

REVIEW: DIFFERENT CLASSIFICATION APPROACHES FOR DERMOSCOPY IMAGES

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ABSTRACT

Worldwide the incident of malignant melanoma is increasing continuously. Melanoma is the deadliest form of skin cancer. There is need of computerised system to evaluate a patient's risk of melanoma using images of their skin lesion captured using dermatoscope due to cost of dermatologist to monitor every patient. Segmentation is performing measure role for detection of skin lesion from images. Dermoscopy images of skin cancer and other pigmented lesions are segmented using different methods. A review of different types of skin lesion segmented techniques is presented in this paper. Accuracy, speed and computational efficiency are the main aim of segmentation.

Key words: Skin cancer, Image segmentation, Dermatoscope

INTRODUCTION

Cancer arises from skin is called as skin cancer. Skin cancer is divided in three parts: Basel-cell skin cancer, Squamous-cell skin cancer and Melanoma. Malignant melanoma is nothing but skin cancer which is less common and more dangerous. Melanocytes are found in uppermost skin layer epidermis that develops benign skin tumor. Melanin is a formation of skin cells which are brown pigments. The deadliest of skin cancer is considered as Melanoma. Less common and most dangerous form of skin cancer is malignant melanoma. Mole that changed in size, shape, color has irregular edges, has more than one color are signs of melanomas.

A device which is used to take the skin lesion images considered as dermatoscope. The examination of skin lesion with dermatoscope is known as dermoscopy. Dermatoscopes has two types: contact and non-contact. Contact, using a layer of gel/oil applied between skin and dermatoscope, and non-contact, with no skin contact and no fluid. very few publicly available datasets are available of dermoscopy images. The research communities are uses PH2 and EDRA image database. The ISIC Archive for the Melanoma project which is large public database of dermoscopy images is created by the international skin image collaboration (ISIC). Dermoscopy images are required for the research, development and comparison of various algorithms for identifying melanoma. These dermoscopy images can be taken from database like PH2, EDRA and ISIC.

The possibility of computer storage and retrieval of dermoscopic images is offered by currently available digital dermoscopic system. Some system even displays the diagnostic results on computer assisted diagnosis (CAD). Diagnostic accuracy with dermoscopy is depends upon the experience of dermatologist. CAD system will helps the less experienced dermatologists. In automatic dermoscopic image analysis usually has three stages: 1) image segmentation 2) feature extraction and feature selection and 3) lesion classification.

SEGMENTATION TECHNIQUES

One of the most important stages is segmentation because accuracy is the main characteristic of segmentation. Several algorithms have been proposed for addressing the segmentation problem. There is no any specific algorithm which is appropriate for all types of digital and fulfils every objective.

The main idea behind segmentation process is to extract regions that different in colour, texture, intensity or any other image statistic.

a) Segmentation based on edge detection

A lot of information about various regions in an image is carried by Edge. The outline of the object is provided by them. A set of connected pixels that lies on the boundary Between two regions that differ in grey value is considered as Edge. The pixels on edge are considered as edge points. In Edge detection technique the information of the edge is detected and edge pixels with adjacent neighbour connectivity are tracked. A structural technique of image segmentation process is Edge detection technique. Basically an operation to perceive important local changes in the intensity level of an image is an edge detection operation.

b) Segmentation based on thresholding

Simple and popular technique for image segmentation is Thresholding. Segmentation based thresholding is simple but powerful method for segmenting images having light objects on dark background. This technique is based on characteristics of image. Multilevel image converted into binary image by this technique. In order to distinguish the regions in distinct intensions, a threshold is applied to the image. A proper threshold T chooses by this technique, which divide image pixels into several regions and separate objects from background. Thresholding technique is used for finding an intensity value considered as threshold, and then threshold splits in desire classes.

In this process the groping of pixels is done with intensity greater than threshold into one class, and all other pixels into another. Thresholding segmentation is difficult to use where the intensity non consistency or noise is present in image.

c) Region based segmentation

A connected homogenous subset of the image with respect to some criterion such as grey level or texture, considered as a region of an image. And group of connected pixels with similar properties are considered as the regions in an image. In region based segmentation technique, each and every pixel is allotted to a particular object or region. As compared to first method, segmentation algorithms are relatively simple and more immune to noise. In this approach, pixels which are corresponds to particular object are grouped together and marked. Appropriate thresholding techniques are used by Region-based segmentation algorithm.

d) Segmentation based on clustering

In segmentation task the Image is divided into two or several different regions of interest. Image is divided into separate regions containing each pixel with alike attributes, this process is considered as segmentation. Clustering methods are mostly unsupervised is approach. This approach can be used to organize the data into groups which is based on individual's data items. The underlying structures in data can be exploited in extensive variety of application can be disclose by clustering procedure. Variety of applications such as Image processing, classification and pattern recognition, modelling and identification are disclosed by clustering procedure. In the process of clustering the samples of the same group are more alike to one another than samples which belong to different groups. K-mean clustering and Fuzzy c-means are the two methods of clustering method. In k-mean clustering one data belong to only one cluster. FCM is a method of clustering in which one piece of data to belong to two or more clusters. These techniques are explained below.

1) K-mean clustering

One of the simplest clustering method is K-means algorithm method. In this clustering method, a grouping of n pixels of an image into K number of clusters, where $K < n$ and K is a positive integer is done. Each point of the data set which is belonging to only one cluster. K-means clustering algorithm is unsupervised learning algorithm. The first step of the algorithm is to define the k number of cluster. Centre is selected randomly considered as k-cluster. Then distance between the each pixel to each cluster centres are considered. The pixel which is having minimum distance is allotted to a cluster otherwise it is moved to the next cluster and it is done in many iterations. Again each pixel is compared to all centroids. The process continuous until the centre converges.

2) Fuzzy clustering

Fuzzy clustering is an unsupervised method. In this method, objects belong to several clusters having different degrees of membership. The objects which are on the boundaries between numerous classes are assigned membership degrees valued between 0 and 1 that

indicates their partial membership. In this method it allocates training vector a set of membership values, one for each cluster. The idea of fractional membership of belonging which is described by membership function is proposed by a fuzzy set theory.

e) Segmentation based on artificial neural network

Artificial representation of human brain which is used to simulate its learning process is considered as neural network.

ANN is categorizing into supervised and unsupervised. The network is trained by giving it the input and the corresponding output, is considered as supervised learning method. The network is only given the input samples and it will adjust its weights so that it will have similar response for similar inputs, is considered as unsupervised learning method. Artificial neural network is the machine learning procedure. ANN working is similar to the human brain. Neural network establish a large no nodes which is similar to human brain's learning process. Each node can perform some basic computing.

CONCLUSION

One of the deadly types of cancer in humans is skin cancer. If the cancer diagnosed at right time the disease can curable. So it is necessary for finding the melanoma at early stage. Various image segmentation techniques are explained, in these review paper. These methods are very useful for detecting the melanoma. The region of interest is detected by the image segmentation.

RESULT



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