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Identification of skin-related diseases by physical skin biomarkers: A machine learning approach to personalized skin solutions

Davoud Rahimi Ardali
University of Portsmouth, UK

Personalized skincare requires customization of products, which are adapted in a way to suit the patient's skin profile. The process of customization involves several major steps one of which is machine driven skin profiling. This study aims to find a link between patients' physical skin measurements and two diseases which will have an impact on different areas of human skin. This study helps with the automation of human skin profiling which is the major initial step to personalized skin solutions. In this study, information obtained from more than 80 volunteers was used to distinguish between skin profiles. The volunteers belonged to one of the three groups used in the study. The first group contains healthy individuals aged 18 to 35 years, and also older healthy adults, aged older than 60 years. The remaining two classes contain adults suffering from diabetes mellitus type II, and adults suffering from rosacea. The physical skin measurements included in this study are: corneometry, sebumetry, trans-epidermal water loss, cutometry, pH, frictiometry and colorimetry. The study shows that the physical skin measurements can be used successfully to distinguish between skin related diseases with satisfactory accuracy. It is also shown that some of the machine learning techniques are particularly suitable for classification tasks of this type. Sensitivity of the selected classification algorithms to the location on the skin where the sample is taken, i.e., affected or unaffected part of skin for volunteers with diabetes mellitus type II and rosacea is also determined.