

Deep Learning Based Psoriasis Detection Using Texture Features and Skin Color

^[1] Sapna.N, ^[2] Thejaswini.B.M
^[1] PG Student, ^[2] Assistant Professor
^[1] VLSI and Embedded Systems,
^{[1][2]} Bangalore Institute of Technology, Bengaluru, INDIA

Abstract: - Dermatological field is the significant barony of prescription where it is concerned with the analysis and medication of skin disorders Psoriasis is one of most commonly affected auto immune disease which will affect their Tlymphocytes (human major immune system hormone). Various current methods are used to detect the brutality of psoriasis disease. Psoriasis Area and brutality index is presently a standard way. The evolution of a robotic psoriasis disease diagnosing system considers the image of an input which is infected on the patient skin that predicts the disease. The System additionally utilizes twofold approach, for example, acknowledgment and expectation, which viably combines Image preparing and Machine Learning strategies like CNN calculation.

Keywords: Node MCU, SVM, TCM, CNN.

INTRODUCTION

Psoriasis was extrapolated from the Greek word psora means itch. Psoriasis is an enduring autoimmune disease characterized by typical symptoms on abnormal skin. The symptoms are redness, irritated and scaly patches of skin. The external factors that can affect disease is alcohol, smoking, sunburn. Most of people suffering from psoriasis disease have accompanied by other serious health condition such as diabetes, Heart disease and Depression sometimes causes rheumatoid arthritis. Detection of psoriasis disease using machine learning algorithms and image processing. At the beginning I used to train the system with the specified dataset through Convolutional Neural Network .By using Image processing techniques such as Smoothing, Feature Extraction. They obtain the affected part of the skin by using Feature Extraction method. They extract the required part from that image and by using SVM (Support Vector Machine). They classify their data into four parts or four stages and by using TCM and Zheng classification, Phototherapy. They provide the specific medication for specified stage of the disease. Even through the hyperspectral imaging process they detect the complexity and spreading nature of the disease in skin layer. Then based on the layer medication can be provided.

LITERATURE SURVEY

R. S. ShiyamSundar et al. [1] Proposes Multiclass support vector machine (MSVM) for the detection of psoriasis skin

disease. This method is used for the learning of each stage of which having the training samples. This algorithm identifies the color and texture features such as gradient, contrast, edges are extracted. The proposed system contains an all five types of Psoriasis image database for testing and classification purposes.

P. B. Manoorkar et al. [2] proposes a skin disease detection through virtual inspection using biopsy and pathological examination. Visual inspection method is used for diagnosis if the appearance lesion is doubtful but all malignant lesions are not able to identify through visual inspection. There are no tools that is accepted by physician to find the skin disease immediately in the clinic. Most of the visual inspection method could help to prevent misdiagnosis of skin diseases.

AlaaHaddad et al. [3] Proposes to detect the skin affected by disease and also to analyze the affected skin image using filter to remove the unwanted noise in the image, filtered image is then converted to grey which is used for preprocessing and get the useful information. Any type of skin disease can be illustrated in the emergency orientation by using grey scale image. Analyzed result can support the doctor to know the type of disease in initial stage to diagnoses. That avoids side effects of the skin.

Monika Das et al. [4] Proposes to enhance the quality of the image and extracting the skin disease features with a series of image processing techniques which is used to predicts the disease skin image by virtue of their texture values calculated with numerical approach and chart diagram analysis.

ZijianGuo et al. [5] propose an SD-198-P is a set of data, in

which having the information with a more accurate in the SD-198. This dataset is used to suggest the generation of the features of deep visual. This experiment shows the accuracy of the information and deep visual performance features which is better than that of hand-crafted features.

PROPOSED METHDOLOGY

In this proposed system a dataset of affected skin image is collected, that image is preprocessed by using CNN algorithm, in which it classifies under certain category. Convolution neural network consist of 4 layers : Convolution layer perform the scanning of the image of 5x5 matrix patterns and results in the form of a 3x3 matrix. Relu layer main objective is to rejects the negative values obtained by convolution layer and allows only the positive value. Max pooling layer compares the value in the relative matrix region and gives maximum value. Final layer is fully connected layer a feed forward neural network which is the output from the max pooling layer which is flattened and then fed into the fully connected layer.

Image Collection:

In this proposed system the input images which is collected are infected, all the input images are examined by dermatoscope. Dermatoscope is basically an enlarger which is used to capture the images of skin lesions.

Image Preprocessing:

The pre-processing reduces the unwanted distortion from the image and enhancing the features of the image for further processing the images. The objective of Preprocessing is to improve the image quality and data. Preprocessing of the image process includes some important things: converting to gray scale, removal of noise, enhancement of image.

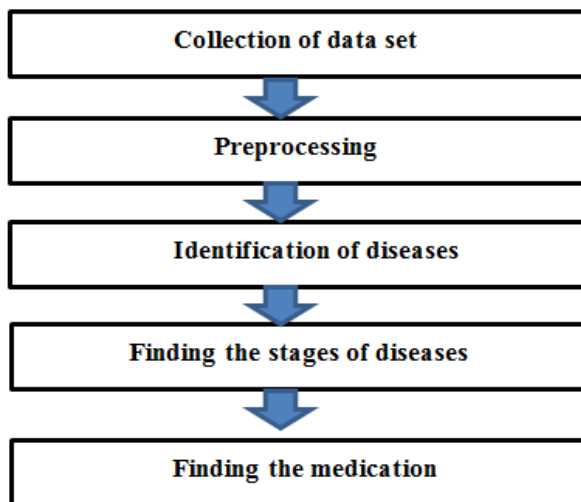


Figure 1: Block diagram

Image Segmentation

The main goal of segmentation is to segment the lesion

from the surrounding skin. It gives the clear identification between the normal skin and the lesion skin.

Feature Extraction:

Feature extraction main role is to extracting information present in given image.

- Contrast
 $\sum_i \sum_j (i - j)^2 C(i, j)$
- Energy
 $\sum_i \sum_j C^2(i, j)$
- Homogeneity
 $\sum_i \sum_j \frac{C(i, j)}{1 + |i - j|}$

The feature extraction is used to smoothing the original image by measuring certain image values. This feature extraction helps us to classify images from one another.

Training:

Create training dataset from images of known Psoriasis types. Train classifiers on the created training dataset. Create testing dataset in temporary folder. Predict results from the test cases. Plot classifiers graphs. Add feature-sets to test case file, to make machine learning models more accurate.

Image Classification:

Support vector machine (SVM) is classified based on binary values using the hyper-plane in which it is also called as decision boundary between two classes. SVM are used to detect the problems such as pattern recognition and classification of texture images. SVM provides a good mapping of non-linear to the linear input data.

Node-MCU

Node-MCU is firmware development kit which is open-source for all user and that helps us to minimize the script lines.. Real time data can be stored using node-MCU. In this proposed method Node-MCU is used to the access the C program using Aurdino IDE.

LCD DISPLAY

LCD (Liquid Crystal Display) is a level board show in its essential type of activity which utilizes fluid gems. LEDs have a differing set of utilization and enormous cases for organizations and buyers, as they can be normally found in TVs, PC screens, cell phones and instrument boards.

RESULTS

The experiment is the identification of skin disease and its stages using convolution neural network algorithm. In this based on the affected skin accuracy it detects the disease and its stages can be predicted using the percentage of area affected on the skin. The basic remedies can also be suggested for the diseases. Using Node MCU and Aurdino IDE the detected psoriasis skin diseases is displayed on LCD

Display.



Figure 1: Identified Diseases and its stage with basic remedies

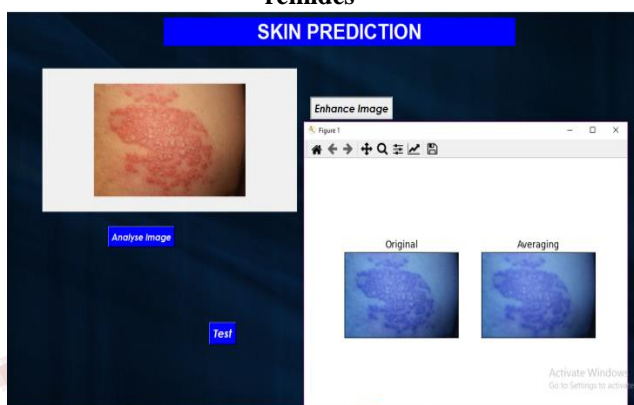


Figure 2: Enhanced Image

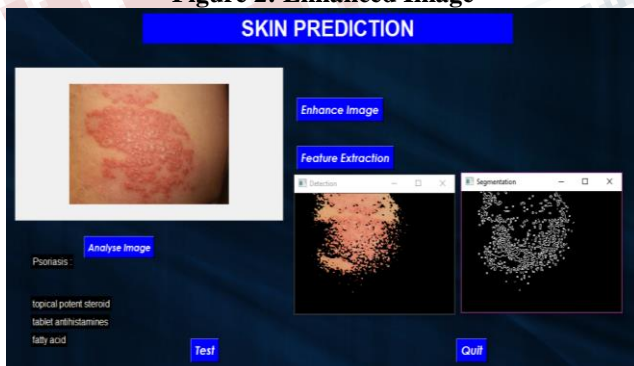


Figure 3: Feature Extracted and Segmented Image



Figure 4: Predicted Diseases is displayed on LCD

CONCLUSION

In their paper they recognize Psoriasis (A Skin Disease) with more noteworthy exactness and propose the fix at each stage identified. The location of illness is finished by utilizing indicated AI calculations and picture handling strategies, for example, include extraction and epitome enhancement.

- 1) The Digital Image Processing Techniques was used for the classification of infected skin.
- 2) These techniques are very helpful in medical science. in which having some difficulty to Despite.
- 3) Prediction of skin Disease (Psoriasis) and stages with greater accuracy.
- 4) Predicted skin disease is displayed on LCD Display.

FUTURE SCOPE

CNN Algorithm is more prominent use in the field of medicinal science. This lessens the time and cost of discovery and arrangement of the malady with higher conceivable precision.

REFERENCE

- [1] Nikhil Garg, Soumya Stheirav and Yasha Hasija, "Automated Detection of Dermatological Disorders through Image-Processing and Machine Learning", IEEE Xplore Compliant - Part Number: CFP17M19-ART, ISBN:978-1-5386-1959-9.
- [2] Ajit Singh, Sunnel Kumar, "Image Processing for recognition of skin diseases, International Jtheirnal of Computer Applications-2016".
- [3] Himanshu Kumar, Lakshay Bajaj, Yasha Hasija "Automated System for Prediction of Skin Disease using Image Processing and Machine Learning" in International Jtheirnal of Computer Applications (0975 – 88857) Volume 180 – No.119, February 2018.
- [4] Juan Lu*, Jonathan H. Manton, Ed Kazmierczak, and

Rodney Sinclair “Automatic Segmentation of Scaling in 2-D Psoriasis Skin Images” in IEEE Transactions on Medical Imaging, Vol. 32, No. 4, April 2013.

[5] Christian Ludwigs and Simon Schafer ,“Skin Disease Classification Using Convolutional Neural Networks”, WHO-2018.

