

Current Trends of Segmentation Algorithms for Skin Lesions

Zhen Ma, João Manuel R. S. Tavares

Faculdade de Engenharia, Universidade do Porto, Rua Dr. Roberto Frias, s/n, 4200-465
PORTO - PORTUGAL

Abstract: Skin cancer has become one of the most frequent forms of cancer nowadays; its high prevalence has attracted many studies towards the causes and treatments in the recent years. However, the current practice of detecting skin cancers is fairly subjective and may suffer from diagnostic errors. In order to solve this problem, an effective computer-aided diagnosis (CAD) system is urgently demanded. Such system can provide an objective source to help the dermatologist improve the diagnostic accuracy. Such an automated system aims to detect the skin lesions on the acquired images and then analyzes whether those lesions are benign or malignant. The usual computational procedure is composed of three steps: image segmentation, feature extraction, and classification. Among these steps, the segmentation has deterministic influences to the later quantitative analysis and classification; however, due to the complicated appearance of skin lesions in the images, correct segmentation of their boundaries is very challenging. Many algorithms have been proposed to fulfill this task, and some of them have achieved satisfactory performances. Nevertheless, the performance of the existing algorithms still needs further improvement to be accepted in clinical practice.

This paper will review these algorithms and summarize their trends of the development; algorithms focused in this work contain both the ones for dermoscopic images and the ones for macroscopic images. Advantages and disadvantages of each algorithm will be discussed; and possible techniques that can be used for improvement will be proposed. Open image database will be used for testing and for the illustration and comparisons among the different algorithms.

Key words: Skin Lesions, Image Segmentation, Algorithm Review, Dermoscopic Images, Macroscopic Images.

Acknowledgments

This work was partially done in the scope of the project “A novel framework for Supervised Mobile Assessment and Risk Triage of Skin lesions via Non-invasive Screening”, with reference PTDC/BBB-BMD/3088/2012, financially supported by Fundação para a Ciência e a Tecnologia (FCT) in Portugal.