Skin Cancer Segmentation, Detection And Classification Using Hybrid Image Processing Technique

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***Abstract*— Now a days the application of image processing and segmentation plays an important role in medical area. For cancer has found to be the most common and hazardous disease. . Skin cancer may be of different types like Melanoma, Basal and Squamous cell among which Melanoma is the most dangerous, uncertain and unpredictable. Detection of skin cancer in the earlier stage is important and can be helpful to cure it. For image segmentation and feature stages we can go through the Melanoma parameters Like Asymmetry, Border, Color, Diameter, (ABCD). With the help of texture, size and shape extracted feature parameters are used to classify the image as Melanoma cancer lesion or as a normal skin. . Computer vision can play important role in Medical area for Image Diagnosis. To deal with this trouble shoot there is a requirement to develop e computer-aided diagnostic systems to facilitate the people for the early detection of the melanoma. The first step includes skin lesion segmentation. The next essential step is to extract the feature and pattern analysis procedures to make a diagnosis of the affected area. This paper gives an idea to deal with the segmentation, detection and classification of the skin cancer and the affected area using hybrid image processing techniques**

***Index Terms*— Skin cancer, Asymmetry, Border, Color, Diameter**

I. INTRODUCTION

A collection of abnormal cells in our body is name as cancer. In humans cancer can start anywhere in the body and spread into the surrounding tissues which is made up of trillions of cells. Normally, human cell grow and divide to form new cells according to the requirement of the body and it vary person to person. When cancer starts to develop in the body the process of reconstruction of new cell stops and the cell becomes more and more abnormal and a new cell form which is not required. That extra cell grows without stopping and called as tumors.
Cancerous tumors are malignant. This means that they can grow and spread into nearby tissues. In short diseases in which abnormal cells divide uncontrollably and destroy body tissue resulting tumors
The skin is the largest organ of the body. The skin protects us from microbes and from the other harmful materials.
Skin has three layers:

- Epidermis- the outer most layer of the skin and creates our skin tone.
- Dermis – it is beneath the epidermis and contains tough connective tissue and sweat glands.
- Hypodermis – made up of fat and connective tissue.

Skin cancer is the uncontrolled and abnormal growth of skin cells. Most often skin cancer develops on skin exposed to the sun but it can also occur on areas which is not sun exposed. There are three types of skin cancer-*basel cell cancer, squamous cell cancer and melanoma tumors.*

- Basel cell-it starts in bassel layer of the skin. It occurs on the face.
- Souamous cell – it begins in squamous cell and mostly found in dark people.
- Melanoma- it begins in melocytes layer and occur at mouth and eyes.

The first two are not so common and do not spread quickly but the third skin cancer spread very quickly over the body. If it is not found in early stages, it is found to be more dangerous. Worldwide, doctor diagnose about 160,000 new cases yearly of melanoma. It more commonly found in women compare to men. Most commonly men have this disease at their back and women suffer it on their legs.
High rate of incidence are found in Australia, New Zealand, North America, Latin America etc.
Melanoma is a cancer that starts in melanocytes. Melanoma is curable if found at early stages. It is most likely to spread to other parts of the body where it is hard to treat and cure.
Science and technology helps out to deal with these kind of skin diseases. One of the most common method which is widely use all over for the detection and the classification of this disease is image processing.
This is the most promising technology now days we are using for the early detection and identification of the disease.
Image processing is nothing but a process which includes the images. In which input is an image, a series of image or videos or photograph following that , the output can be an image processing or a set of characters or parameters related to the input images. In modern science and technologies , images have wide spread and broader future work. It is the method to perform some operations on images, in order to get an enhanced image for useful information.

Image processing play an important role for the detection of the skin cancer. To analyze and assess the risk of melanoma a framework has to develop using dermatological photographs.

It includes the following:

- Illumination and correction the preprocessing
- Segmentation of the lesion
- Feature extraction

A. Illumination and correction preprocessing :

The first step is to proposed framework whether the image is correct or not. We assume the model with the color pixel and calculate the illumination.

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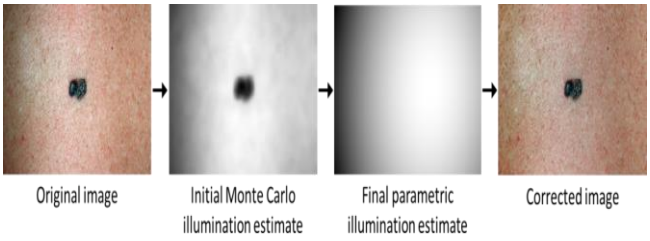

A. *Fig 1: Flow chart showing the illumination variation*

B. *Skin Lesion Segmentation*:

This step includes to find the border of the skin lesion. This step has to perform accurately because to assess the risk of the melanoma tumors.

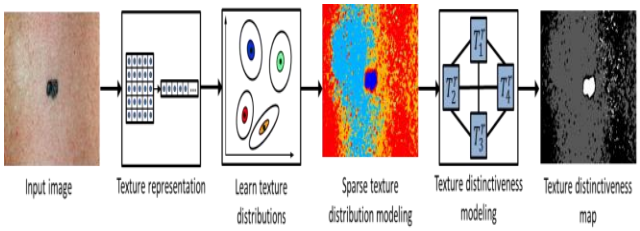

Fig. 2. Flow chart showing the steps to calculate the texture.

C. *Feature Extraction* :

With the help of image processing we can extract the image in n-dimensions as per the feature space. ABCD parameter (asymmetry , border, color, diameter) is used to detect the melanoma.

Fig. 3 Shows an example of melanoma

II. LITERATURE REVIEW

In the Paper of Miss Arushi Bhardwaj and Dr. J.S Bhatia, Paper Name-IOSR-JDMS, Paper Title ”An Image Segmentation Method for Early Detection and Analysis of Melanoma” Oct 2014 stated that with the help of MATLAB the stage of melanoma can be detected.

In the Paper of Mr. Pauline J,Sheeba Abraham and Bethanney Janney J “Detection of skin cancer by image processing techniques” JCPRC5-2015, we study the classification of the skin cancer by using the watershed method and edge detection. With the PCA(Principal Component Analysis) gives accuracy of 92% compare to TDS (Total dermatoscopy score)

In the paper of Nisha Oommachen, Vismi V, Soumya S, Jeena C D – IOSRJEN- Feb 2013 “Melanoma Skin Cancer Detection Based on Skin Lesions Characterization” We found that the classification and the segmentation of images by their asymmetry border color diameter. Pattern analysis and texture analysis can also be done. We find the connected image of the origin with the specific property. It includes down sampling filtering and detection.

III. AUTHOR REVIEW

Image Processing has promising scope in early detection & classification of skin cancer by using skin image as input. A lot of research has been done in this field covering various avenues such as early symptom detection, malignant transformation, cancer classification, benign/malignant discrimination etc. But still further research should be carried out in this field to make the system more useful & applicable.

For this, the author(s) propose various improvements in this technology for the betterment of people. Firstly the author proposes to develop an integrated algorithm for skin cancer prevention & early transformation detection & stage classification. Also the author proposes to Use of Artificial Neural Network to use multiple image statistics such as skewness, kurtosis etc to train ANN & correlate with skin cancer image statistics to predict malignant disease probability.

Combined with the use of ABCD Parameters (Asymmetry /Border/Color/Diameter) to train ANN (Artificial Neural Network) to predict malignant disease probability more accurately with a weighted average system based on location, ethnicity/race, skin color, occupation etc to improve ANN prediction accuracy.

The author(s) also advocate the use of statistical averaging techniques to combine results of Image Statistics Based ANN prediction with ABCD Based ANN Prediction combined with feature weights to improve prediction accuracy & combination of Classifier technique with ANN results to classify lesion in benign or malignant.

Also there is a need for development of intelligent border prediction technique to find border of lesion to accurately classify irregularity.

Conclusively the author(s) propose to develop a fully applicable system wherein it can be used as an improved method to stage & classify malignant disease or early transformation for better treatment & good prognosis.

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