"Skin Lesion Segmentation in Dermoscopic Images by Multilevel Feature Extraction"

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Abstract: For early detection of diseases like skin cancer Image processing techniques are most commonly Used on Dermoscopic images. A study Shows that it can improve intensity, sensitivity and specificity for early detection of skin cancer through image processing techniques. Collected scan image of the skin are pre-processed and the Region of Interest (ROI) is segmented. The proposed system consist of preprocessing, image resizing and filtering, segmentation, features extraction and classification. features such as color, texture and intensity with classification effected by means of an SVM (Support Vector Machine). This Classification identifies whether these images are normal or abnormal.

Keywords— Pre-processing; Image resizing and filtering; segmentation; Features extraction; Classification(by using support vector machine).

INTRODUCTION:

Skin cancer is one of the most common type of cancer in both men and women. Due to this large number of people die every year. This disease has different stages whereby it starts from the small area of the skin and spreads throughout the different areas of the skin. In this process, we are using the color features in combination which gives better stability of using color or gray level information alone. We are using k-means clustering algorithm to segment the lesion. The features are extracted by six different color-texture feature extractors from the segmented images. Classification accuracy of our proposed system is based on four different types of classifiers and their values are compared with one another. The results of the proposed system are computed on the dataset images in order to perform better analysis of our proposed system

METHEDOLOGY:

In this process, we are using the color features in combination which gives better stability of using color or gray level information alone. We are using k-means clustering algorithm to segment the lesion when we give input image. An image is a visual representation of something and it is a picture that has been created or copied and stored in electronic form. An image can be expressed in terms of vector graphics or raster graphics. An image stored in raster form is sometimes called as bitmap. An image map is a file containing information which can be in any form like, JPEG, PNG, GIF, ETC. After this, pre-processing will be done by using following steps:-
Gaussian filtering:-The Gaussian Smoothing Operator performs a weighted average of surrounding pixels based on the Gaussian distribution. It is mainly used to remove Gaussian noise and is a realistic model of defocused lens.
Image Resizing:- In computer graphics and digital imaging, image scaling refers to the resizing of a digital image.
Segmentation:- Image segmentation is the process of doing partition a digital image into multiple segments (sets of pixels, also known as super-pixels). The goal of doing segmentat is to simplify and/or change the representation of an image into something that is more meaningful and easier to analyze. Image segmentation process is mainly used to locate objects and boundaries (lines, curves, etc.) in images.
Feature Extraction:- Feature detection, description and matching are essential components of various computer vision applications, thus they have received a considerable attention in the last decades.

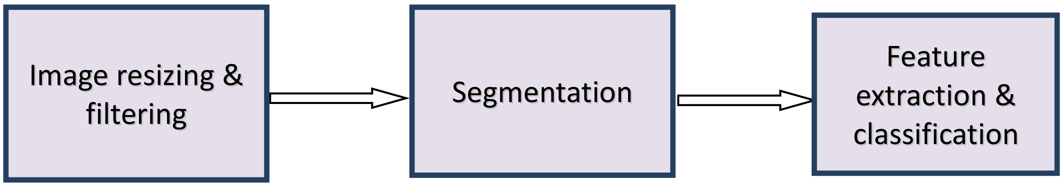

fig. 1 Block Diagram

A. PRE-PROCESSING STAGE

In this image Pre-processing stage includes

i). GAUSSIAN FILTERING

The Gaussian Smoothing Operator performs a weighted average of all surrounding pixels based on the Gaussian distribution. It is used to detach Gaussian noise and is a realistic model of defocused lens. Sigma defines the amount of blurring. Large values for sigma will give large blurring for larger template sizes.

ii). IMAGE RESIZING

In computer graphics and digital image processing, **image scaling** refers to the resizing of a digital image. In video technology, the axaggeration of digital material is known as upscaling or resolution enhancement. When scaling a vector graphic image, the graphic primitives that make up the image can be scaled by using geometric transformations, with no loss of image quality. While scaling a raster graphics image, a new image with a higher or lower number of pixels must be generated. In the situation of decreasing the pixel number (scaling down) this usually results in a visible quality loss. By the standpoint of digital signal processing, the scaling of raster graphics is a two-dimensional example of sample rate conversion, the conversion of a discrete signal from a sampling rate to another.

B. SEGMENTATION

Image segmentation is the process of doing partition a digital image into multiple segments (sets of pixels, also known as super-pixels). The main aim of segmentation is to simplify and/or change the representation of an image into something that is more meaningful and easier to analyze. Image segmentation is specially used to locate objects and boundaries (lines, curves, etc.) in images. More precisely, image segmentation is the process of allocating a label to every pixel in an image such that pixels with the same label share certain characteristics. The result of image segmentation is a set of segments that thoroughly cover the entire image, or a set of contours extracted from the image (see edge detection). Each and every pixels in a region are similar with respect to some characteristic or computed property, such as color, intensity, or texture.

C. FEATURE EXTRACTION

Feature detection, representation and matching are essential components of various computer vision applications, thus they have received a considerable attention in the last decades. Several feature detectors and descriptors have been proposed in the literature with a variety of definitions for what kind of points in an image is potentially interesting (i.e., a distinctive attribute). The basic idea is to first detect interest regions (key points) that are covariant to a class of transformations. Then, for each detected regions, an invariant feature vector representation (i.e., descriptor) for image data around the detected key point is built. Feature descriptors extricated from the image can be based on second-order statistics, parametric models, coefficients obtained from an image transform.

D. CLASSIFICATION

SVM

Support vector machines (SVMs, conjointly support vector networks) square measure supervised learning models with associated learning algorithms that analyze information used for classification and multivariate analysis. Given a collection of coaching examples, every marked as happiness to 1 or the opposite of 2 classes, associate SVM coaching algorithmic rule builds a model that assigns new examples to one class or the opposite, creating it a non-probabilistic binary linear classifier (although strategies like Platt scaling exist to use SVM during a probabilistic classification setting). An SVM model may be a illustration of the examples as points in house, mapped so the samples of the separate classes square measure divided by a transparent gap that is as wide as possible. For a dataset consisting of options set and labels set, associate SVM classifier builds a model to predict categories for brand new examples. It assigns new example/data points to 1 of the categories. If there square measure solely two categories then it are often known as as a Binary SVM Classifier.

There are two kinds of SVM classifiers:

Linear SVM Classifier

Non-Linear SVM Classifier

Svm Linear Classifier

In the linear classifier model, we tend to assumed that coaching examples premeditated in house. These information points area unit expected to be separated by a visible gap. It predicts a straight hyper plane dividing two categories. The primary focus while drawing the hyper plane is on maximizing the distance from hyper plane to the nearest data point of either class. The drawn hyper plane called as a maximum-margin hyper plane.

SVM Non-Linear Classifier

In the world, our dataset is generally dispersed up to some extent. To solve this problem separation of data into different classes on the basis of a straight linear hyper plane can't be considered a good choice. For this Vapnik suggested creating Non-Linear Classifiers by applying the kernel trick to maximum-margin hyper planes. In Non-Linear SVM Classification, information points premeditated in a very higher dimensional house.

CONCLUSION

Skin cancer is one of the most common type of cancer in both men and women. Due to this large number of people die every year. It specifies that image processing techniques has been used to detect early stage of skin lesions. The Dermoscopic image is first pre-processed, filtered and then segmented. Skin Lesion Classification from Dermoscopic Images can be calculated by using SVM classifier.

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