MULTISPECTRAL DERMOSCOPE

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1. INTRODUCTION

Skin cancers like Melanoma and Basal Cell Carcinoma (BCC) are frequent in Caucasian populations. So far, the standard diagnostic procedure for Melanoma and BCC is based on clinical observation with a Dermoscope (epiluminescence microscopy) and invasive tissue biopsy with subsequent histological examination. Early diagnosis is significant for the effective treatment of Melanoma and BCC.

2. MULTISPECTRAL DERMOSCOPE

We have built a novel type of Dermocscope, the Multispectral Dermoscope which apart from focusing on the morphology of the sample focuses also on the scattering properties and the vascular pattern of the sample. The principle of operation is similar to that of a common Dermoscope. Major differences, however, are the use of high power LEDs emitting at distinct spectral regions (**470** nm (blue), **530** nm (green) and **630** nm (red)) as light source, a polarizer for the illumination and an analyzer for the detection. These spectral regions target on the major absorbers of the skin (hemoglobin and melanin [1]). The sample is illuminated with each spectral region at two different positions of the analyzer, one parallel **(0°)** to the polarizer and one orthogonal **(90°)** to the polarizer. In the former case single and multiple photons are detected while in the latter only multiple scattered photons are detected.

3. IMAGE PROCESSING

By computational processing of these images information that are not achievable by a common Dermoscope can be extracted. One algorithm is the **Pol Blue** [2]. In this case we target on enhancing the contrast for highly scattering structures on the superficial layers of skin and we achieve that by subtracting the effect of multiple scattered photons. Another type of image processing is the **Blood Contrast**. The success of this type of processing relies on the fact that if we subtract the effect of absorption of melanin we can visualize only the effect of absorption of hemoglobin thus revealing the vascular pattern of the sample (Figure 1).

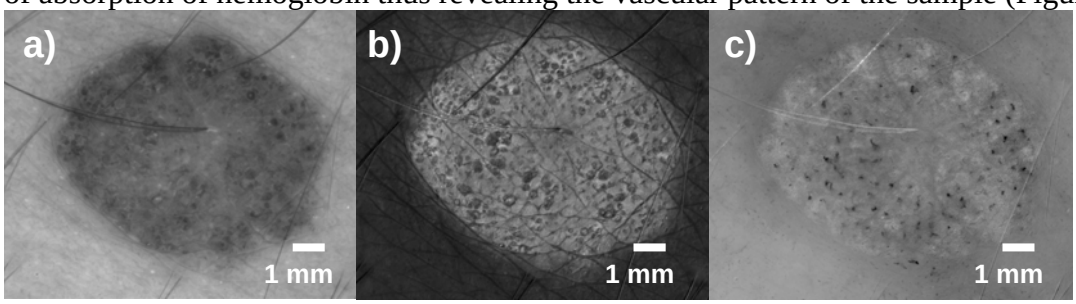

Figure 1. a) Skin lesion under white illumination, b)Pol Blue, c) Blood contrast.

References

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