SKINcure: A Real Time Image Analysis System to Aid in the Malignant Melanoma Prevention and Early Detection

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Introduction

Skin cancer (Melanoma) incidence rates have been increasing for the past three decades. The most important risk factors for melanoma skin cancer are unprotected exposure to UV radiation, and growing melanoma-type moles. However, early diagnosis of malignant melanoma increases the chances for cure significantly. Therefore a real time image analysis system to aid in the malignant melanoma prevention and early detection is highly in-demand.

In this poster, we propose a portable real time image analysis system to aid in the malignant melanoma prevention and early detection. We present an image recognition technique, where the user will be able to capture skin images of different mole types. Our system will analyze and process the images and alert the user at real-time to seek medical help urgently.

Proposed System

Our proposed system captures data from the environment (e.g. sun-light exposure) and plugs it into the system to alert the user in real-time for preventing the risks associated with developing skin cancer disease. More specifically, we present an image recognition technique, where the user will be able to capture skin images of different mole types.(Figures 1 and 2).

The proposed system will process, analyze, and classify clinical and dermoscopic images into normal, atypical and melanoma cases based on certain image features (i.e. color, shape, and texture). This work introduces convenient steps for automating the process of melanoma prevention and detection; and as a result, it can alert the user at real-time to seek medical help urgently.

Figure 1. iPhone dermotoscope, up to 20x magnification

Figure 2. Sample of skin lesion, including normal lesion (first column), melanoma lesion (second column) and atypical lesion (third column).

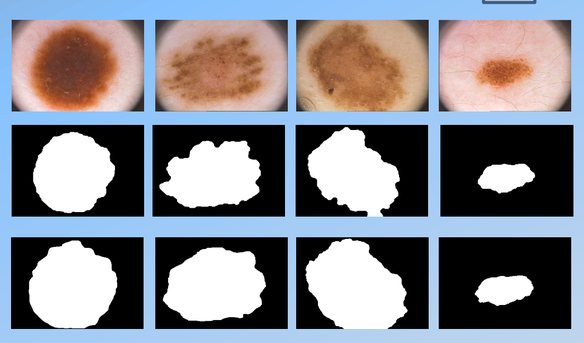

Figure 3. Lesion segmentation results, original lesion (first row), lesion segmented by our algorithm (second row) and lesion segmented by dermatologists (third row).

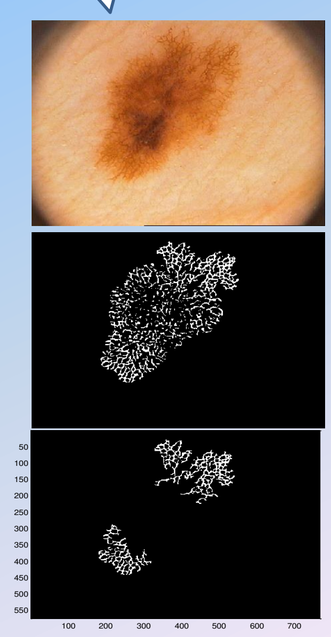

Figure 4. Pigment network detection.

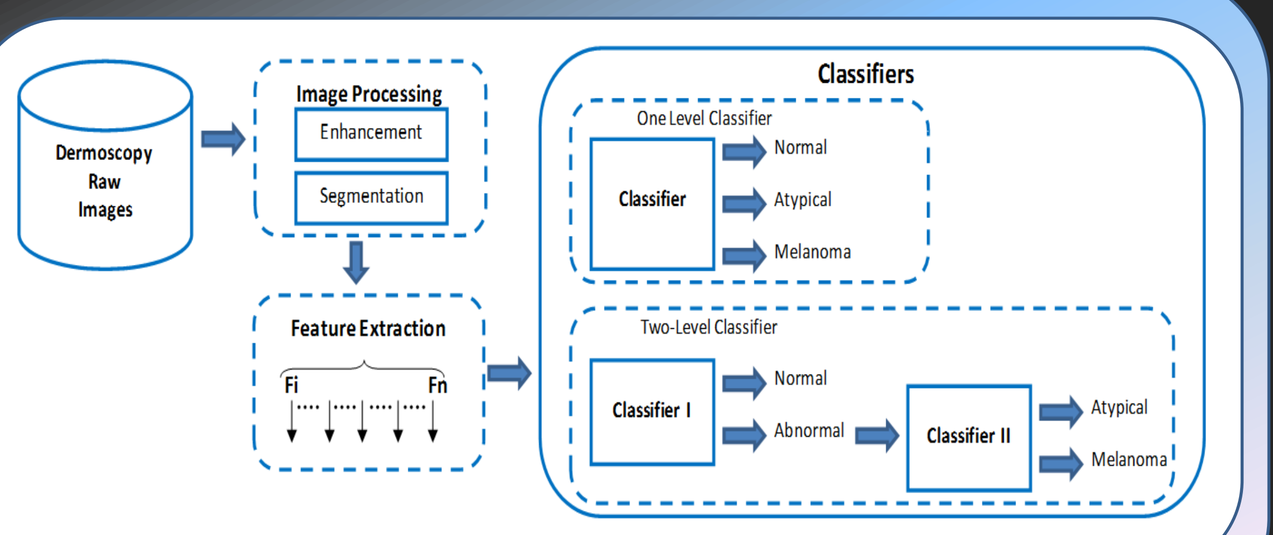

Figure 5. Proposed framework for dermoscopy image classification.

Results

The proposed framework compares two types of classifiers (Figure 5). As a result, the two-level classifier outperforms the one level classifier. In the one-level classifier, we were able to classify normal, atypical and melanoma images with an accuracy of 90.3%, 92.3% and 90.3%, respectively. On the other hand, the two-level classifier achieved 90.6%, 97.7%, and 91.3% accuracy rates, respectively.

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