FEATURE EXTRACTION APPROACHES BASED ON SKIN CANCER DETECTION

[1] V.Gayathiri, [2] Dr.PonPeriasamy, [3] Dr.V.Mahalakshmi
[1] Assistant Professor , [2] Associate Professor , [3] Research Coordinator(SCRA)
[1] Department of BCA,
[1] G.T.N. Arts College, Karur Road,Dindigul, India

Abstract :

Skin image is taken as an input from the patient through the proposed system. Many skin images prone to much noise. Classification is applied on the skin images and produces output with low error rate. The feature extraction approach is applied and capable of extracting the skin cancer types easily. Output of the segmented skin image is considered as the input and important skin characters for the input are processed. Classification is applied on the skin images and produces output with low error rate.

Key terms: Melanoma, Noise Removal, Image Enhancement, Feature Extraction

I. INTRODUCTION

Skin cancer become the most common cancer among many people illiterately. Most skin cancers types can be treated successfully if they are found early. Basically skin cancer is diagnosed visually by the dermatologist with initial clinical screening and followed periodically regular methods such as dermoscopic analysis, a biopsy and histopathological examination. Also cost spending for diagnosis and therapy become rapidly higher for past decades. Skin cancer are categorized accordingly the different look in skin cancer images.thats the main reason to often check with the doctors if we found any difference such as spots,sores,lumps,bumps and other new change in marks to be worry. Hongmingxu et al ., proposed a slide skin image analysis in which a multi resolution framework to accurately fix the skin epidermis and dermis image tiles. By integrating both skin epidermis and dermis analyses are segmented for skin melanoma diagnosis. Both cytological and textural features are used for skin image classification and more than 95% classification accuracy is achieved. Pauline J sheeba Abraham *et al* ., explains that a skin cancer detection and analysis from given photograph of patient's cancer which can be used to the diagnosis of skin cancer. This scheme uses two methods for classification of skin cancer- ABCD rule which is a base and finally the feature extraction is done using principal component analysis. These methods are compared for their effectiveness. HaoChang *et al* ., reported a novel strategy diagnosis with two steps: First build a segmentation neural network (skin_segnn) and achieved very high lesion boundary detection accuracy. Second, he builds another very deep neural network based on Google inception v3 network (skin_recnn) and its well-trained weight. The novel designed transfer learning based deep neural network skin_inceptions_v3_nn helps to achieve high prediction accuracy. Bhavya Patel *et al* ., presented a method which segments skin lesion using clustering techniques to detect the melonama skin. Clustering methods are applied on the skin images and it produces the cancer lesion as the output. These final output have low error rate which are used by the doctors for quick judgement about the diseases.

II.LITERATURE SURVEY:

Andre Esteva *et al* ., Stated that deep Convolutional Neural Networks (CNNs) shows a highly variable tasks across many fine-grained object categories. He demonstrated the classification of skin lesions using a single CNN, trained end-to-end from images pixels and disease labels as inputs. He used a CNN using a dataset of 129,450 clinical images consisting of 2,032 different diseases. He test its performance against 21 board-certified dermatologists on biopsy-proven clinical images with two critical binary classification use cases such as i) keratinocyte carcinomas versus benign seborrheic keratoses which represents the identification of the most common cancers. ii) malignant melanomas versus benign nevi represents the identification of the deadliest skin cancer. The CNN achieves performance on across both tasks with all tested

experts which enlights an artificial intelligence capable of classifying skin cancer with a level of competence comparable to dermatologists perspectives. Schindewolf *et al.,* described that a feature set was calculated which describes the texture, color and their distributions as well as other properties such as asymmetry, size and border of each lesion. These features combined with the histologic diagnosis became the input in a commercial statistical classification program. This proved that a correct classification rate of about 92% was reached with the mathematical classifier as compared with the histologic diagnosis which overcome the human eye accuracy rate 75%. Mara M Mihai *et al .,* proposed that nanotechnology is the best candidate approaches for diagnosis, treatment of cancer and is able to overcome most important limitations of current therapeutic strategies by specifically the tumor, by stabilizing chemotherapeutic compounds, and by ensuring a controlled and durable release of the drug. The special behaviour of nano particles and complex nano systems can be efficiently used for skin tumor detection, nano particles used to penetrate and be detected in the deepest layers of the skin.

III.CLASSIFICATION BASED ON FEATURE EXTRACTION APPROACHES:

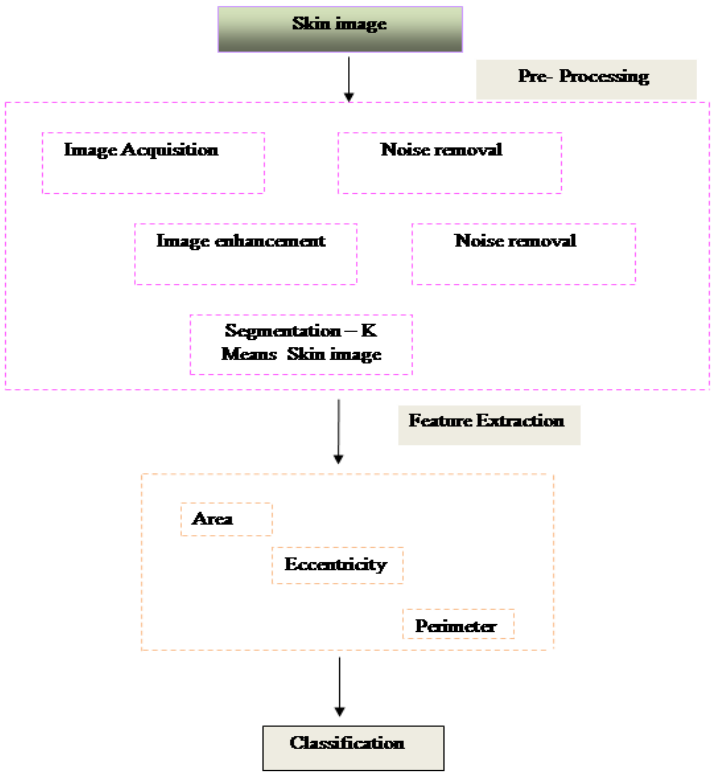

Figure 1: Flow Diagram based on feature extraction

Skin image is taken as an input from the patient through the proposed system. System is developed in such a way that it can accept only colour images as its input. In Figure 2 and 3 the colour image is then converted to greyscale, which is a basic operation

Figure 2 : Original Image

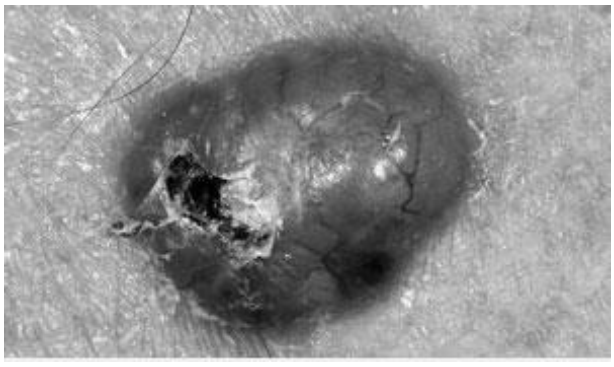

Figure 3: Greyscale Image

Medical images are prone to many noises. Noise can be called as irrelevant information that surrounds the image in the current domain. Obtained skin image is prone to much noise; these noises are removed using the Filter techniques. One of them is Median filter which eliminates the additional noise from the skin image and smoothen the quality of the image. Input image is added with a little noise to make it better for smoothening. Apply median filter on the pixels of the input image, which results in the process given in figure.The outcome of the noise removal process is a smoothened image.

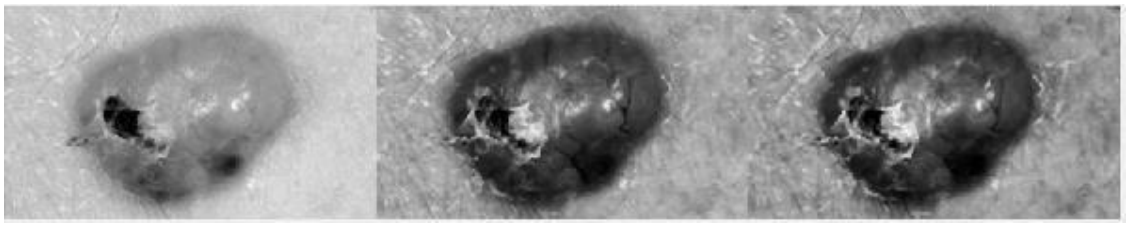

Figure 4: Noise removed Image

The outcome of the Noise removal is the filtered image which is given as an input to stretch its quality and enhance its contrast that can be used based on the context of the domain. By enhancing the skin image clarity of the image increases more than the processed image. Figure 5 is an example for Image Enhancement.

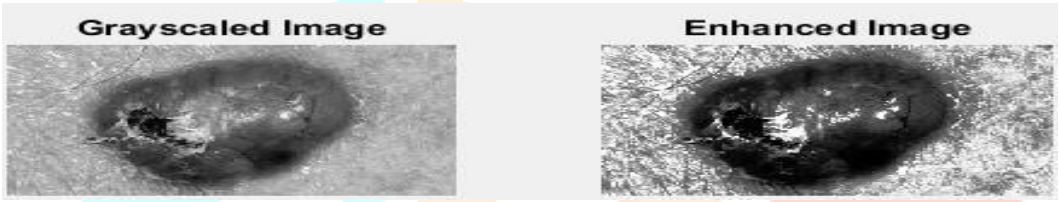

Figure 5: Image enhanced form Grey scale

IV. FEATURE EXTRACTION

Output of the segmented skin image is considered as the input and important skin characters for the input are processed. Skin characters include calculation of Area, Perimeter and eccentricity.

1) **AREA** – important skin character that is calculated for the affected skin portion. It is determined by the formula:

$$A = \sum i \sum j(A_{ij}, X - ROI[Ar] = i, Y - ROI[Ar] = j \quad \text{.....(1)}$$

Where i, j- pixels within the shape.

ROI- region of interest.

X - ROI [] - vector contain ROI x position

Y - ROI [] - vector contain ROI y position

2) **PERIMETER** – determines the depth of the skin cancer affected image and it is determined by the formula:

$$B = \sum i \sum j(P_{ij}, X - edge(P) = i, Y - edge[P] = j \quad \text{.....(2)}$$

3) **ECCENTRICITY** – is a calculation done by considering the max and min value of the affected skin image and it is determined by the formula:

$$E = \frac{length\,of\ major\,axis}{length\,of\ \min or\,axis} \quad \text{.....(3)}$$

V.RESULTS

Image	Area	Perimeter	Eccentricity	Type
	68.23	7.815	1.362	Melanoma
	80.23	18.25	2.987	Squamous
	1.056	25.96	1.231	Benign

Fig 6 : Figures are classified into three types as Benign, Squamous and Melanoma

VI.CONCLUSION

Segmented skin image is considered and output of the image is determined **.** Skin characters include calculation of Area, Perimeter and eccentricity are calculated and accuracy of the Skin image is improved and in future enhancement KNN algorithm can be applied for skin cancer detection.

VII. REFERENCES

[1] Andre Esteva, Brett Kuprel, Roberto A. Novoa, Justin Ko, Susan M. Swetter, Helen M. Blau & Sebastian Thrun "Dermatologist-level classification of skin cancer with deep neural networks" Nature volume542, pages115–118 (02 February 2017)

[2] Schindewolf T [1] ,Stolz W,Albert R,Abmayr W,Harms "Cassification of melanocytic lesions with color and texture analysis using digital image processing." Analytical and quantitative cytology and histology [01 Feb 1993, 15(1):1-11]

[3] Mara M. Mihai*,Alina M. Holban**,Andreea Călugăreanu†,Olguța A. Orzan*"Chapter 11 – Recent advances in diagnosis and therapy of skin cancers through nanotechnological approaches", Sciencedirect Articles[2017, Pages 285–306]

[4] Sigurdur Sigurdsson "Detection of Skin Cancer by Classification of Raman Spectra",IEEE,2017

[5] HongmingXu[a]ChengLu[abc]RichardBerendt[d]NareshJha[d]MrinalMandal[a] "Automated analysis and classification of melanocytic tumor on skin whole slide images", elsevier,14 February 2018

[6] Pauline j sheeba Abraham and bethanney janney j,"detection of skin cancer by Image processing Techniques", Journal of chemical and Pharmaceutical Research 2015

[7] "Computerized Skin Cancer" , IEEE 2017

[8] Hao Chang1 "BOOK Skin cancer reorganization and classification with deep neural network "department of genetics, yale university school of medicinespecial recognition, 2017

[9] Mahmoud Elgamal ,"AUTOMATIC SKIN CANCER IMAGES CLASSIFICATION"

[10] CiteSeerX,2017