell. Skin cancer is the most commonly diagnosed cancer. Skin cancers either non melanoma or melanoma.

In real world image processing plays a great role in medical fields. Such application can be used for diagnosis of various diseases. In recent years a large amount of death rates are reported due to cancer. As the technology has been improved in recent years various image processing technology has been developed to detect the skin automatically. The challenges are variation in the appearance of human skin color and in available datasets malignant images are more compared to that of benign images. In this paper the data is collected from a HAM10000 data set. And the data set are separated by data preparation. Next stage is the preprocessing stage, Here the feature extraction techniques done by efficient-Net architecture. Finally classification done by fully connected layer we can classify the two different classifications.

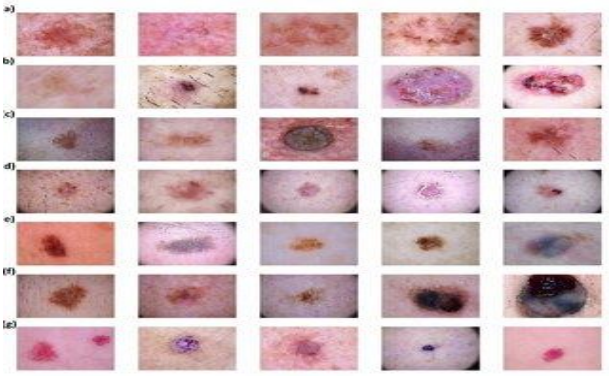

Fig1: Different skin lesions

2. LITERATURE SURVEY

This paper presents a mobile automated skin classification by using KNN classifier for classification. This KNN is the simplest machine learning algorithm. The paper consists of mainly three sections: image segmentation, feature extraction, and classification. Using a camera such as Smartphone or a PC can run this kind of output. Monochrome image, contour detections done in the first stage. They propose image based automated melanoma recognition system on android Smartphone. The main disadvantages are Limitations of memory, processing capability, power usage, also they get the accuracy as66.7%.[1]

This paper describes the early detection of skin cancer using artificial neural network. Here the pre-processing stage includes image enhancement and noise removal. The segmentation is done by thresholding of skin lesions and also feature extracted by 2D wavelet transform method. The feature extracted values are given to the neural network. Back propagation neural (BPN) network is based on classification and this classification is efficient to train ANN. The classification is finding out of cancerous or non-

cancerous skin lesions. This paper gives more accuracy result than the previous paper. [2]

In medical image processing automated diagnostics of skin cancer is the most challenging problem. This paper gives classification of malignant or benign skin images. This paper mainly determines the pre-processing stage. This stage gives the result of improving the quality of images, and noise removal techniques. This paper provides a good starting for research work for automatic skin cancer. [3]

Inthis paper contains the image acquisition, pre-processing, segmentation, feature extraction and classification. In pre-processing step the hairs are removed and resized image by 512*512 and this image undergo the segmentation by thresholding method. The image is converted in to gray level in order to get statistical parameter(mean, skewness ,kurtosis)form GLCM(contrast, energy, homogeneity ,correlation).The classification is done by ANN and also they get total 60images among that 37 were classified as cancerous and 33 non-cancerous. The accuracy of this paper gives the accuracy of 88%. [4]

This paper proposes automatic segmentation and classification of skin lesions. The skin image contained unwanted hairs and noise and segmented the extracted lesions. Here both SVM and k-NN classifiers are for classification by feature extracted values. The feature extraction undergoes color, texture, and RGB histogram. In this paper discuss about 5 types of diseases of 726 own data set. The f-measure for both classifications is around 61%. [5]

In this paper propose an intelligent agent based or robotic system. The system tries to develop and identify benign and malignant skin lesions. It will promote early diagnosis by home environment. Here the feature extraction takes place by genetic algorithm (GA). The author classifies the healthy and cancerous type of classification. Here the classification is done by support vector machine classifier from 1300 dermoscopy images.[6]

In this paper they propose to do classification of melanoma and non melanoma cancer. The two type of classification undergoes normal and cancerous skin lesion. The detection of skin cancer includes mainly four stages pre-processing, segmentation, feature extraction and classification. The preprocessing is done by noise removal and median filter. This median filter output is given to the input of histogram equalization phase. For separate foreground and back ground is taken by ostu thresholding of segmentation method. The segmentation is identifying the region of interest. Than feature is extracted by some features like area, mean, variance and standard deviation. The classification is carried out by support vector machine(SVM),K-Nearest Neighbor(KNN),Decision tree(DT) and Boosted Tree(BT).Comparison of the classification is done by this techniques. The accuracy shows are SVM is 93.70%,KNN is 92.70%,DT is 89.5% and BTis84.30%.[7]

This paper summarizes the efficient non-invasive computer-aided diagnosis (CAD) make the identification process faster and easily. Such automated system has three content reliable lesion segmentation, pertinent features extraction. In this paper they propose an automated system that uses an Ant colony based segmentation. Here the comparison is between the two type of classification KNN and ANN.ANN gives better results than KNN [8].

This paper discuss about the rapid and intelligent system of skin cancer. Here using ECOC SVM and deep convolutional neural network for classification. First step is the RGB collection of data from internet. The pre-trained AlexNet convolutional neural network model is used for extracting values. The results are obtained by showing total of 3753 images of data. Here they try to classify different types of classification namely squamouscellcarcinoma(95.1), actinickeratosis(98.9), squamouscellcarcinoma(94.17), basalcellcarcinoma(91.8) and melanoma(90) [9]

This paper develops to classify the malignant melanoma and benign classification by using back propagation neural network .the initial stage is image acquisition pre-processing. the feature extracted by advanced image of symmetry recognition, Border detection, shading and dimension discovery. Neural network can give the multi classification result. Here the back propagation is the hidden layer. In this section they examine the ABCD dermoscopy innovation for early prediction. [10]

In this paper discuss about the melanoma disease detection using convolutional neural network. The computer system integrated software developed from deep learning namely convolutional neural network (CNN). This gives more result for detecting skin cancer. Here using various libraries in python for detection of skin cancer. This model is trained and tested by using dataset from ISIC(international skin imaging collaboration).the main aim of this model is to detect skin cancer for early diagnosis. [11]

The biomedical imaging gives the application of various type of skin cancer. Many techniques have offered to detect the tumor early stage of ultrasonic and MW imaging. Most of these studies gives the large printing area with lower band width .to overcome these drawbacks a new UWB elliptical patch antenna is used. The layer of indium Tin Oxide applies to improve the antenna. The proposed antenna gives the BW of 3.9GHz to 30GHz with resonance 2.4GHz.the maximum accuracy about 92% .[12]

The skin cancer cause melanomas a dangerous disease about 75% death cases are reported. The early diagnosis is possible for detection of this kind of disease.

Here we can see the convolutional neural network obtain better performance than other deep learning algorithms. In this paper they proposed to do the automated melanoma detection of skin lesion using EfficientNet-B6.This architeure is the advanced model of convolutional neural network. ISIC 2020 challenge data set is used here. [13]

This paper tries to explain the early detection of melanoma using EfficientNet-B4 architeure. This method is includes the biomedical treatment to the patients. The images are collected from ISIC 2020 challenge dataset. This includes a large set of data. The classification is adjusted by convolutional neural network. The probability value of AUC-ROC of positive or false prediction. This gives better performance than VGG-16 and ResNet-50.[14]

This paper developed skin cancer classification using deep convolutional neural network. They classify two binary classifications such as benign and malignant. In the first stage pre-processing carried out by removing noise by kernel and artifacts. This section describes DCNN model with some transfer learning models such as AlexNet, ResNet,VGG-16,MobileNet ,etc. The model is evaluated by HAM10000 dataset with 93.16% of training and 91.93%testing accuracy as result. They conclude that when compare with transfer learning models is less reliable and robust than DCNN. [15]

3. METHODOLOGY

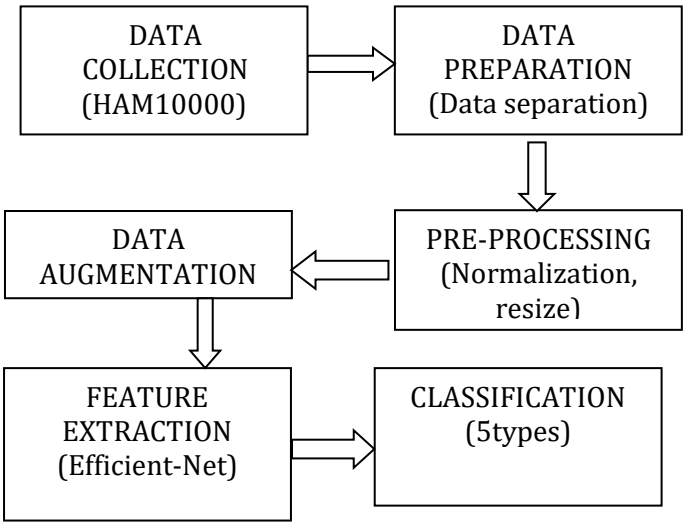

Fig2: Block diagram representation

My proposed work to do 5types of skin cancer classification using deep learning techniques. The work is implemented in python platform. Here the data is collected from HAM10000 dataset which available in website. Next stage is the data separation done by data preparation. Than the image is resized and normalized by pre-processing. The data augmentation gives the random brightness, horizontal flip and shift etc. The features are extracted by Efficient Net architecture by training and validation accuracy. The final stage is the classification by using fully connected layers.

4. CONCLUSION

In this article, we introduced a survey of some papers and their classification and detection algorithm in varies method. The different papers conclude that early detection of skin cancer is making decrease in death cases. Here we can see there are lot papers represent different types of algorithm for classify the skin lesions. And also some advanced technology gives more accurate values. The automated skin classifications of research work are also be seen. We are expecting that our work gives more accuracy and better result in future work.

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