

Medical > In Vivo > Melanoma & Pigmented Lesion Research

53

Wavelet-based statistical classification of skin images acquired with reflectance confocal microscopy.

*Halimi A, Batatia H, Le Digabel J, Josse G, Tourneret JY.
Biomed Opt Express. 2017 Nov 8;8(12):5450-5467. doi: 10.1364/BOE.8.005450.*

ABSTRACT

Detecting skin lentigo in reflectance confocal microscopy images is an important and challenging problem. This imaging modality has not yet been widely investigated for this problem and there are a few automatic processing techniques. They are mostly based on machine learning approaches and rely on numerous classical image features that lead to high computational costs given the very large resolution of these images. This paper presents a detection method with very low computational complexity that is able to identify the skin depth at which the lentigo can be detected. The proposed method performs multiresolution decomposition of the image obtained at each skin depth. The distribution of image pixels at a given depth can be approximated accurately by a generalized Gaussian distribution whose parameters depend on the decomposition scale, resulting in a very-low-dimension parameter space. SVM classifiers are then investigated to classify the scale parameter of this distribution allowing real-time detection of lentigo. The method is applied to 45 healthy and lentigo patients from a clinical study, where sensitivity of 81.4% and specificity of 83.3% are achieved. Our results show that lentigo is identifiable at depths between 50 μ m and 60 μ m, corresponding to the average location of the dermoepidermal junction. This result is in agreement with the clinical practices that characterize the lentigo by assessing the disorganization of the dermoepidermal junction. **KEYWORDS:**(100.0100) Image processing; (100.2960) Image analysis; (100.7410) Wavelets; (170.0170) Medical optics and biotechnology; (170.0180) Microscopy; (170.6935) Tissue characterization
PMID: 29296480 PMCID: PMC5745095 DOI: 10.1364/BOE.8.005450