Smartphone-Based Wound Assessment System for Patients With Diabetes

Abstract

Diabetic foot ulcers represent a significant health issue. Currently, clinicians and nurses mainly base their wound assessment on visual examination of wound size and healing status, while the patients themselves seldom have an opportunity to play an active role. Hence, a more quantitative and cost-effective examination method that enables the patients and their caregivers to take a more active role in daily wound care potentially can accelerate wound healing, save travel cost and reduce healthcare expenses. Considering the prevalence of smartphones with a high-resolution digital camera, assessing wounds by analyzing images of chronic foot ulcers is an attractive option. In this paper, we propose a novel wound image analysis system implemented solely on the Android smartphone. The wound image is captured by the camera on the smartphone with the assistance of an image capture box. After that, the smartphone performs wound segmentation by applying the accelerated mean-shift algorithm. Specifically, the outline of the foot is determined based on skin color, and the wound boundary is found using a simple connected region detection method. Within the wound boundary, the healing status is next assessed based on red–yellow–black color evaluation model. Moreover, the healing status is quantitatively assessed, based on trend analysis of time records for a given patient. Experimental results on wound images collected in UMASS—Memorial Health Center Wound Clinic following an Institutional Review Board approved protocol show that our system can be efficiently used to analyze the wound healing status with promising accuracy.
Fig. 1. Wound image analysis system software system.
EXISTING SYSTEM
Visual examination of current practices methodology used in existing system.

DRAWBACK OF EXISTING SYSTEM
- Patient must regular to the clinic.
- Inconvenient and time consuming for patients
- Health care cost and special transportation, e.g., ambulances.

PROPOSED SYSTEM
Image analysis system implemented solely on the Android smartphone. The wound image is captured by the camera on the smartphone with the assistance of an image capture box. After that, the smartphone performs wound segmentation by applying the accelerated mean-shift algorithm.

ADVANTAGE OF PROPOSED SYSTEM
- Save travel cost and reduce healthcare expenses.
- Analyze efficiently promising accuracy for wound healing.

SYSTEM SPECIFICATION

Hardware Requirements

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<tr>
<td>System</td>
<td>Pentium IV 2.4 GHz</td>
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<tr>
<td>Hard Disk</td>
<td>40 GB</td>
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<td>Floppy Drive</td>
<td>1.44 Mb</td>
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Monitor : 15 VGA Colour
Mouse : Logitech
Ram : 512 Mb

**Software Requirements**

Operating system : Windows Family
Tools : eclipse
Technology Used : Java
Backend Used : SQLITE