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Smartphone Based Wound Assessment System for Diabetes Patients

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ABSTRACT: Diabetic foot ulcers speak to a critical medical problem. Right now, clinicians and medical caretakers primarily construct their injury evaluation in light of visual examination of wound size and mending status, while the patients themselves rarely have a chance to play a dynamic part. Henceforth, love quantitative and practical examination technique that empowers the patients and their parental figures to take a more dynamic part in every day wound care possibly can quicken wound recuperating, spare travel cost and diminish human services costs. Considering the commonness of cell phones with a high-determination computerized camera, evaluating wounds by breaking down pictures of ceaseless foot ulcers is an alluring choice. In this paper, we propose a novel injury picture examination framework actualized using feature extraction and color segmentation. Here we are using the Normalized minimum distance classifier for classifying the output.

KEYWORDS: Diabetic, Normalized minimum distance classifier

I. INTRODUCTION

There are a few issues with current practices for treating diabetic foot ulcers. To start with, patients must go to their twisted center all the time to have their injuries checked by their clinicians. This requirement for successive clinical assessment is not just badly designed and tedious for patients and clinicians, additionally speaks to significantly social insurance cost since patients may require exceptional transportation, e.g., ambulances. Second, a clinician's wound evaluation process depends on visual examination. He/she depicts the injury by its physical measurements and the shade of its tissues, giving vital signs of the injury sort and the phase of mending. Since the visual appraisal does not deliver target estimations and quantiable parameters of the recuperating status, following a wounds mending process crosswise over sequential visits is a troublesome assignment for both clinicians and patients. The injury picture is caught by the camera on the Smartphone with the help of a picture. From that point forward, the Cell phone performs twisted division by applying the quickened mean-move calculation. In particular, the diagram of the foot is resolved in view of skin shading, and the injury limit is discovered utilizing as usage associated locale location technique. Inside the injury limit, the mending status is next evaluated in view of red–yellow–black shading assessment show. Diabetic injury administration requires long haul, rehashed estimations to guarantee restorative viability. As the quantity of patients requiring wound administration expands, the accessible doctor patient time for straightforward injury following winds up plainly lacking. All things considered, there is a need to give a way to precisely track diabetic injuries outside of a clinical setting. Current clinical methodologies have restricted precision for wound size estimations. The portable application prompts a patient to take a picture of their injury, and after that it sends the picture to the host server. The server yields the figured surface range to the application where the information focuses are put away. The central segments of the arrangement incorporate the Phone Application, Wound Measurement Code, and Host Server.

II. OBJECTIVES

The objective of the proposed system is given below

(a) A more quantitative and cost-effective examination technique that empowers the patients and their caregivers to play a more dynamic part in day by day wound care conceivably can accelerate wound healing, save travel cost and reduce healthcare expenses.

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(b) Our arrangement gives picture examination calculations that keep running on a Smartphone, and along these lines give a minimal effort and simple to-utilize gadget for self-administration of foot ulcers for patients with sort 2 diabetes.

III. LITERATURE SURVEY

In literature, the problem and the previous techniques of ulcer detection system is described
Lei Wang et.al states that a structure that Design a very productive and exact calculation for continuous injury investigation that can work inside the critical computational limitations of the cell phone. The model result demonstrates that thecalculation shows signs of improvement likelihood with the assistance of wound picture and recuperating status investigation. This paper proposed a framework that makes a difference client consequently twisted limit has been totally decided and the injury range ascertained. [1]
Hazem Wannous et.al This paper speak to The quantitative evaluation of wounds on visual examination and manual system to depict the state of the injury picture parameter like surface, profundity and the organic nature of the skin tissues Wound surface and shape are right now measured with a conventional technique.[2]
Sadhana et.al [3] this paper expresses that the general structure of framework and control stream of calculation. This paper incorporate the primary parts of the arrangement that is Image handling, Image Segmentation, Foot layout location, shading division, wound mending. [3]
In [4] A.Suresh.et.al, proposed, the Chan-Vese dynamic form based technique for medicinal reason to effectively recognizing of ulcer influenced range in a foot of a diabetic patient. Chan-Vese dynamic form technique was utilized for division. It considered as of perception of the diabetic ulcers in the foot and utilized division and spoken to with compelling ulcer region with shading and furthermore in dim shading pictures.
In [5] Simerjit Singh.et.al, proposed, Diabetic foot ulcer is described by an established set of three of neuropathy, ischemia, and disease. Each of these has a multifactorial aetiopathogenesis. These variables are intensified by mechanical anxiety made by foot distortions. The most regularly utilized arrangement frameworks are the Wagner-Ulcer Order framework and the University of Texas Wound Classification. These characterizations help to foresee the result of this condition. Anticipation of this condition is vital to forestall long haul grimness and here and there mortality

IV. PROPOSED SYSTEM

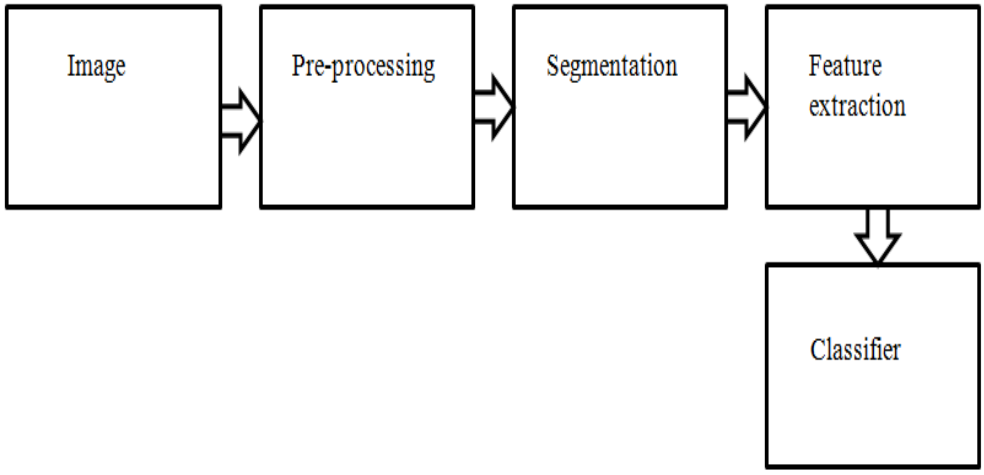

Fig 1: Block diagram of proposed system

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Description:-Above figure shows the block diagram of proposed system I take an image as input. The next block is preprocessing block to process on image then segmentation is applied on this processed image. By using segmentation the image is divided into small parts. The next block is feature extraction to extract the different types of features for example, color movement and texture feature. Gabor filter is used for the texture feature. Gabor filter is a linear filter used for edge detection. Gabor filters are directly related to Gabor wavelets. The final block is classifier to classify the image. Normalized minimum distance classifier is used.

V. RESULTS AND DISCUSSION

The results of the image analysis and the final output for the diabetes affected patient are shown below in below figure.

Fig 2: Original Image of affected Patient

Fig 3: Median Filtered Output

Fig 4: Masked Image

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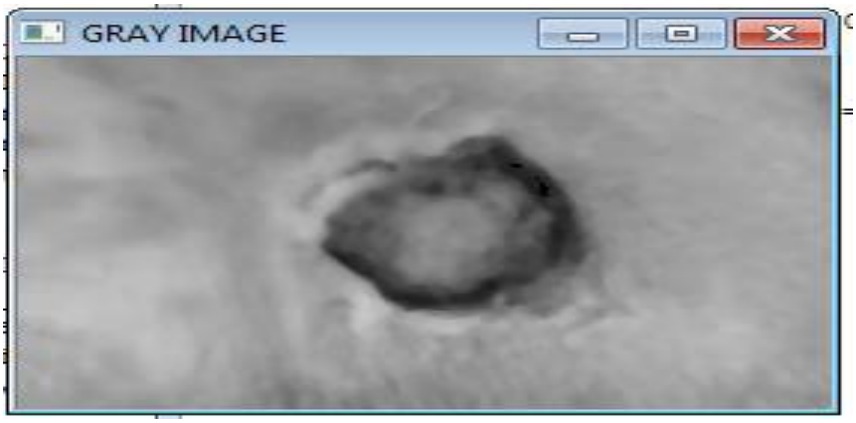

Fig 5: Gary scaled Image obtained after Segmentation

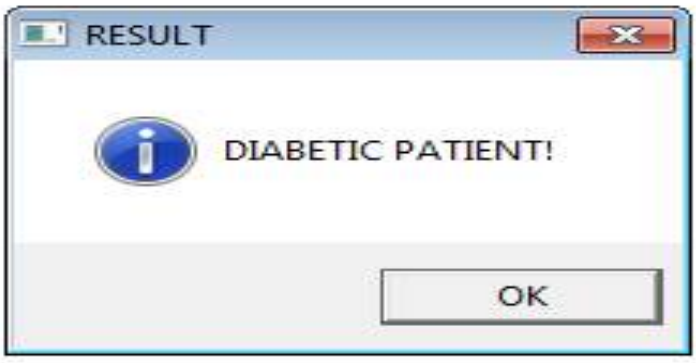

Fig 6: Final result of the Classifier

To validate the algorithm the same process is checked using the normal foot image and the same output is shown in below figures.

Fig 7: Original Image of the Normal Foot

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Fig 8: Median Filtered Output

Fig 9: Masked Image

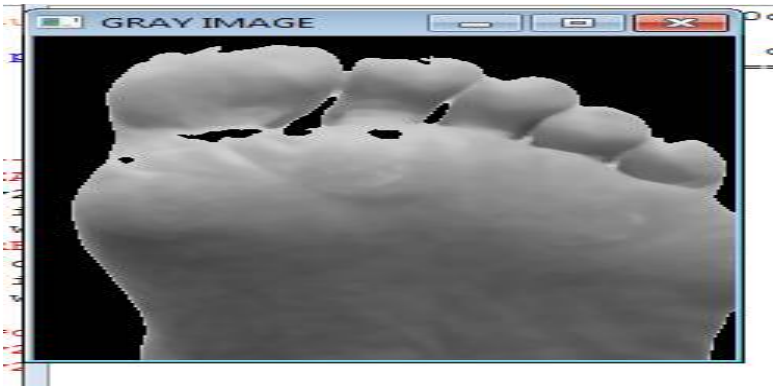

Fig 10: Gary scaled Image obtained after Segmentation

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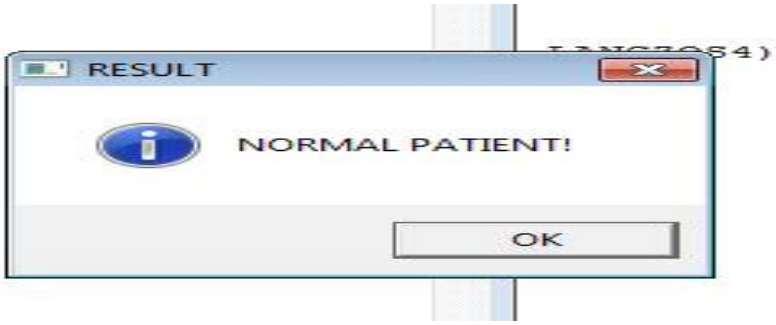

Fig 11: Final result of the Classifier

VI. CONCLUSION

The objective of proposed framework is to give the better wound image and healing status investigation through the Smartphone. We utilize the mean shift based boundary detection algorithm to analysis of precise wound boundary determination result. This technique Patients are effectively required in their own particular care. The wound investigation frameworks where by physicians can remotely access the image of wound and the result of wound healing. General outcome is store in database. Patient's traveling cost is considerably decreased. Additionally it will decrease the patient's uncommon strained quality and stress. Specialist can analyze the problem easily through wound images and its segmentation. The proper report of the healing can be given to the patient on time. It is easy to use for self-management and self-monitoring of foot ulcer for diabetic patients. The segmentation of image can be deciding the layout of foot ulcer and precise wound surface are detect. The processing algorithms are both exact and appropriate for real-time wound image analysis that designs a highly efficient and precise.

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