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MELANOMA SKIN CANCER DETECTION BY USING RASHBERRY PI

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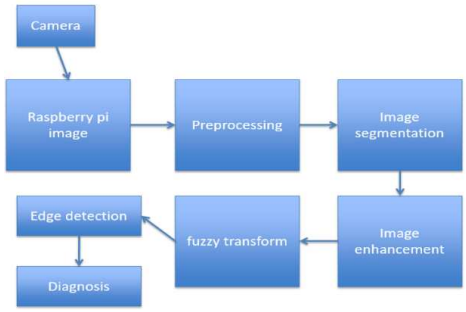
***ABSTRACT*: In recent days, skin cancer is seen as one of the most Hazardous form of the Cancers found in Humans. Skin cancer is found in various types such as Melanoma, Basal and Squamous cell Carcinoma among which Melanoma is the most unpredictable. The detection of Melanoma cancer in early stage can be helpful to cure it. Image processing can play important role in Medical Image Diagnosis and it has been proved by many existing systems. In this paper, we present a Fuzzy method for the detection of Melanoma Skin Cancer using Image Processing tools. The input to the Rassberry pi is i phahkom image and then applying image processing technique , it analyses it to conclude about the presence of skin cancer. The Wavelet tool box and Image processing tool box checks for the various Melanoma parameters Like Asymmetry, Border, Colour, Diameter, accurate location, by texture, size and shape analysis for image segmentation and feature stages. The extracted feature parameters are used to classify the image as Normal skin and Melanoma cancer lesion**.

I INTRODUCATION

As we have noticed that in recent years skin cancer has become common in day to day life.so this paper is based on detection of skin cancer. There are different types of skin cancer they are Melanoma,,Basal and squamous .In this paper Melamona skin cancer is detected by the help of image processing .In this process image is processed into different stages such as image segmentation, image enhancement, preprocessing and FUZZY logic.

Block diagram :



II PREPROCESSING

- Pre-processing of an image means "preparation" of the sample/image to introduce it to an algorithm for specified task : tracking targets , recognition, feature extraction, etc .

- An example, for pattern recognition : you have set of images for testing/recognition process (like face recognition) : the preprocessing is the size adjusting of the considered image, luminance normalization, statistical normalization (all the samples having mean 0 and variance 1), filtering noise with specified filter (Gaussian kernel, median, Kalman filter, low-pass filter ....), conversion to certain class, etc

In some cases, some algorithms may be used for " preprocessing" like the PCA (Principal Component analysis) to reduce the samples' dimensions.

III IMAGE SEGMENTATION

- Splitting and merging attempts to divide an image into uniform regions. The basic representational structure is pyramidal, i.e. a square region of size **m** by **m** at one

level of a pyramid has 4 sub-regions of size $\frac{m}{2}$ by $\frac{m}{2}$ below it in the pyramid. Usually the algorithm starts from the initial assumption that the entire image is a single region, then computes the homogeneity criterion to see if it is TRUE. If FALSE, then the square region is **split** into the four smaller regions. This process is then repeated on each of the sub-regions until no further splitting is necessary. These small square regions are then **merged** if they are similar to give larger irregular regions. The problem (at least from a programming point of view) is that any two regions may be merged if adjacent and if the larger region satisfies the homogeneity criteria, but regions which are adjacent in image space may have different parents or be at different levels (i.e. different in size) in the pyramidal structure. The process terminates when no further merges are possible.

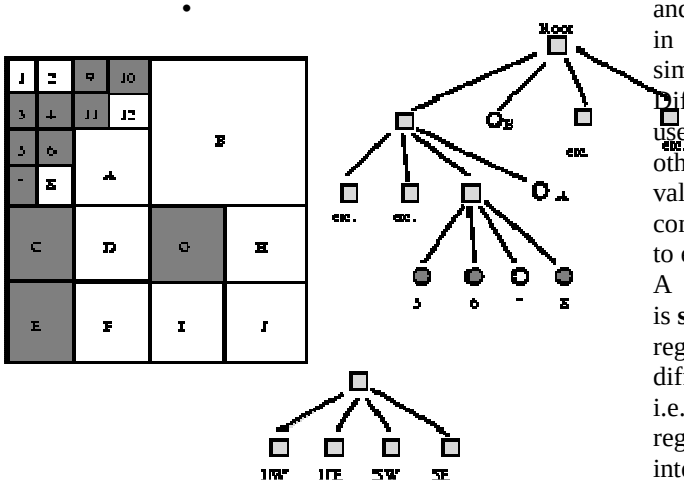


Figure 1: Quad splitting of an image

Although it is common to start with the single region assumption, it is possible to start at an intermediate level, e.g. 16 regions or whatever. In the latter case, it **is** possible that 4 regions may be merged to form a parent region. For simplicity, assume we start with a single region, i.e. the whole image. Then, the process of splitting is simple. A list of current regions to be processed, i.e. regions defined as not homogeneous is maintained. When a region is found to be homogeneous it is removed from the ProcessList and placed on a RegionList.

Algorithm for successive region splitting

Set ProcessList = IMAGE
Repeat
    Extract the first element of ProcessList
    If the region is uniform then add to RegionList
    Else split the region into 4 sub-regions and add these to ProcessList
Until (all regions removed from ProcessList)

Uniformity is determined on the basis of homogeneity of property as in the previous examples. For a grey level image, say, a region is said to be statistically homogeneous if the standard deviation of the intensity less than some threshold value, where the standard deviation is given by,

$$\sigma = \left[\frac{1}{N-1} \sum_{j=1}^{N} (x_j - \bar{x})^2 \right]$$

and $\bar{x}$ is the mean intensity of the N pixels in the region. Whereas splitting is quite simple, merging is more complex. Different algorithms are possible, some use the same test for homogeneity but others use the difference in average values. Generally, pairs of regions are compared, allowing more complex shapes to emerge.

A program in use at Heriot-Watt is **spam** (**sp**lit **a**nd **m**erge) which takes regions a pair at a time and uses the difference of averages to judge similarity, i.e. merge region A with neighbouring region B if the difference in average intensities of A and B is below a threshold.

IV IMAGE ENHANCEMENT

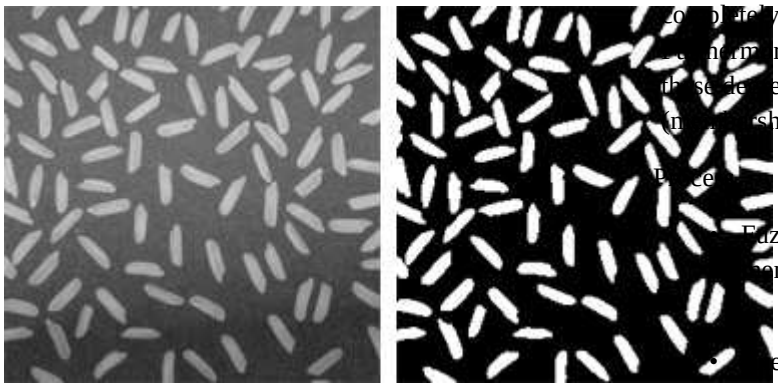
Image enhancement is the process of adjusting digital images so that the results are more suitable for display or further image analysis. For example, you can remove noise, sharpen, or brighten an image, making it easier to identify key features.

Here are some useful examples and methods of image enhancement:

- Filtering with morphological operators
- Histogram equalization

- Noise removal using a Wiener filter
- Linear contrast adjustment
- Median filtering
- Unsharp mask filtering
- Contrast-limited adaptive histogram equalization (CLAHE)
- Decorrelation stretch

The following images illustrate a few of these examples:



Correcting nonuniform illumination with morphological operators.

Enhancing grayscale images with histogram equalization.

Deblurring images using a Wiener filter.

Image enhancement algorithms include deblurring, filtering, and contrast methods. For more information, see Image Processing

V FUZZY LOGIC

Fuzzy logic is a form of many-valued logic in which the truth values of variables may be any real number between 0 and 1. By contrast, in Boolean logic, the truth values of variables may only be the integer values 0 or 1. Fuzzy logic has been employed to handle the concept of partial truth, where the truth value may range between completely true and completely false.[1] Furthermore, when linguistic variables are used, these degrees may be managed by specific membership functions.[2]

- Fuzzify all input values into fuzzy membership functions.
- Execute all applicable rules in the rulebase to compute the fuzzy output functions.
- De-fuzzify the fuzzy output functions to get "crisp" output values.

VI OUTPUT AND RESULT

ORGINAL IMAGE:

OUTPUT IMAGE:

VII REFERENCE

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