

Medical > In Vivo > Other material

45

Automated Segmentation of Skin Strata in Reflectance Confocal Microscopy Depth Stacks.

Hames SC, Ardigò M, Soyer HP, Bradley AP, Prow TW. *PLoS One*. 2016 Apr 18;11(4):e0153208. doi: 10.1371/journal.pone.0153208.

ABSTRACT

Reflectance confocal microscopy (RCM) is a powerful tool for in-vivo examination of a variety of skin diseases. However, current use of RCM depends on qualitative examination by a human expert to look for specific features in the different strata of the skin. Developing approaches to quantify features in RCM imagery requires an automated understanding of what anatomical strata is present in a given en-face section. This work presents an automated approach using a bag of features approach to represent en-face sections and a logistic regression classifier to classify sections into one of four classes (stratum corneum, viable epidermis, dermal-epidermal junction and papillary dermis). This approach was developed and tested using a dataset of 308 depth stacks from 54 volunteers in two age groups (20-30 and 50-70 years of age). The classification accuracy on the test set was 85.6%. The mean absolute error in determining the interface depth for each of the stratum corneum/viable epidermis, viable epidermis/dermal-epidermal junction and dermal-epidermal junction/papillary dermis interfaces were 3.1 μ m, 6.0 μ m and 5.5 μ m respectively. The probabilities predicted by the classifier in the test set showed that the classifier learned an effective model of the anatomy of human skin. PMID:27088865
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