

Propagation method for detection of Skin Cancer

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Abstract- In this paper, we have presented a new technique for classification of skin cancer using back-propagation training techniques. — Skin cancer is the deadliest form of cancers in humans. Skin cancer is commonly known as Melanoma. Melanoma is named after the cell from the melanocyte. Skin Cancers are of two types- Benign and Malignant Melanoma. The system is tested on skin dataset of skin cancer images and the classification accuracy comes out to be 100%.

Keywords – Artificial Neural Network, Skin Cancer, Digital Image Processing, Melanoma.

I. INTRODUCTION

Skin is the human disease. It is a protective layer of the body which acts as first line of defense against foreign particles entering into the body. There are many diseases that affect the skin, one such abnormality occurring in skin is skin cancer. Normal cells grow in a controlled way such that new cells replace the old ones. But in the case of cancer, they grow in an abnormal way. Normal cells become cancerous due to the genetic disorders occurring in the nucleus of the cells by external or internal factors Skin cancer at its early stages can be cured. But when it is not recognized at its early stages, it begins to spread to other parts of the body and can be deadly. Detection of skin cancer in the earlier stage is very Important and critical. In recent days, skin cancer is seen as one of the most Hazardous form of the Cancers found in Humans. Skin cancer is found in various types such as Melanoma, Basal and Squamous cell Carcinoma among which Melanoma is the most unpredictable. The detection of Melanoma cancer in early stage can be helpful to cure it. Computer vision can play important role in Medical Image Diagnosis and it has been proved by many existing systems. This represented a computer aided method for the detection of Melanoma Skin Cancer using Image processing tools.

The application of image processing for diagnostics purpose is a non-invasive technique. There is currently a great interest in the prospects of automatic image analysis method for image processing, both to provide quantitative information about a lesion, which can be relevance for the clinical, and as a standalone early warning tool. In order to achieve an effective way to identify skin cancer at an early stage without performing any unnecessary skin biopsies, digital images of melanoma skin lesions have been investigated. To achieve this goal, feature extraction is considered as an essential-weapon to analyze an image appropriately. In this paper, different digital images have been analyzed based on unsupervised segmentation techniques.

II. RELATED WORK

Zapirain et.al in [1] a digital system for enhancing the diagnosis of skin cancer is presented. The algorithm is based on the standard ABCD dermatologic protocol, and on the measurements of contours and surfaces of some specific areas into the mole image captured by epiluminiscence techniques. Automatic algorithms of digital image processing have been developed in order to detect the appropriate segmentation of the images of suspected moles. This allows one to calculate some quantitative features based on the external contour using the Isodata Algorithm. In addition, other features are found based on the internal contours segmented using color heterogeneity criteria. These small internal moles help the diagnosis of the skin cancer to extract information about propagation and irregularities. The database used consists of 65 images already catalogued by dermatologists and the results are successful according to the assessment of medical experts.

Choudhury et.al in [2] paper proposes a multilayer decomposition aided method based on textural and color feature for detection and classification of skin cancer images. Firstly, images are decomposed into a piecewise base layer and detail layer by weighted least squares (WLS) framework based edge-preserving decomposition. From detail or enhanced layer of original image, normalized symmetrical Grey Level Co-occurrence Matrix (GLCM) and Histogram of Oriented Gradients (HOG) are taken as textural feature descriptor and color histogram obtained from base or smoothed layer of image is considered as color feature vector. These feature values extracted from smoothed and enhanced images are fed to Multiclass Support Vector Machine (MSVM) and Extreme Learning Machine (ELM) for classification. An average accuracy of 94.18% and 90.5% with MSVM and ELM, respectively are obtained while classifying four types of skin cancer cells (Squamous cell carcinoma, Basal cell carcinoma, Melanoma, Actinic keratosis) for DermNet NZ database.

Mhaske et.al in [3] early detection and classification of Melanoma skin cancer is done using different classifiers as Neural Network and Support Vector Machine. Image processing is having very important role in medical domain. Melanoma skin cancer is critical and dangerous for human beings. Early detection of Melanoma skin cancer is very much necessary for the patient because this Melanoma skin cancer directly lead to the death of a person. If it is detected at early stage then Melanoma skin cancer is completely curable.

Wong et.al in [4] an automatic method for segmenting skin lesions in conventional macroscopic images is presented. The images are acquired with conventional cameras, without the use of a dermoscope. Automatic segmentation of skin lesions from macroscopic images is a very challenging problem due to factors such as illumination variations, irregular structural and color variations, the presence of hair, as well as the occurrence of multiple unhealthy skin regions. To address these factors, a novel iterative stochastic region-merging approach is employed to segment the regions corresponding to skin lesions from the macroscopic images, where stochastic region merging is initialized first on a pixel level, and subsequently on a region level until convergence. A region merging likelihood function based on the regional statistics is introduced to determine the merger of regions in a stochastic manner. Experimental results show that the proposed system achieves overall segmentation error of under 10% for skin lesions in macroscopic images, which is lower than that achieved by existing methods.

III. IMAGE PROCESSING CONCEPT

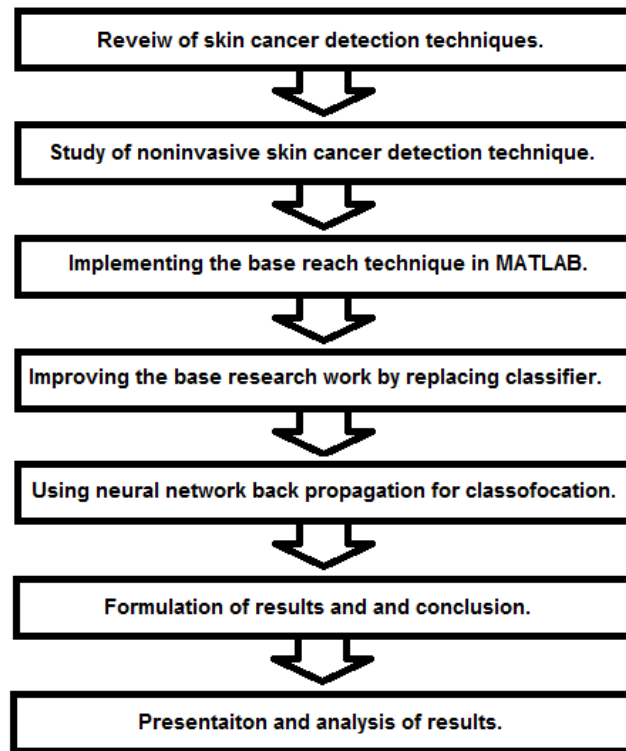
Image processing step involves two processes. First hair removal is done and after that, filtering is done to remove any additional noises present in the image. Hair removal is done using Dull Razor software. The dermoscopic images may contain hairs. These hairs somehow will give erroneous classification. So it is desirable to do the hair removal before proceeding to further steps. Dull Razor software [10] is medical imaging software for hair removal. In this, a special type of filter is used, which replaces hair pixels by neighboring pixels. It improves classification results. Even after hair removal, there may be some noises present in the image. Air bubbles, scratches in the skin etc. constitutes the noises. These noises are removed using Filtering. Filtering technique adopted here is Median Filtering. It is an image filtering method in which each pixel value in an image is replaced with the median value of its neighboring pixels including itself. Median filtering is used for minimizing the influence of small structures like thin hairs and isolated islands of pixels like small air bubbles.

IV. PROPOSED WORK

The accuracy can be improved using appropriate classifier which will remove the accuracy problem in the work. We, by understanding the complexity of the work have used a much more reliable classifier which use proper classification i.e. ANN. We have used the classification not only considering the threshold of the classification system. We have considered the data set correlation which helped in improvement of results. We have used the data correlation to select the best feature for the classification process in the system. We proposed to use neural network back propagation to improve the overall accuracy and in particular the atypical accuracy for skin cancer images. A classifier classifies the given datasets into cancerous and non-cancerous. Here a computer based classifier implemented in MATLAB software is used for classification purpose. Since there are 7 features, the classifier network consists of 7 inputs. Number of hidden neurons taken is 4 and one output neuron. The activation function used is tan sigmoid function. The output of the network is 0 or 1. Zero indicates a non-cancerous or benign condition

and One indicates Cancerous condition or malignant melanoma condition. The classifier is designed in MATLAB software. ANN is trained using Back propagation algorithm, by giving known values of features and desired output.

V. RESEARCH METHODOLOGY



VI. RESULTS

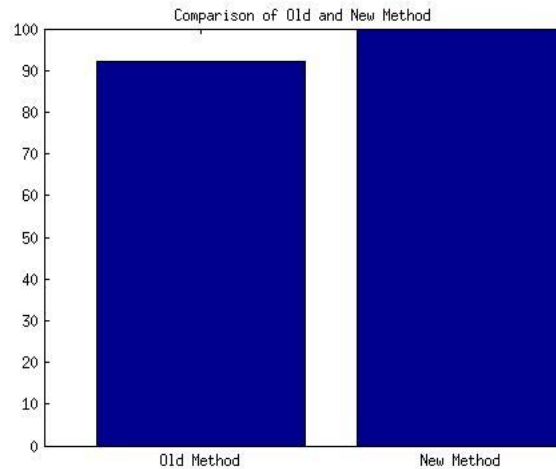
After classification we have generated the testing results. The results are 100% in our case.



ORIGINAL IMAGE



FINAL THRESHOLD ROI



From Experimental results we conclude that the Accuracy of the system is shown. The accuracy of old method is about 92% while our accuracy is 100%.

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