# Diabetic Wound Detect Using Image Processing

**Mrs. M.Saranya[1], S. Aathiseshan[2], K.Dhanalakshmi[3], P.Malathi[4], K.Vikram[5]**
[1, 2, 3, 4, 5] Dept of Biomedical Engineering
[1, 2, 3, 4, 5] Mahendra Institute of Engineeringand Technology,Thiruchengode

***Abstract-*** *Diabetes mellitus is a serious chronic disease that affects millions of personsin worldwide. In patients with diabetes, ulcers occur frequently and heal gradually. Grading and staging of diabetic ulcers is the primary step of effective treatment and wound depth and granulation tissue amount are two important indicators of wound curing progress. Though, wound lowest point and granulation tissue amount of dissimilar difficulties can visually appear quite alike, creation accurate machine learning classification challenging. In this project, we innovatively adopted the fine-grained classification idea for diabetic wound grading by using SIFT (scale invariant features transform) algorithm to deal with highly similar images of five grades. Wound area extraction, sharpening, resizing and increase were used to pre-process images before being input to the SIFT. In our system we collected a diabetic wound dataset of images and marked them with wound depth and granulation tissue grades as labels for classification. Image processing was showed using holdout validation on this diabetic wound training dataset. Comparisons with widely used SIFT algorithm demonstrated work for the task of grading diabetic wounds.*

## I. INTRODUCTION

Accurate and thorough diabetes screening is an important factor in proper wound care. Wound testing serves two important purposes to determine the severity of a wound in order to predict the expected level of wound healing and to develop a comprehensive care system and serve as a reliable outcome measure that can be used to evaluate the effectiveness of a given wound treatment program.

The key parameter to be included in the diabetes wound test is the average size of the wound. Several methods for determining the size of the wound have been developed and validated including the depth of the wound, an area greater than the depth of the wound or volume, believed to be more accurate and reliable. Comparisons of the various methods available to inspect the wound area have also been made, and although stereo image specifications may be more accurate, the use of the wound in trace acetate exposure or calculations made in terms of length / width measurements is considered reliable and easy to use. Other wound healing decisions that should be included in a wound test are bioburden wound examination and wound size.

## II. LITERATURE SURVEY

Monitoring the wound healing process is as difficult a task for nurses and nurses as it is to diagnose the wound. All types of wounds need to be examined; not ordinary sores but also sores, burns, painful wounds or surgery. For people with type 2 diabetes, foot ulcers are a major health problem affecting 5-6 million people in the US. Sores on the feet are painful, at risk of infection and very slow to heal [1]. Wound analysis is performed using a proposed system that contains a mean shift algorithm, a method to determine the boundary of the wound and a color separation method to determine the condition of wound healing. Previous methods such as level set method, SVM has many disadvantages which is very expensive. When the skin color is not evenly matched it gives false edges and missing borders. Therefore, to solve these problems a better approach is required such as the adaptive mean shift segmentation algorithm [2].

The wound imaging program consists of a number of processes that include photography, image retention in the database, pre-wound processing, wound severity, wound color separation and wound procedure detection. A photo of the wound is taken by a Smartphone and stored in a photo database. Photography is the first activity after a photo shoot. The pre-processing step reduces image processing to maximize speed and remove unwanted details. The pixel size of the original image is divided into 4 on both vertical and vertical directions to get 816 * 612. It provides a good balance between wound resolution and efficiency [3]. A pre-made image is converted to a gray image and used the Otsu Binary limit to find the foot frame. Depending on the footprint effect and if the footprint results are considered a binary image, then the infected area is marked "White" and the rest area is marked "dark‟‟ and this helps to determine the wound boundary within the foot area. it is more complicated [4].

## III. SYSTEM STUDY

### EXISTING SYSTEM

In this program a picture analysis of the texture of skin diseases is used. Using a standard camera, photos are recorded and enhanced. It requires a lot of process to build an

image. Sometimes it may end up taking a bad picture or taking pictures accidentally. It also encourages a process of longing.

**PROPOSED SYSTEM**

Images of the ulcer are collected from the open source database. Color separation is done through the Particle Swarm Optimization (PSO) process. The Reproductive Region (ROI) is extracted from a separate image, various textual and color-based features are extracted and separated by images of diabetes lesions using classifiers. In this method we use the SIFT algorithm to detect the wound of diabetes. A holistic view of the proposed method of classifying diabetes wounds.

**ADVANTAGES**

- Image based Python processing is easy to use and very supportive but its operating time can increase accounting costs, it is necessary to purchase a license to use it.
- Python in Image processing is free and fast and very popular in the field of scientific research.
- It reduces the duration of labor and predisposes to early detection of diabetes and treatment.

## IV. SYSTEM FUNCTION

**ARCHITECTURE DESIGN**

In this project diabetic wound detection process is done with the help of SIFTalgorithm, the input image sample acquisition process is used for separate the input image background and image segmentation process has canny edge filter used for wound outer line detection then convert the given image is grey scale image conversionand here wound image samples are collected and trained in data base which is used for matching the given input image sample ,if image is matched means the output image is predicted.

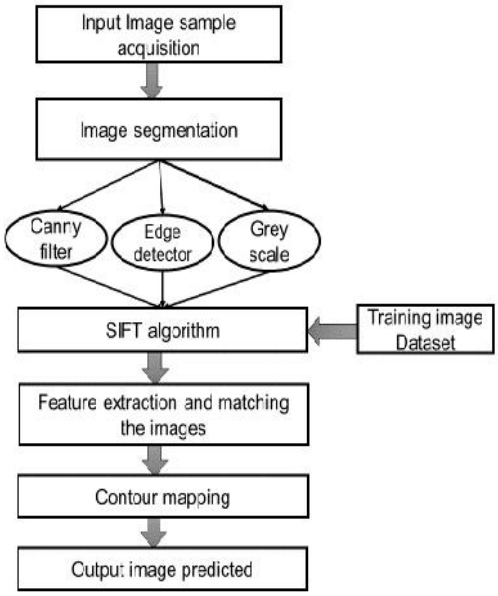


**Fig. no1 : Architecture Design**

## V. SYSTEM SPECIFICATION

**Hardware Specification**

| | |
|---|---|
| Processor | : INTEL i5($7^{th}$ generation) |
| RAM | : 4 GB RAM |
| Hard disk | : 1TB |
| Monitor | : 20’ color monitor |

**Software Specification**

| | |
|---|---|
| Front end | : GUI |
| Back end | : python |
| Software | : python IDLE. |
| Platform | : Windows 8 |

## VI. ALGORITHM& TECHNIQUES

**SIFT ALGORITHM**

In the last few chapters, we saw some corner machines like Harris etc. It is flexible, which means that, even if the image is rotated, we can get the same angles. Obviously because the corners remain the corners in the rotating image as well. But what about measuring. For example, check out the simple picture below. It is present in a small image inside a small window that is flat when it is approached by the same window. Therefore, the corner of Harris is not always equal.

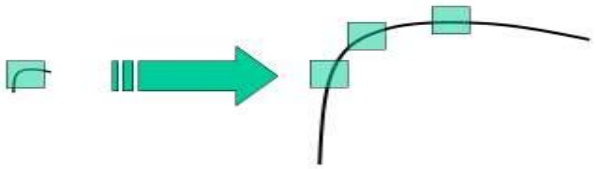

**Fig no 2: Image is scaled.**

**Scale-space Detection**

Typical image features from scale-invariant key points that extracted the main ideas and compiled its definitions. This Gaussian Laplacian is slightly more expensive, so the Sift algorithm uses a Gaussian modification that is an approximation of Gaussian Laplacian. The Gaussian difference is obtained as the Gaussian difference due to the two separations of an image, let it be and. This process is designed to propagate the image in the Gaussian pyramid.
Gaussian Laplacian is less expensive, so the Sift algorithm uses the Gaussian difference for LoG estimates. The Gaussian distinction is found in contrast to the blurring of the two-dimensional image, let alone. This process is performed by different octaves of the image in the Gaussian pyramid.

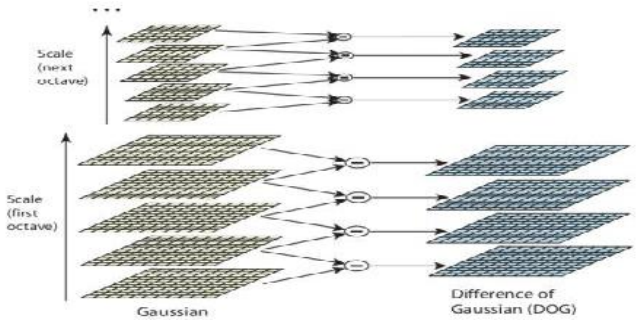


**Fig no 3: Gaussian filter**

**WOUND DETECTION TECHNIQUE**

In color image processing, there is a variety of colors. The RGB (Redish-Blue) model is a widely used model, one of which is monitoring. In this model they use 3 pieces of colored objects to represent images. Apart from the Red Green Blue (RGB) model, there is also the hue saturation value (HSV) model, where this model has 3 components, namely, saturation, and value. Hue is a measurement of the wavelength achieved by visually dominant color, while saturation is the size of the amount of white light mixed with color.

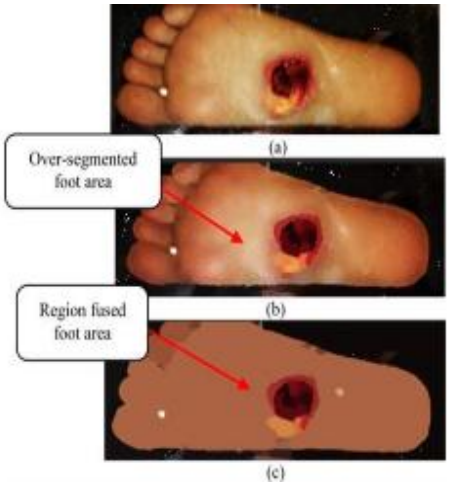


**Fig no 4: wound detection process**

A pre-made image is converted to a gray image and used the Otsu Binary limit to find the foot frame. Depending on the footprint effect and if the footprint results are considered a binary image, then the infected area is marked "White" and the rest area is marked "dark‟‟ and this helps to determine the wound boundary within the foot area. it is more complicated.

**VII. SYSTEM SOFTWARE**

**PYTHON IDLE SOFTWARE:**

IDLE has two main types of windows, the Shell window and the Editor window. You may have several windows editors at once. For Windows and Linux, each has its own advanced menu. Each menu listed below indicates which type of window is associated with it.

Windows output, such as for editing => Find in files, is a sub-type of window editor. They currently have the same top menu but a different default theme and content menu.

In macOS, there is only one application menu. It changes dramatically depending on the currently selected window. It has an IDLE menu, and some of the entries described below are moved to comply with Apple’s guidelines.

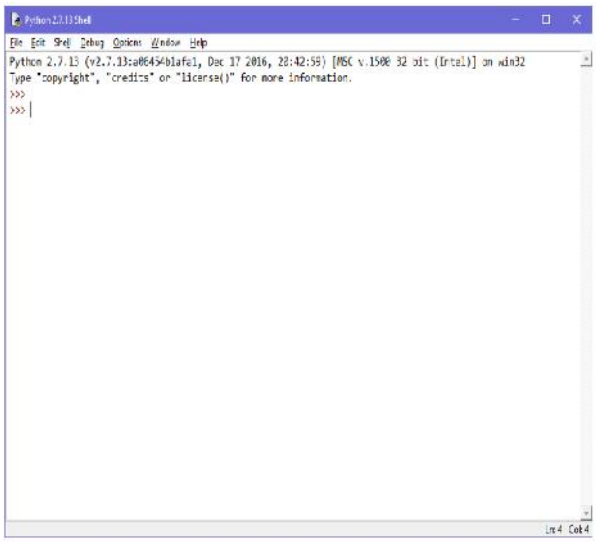


**Fig no 5: Python IDLE software**

## LANGUAGE USED -PYTHON

Python is a powerful, translated language (composed of byte codes). There are no statements of type variables, parameters, functions, or methods in the source code. This makes the code shorter and more flexible, and you miss out on the time-tested compilation of source code. Python tracks all types of values during operation and unreasonable flag codes as it works.


**Fig no 6: python logo image**

## VIII.HARDWARE REQUIERMENTS &SPECIFICATION

## I5 PROCESSOR

Intel core is a family of I5 processors famous for its latest architecture and integrated architectures that also offer the same computer utility. It is also amazing to provide users with an excellent user interface.


**Fig no 7: Intel i5 processor**

## BASIC FEATURES OF I5 PROCESSOR

I5 processors offer complete accuracy and high performance and responsiveness leading to providing users with high levels of access and reducing processor processing time.

The Intel I5 processor is fully integrated with the latest HD graphics with a powerful and advanced engine that provides high quality smooth display and 3d graphics capabilities. All I5 processors can be considered as high-end graphics processors and everyday computer multimedia.

Intel I5 processors also provide hyper threading technology to its users who perform the ability to perform multiple user and system tasks. Programs with I5 processors can perform the performance and integration of two tasks simultaneously without causing delays and making error correction errors. They are very responsive that the release of programs can be done simultaneously as well. we can easily say that the Intel I5 is the best choice for homes and offices. More than seven applications can run simultaneously on the system with an I5 processor built into the motherboards.

## VIII. RESULTS

Thus, the detection of diabetic wound in leg was detected and all the expected outputs were successfully implemented which is represented as follows.

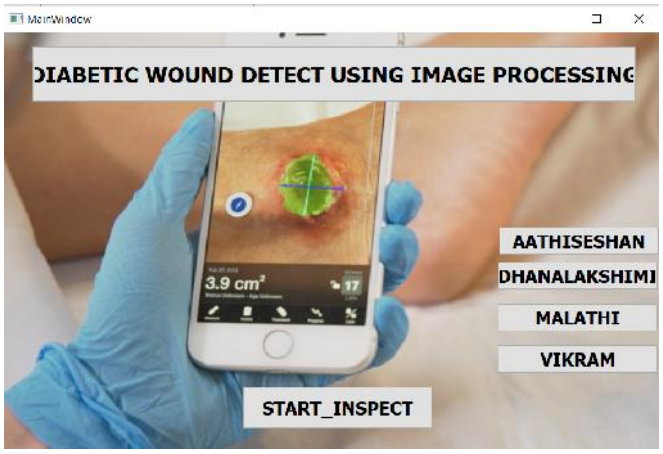


**Fig no 8: welcome page for wound detection**

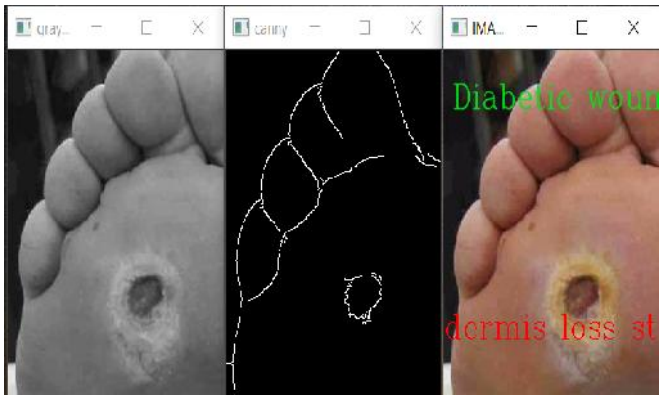


**Fig no 9: Gray and canny edge detection of diabetic wound.**

## IX. CONCLUSION

This project concludes with the creation of a Wound Image Analysis Classifier (WIAC) to track wound healing status. Limited analysis of wound healing condition by improving functional separation. Classifiers are used to classify wound images according to the size of the lesions as labels. An effective tool is designed for the analysis of the wound healing process using the process of sorting, filtering, extracting techniques and transparency techniques using color image processing. Active detection of cells and the measurement of their health status in the lesion image and assist in diagnosing the wound condition in a non-physician manner. Wound damage can be easily diagnosed using this tool. Images tested using this tool must be compared with the actual global lesion database and performance can be calculated.

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