

Detection of In-Situ Melanoma Using Symmetry of Data and Color Spread Factor

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Abstract : *The differentiation of melanoma dysplastic nevus, and non dysplastic nevus is not so easy task for even for the experienced dermatologists. But still it is curable suppose if it is diagnosed at the early stages. In this paper we are focusing to identify the distortion parameter, symmetry of the data according to the axis and the color spread factor.*

Key words: Skin Cancer, Melanoma, Early Detection, In Situ Melanoma. Pigmented skin lesion(PSL)

I. INTRODUCTION

An abnormal growth of cell in a human body is nothing but a cancer. Cancer is mainly classified into two types, histological type and primary site. Suppose by the tissue in which the cancer originated is called histological type of cancer and from the location of the body where the cancer first originate is called primary site of cancer. There are mainly five types of histological type of cancer they are, lymphoma, leukemia, sarcoma, histological and carcinoma. Among these cancer types carcinoma is again subdivided into two types they are, adenocarcinoma and squamous cells.

A cancer that form in the network of the skin that is called pigmented skin lesion also called as skin cancer. There are mainly four types of skin cancer they are, neuro endo crine, squamous cell carcinoma, basal cell carcinoma and finally melanoma. Suppose if a PSL appears in melanocytes, is called melanoma type of skin cancer. Melanoma can appear anywhere on the skin surface depending on the part of the body and the gender, see the table 1.

Table : 1. Melanoma incidence by part of the body and gender [1].

SL.NO	BODY PARTS	GENTS %	LADIES %
01	NECK	23	14
02	TRUNK	35	13
03	ARM	17	17
04	LEG	25	56

Skin cancer has elevated faster than all other cancers, and the death rate increased especially in fair skinned population in recent years [2]. Nowadays one out of three cancer patients are suffering from skin cancer and according to the National Cancer of Institute one out of five American will develop skin cancer in their life time[3]

This research paper is organized as follows. Section 2 discusses the literature survey about melanoma insitu skin cancer diagnosis techniques, features and classification, characterization methodologies adopted by researchers. The next section discusses the experimental evaluation work. Finally the conclusion of the research work presented in this paper is discussed in the fourth section.

II. LITERATURE REVIEW

The early detection of melanoma insitu can be activated in the following diagnosis method they are, asymmetry, In this the asymmetry is verified with respect to a point under one or more axes [5], border, color, differential structure, pattern analysis method looks for identify specific patterns, which may be reticular, globular, cobblestone, homogeneous, starburst, parallel, multicomponent, nonspecific or pigment network, dots/globules/moles,[4], menzies method seek to identify negative and positive features [5], seven point check list refers to seven standard that assess both the chromatic characteristics and the shape and/or texture of the lesion. These standards are atypical pigment network, blue-whitish veil, atypical vascular pattern, irregular streaks, irregular dots/globules, irregular blotches, and regression structures [6],[7], texture analysis, novel method [8]. Again under border based method the PSL is divided into four bicubic segments. Then, it is examined if there is a sharp, steep cutoff of pigment pattern at the periphery of the lesion or a gradual, indistinct cutoff. This features describing the shape of the PSL are then computed, this method involves the following, spherical coordinates [9], JSEG algorithm [10], fuzzy border [11], hybrid architecture [12], active contours [13], border detection [14],[15], thickness ratio [16], the circularly index [17], centroid location [18]. Next under color based method Color features inside the PSL are examined, and the number of colors present is then determined. They involves light brown, dark brown, black, red, white and slate blue. this method involves the following, color texture [19], chromatic difference [20], [21], spherical coordinate, blue whitish veil [22], kinetics of skin lesion [23],[24], wavelet confidents characterization, combined ABCD rule[25]. The above mentioned techniques, methodologies parameters and features plays an important role to detect, classify and characterize the early stage of skin cancer melanoma.

III. EXPERIMENTAL STUDIES

This experimental study is chiefly designed towards identifying the PSL present in the image and extracting the border for PSL, the asymmetry of the lesion, the color spread factor in the PSL and distortion parameter present in the PSL. In order to extract

the above mentioned parameter the images are nonadhesived using the bicubic interpolation technique. The pictorial view of above mentioned steps are as follows:

INPUT IMAGE:-

We have taken one melanoma effected image as input. To find out the feature parameters of this image we will do the image pre-processing on this image. Under the preprocessing steps we will do binarization of the image.

Step 1:-



FIG 3.1 MELANOMA INPUT IMAGE

Step 2:

To do the binarization process using 3*3 binary algorithms and for the thresholding of the image we will use adaptive thresholding.

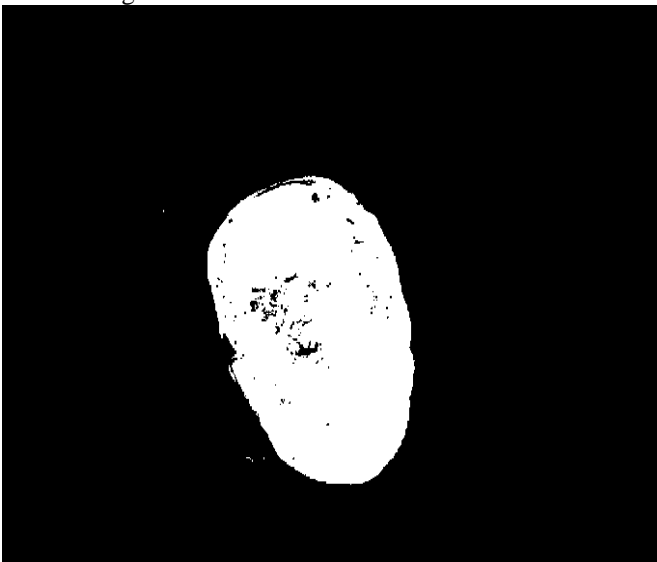


FIG 3.2 BLOCK BINARIZE IMAGE

Step 3:-

In step 3 will use filtering or denoising process on that binarize image.



FIG 3.3 FILTERED OR DENOISED IMAGE

Step 4:

Will calculate the displacement among the sub-moles using region clustering. By using this method we can find the mole location.

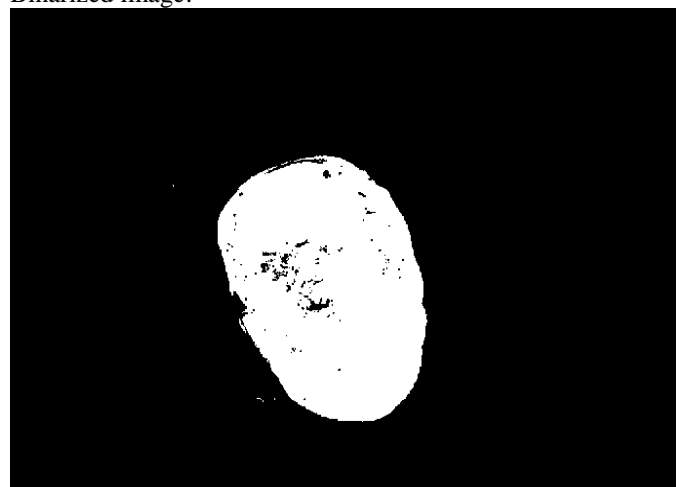
Step 5:

Boundary Parameters calculation: Binary Edge Detection



FIG 3.4 BINARY EDGE DISTORTION ANALYZE

Binarized image:



3.5 FREQUENCY OF DISTORTION

Nse free image:

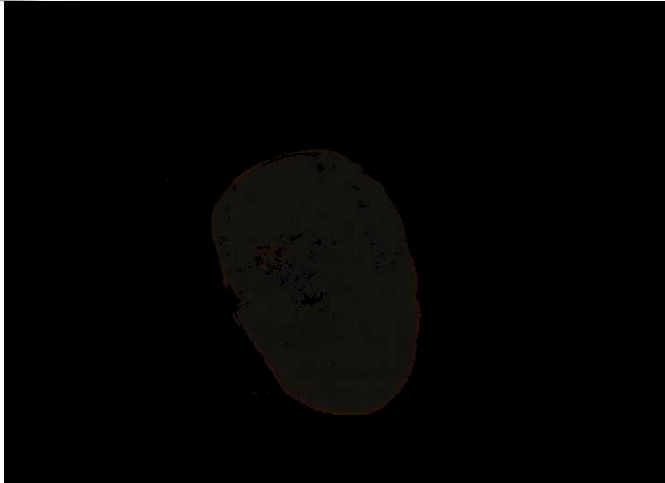


FIG: 3.6 AXIS BASED ASYMMETRY PARAMETERS

Step 6:

MOLE EDGE PARAMETERES

To find the mole edge parameters we will use Border Diffusion Laplacian Filter. The output data will be saved as color spread factor of the NSE free image.

- 1) Distortion parameters : 4.50000
- 2) Symmetry of the data according to the axis : 0.31885
- 3) Color spread factor : 0.00240

Step 7:

Final data to be diagnosed

To find the mole regions we are using Gaussian Filter

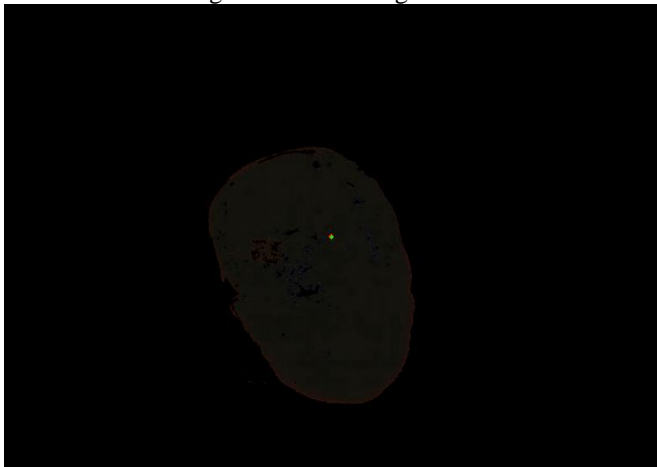


FIG: 3.7 FINAL MOLE RECOGNITION

IV. CONCLUSION AND FUTURE WORK

A system is being developed to help dermatologists and academician in determining whether a nevus is malignant or not. But from the obtained result it is clear that no one or two parameters can affirm the detection of melanoma insitu, hence an advanced multi parameter computer vision based diagnosis system using multilayer neural network to be adopt to detect melanoma insitu at the early stage.

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