AI BASED LOCALIZATION AND SPECIFICATION OF SKIN DISEASE WITH ERYTHEMA

TEAM LEADER: DHIVYA BHARATHI R

TEAM MEMBER: ABARNA S

TEAM MEMBER: GAYATHRI B

TEAM MEMBER: KAVYA A

LITERATURE SURVEY

1. **METHOD OF REDUCING DIMENSIONS OF SEGMENTATION FEATURE PARAMETER APPLIED TO SKIN ERYTHEMA IMAGE SEGMENTATION.**

   AUTHORS: KeKe Shang; Liu Ying; Niu Hai-jing; Liu Yu-fu

   Basing on analyzing a lot of erythema images, proposed a new segmentation feature parameter applied to the skin erythema image segmentation. At last, by using the fuzzy-c-means cluster arithmetic, compared the segmentation speed and segmentation effect of adopting different segmentation features parameter and found that the segmentation result by using the new segmentation feature parameter is better.

2. **IMPLEMENTATION OF FUZZY C-MEANS CLUSTERING OF PSORIASIS ASSESSMENT ON LESION ERYTHEMA**

AUTHORS: Ahmad Fadzil M Hani; Esa Prakasa; Hermawan Nugroho; Vijanth S. Asirvadam

In this paper, an objective PASI erythema-scoring algorithm has been developed. The colour of lesion erythema was found to be dependent on the normal skin tone of the affected person. Normal skin tones are categorised into four groups (dark, brown, light brown and fair skins). A soft clustering is applied to solve the ambiguity problems at cluster boundaries. CIE L*a*b* data of lesions and their surrounding normal skin are used to calculate lesion erythema. Two dedicated fuzzy c-means (FCM) algorithms are applied consecutively to classify normal skin tone and to score PASI erythema.

3. INFRA RED THERMAL IMAGING OF THE SKIN QUANTIFIES REACTIVE HYPERAEMIA

AUTHORS: E.F.J. Ring; D. Elvins

It is possible to induce local skin blood flow changes by chemical, radiation and thermal stress to the skin. Localised trauma from mechanical stress can also be measured by this technique from a two dimensional dynamic image. Examples of experimental U.V. erythema, topical vasodilator, and cold stress reaction to the hands are described.

4. RANDOM FOREST BASED ERYTHEMA GRADING FOR PSORIASIS

AUTHORS: Mithun Das Gupta; Srinidhi Srinivasa; J. Madhukara; Meryl Antony

Erythema or redness of skin is an important identifier for evaluation of PASI score. Extra subjectiveness in the evaluation of erythema has been observed, since the perception of redness can be influenced by the skin tone, ambient lighting and many other such factors which are difficult to control in a clinical setting. We propose a novel colorimetric feature for erythema grading by extending the tissue-photon interaction model to make it skin tone independent. We propose to use Skellam distribution statistics as feature vectors for erythema grading.

5. A NOVEL APPROACH FOR AUTOMATIC IDENTIFICATION OF PSORIASIS AFFECTED SKIN AREA

AUTHORS: T.R. Arunkumar; H. S. Jayanna

Today dermatologists visually analyse the patients for the line of treatment which is biased by various external factors. The proposed model for diagnosis is not subjective where the decisions are based on various external factors such as emotions, part of the day and vary from dermatologist to dermatologist which may have a great impact on the treatment of the disorder. The algorithm is objective and minimizes the deviation in the line of treatment as it is not affected by intra and inter diagnosis by dermatologists. The RGB histogram is

analyzed and a model is built based on mean and standard deviation to differentiate healthy skin and psoriasis disorder affected skin.

6. AUTOMATIC SEGMENTATION OF SCALING IN 2-D PSORIASIS SKIN IMAGES

AUTHORS: Juan Lu; Ed Kazmierczak; Jonathan H. Manton; Rodney Sinclair

It employs a visual analogue scale to score the thickness, redness (erythema), and scaling of psoriasis lesions. However, PASI scores are subjective and suffer from poor inter- and intra-observer concordance. As an integral part of developing a reliable evaluation method for psoriasis, an algorithm is presented for segmenting scaling in 2-D digital images. A Markov random field (MRF) is used to smooth a pixel-wise classification from a support vector machine (SVM) that utilizes a feature space derived from image color and scaling texture. The algorithm is shown to give reliable segmentation results when evaluated with images with different lighting conditions, skin types, and psoriasis types.

7. OBJECTIVE MEASUREMENT OF ERYTHEMA IN PSORIASIS USING DIGITAL COLOR PHOTOGRAPHY WITH COLOR CALIBRATION

AUTHORS: Abhay Raina; Ricky Hennessy; Michael Rains; James Allred; Dayna Diven; Mia K. Markey

This procedure is standardized for different camera systems and lighting environments through the usage of a color card with predetermined color values in order to calibrate the images. Quantitative measures based on the digital color images are shown to correlate well with subjective assessment of psoriasis severity collected using a standard numerical scale by a panel of dermatologists. Additionally, the color calibration process is shown to improve results.

8. ANALYSIS AND DIAGNOSIS OF ERYTHEMATO-SQUAMOUS DISEASES USING CHAID DECISION TREES

AUTHORS: Alaa M. Elsayad; Mujahed Al-Dhaifallah; Ahmed M. Nassef

Erythemato-squamous diseases (ESDs) are common skin diseases. They consist of six different categories: psoriasis, seboreic dermatitis, lichen planus, pityriasis rosea, chronic dermatitis and pityriasis rubra pilaris. They all share the clinical features of erythema and scaling with very little differences. Their automatic detection is a challenging problem as they have overlapping signs and symptoms. This study evaluates the performance of CHAID decision trees (DTs) for the analysis and diagnosis of ESDs. The Chi-Squared Automatic Interaction Detection (CHAID) decision tree model is a very fast model with the ability to build wider decision trees and to handle all kinds of input variables.

9. MODELING PSORIASIS LESION COLOUR FOR PASI ERYTHEMA SCORING

AUTHORS: M. H. Ahmad Fadzil; Dani Ihtatho

To evaluate treatment efficacy, the Psoriasis Area and Severity Index (PASI) as a gold standard method is used to measure psoriasis severity. Commonly, the erythema (a PASI parameter) of a lesion is assessed visually but may lead to subjective and inconsistent results. Since psoriasis lesions can have a wide variety of colour, modeling the psoriasis colour is necessary. In this work, we proposed a colour model of psoriasis lesion that can be used in PASI erythema scoring. The colour of psoriasis lesion is modeled by hue (H), saturation (S), and value (V). Correlation coefficient between HSV parameters of lesion references with PASI erythema score is calculated. Among the three parameters, hue and saturation are the two most correlated parameters with PASI erythema scores. Larger numbers of lesion references are required in order to model the distribution of lesions with different scores in hue-saturation plane.

10. OBJECTIVE ASSESSMENT OF PSORIASIS ERYTHEMA FOR PASI SCORING

AUTHORS: M. H. Ahmad Fadzil; Dani Ihtatho; Azura Mohd Affandi; S.H. Hussein

Psoriasis is a skin disease which is indicated by the appearance of red plaques. Although there is no cure for psoriasis, there are many treatment modalities to help control the disease. To evaluate treatment efficacy, PASI (Psoriasis Area and Severity Index) which is the current gold standard method is used to determine severity of psoriasis lesion. Erythema (redness) is one parameter in PASI.