

Cloud-Driven Application for Measurement of Wound Size

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Abstract

A web-based tool is described to store images of ulcers and measure ulcer size automatically. The web tool enables doctors and caregivers to upload images from any device. The ulcer size is automatically extracted using image processing algorithms.

Keywords:

Wound size, internet

Introduction

Measurements are key to management, especially for long term problems like ulcers. Size variation helps, but accuracy of measurement has issues related to depth, body, and curvature. We hereby describe an open source web application for measurement of ulcer size for consistent and comparative documentation with device and lighting independence. Application features and usage methodologies are suitable for standalone, team-sharing and tele-monitoring scenarios.

Prior Methods

Existing methods of measuring wounds include scale/ruler measurements (linear measurements), acetate paper measurements [1,2], depth gauges, and ultrasound imaging. (Figure 1). Tracing the wound perimeter with a marker on clear acetate can be more accurate but is complicated by condensation related fogging and obscuration of wound margins. Contact with the wound area can lead to patient discomfort and even infection. Automated techniques have been developed [1] to overcome these drawbacks.

Stereophotogrammetry reconstructs a 3D image through twin cameras [3]. A variant is to use a single camera with Image JTM, [4] a target sheet for calibration [5], laser based triangulation [6], and structured light [7,8], to map the 3D surface of a wound and then segment out the wound region which can be more accurate but expensive.

Methodology

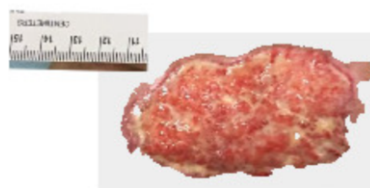
Our technique matches [4,5] and involves the following broad steps:

1. User takes image of the wound region, with a known scale placed in background,
2. The scale and wound are extracted from the image.
3. Measurements on the scale are used to determine how many pixels correspond to one mm²,
4. The image is loaded after login on to the free access website – <http://med.insofe.edu.in:8282/> (Username: test, Password: testp@ss1234),

5. At the site, the image becomes visible along with an online drawing tool which allows the user to broadly mark out the area of interest by drawing two quadrilaterals – one outside the wound area, and the other inside the wound,
6. Image processing is used to convert the image to an identifiable number of pixels corresponding to this marked region which are used to determine the wound area in mm².



(a) Image of wound with scale



(b) Wound and scale extracted



(c) Extent and size measured using algorithms

Figure 1 - Workflow

Discussion

You cannot manage what you cannot measure. Wounds and ulcers need daily assessment which includes the size and depth of

wounds. We offer an easy method which can be used by clinicians. It is currently free for use by anybody.

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