

Skin Disease Recognition Using Texture Analysis

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Abstract

Dermatology using texture analysis is a method that analyzes and detects skin diseases only from images, so people who live in remote areas or have limited mobility can easily cure these skin problems. The detection of skin diseases is mainly based on the doctor's experience and the time-consuming results of skin biopsy. This method is mobile-based, so it is affordable even in remote areas and is non-invasive to the patient's skin. The proposed system is very useful in rural areas where access by dermatologists is limited. Help patients and dermatologists determine the type of disease based on the pictures of the affected area at the initial stage of the skin disease. These results indicate that the proposed system can help general practitioners effectively and efficiently diagnose skin conditions, thereby reducing further complications, Condition and morbidity.

Keywords- Skin disease, Classification by Neural Network (NN).

I. Introduction

Today, human beings be afflicted by pores and skin illnesses, greater than a hundred twenty five million

human beings be afflicted by psoriasis, and withinside the beyond few decades, the pores and skin can develop rapidly, particularly melanoma, that's the maximum numerous pores and skin cancer. The occurrence of dermatophytes is high, particularly in rural areas. Early pores and skin illnesses may be avoided with the aid of using checking the inflamed location early and its severity Skin tone and pores and skin tone play an essential position in figuring out pores and skin conditions. The shadeation and roughness of the pores and skin are visually one-of-a-kind. Automatic processing of such photos for pores and skin evaluation calls for a quantitative discriminator to differentiate illnesses.

The proposed machine is a mixed version for prevention. And early detection of pores and skin cancer, psoriasis and dermatophytosis. Basically, the prognosis of pores and skin illnesses relies upon on numerous characteristics, including shadeation, shape, texture, etc. There isn't any any universally widely wide-spread remedy for pores and skin illnesses. Different medical doctors deal with the identical signs in one-of-a-kind ways. The remedy of pores and skin illnesses is early detection, that's a dependable extra remedy for early detection. In this document, the proposed machine is used to without problems diagnose numerous kinds with the aid of using studying statistical parameters. Statistical evaluation offers with the evaluation of random statistics. The random date is a pores and skin sample. disorder Use a preferred database. These statistics haven't any mathematical expressions, they've positive statistical properties. To examine random statistics, we want to investigate its statistical properties. With the development of the present day generation, a huge quantity of clinical statistics is generated each day, which includes precious and essential data approximately the patient. Image-primarily based totally synthetic intelligence is turning into increasingly more famous in treating positive clinical conditions (particularly pores and skin conditions). The diagnostic accuracy of a pc machine in large part relies upon on the selection of suitable functions, the supply of the classifier and statistics set used,

and the range of photos on which the version is trained.

Convolutional Neural Networks (CNN) are normally used for sample popularity and category tasks. To higher recognize the one-of-a-kind paintings of researchers, we reviewed one-of-a-kind techniques of classifying pores and skin illnesses. This article is split into 4 parts. Present preceding knowledge; the character of imaging and the usage of conventional and deep getting to know techniques to categorise pores and skin illnesses. The 1/3 element summarizes the conventional orcharacteristic extraction generation and CNN-primarily based totally pores and skin disorder remedy techniques, Identification and category. The fourth phase introduces the evaluation and outcomes of conventional techniques and CNN primarily based totally techniques, and the 5th phase introduces the conclusions.

Objective and scope of project-

The project aims to create a web-based platform for predicting disease outbreaks based on various symptoms. Users can select different symptoms and search for diseases by their probability numbers.

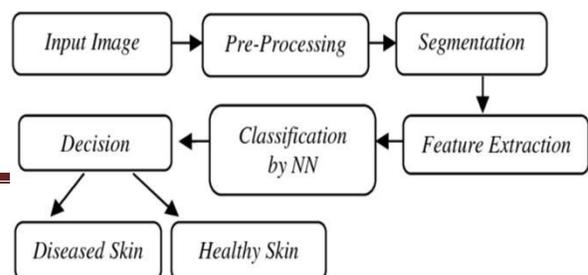
- Develop a web interface platform for disease prediction.
- It is not recommended to use drugs for this disease.
- No medical history was considered.
- Implement a naive Bayes classifier that classifies diseases based on input.

II. Literature Review

There is a research about bag of features in which researchers bring SURF (Speeded UP Robust Feature) inside for improving efficiency of feature extraction, image recognition and classification. The researchers also used SPM to provide higher accuracy. Moreover, LIB-SVM was used for classification of codebook of histogram [5].

In [3] the researchers talk about speeded up robust features (SURF) that is a fast method having high accuracy because of combining steps of matching with novel detection for object recognition.

In [6] researchers develop an automated system to



detect disordered parts in a face. The researchers based on results conclude that digital images are sufficient for detection of abnormal parts [6].

Some study regarding skin diseases in children shows that most of experts working in clinic need to know the history of patients beside examination, since describing the findings is an essential aspect in clinical assessment [2].

There are also certain disadvantages of the current image processing techniques used for skin disease detection. The main problem with the median filter is its high computational cost. Also, the software implementation of median filter does not provide accurate results [4]. The issue with sharpening filter is that when a high pass mask is applied to the image, there are negative pixel values in the output image.

The current practices used by dermatologists include biopsy, scrapings, diascopy, patch testing and prick Test which are invasive methods of detection. In patch testing and prick test, the allergen is directly applied to the infected area. The skin might take a long time even several days to react to the allergen [1].

The KNN models are not appropriate to use with larger-size data models, as it may take a significant time in performing the predictions of the outcome. In addition, the model performs poorly when working with high dimensional data with inappropriate feature information, which might impact the performance of the model in accurate predictions [8], which has made the model inappropriate for the skin disease classification.

The image is classified based on intensity though a statistical approach, namely Gray Level Co-occurrence Matrix (GLCM) extracts the features that appear in the acquired image, usually the textured-based parameters [9].

K-Nearest Neighbor (KNN) [7] is the predominantly used classification model widely used in forecasting and predictive models. The models do not need training of the model. Moreover, the accuracy of the KNN model is considerably high.

This section introduces a systematic method for identifying, extracting and classifying skin diseases. This system helps to detect melanoma, eczema and psoriasis. The structure of the whole system can be divided into several modules, including preprocessing, extraction and classification.

Fig. 1: Block Diagram of Skin Disease Classification System

1. Input Acquisition:

Image acquisition in image processing is step one within the workflow sequence. Where the entered photographs are acquired both by taking pictures of the photo through a digital camera or by downloading the photo immediately from the database. Further processing isn't feasible if there is no photo.

2. Preprocessing-

Use preprocessing techniques to remove unnecessary distortion from photo statistics. The photo length will be scaled to a single 360X360 ratio to get the correct feature class result. Then convert the photo from RGB to grayscale. Achieve higher photographic quality. The hair and various pigments in the pattern can be removed through the filter medium. For example, in order to achieve the overall performance of the skin and pore detection system, some serious problems must be overcome. Create basic statistics and standardize images. The next section will explain how to resize photos.

3. Segmentation-

The process of dividing a virtual photo into multiple segments is called segmentation. This step is necessary to simplify the photo and make it difficult to identify and analyze. The segmentation method is especially aimed at affected pores and affected skin. Segmentation uses threshold entropy method.



Fig.2.Example of Original image of Psoriasis Database

III. Proposed Methodology



Fig.3.Example of resizing image of Psoriasis Database

4. Feature extraction-

The first is a convolutional network. (CNN) is a collection of composite layers containing linear and non-linear processes. These layers are tested together. The basic building blocks of many CNN models are: a convolutional layer, a grouping layer, a rectified nonlinear linear unit (ReLU) layer connected to a general multi-layer neural network called a fully connected layer, and a lossy layer on the back. CNN is known for its high performance in image processing tasks and natural language processing applications. Feature extraction is used to identify input patterns. This is a very difficult step and highly depends on the performance of the classifier. Co-occurrence matrix (GLCM) is used for feature extraction in texture analysis. Property i.1) Energy: Returns the sum of the squares of the elements in the GLCM. For a constant energy image, the range is from 0 to 1 to 1.2) Correlation: For a positively correlated image, the range is negative 1 to 1 3) Contrast: In the entire image, The intensity contrast between a pixel and its neighboring pixels has the same meaning. 4) Homogeneity: measure the closeness of the element distribution in the GLCM to the diagonal GLCM. The value range is 0 to 1. GLCM diagonal, uniformity -1.

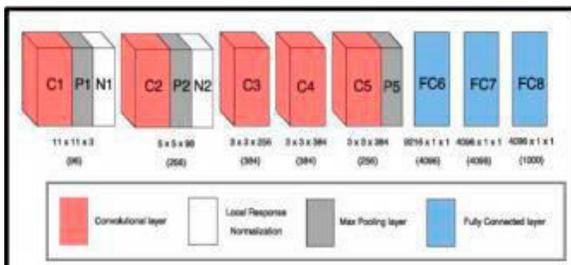


Fig.4. Alex Net block diagram

Alex Net is a detailed CNN model developed by Krizhevskiyetal, used to model 2012 Image Net, used to solve the main visual recognition problem (ILSVRC 2012). Alex Net is composed of five layers of folds; in which a ReLU line layer is added after each convolutional layer. In addition, the first, second, and fifth layers contain the largest grouping layer, as shown in Figure 2. In addition, the two normalization layers after the first and second convolutional layers overlap. Plus two fully connected layers on the model, followed by a smooth top layer. Alex Net received training on 1.2 million images in more than 1,000 categories. We recommend extracting features from pre-trained convolutional neural networks. Because this is the easiest and most reliable way to use pre-built deep learning network functions.

5. Classification-

Classification is a computer vision technology. After feature extraction, the classification task is to use Support Vector Machine (SVM) to classify the image. If SVM makes more use of the functions extracted from the training set, a course can be trained. ...Segment sizes are sorted. In this system, it basically consists of three levels: input level, hidden level and output level. Here, the black propagation algorithm (BPN) for the classifier is used for training. The hidden level and output level adjust the value of the weight. The various features are classified based on inference errors. In the BPN algorithm, the signal flow is positive. Every time the output signal is compared with the desired output, if the output signal does not match the output signal generated by the network, an error signal will be generated. The error signal propagates back to the input layer, and the weights in the hidden layer are adjusted so that the error signal is the same. At the beginning of training, the entry layer and hidden layer are randomly initialized during the BPN algorithm. This process continues until the error reaches zero.

IV. Result



Fig.6 output after training of old dataset (12000 images)

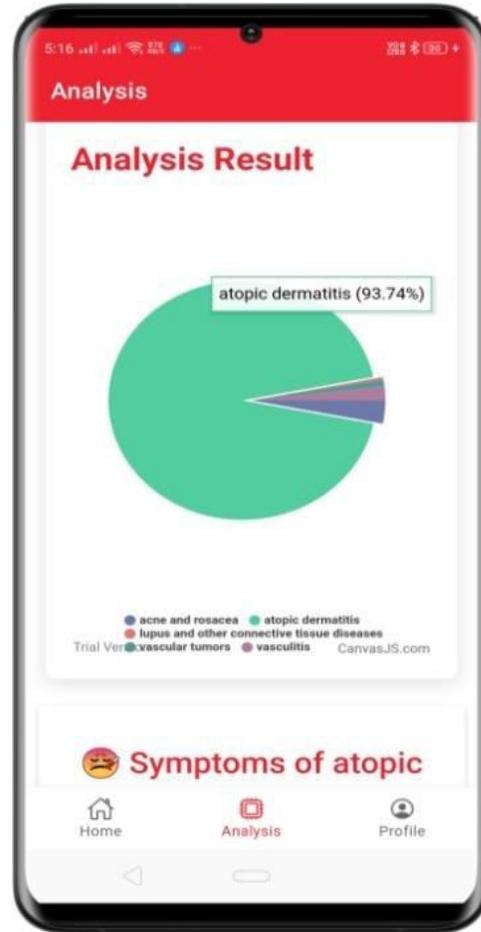


Fig.7 Analysis result



Fig.6 Analysis result

V. Conclusion

The skin disease recognition using texture analyses can be determined using neural system determination of skin illness and can be achieved through the various steps like image acquisition, feature extraction, classification, very much characterized division and arrangement method. Using back propagation algorithm, we can diagnosis the multiple skin diseases as well as classify skin disease. The numerous images are recorded and determination of skin diseases is using texture analysis. The collected skin disease images are set together gives practical, less demanding and quicker finding for understandable ranges. These helps in identifying the disease earlier and patient can be treated immediately. This also enhance the general productivity and also reduces the computational time.

VI. References

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