SKIN DISEASE DETECTION USING ARTIFICIAL INTELLINGENCE

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Abstract : **A skin disease is a particular kind of illness caused by bacteria or an infection. These diseases like alopecia, ringworm, yeast infection, brown spot, allergies, eczema etc. have various dangerous effects on the skin and keep on spreading over time. It becomes important to identify these diseases at their initial stage to control it from spreading. These diseases are identified by using many technologies such as image processing, data mining, artificial neural network (ANN) etc. Recently, image processing has played a major role in this area of research and has widely used for the detection of skin diseases. Techniques like filtering, segmentation, feature extraction, image pre-processing and edge detection etc. are part of image processing and are used to identify the part affected by disease, the form,, its affected area colour etc.**

Index Terms **- A.I. , Image Processing, Data Mining, Artificial Neural Network (ANN), Filtering, Segmentation, Feature Extraction, Image Detection, Edge Detection.**

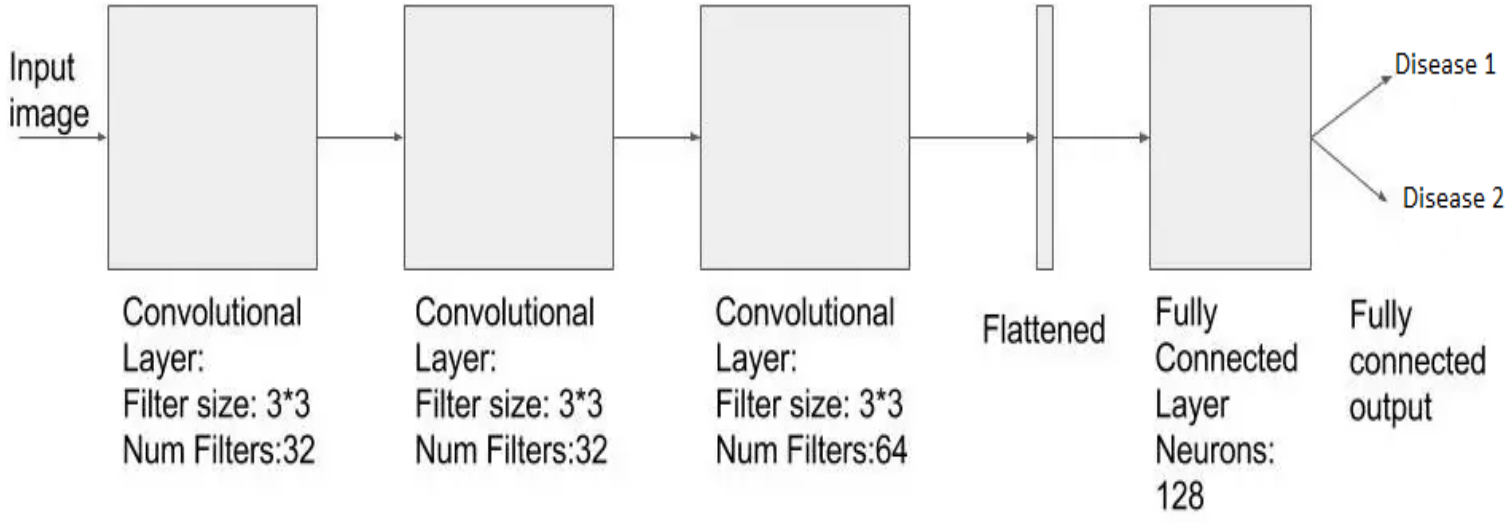
1. INTRODUCTION

The biggest organ of the body is human skin. Bacterial, fungal or other infections produce symptoms like swelling, burning, redness and itching and diseases like acne, alopecia, ringworm, eczema, dermatitis, hives, and other skin problems. Image processing is used to detect these diseases by using various methods like segmentation, filtering, feature extraction etc. To get an improved image or to get meaningful information from an image, it is necessary to convert an image into digital form and then perform functions onto that image. It is a part of signal processing. The input is an image and it may be a video, a photograph and output is also another image having same characteristics as input image. Mostly Image Processing models take input samples as 2-D signals and after that they apply fixed signal processing methods to them.

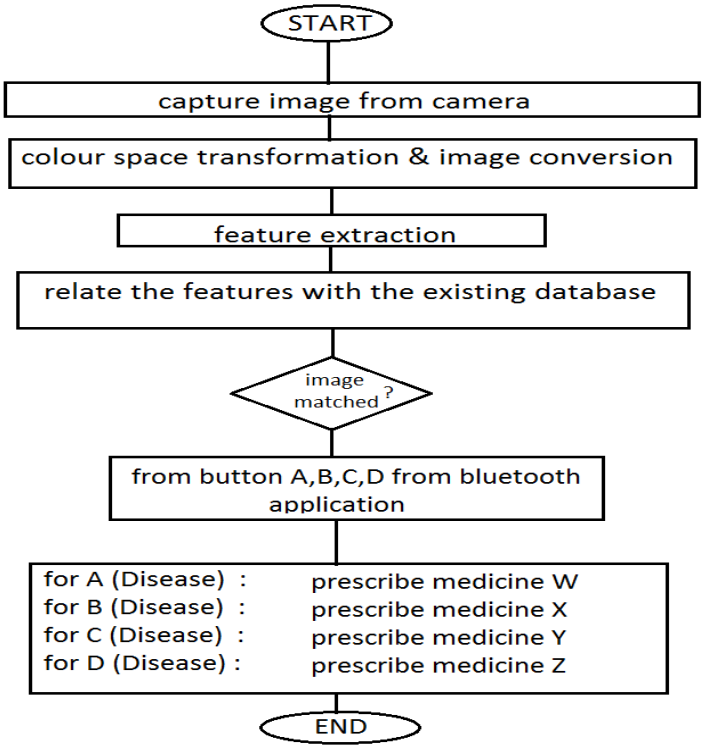
Firstly, take an image, apply filters to remove noise from the image, segment the image to extract meaningful information, feature extraction is done on the basis of input parameters and then classify the diseases by using appropriate classifier. It is an extremely bulky process to predict a disease based on the visual diagnosis of cell type with precision or accuracy, especially when multiple features are associated. If we get the information about the dead skin which is not visible by naked eyes well in time then we can easily prevent the further spreading of disease on the other part of body.

One of the major problems coming in the medical field is that doctors are not able to detect that infected part which is not visible by naked eyes and therefore they only operate the visible infected part of the skin and this may cause a major problem like cancer or psoriasis any dangerous disease in the future. Skin disease classification system is developed and the relationship of the skin disease image across different type of neural network is established. The collected medical images are feed into the system, and using different image processing schemes image properties are enhanced. Useful information can be extracted from these medical images and pass to the classification system for training and testing using Artificial Intelligence for detection of dead skin.

2. BLOCK DIAGRAM



3. FLOWCHART



4. NEURAL NETWORK CLASSIFIER PROCESS:

PRE-REQUISITIES

i) OpenCV: We use openCV to read images of Diseases so you will have to install it.
ii) Shape function:
if you have multi-dimensional Tensor in TF, you can get the shape of it by doing this:

```
a = tf.truncated_normal([16,128,128,3])

sess = tf.Session()
  sess.run(tf.initialize_all_variables())
sess.run(tf.shape(a))
```

output will be: array([16, 128, 128, 3], dtype=int32).

You can reshape this to a new 2D Tensor of shape[16 128*128*3]= [16 49152].

```
b=tf.reshape(a,[16,49152])
sess.run(tf.shape(b))
```

Output: array([16, 49152], dtype=int32)

iii) **Softmax**: is a function that converts K-dimensional vector 'x' containing real values to the same shaped vector of real values in the range of (0,1), whose sum is 1. We shall apply the softmax function to the output of our convolutional neural network in order to, convert the output to the probability for each class.

B. READING INPUTS

Using input images from computer from n number of folders. Typically, input is divided into three parts.

1. Training data: we shall use 80% i.e. 0 images for training.
2. Validation data: 20% images will be used for validation. These images are taken out of training data to calculate accuracy independently during the training process.
3.**Test set**: separate independent data for testing which has around 400 images. Sometimes due to something called **Overfitting;** after training, neural networks start working very well on the training data(and very similar images) i.e. the cost becomes very small, but they fail to work well for other images. For example, if you are training a classifier between dogs and cats and you get training data from someone who takes all images with white backgrounds. It's possible that your network works very well on this validation data-set, but if you try to run it on an image with a cluttered background, it will most likely fail. So, that's why we try to get our test-set from an independent source.

5. INPUT AND OUTPUT IMAGES WITH RESULTS

INPUT IMAGE

A.

OUTPUT IMAGE

6. CONCLUSION

A Computer based skin disease detection system is proposed. The diagnosing methodology uses Digital Image Processing Techniques for the classification of infected skin. The unique features of the enhance images were extracted using HSV histogram and SURF. Based on the features, the images were classified as infected skin and normal skin. This methodology has got good accuracy also. By varying the Image processing techniques and Classifiers, the precision can be improved for this system. Despite having some difficulty, these techniques are very helpful in medical science. The data we have collected will be helpful in medical field to see the clear image of the infected part in the skin as well as that part which are not visible by human eyes.

7. REFERENCES

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