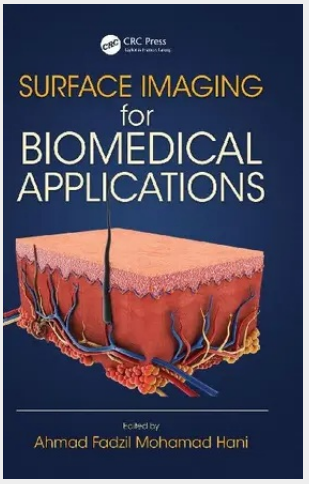
Hani

Surface Imaging for Biomedical Applications



Based on hospital clinical trials examining the use of signal and image processing techniques, Surface Imaging for Biomedical Applications bridges the gap between engineers and clinicians. This text offers a thorough analysis of biomedical surface imaging to medical practitioners as it relates to the diagnosis, detection, and monitoring of skin conditions and disease. Written from an engineer's perspective, the book discusses image acquisition methods, image processing, and pattern recognition techniques. It focuses on a variety of techniques used in recent years for image processing and pattern recognition (principal component analysis, independent component analysis, singular value decomposition, texture modeling, inverse model analysis, polynomial surface fitting, and classification techniques), and considers interventional and non-invasive procedures used to diagnose skin-related disease. It examines the biological causation of four skin disorders (psoriasis, vitiligo, ulcer, and acne), provides basic terminologies in surface imaging, and details the outcome of various clinical observations and other research. It also details numerous measurement parameters related to surface imaging (body surface, skin color, tissue characteristic, thickness, roughness, volume of skin, and retinal changes). - Discusses the development of a psoriasis severity measurement tool - Provides material on assessing segmented repigmentation areas in vitiligo patients via VT-Scan - Introduces a volume ulcer assessment using non-invasive 3D imaging - Presents an automated system for acne grading that is based on capturing the images of various body parts using the DSLR camera - Includes the MATLAB® codes for various pattern recognition techniques applied during the assessment/measurement at the end of each chapter This interdisciplinary reference highlights the importance of disease diagnosis and monitoring, and is suitable for medical practitioners, biomedical engineers, and core image processing researchers.

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