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RESEARCH ARTICLE



A Curvelet Based Decomposition Approach for Skin Infection Detection

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Abstract: Medical Image Processing is one of the critical applications of image processing that requires more accuracy than other application. The presented work is focused on the detection of infection or wound identification for skin images. The work is defined as color model based hybrid approach in which the statistical analysis is combined with curvelet decomposition to identify the effective infection ROI over the image. After the extraction of image ROI, the next work is to apply the curvelet over the image to extract the curvic features so that the main boundary areas over the image will get highlighted. At the final stage, the statistical measure based statistical measure will be applied to identify the effective image areas and obtain the infection area. The work is analyzed in terms of size of region area.

Keywords: Image Segmentation, Medical Images, Restoration

I. INTRODUCTION

The medical image processing is most important specific case of image processing in which all the information sources are represented by information sensor. The criticality is here defined in terms of effective analysis and lesser acceptability of any information loss over the images. The statistical image Information is processed can be achieved at different levels to maintain the integrity of detection process. Analogous to other forms of image segmentation, disease detection in medical images is usually performed at one of the three different processing levels: signal, feature and decision. Signal level image information processing, also known as pixel-level image segmentation. This segmentation type itself represents low level image decomposition, where a number of pixel level statistical analysis is performed for effective disease identification over the image. Object level image segmentation, also called feature level image

segmentation; identify the image features over the image in the form of information objects. The segmentation process actually performs the object labeling and obtains the descriptor information that has already been extracted from individual input image object. Finally, the highest level, decision or symbol level image segmentation depends on the probabilistic decision taken regarding the object or area selection obtained by local decision makers operating on the results of feature level processing on image data produced from individual sensors.

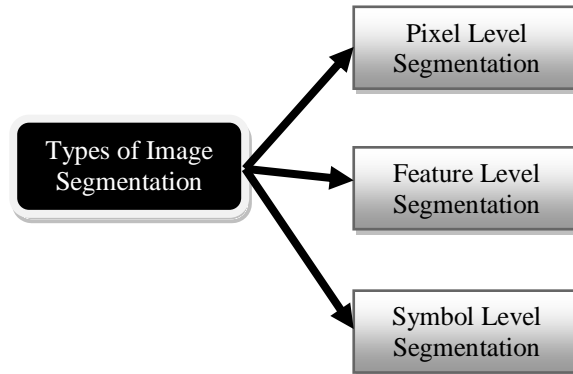


Figure 1 : Types of Image Segmentation

Pixel-level image segmentation represents the extraction of visual information object over the image. This kind of information objects are defined number of registered image signals, obtained from different sensors. The goal of pixel-level image segmentation can broadly be defined as: to represent the visual information present in any number of input images, in a single image without the introduction of distortion or loss of information.

In simpler terms, the main condition for successful segmentation is identify the information objects separately and these objects are visually separated from other objects so that the description information labeling will be applied to objects. While performing this kind of object identification and segmentation, it is required to visualize the required information and hide the redundant information over the image. The segmentation can be applied based on the feature analysis. The feature extraction of the image is done under significant approaches. The main requirement of the featured segmentation process is to identify the effective objects without any information loss. In case of medical images, the component identification or the disease detection is also performed in same way.

Another associated concept with pixel level segmentation is to perform the characteristic analysis over the image. The presented work has combined the feature level segmentation decomposition approach. The work is here performed on normal skin images to identify the infected area. This infected area can be a wound, scar or the other skin problem.

In this paper, a hybrid approach is defined for skin infected area identification. The hybrid approach is defined using the statistical analysis, decomposition process and the color characteristic analysis. In this section, the exploration to the basic segmentation approach along with description information of different segmentation approaches. In section II, the work defined by earlier researchers is defined. In section III, the presented work model is defined. In section IV, the results obtained from the work are presented. In section V, the conclusion obtained from the work is described.

II. EXISTING WORK

In this paper, some of the approaches defined by the earlier approaches for image segmentation are defined. Richa Singh[1] presented a work on multi level image Segmentation and match score based Segmentation to improve the visibility and image quality. Author defined the work for facial recognition. Author defined the Segmentation process for improving the match score for spectral face images. The Segmentation of visible and long wave infrared face images is performed using 2V-Granular SVM which uses multiple SVMs to learn both the local and global properties of the multispectral face images at different granularity levels and resolution. The efficacy of the proposed algorithm is validated using the Notre Dame and Equinox databases and is compared with existing statistical, learning, and evidence

theory based Segmentation algorithms. R. Riyahi[2] presented a comparative analysis work on Segmentation approach and identification of tree crown images. Author presented a work on three different pixel based Segmentation methods under PCA approach so that the image transformation for satellite images. Author defined a work on visual and statistical analysis on images. Author defined the quality assessment of Segmentation images and shows the PCA based work to improve the image. Mohammad Hanif[3] presented a work on visual and thermal images to improve the Segmentation process and to improve the accuracy of face recognition. Author defined the face recognition system so that the visual and thermal images. Author defined facial feature extraction based work to perform image Segmentation under gabor filtration. The filtration process is defined to extract the image features and expression under light intensity. Firooz Sadjadi[4] defined a comparative analysis for different Segmentation approaches. In this paper we provide a method for evaluating the performance of image Segmentation algorithms. Author define a set of measures of effectiveness for comparative performance analysis and then use them on the output of a number of Segmentation algorithms that have been applied to a set of real passive infrared (IR) and visible band imagery. Shutao Li[5] has defined a work on image Segmentation under region segmentation and frequency analysis. In this paper, a new region based multi focus image Segmentation method is proposed. The motivation of our proposed method lies in the fact that region-based image Segmentation methods could be more meaningful than pixel-based Segmentation methods which just consider individual pixels or associated local neighborhoods of pixels in the Segmentation process. The proposed method is more robust to misregistration or slight motion of the object than the pixel-based method.

Myungjin Choi[6] has defined a work on image Segmentation and curvelet based transformation. Author defined a work on curvelet transformation and edge detection and wavelet transformation. Since edges play a fundamental role in image understanding, one good way to enhance spatial resolution is to enhance the edges. Curvelet-based image Segmentation method provides richer information in the spatial and spectral domains simultaneously. Author performed IKONOS image Segmentation. This new method has reached an optimum Segmentation result. Yao Wan-qiang[7] defined a work on wavelet based work on image Segmentation. Author focuses on image Segmentation between multi-spectral images and panchromatic images using a wavelet analysis method with good signal processing and image processing traits. A new weighting technique is developed based on wavelet transformation for the Segmentation of a high spatial resolution image and a low-resolution, multi-spectral image. The experimental results show that the new method presented is clearly better in not only preserving spectral and improving spatial presentation, but also avoiding mosaic occurring. Paul Hill[8] defined a work on image Segmentation and complex wavelet. The Segmentation of images is the process of combining two or more images into a single image retaining important features from each. Segmentation is an important technique within many disparate fields such as remote sensing, robotics and medical applications. Wavelet based Segmentation techniques have been reasonably effective in combining perceptually important image features. This novel technique provides improved qualitative and quantitative results compared to previous wavelet Segmentation methods.

M.Prem Kumar[9] has defined a work on image Segmentation under quality assessment so that the impulse noise over the image will be reduced. In this paper, Image Segmentation based on local area variance is used to combine the denoised images from two different filtering algorithms, Vector Median Filter (VMF) and Spatial Median Filter (SMF). Experimental results show that GIQI is better in non-reference image Segmentation performance assessment than universal image quality index (UIQI). Mrinal Kanti Bhowmik[10] has defined a work on image Segmentation and thermal images and visual images under wavelet transformation for face recognition. This paper investigates Quotient based Segmentation of thermal and visual images, This approach is based on a definition of an illumination invariant signature image which enables an analytic generation of the image space with varying illumination. Harishwaran Hariharan[11] has defined a work on image Segmentation and enhancement so that the image decomposition will be performed. Author demonstrate how the proposed method improves the interpretive information of the input images, by comparing it with widely used Segmentation schemes.

III. RESEARCH METHODOLOGY

The presented work is defined to perform the skin disease or infection detection based on hybrid approach. This approach combines the statistical analysis, color information analysis and the decomposition approach. The work is here applied on infected images in the form of some scar or wound or the allergy. The work is able to identify the infected region area over the image effectively.

Skin Infection Localization is an essential step in Skin Infection recognition system which is used mostly for to identify the infection area and the criticality of the infection. Color detection of Skin Infection remains a difficult task due to varying shapes and color of human skin. In spite of the most complex algorithms developed until the present, the Skin Infection localization continues to be hot area of research and it does not exist on a single method that can provide us the complete results with full accuracy. This amazing new system replaces keyed locking mechanisms with an Skin Infection sensor that actually recognizes who is and who is not authorized to enter.

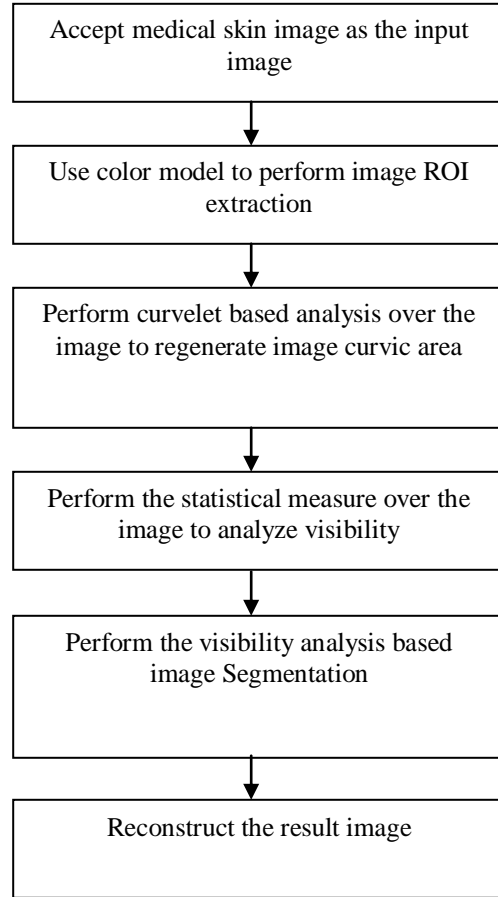


Figure 2 : Flow of Work

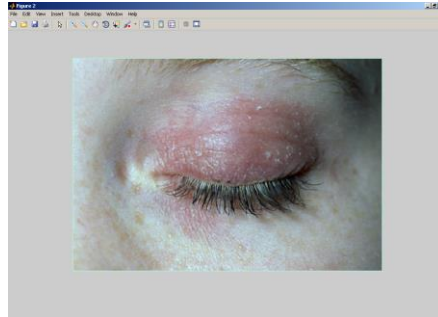
The choice of color detection algorithm over another depends upon the peculiar features of the problem being considered. Research into better color detection and Skin Infection localization has shown that it suffers from the limitation of finding the coarse centre and radius of infected area and Skin Infection. It takes a long time to localize the Skin Infection. Also Skin Infection is not localized correctly. The proposed method uses chain code for Skin Infection detection.

At the earlier stage of the work, the color information analysis based approach will be used to perform medical image segmentation. This segmentation process will separate the background and foreground area of image. This foreground will be considered as the main ROI on which image Segmentation will be applied. After the extraction of image ROI, the next work is to apply the curvelet decomposition over the image to extract the curvic features so that the main boundary areas over the image will get highlighted. This stage will identify the curves for infected region. At the final stage, the statistical measure based statistical measure will be applied to identify the effective image areas and to reconstruct the

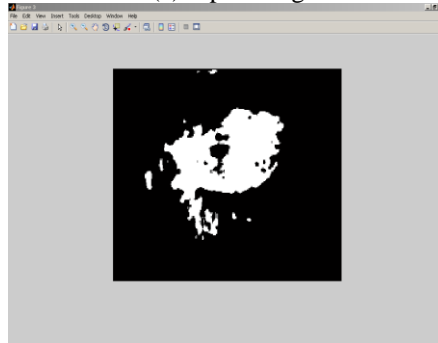
image features. This statistical measure will perform the similarity analysis at the earlier stage and on later stage, perform the visibility.

IV. RESULTS

The presented work is implemented in Matlab environment and analyzed under different vectors. The



3(a) Input Image



3(b) Segmented Infected Area

Figure 3 : Result for Skin Infection Identification

work is here been analyzed under region size of infected area. The results obtained from the work are shown here under in figure 3. The figure is showing the input skin image and the infected area identification over the image.

V. CONCLUSION

In this paper, the infection detection is been performed using the hybrid approach. The clustering is basically used to reduce the data size on which the process will be performed and the proposed approach will perform the error reduction and the infection area segmentation. The obtained results show the present work is quite effective then the existing.

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