Skin Disease Detection and Classification using Image Processing Algorithm

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Abstract

There are many diseases but the most common disease is kin disease. This disease commonly occurs in people of every age. Since dermatologists are expensive, there is a need of computerized system that uses the image of the patients skin lesions and evaluate the patients based on it. In this paper, we are developing a skin disease detecting of image processing techniques/methods and Neural Network. The proposed system will capture image through a camera and upload it on the computer application. Each image is going through the Pre-processing as well as segmentation. After that Feature extraction is performed. In the predictive modelling application, feature extraction is very essential. Primitive picture features can be shape, colour, structure etc. Finally, feature classification can be done.

1. INTRODUCTION

Skin is a major organ of human body. Skin diseases not only have an effect on the skin but also it affects a person's routine life. It causes a person loose self-confidence, and this leads to depression and even spoil relationships. People of all age group can be affected by skin diseases. In India,2013, there are 15.1 crore people were affected from skin disease. Early diagnosis of melanoma is important for successful treatment. An experienced dermatologist reaches approximately 80% accuracy of diagnoses through visual inspection. In this paper, skin disease diagnosis system is implemented to detect skin diseases by using image processing and deep learning techniques.

1.1. Need and Motivation

- Free Skin Disease Detection
- Improve the speed of diagnosing
- Skin diseases are often misdiagnosed due to lack of experience and knowledge of different skin lesion types

1.2. Existing System

Most of the system we investigated weren't using Neural Network Algorithm to detect Skin Disease.[1][2][3] Other algorithms don't offer the same accuracy as Neural Network.[4][5]

Also, other applications don't provide accurate pre-processing which causes error in detecting disease.

1.3. Proposed System

Our system consists of two parts- the training and the detection.

In training section, the user can train on its custom dataset and choose between available algorithms or can totally ignore it.

Proposed System is shown in figure 1.3.1 and the data flow diagram is depicted in figure 1.3.2. The detection part is the main focus of the user. The application will ask the user for following options-

- Input Image
- Gray Scale
- Pre-processing
- Detect

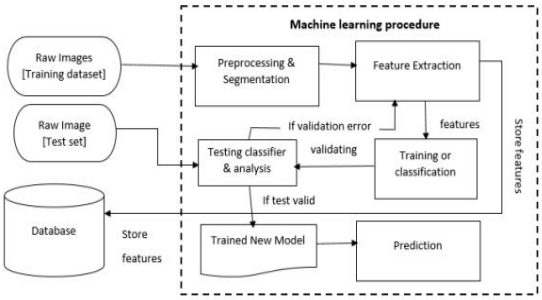

Figure 1.3.1: Proposed System

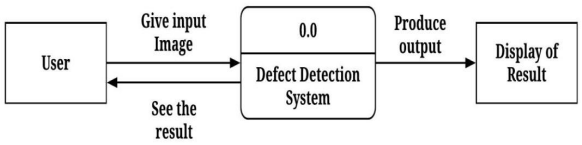

Figure 1.3.2: Data Flow Diagram

- Classify

2. WORKFLOW OF SYSTEM

Our System Workflow have been depicted by the following diagram. The model has already been trained by 460 images to detect 6 diseases.

The user in the system uploads the image of the infected area. The image is then grey scaled and pre-processed to remove the noise and hair in the image if any, to focus on the infected area.

The infected area is then isolated and based on the calculations (Asymmetric Index, Compactness Index, Colour, Diameter) the disease is detected and classified.

3. IMPLEMENTATION

3.1. GUI Main

The user is first provided the home screen with two options- Start and Train. If the user presses 'Start', GUI tab opens and when the user presses 'Train', GUI Admin tab opens.

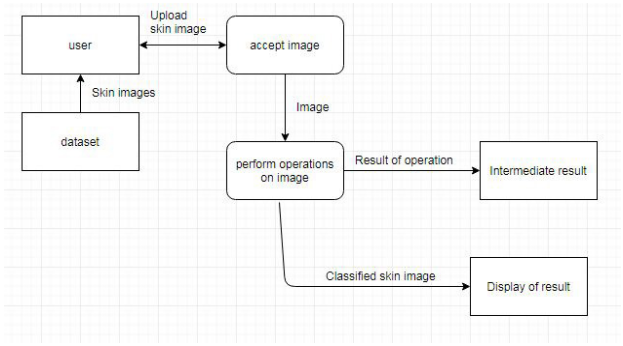

Figure 2.1: Workflow Diagram

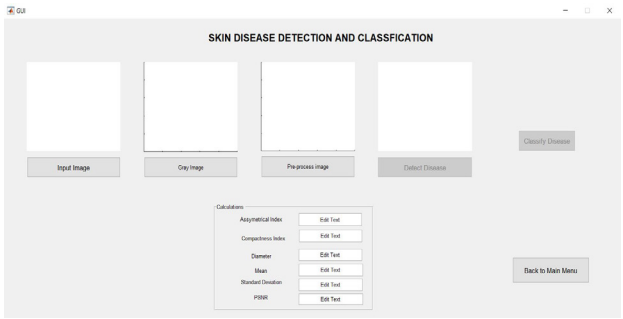

Figure 3.2: GUI

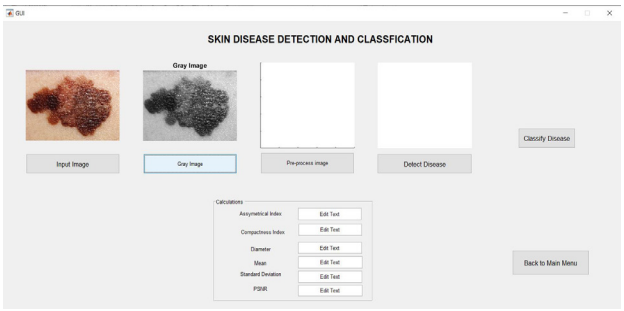

Figure 3.2.2: Grey-Scale

3.2. GUI

In this tab the user is expected to perform 4 steps for detecting the disease. First the user will input clear image of the infected area.

Then the image will be grey scaled and pre-processed. After pre-processing the user will be given option to detect disease. Finally, the user can classify disease by clicking on the 'classify disease' button.

The image is then grey-scaled which means converted from RGB colour scheme to shades of grey so less information is to be processed for each pixel.

3.2.1. Input Image

The user can upload image from local files on his computer by clicking on 'input image' button.

3.2.2. Grey Scale

The image is then grey-scaled which means converted from RGB colour scheme to shades of grey so less information is to be processed for each pixel

3.2.3. Pre-Processing

In pre-processing various functions such as segmentation, High- Pass Filtering, Thresholding are performed on the input image.

Segmentation is the process of partitioning the image into various segments or pixels to help analyse the image better.

In image thresholding the image is partitioned in

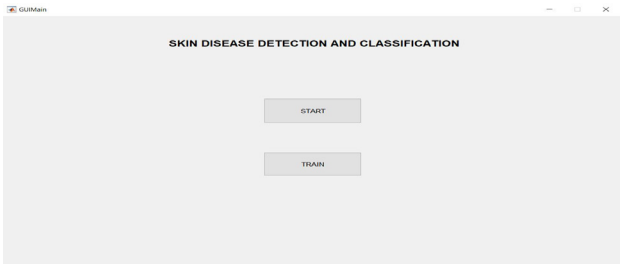

Figure 3.1: GUI Main

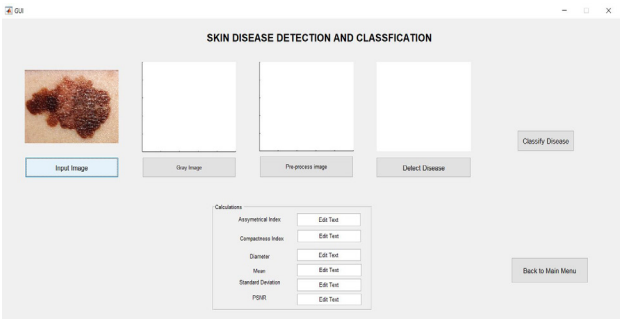

Figure 3.2.1: Input Image

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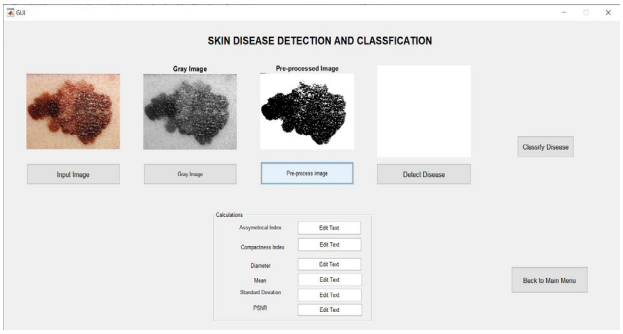

Figure 3.2.3: Pre Processing

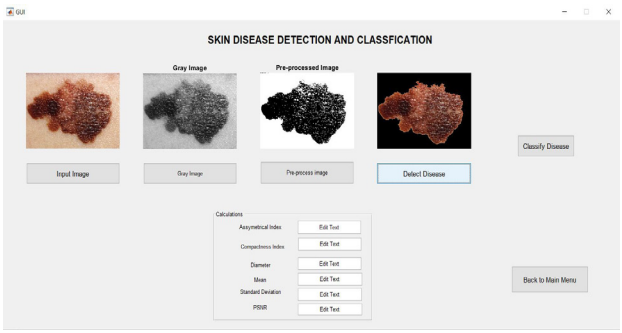

Figure 3.2.4: Detect Disease

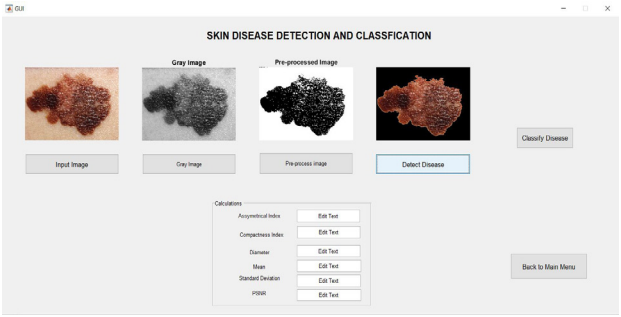

Figure 3.2.5 Classify Disease

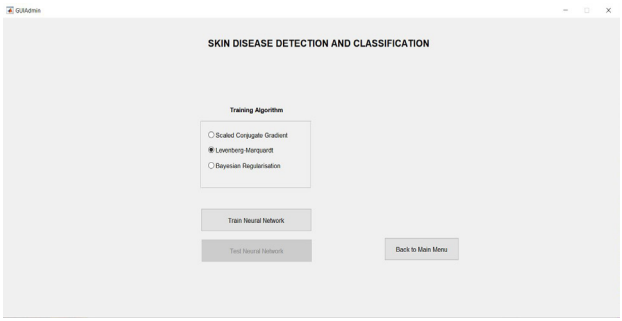

Figure 3.3: GUI Admin

background and foreground.

3.2.4. Detect Disease

Here the disease is detected by analysing the pre-processed image in the previous step. In the end of this step the values for AI, CI, Colour, Diameter are calculated.

3.2.5. Classify Disease

After detection of disease the calculated values are put through Neural Network Algorithm to predict and classify the disease. Finally, the disease is displayed to the user.

3.3. GUI Admin

The user can train the model using custom dataset by provided three algorithms. Or user can ignore this tab as the model is already trained.

The user can train the model and test it to find out the accuracy of the model.

4. CONCLUSION

In this paper, a computerized skin disease diagnosis system is proposed. This system is helping medical society for early skin disease detection. This system is helping the dermatologists to improve the diagnosis time and the accuracy of their involvement. On large datasets this system can be tested in future consisting of a variety of complexities to get better efficiency of the algorithm. Also, with the usage and the demand of the system we can expand the number of diseases which can be recognized by the system into considerable amount.

5. REFERENCES

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