Detection and classification of Skin cancer Using Color based Segmentation

Vishwanath Burkpalli[1]
Professor, P.D.A College 0f Engineering College, Kalaburgi – 585102, India.
Shweta M Madiwal[2]
Asst. Prof, Dept.of CSE , GECW, Kalaburagi , Karnataka , India

Abstract: ***Skin cancer can be defined as skin growths with differing causes and various degrees of malignancy. Skin cancer can also be referred to as Skin Neoplasm's. Skin cancer develops on skin and so can be seen. The main cause of Skin cancer all over the world is UV radiations coming from the sun and it is estimated that Americans are greatly affected by skin cancers than the Africans and Asians. This is due to the fair complexion of their skin and so less melanin. Whereas Africans and Asians due to the high melanin content in the skin is far resistant to skin cancer .It has been statistically proven that fairer skin toned people are much prone to tanning and so is prone to skin cancer. Untreated cancers can cause serious illness and death. In this work the presented a method called automatic segmentation of skin lesion in conventional macroscopic images. The main idea of this paper is segmenting the skin lesion from macroscopic images a novel approach region merging likelihood based on the statistics to determine the merger of region in a stochastic manner. The RBFN then processes the computed features and classifies the skin lesion either as a benign or a malignant. The paper discusses with intermediate results on sample skin images.***

Index terms: Denoising, segmentation, radial basis function network.

I.INTRODUCTION

The main cause of Skin cancer all over the world is UV radiations coming from the sun and it is estimated that Americans are greatly affected by skin cancers than the Africans and Asians. This is due to the fair complexion of their skin and so less melanin. Skin cancer develops on skin and therefore from skin cells. Based on the type of skin cells, from which cancer arise, is classified into Basal cell cancer [BCC], squamous cell cancer [SCC], Melanoma. Skin cancer is a malignant tumor, able to invade surrounding tissues and metastasize (or spread) to other parts of the body, but it depends on the type of skin cancer, and how it's treated. There are mainly three different types of skin cancer:

1. Basal cell carcinoma
2. Squamous cell carcinoma
3. Melanoma

In this work the proposed iterative stochastic region merging method is robust to noise and artifacts illumination, color variation and separating the weak boundary which are the key challenges to skin lesion segmentation in macroscopic images previously this approach has not been proposed. The proposed method differs from current methods based on the statically region merging algorithm. The proposed method uses merging criteria by introducing a new likelihood function that allocates stochastic region merging decision. It will take multipass strategy to get accurate results while the current method that is statistical region merging algorithm uses a single pass strategy to get the segmentation result. It concludes that the proposed method is better and gives accurate results as compared to current methods.

1.1 REVIEW OF LITERATURE SURVEY

- **Anisotropic Mean Shift Based Fuzzy C-Means Segmentation of Dermoscopy Images**

Huiyu Zhou, Gerald Schaefer,FEBRUARY 2009 has Exposed on this paper, they introduce a new mean shift based fuzzy c-means algorithm that requires less computational time than compared to normal fuzzy c-mean while providing good segmentation results. The proposed segmentation method uses a mean field term within the standard fuzzy c-means objective function for accurate values. Since mean shift can quickly and reliably find cluster centers, the entire strategy is capable of effectively detecting regions within an image.

- **Border detection in dermoscopy images using statistical Region merging**

M. Emre Celebi1, Hassan A. Kingravi2, Hitoshi Iyatomi3, and 29 December 2007 they proposed previously all employ a procedure of automated computer-aided diagnosis of melanoma. In those, automated border detection is one of the main techniques, because further steps are dependent on this. It present a fast and unsupervised approach to border detection in dermoscopy images of pigmented skin lesions based on the statistical region merging algorithm.

- **IRGS: Image Segmentation Using Edge Penalties and Region Growing**

Qiyao Yu and David A. Clausi, Senior Member, IEEE DECEMBER 2008 they worked on an image segmentation method named iterative region growing using semantics (IRGS) is proposed. Compared to histogram thresholding and clustering where noise will be existed, IRGS is better choice. The IRGS is characterized by two aspects:

1) It uses a sequence of edge penalty functions to approximate the traditional Markov random field (MRF) context model in formulating the objective functions

2) It uses a region growing technique in searching for the solutions to those objective functions. The IRGS combines the attractive features of edge-based and region-growing methods.

1.2. PROBLEM STATEMENT

People with cancer disease, may need complex treatment, because cancer cell rarely spread to other parts of the body and may require more costly treatment in recognition phase also. So automatic segmentation of skin lesions from macroscopic images is a very challenging problem due to some factors. To solve all these problems a new approach is introduced called "Iterative stochastic region merging**".**

1.3. OBJECTIVES

The objective is to develop a system for recognition and classification of the skin cancer based on the input image given to allow the end users to understand about the complexity of the disease and helps to cure it.

II.SYSTEM ANALYSIS

2.1 EXISTING SYSTEM

- It uses statistical region merging algorithm is efficient in linear time/space.
- So this is a fast segmentation algorithm because it takes single pass strategy to get segmentation result but it does not give accurate result as compared to stochastic region merging.

2.2. PROPOSED SYSTEM

- It uses iterative stochastic region merging and it is more robust to noise and artifacts, illumination, separating the weak boundaries these are the key challenges.
- Here have to segment the skin lesion from macroscopic images, where SRM is initialized first on the pixel level and subsequently on a region level.
- Region merging function is applied to statistical region merging to converting into a stochastic region merging. It uses multi pass strategy to get accurate segmentation result.

III.SYSTEM SPECIFICATION

3.1. SOFTWARE REQUIREMENTS

- Operating system: Window XP/7
- Language: MATLAB
- Development tool: MATLAB 2010
- Documentation: MS word 2007
- Presentation: MS power point
- Database: MS Access/system

3.2. HARDWARE REQUIREMENTS

- Monitor: 15 LCD (color model)
- Keyboard: QWERTY keyboard
- Mouse: Logitch
- Digital camera: 5mp minimum
- RAM: 1GB
- Memory: 160GB
- Processor: P4/I3/I7

IV. SYSTEM DESIGN

In system design there are two phases, training phase and testing phase. The different types of skin cancer diseases are stored in database. In training phase the chosen standard set of images of different diseased images are taken from the standard database for training purpose. After that we have to reconstruct the image. In this step first we have to convert that image into lab image, resizing and reshaping has to be done. After that we have to adjust the counters and extract the edges. Then next step is processing and feature extraction. Here first we have to apply MRF in this initially image is divided into MXN regions, were each region is consisting of a single pixel. Each region is assigned a unique number. After that we have to apply ROI here we are separating the defected part from skin and get the values of both.

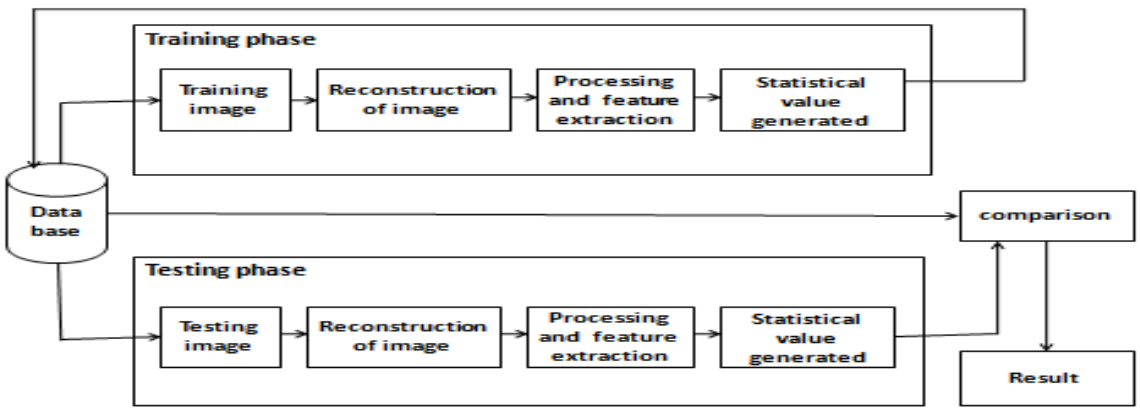

Figure .1: system design

V. METHODOLOGY OF THE STUDY

The aim of the proposed work is to develop and design a system for recognition and classification of the natural skin cancer image by using the digital image processing techniques like image segmentation c, feature extraction and image classification.

- Preprocessing
- Image segmentation
- ROI & RAG
- Feature Extraction
- Classification

5.1. Preprocessing:

The pre-processing step removes the undesirable parts, enhances the image, corrects the image skew and removes noise from the image. The approach of reducing one degradation at a time allows us to develop a restoration algorithm for each type of degradation and simply combine them.

5.2 Image Segmentation:

The segmentation is the most important stage for analyzing image properly since it affects the accuracy of the subsequent steps. To addresses this problem, several algorithms have been proposed. They can be broadly classified as thresholding, edge-based or region-based methods.

5.3. RAG & ROI:

There are two general reasons to draw a Region-of-Interest (ROI) on neuroimaging data : to examine the morphological properties of an anatomic structure, and to extract data for a specific structure from a corresponding functional data set.

5.4. Feature Extraction:

Every image has got its own features like the histogram map or the edge map etc. Different types of images can be recognized by identifying these features. The recognition is a process of identifying how close would the features of an input images are, corresponding to the training set of features. It is important to identify what features are unique for the case of images. Some common image features are discussed as Colour, Texture, Area.

5.5. Classification:

Grouping image pixels into categories or classes to produce a thematic representation. Classification can be used in thematic maps or can be further incorporated into digital analysis. It can be performed on single or multiple image channels to separate areas according to their different scattering or spectral characteristics. Digital image classification procedures are differentiated as being either supervised or unsupervised (clustering).

VI.CONCLUSION

For segmenting the skin lesion from macroscopic images is a very challenging problem is solved by proposed a method called iterative stochastic region merging. Here without using dermoscope we can capture the images with the help of conventional cameras which facilitates the remote image acquisition in telemedicine. Our experimental results shows that proposed system is better than existing system because it takes multi pass strategy to get accurate segmentation result as compared to our existing system.

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