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Classification of PH2 Images for Early Detection of Skin Diseases

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Abstract:

Melanoma is one of the most deadly types of skin diseases, but there is an opportunity to survive in case of an early diagnosis. Our paper offers a contribution to assist dermatologists and experts to save time and effort to diagnose and treat melanoma in its early stages. Segmentation is necessary to focus the system on the skin lesion only, so we apply the Active contours algorithm to isolate the lesion area from the rest of the image. The PH2 dataset contains many features. In our proposed system, we focus on extracting color features through the Fuzzy color histogram (FCH) technique. The SVM, K-NN, ANN and FFNN classifiers present promising results, with 100% accuracy, 100% sensitivity and 100% specificity.

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Contents

I. Introduction



Skin lesions cause death to thousands of people annually. Melanoma is the most deadly type of skin cancer. The number of infections in the United States each year is 87,110, and those who lose their life are 9730 people. Dermoscopy is a diagnostic device for skin diseases, for imaging the surface of the skin and pigmented structures [1]. Skin diseases, according to PH2 dataset, are classified as Melanoma, atypical and benign. Exposure to ultraviolet rays due to sunlight causes the production of abnormal cells, which causes skin diseases. Melanin is produced by Melanocyte cells and is responsible for the production of pigment cells and giving the skin its natural color. In the beginning, dermatologists diagnose lesions by visual examination by dividing the lesion into four parts for measuring Asymmetry, the uniformity of borders, the number of colors inside the lesion, the diameter of the lesion and monitoring its growth [2]. The detection of skin lesions is delayed in its early stages due to the limited availability of dermatologists. Early detection of skin lesions reduces globalized biopsies and increases survival. In addition, the early diagnosis prevents the expansion of the lesions and its growth and prevents the transmission of the lesion to another person. Therefore Computer Aided Diagnosis (CAD) is necessary to help experts to early detect skin lesions. Manual extraction of features to diagnose lesions is inaccurate due to the high differences in the lesions region. CAD systems accurately diagnose lesions so that the lesions features are extracted without the features in the healthy skin area that affect the performance of the diagnosis. In this paper, we propose to classify the skin lesions acquired from the PH2 data set by using SVM and KNN classifiers. The classifiers are fed with the extracted features by the Fuzzy Color Histogram (FCH) algorithm, these features are carefully extracted from the region of interest (ROI), which is determined by using Active Contour Technique method (ACT).

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The melanoma skin cancer detection and classification using support vector machine
 2017 IEEE Jordan Conference on Applied Electrical Engineering and Computing Technologies (AEECT)
 Published: 2017

Automatic recognition of melanoma using Support Vector Machines: A study based on Wavelet, Curvelet and color features
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