

# A Novel Approach to Detect the Wounds in Human Skin using Image Processing Techniques

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## ABSTRACT

Skin types are **epidermis, dermis, cutis** and **sub cutis**. The top most layer of skin is represented as epidermis, the next layer followed by the epidermis called as dermis, and the layer in vascular are represented as cutis and sub cutis. Types of skin disease are bacterial, fungal and enzyme. The skin region is identified by its skin color. By using filter and finding the average among the lesion. and finding the affected area by extracting the primary colors from the lesion and by using line detection we can easily find the affected area of human skin finding the edge of the affected area.

## Keywords

Probability Distribution, Image Enhancement, Image Extraction, Detection.

## 1. INTRODUCTION

The skin region is identified by its skin color. Skin types are **epidermis, dermis, cutis** and **sub cutis**. The top most layer of skin is represented as epidermis, the next layer followed by the epidermis called as dermis, and the layer in vascular are represented as cutis and sub cutis. Types of skin disorders are atopic dermatitis, psoriasis, and planus. From the lesion the affected area is extracted by using various morphological filtering, and image segmentation thereby it helps to treat the disease with proper medication.

### 1.1 Probability Distribution

A histogram is a graphical representation of the distribution of data. Intensity transformation functions based on information extracted from image intensity histograms play a basic role in image processing, in areas such as enhancement, compression, segmentation, and description. The focus of this section is on obtaining, plotting and using histograms for image enhancement.[1]

## Generating and plotting image histograms

The histogram of a digital image with total possible intensity levels in the range  $[0, G]$  is defined as the discrete function

$$h(r_k)=n_k$$

where  $r_k$  is the  $k$ th intensity level in the interval  $[0,G]$  and  $n_k$  is the number of pixels in the image whose intensity level is  $r_k$ . [1]

## 1.2 Morphological

Using morphological operation we can separate the background of the given image and the predefined function is used to find out the background. There are many structural elements are available in MATLAB by using disk we can find the background of the given image. [1][3]

## 3. THEORITICAL ASPECT:

To find the affected area we can extract the RGB color and detect the wounds in human skin using image processing techniques. Using line detection we can find the top and the bottom lesion. Finding the edge of the lesion by using edge detection.

### 3.1 Histogram Of The Image

The primary colors RGB is separately visualized using histogram and separating the background of the image is done by using morphological operation .and the result should be subtracted from the given lesion will look like this. It is used to analyze the maximum intensity value of the given image. [1]



Figure 1: Original Image

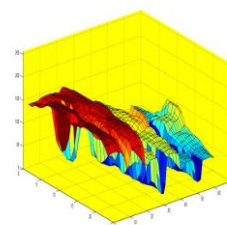


Figure 2: Background

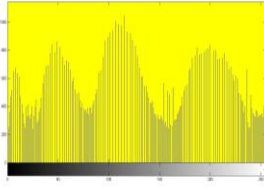


Figure 3: Histogram



Figure 4:RGB band

### 3.2 Intensity Transformation

**Imadjust** is a simple image enhancement technique that attempt to improve the contrast in an image by the range of intensity value it contains to span a desired range of values.[1]



Figure 1: Original Image



Figure 5: After applying Imadjust

### 3.3 Matrix Operations

Here the matrix operation is used To improve the brightness of the image. By adding the images after applying the **imadjust()** .[1]

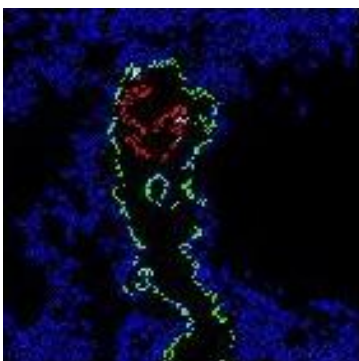


Figure 6:Matrix Image

### 3.4 Image Enhancement

A new image whose pixels have gray values calculated from the gray values under the mask. The combination of mask and function is called filter. The process consists simply of moving the filter mask from point to point in an image.[2]

### 3.5 After applying the filter

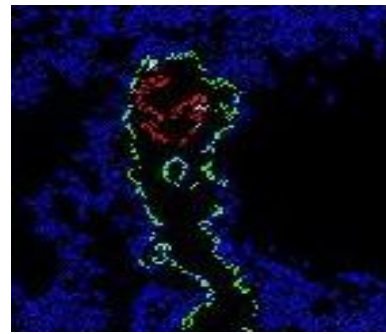


Figure 7: Filter Image

### 3.6 Linear Filter:

Linear function of all the gray values in the mask, then the filter is called a linear filter. These filters are used for smoothen the image. In linear spatial filter, it has nine types of filters. They are **average, disk, Gaussian, Prewitt, Sobel, motion, unsharp, log, laplacian**. These are the built in filter mask.[1]

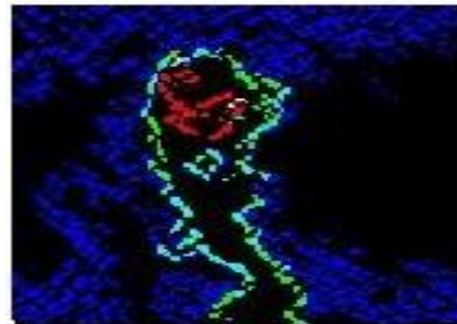
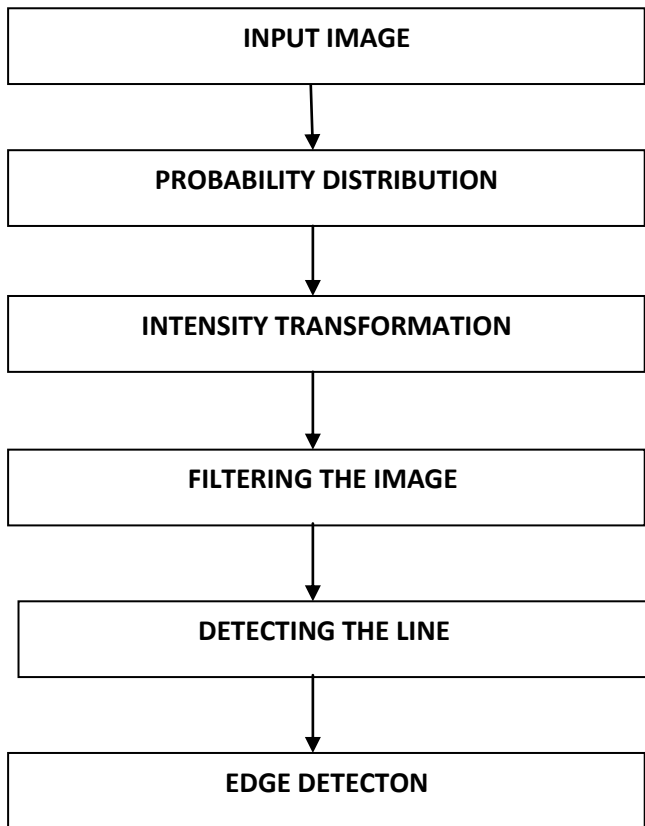


Figure 8: After Applying The Linear Filter

## 4. METHODOLOGY

### 4.1. Flow chart for finding the affected area.



#### 4.2. Methods for extracting the affected area.

Process 1: Applying the intensity transformation function

Process 2: Applying matrix Operations.

Process 3: Applying own mask for filter

Process 4: Applying Linear spatial filters.

Process 5: Extracting the R value.

Process 6: Apply line detection

Process 7: Edge detection

#### 5. IMAGE EXTRACTION:

Here the given lesion is extracted by splitting the rgb. The affected area can be easily extracted by extracting it into primary colors.



Figure 1:Original image



Figure 9:Extraction

#### 5.1 Line Detection:

The second level of complexity is line detection. The preferred direction of each mask is weighted with a larger coefficient than other possible direction. The coefficients of each mask sum to zero, indicating a zero response from the mask in areas of constant intensity, there are 4 line detector masks are available they are *horizontal.vertical,+45& -45.[5]*



Figure 10 :Bottom Part Of The Lesion

#### 5.2 Absolute Operation:

By taking the absolute of the lesion the affected part will have a clear visualization



Figure 11: Absolute

#### 5.3 Edge Detection

The canny detector is the most powerful edge detector provided by function edge.



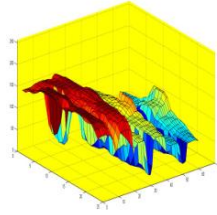
Figure 12:After Applying Canny Detector

### 6. RESULTS

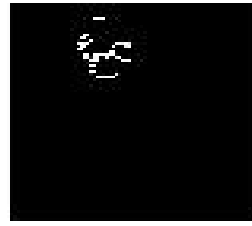
Page 1: Here the result represents the average and filter of the given image (wound).



Original image



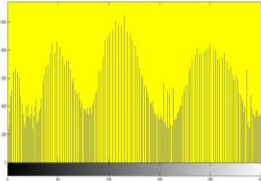
Background



Line Detection



Absolute



Histogram



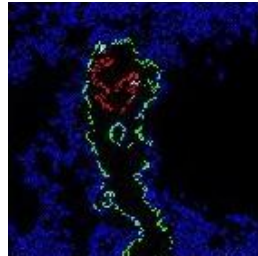
RGB band



Edge detection



Strech

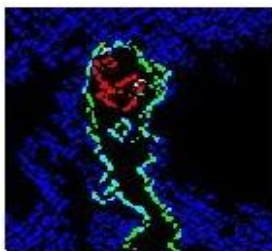


Filter Image

## 7. CONCLUSION:

In this project A NOVEL APPROCH TO DETECT THE WOUNDS IN HUMAN SKIN USING IMAGE PROCESSING TECHNIQUES we have projected some of the different approaches like intensity transformation, enhancement, extracted and detecting the affected area in human skin using image processing techniques. It also includes the detection of affected area with the help of image segmentation.

Page 2: Here the affected area is extracted.



Average Image



Extracted area

## 8. FUTURE ENHANCEMENT:

The above approaches have done with the first layer in human skin which is epidermis. The further implementation of this study is continue with other two types of skin.

- Dermis-the next layer followed by epidermis.
- Cutis-the layer in vascular.

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Page 3: Image segmentation results

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