

Automated Detection Of Dermatological Disorder Through Image Processing And Machine Learning

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Abstract : Dermatological disorder is one of the biggest skin related disease due to its highly complex and expensive diagnosis. In case of fatal diseases like Melanoma, Eczema, Psoriasis, etc. the application of automated methods will help in early detection of dermatological diseases through lesion images, a machine intervention. Our model will be designed into three phases, data collection, designing model and finally prediction. We will be using AI algorithm like Convolutional Neural Network (CNN) and will combine it with image processing tools such as grey scaling, blurring, sharpening, reducing the noise and smoothing to form a better structure and accuracy. Disease is predicted as an output.

Keywords: Dermatological disorder, skin disease, early detection, lesion images, Image processing, Machine learning, CNN, better accuracy.

I. Introduction

Skin diseases are one of the most common diseases in humans and its incidence is increasing dramatically. Skin cancer is very common diseases. Therefore, early diagnosing is a crucial issue for patient. However, only experienced doctor is able to classify the skin cancer from other skin diseases. Thus, the computer-based skin cancer detection is necessary to provide recommendation for non-specialized user. It is already known that early finding and treatment of skin cancer can reduce the chances of death of patients. One of the cost-effective detections and analysis of skin disease is Digital Dermoscopy. An automatic medical images analysis system has usually three stages: (1) Proper Enhancement, (2) feature extraction and selection (3) Classification.

II. System Analysis

a. Present System

Today, people go to dermatologist for skin disease which is quite expensive. And it is also difficult to find dermatologist in rural areas. Skin disease if not cured in early stage might lead to cancer. Hence, it is important to cure skin disease as early as possible.

b. Proposed System

As we all know, it is difficult to find the dermatologist in rural areas and even in urban areas dermatologists are quite expensive. Hence, we have proposed a system where a user will just have to upload the image of the affected area of the skin and then the user will get the result whether a skin disease is detected or not. By using Image processing techniques and Machine learning algorithm like CNN the accuracy of the system is quite high even better than dermatologists. Identifying the dermatological disease in early stage due to unavailability of Dermatologists, is one of the most difficult challenge faced in rural areas and also to the one's in urban areas who cannot afford costly Dermatologists. To overcome these challenges, we are developing a model which will take the input in the form of image. After converting it into array, it will be fed into trained model. Further it will be broken down to corresponding features, and then the disease will be predicted by this model.

III. Methodology

The process starts with giving the image of disease as an input. Image Processing part of our project will start it's working. It will fetch the features of the input image and will store the results in matrix form.

The trained model of machine learning will fetch these features and will give best matched image as an output provided by the disease name. So, the patient will be able to cure disease at the early stage.

IV. Implementation

Our project is divided into two parts: 1. Image Analysis, 2. Machine Learning.

First various images of skin disease are collected and divided into four major skin disease types. Each type has its own features that are needed at the time of skin detection. These images are converted into matrix and these values are stored. Features are extracted using watershed algorithm and various image processing techniques such as erode, dilution. In order to extract more features from images, these images are converted into grayscale. This will increase depth of the image colors.

Further, data is divided into 3:1 ratio. i.e. 3 part will be training data and 1 will be testing data. Convolutional Neural Network (CNN) algorithm is one of the main categories to do image recognition and Image Classification. CNN image classification takes an input image, process it and classify it under skin disease categories. CNN use relatively little pre-processing compared to another image classification algorithm. At the end, the disease will be detected as the output of the whole process.

V. 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 techniques like HSV and Watershed algorithm for Image Segmentation. 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.

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