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Skin Diseases Detection Using Convolutional Neural Network

Sanket Jori[1], Rohit Sarmalkar[2], Gayatri Shinde[3] , Sonali Khairnar[4],

[1-3]*Student, Dept. of Computer Engineering, ISB&M College of Engineering, Pune, India*
[4]*Professor,* Dept. of Computer Engineering, ISB&M College of Engineering, Pune, India

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Abstract - *Skin is the most important organ in the human body. Our skin acts as a shield to protect our internal organs to get damaged. But this part of the human body can be affected by some infections like fungus or viruses or even dust too. All over the world, millions of people suffer from various skin diseases. From acne problems to eczema people suffer a lot.For that proper diagnosis can reduce the miseries of the people suffering. In this paper, we have tried to develop a prototype to detect skin diseases using Convolutional neural networks.*

***Key Words*: Skin disease, Neural networks, image**

1.INTRODUCTION

Skin is a part of our body that protects our internal organs like kidneys, heart, liver, and other sensitive organs from the outside environment. Skin produces various vitamins the vital one is vitamin D. If this part of our skin gets infected then that became the worst. Around the world, we have various types of weather environment, different type of weather conditions, humidity, food habit they can directly or indirectly affect our skin. Skin can be affected by fungus and cause different kinds of fungal infections. Suffering from skin issues is common in our day-to-day life as we have to spend a long time outside under the sun or in the pollution that causes sweat which is a house of bacteria that creates a bad smell along with some skin problems.

So to treat our skin first we need to identify the disease. Here we have used CNN(Convolutional Neural Networks) rather than image processing. We developed a web application to detect skin disease. we have made a classifier prototype that will give the class of skin disease by analyzing an image and matching the image from its previous training data to produce maximum accuracy. To detect skin disease users have to take a photo of the affected area of their skin and have to transfer that photo to the application then the application will answer the disease name.

2. LITRATURE REVIEW

1. Paper Name: Edge Detection in Dermascopic Images by Linear Structuring Element
Author: Sudhriti Sengupta, Neetu Mittal

Abstract: Skin lesions are the abnormal portion in the skin which are hard to recognize. These abnormalities are generally due to different colors, textures, or shapes. Skin lesions are indicators of some disease... Automated skin lesion analysis will help the medical practitioners for timely and correct diagnosis and treatment of the disease. In this paper, edge detection for skin lesion detection is proposed. Dilation of a linear structure of a specific dimension is used for enhancing the edges of the skin lesions. This results in better segmentation of the dermatoscopic image.

Method: Edge Detection

Concept: The main objective of edge detection is to find the boundaries of the objects present in the image. this technique works by detecting discontinuities in brightness. Some of the commonly used edge detection techniques are Sobel, Prewitt, Roberts, Laplacian of Gaussian, and Canny, etc. A Sobel edge detection operator is applied to the test image to obtain the border of the lesions present in the skin.

2. Paper Name: Skin Disease detection based on different Segmentation Techniques
Author Name: Kyamelia Roy, Sheli Sinha Chaudhuri, Sanjana Ghosh, Proggya Chakraborty

Abstract: The outer part of the human body is skin. The skin pigmentation of human beings varies from person to person and it can be dry, oily, or combination. If the symptoms of skin diseases such as acne, dermatomyositis, candidiasis, ringworm,

eczema, psoriasis, etc. are left untreated in its early stage then its dangerous for the persons health.

Method Name: K-means Clustering

Concept: In K-means clustering a set of data points and a set of centers are considered in the image. Using the elbow method 4 cluster points are considered randomly from the image. The distances between each data point and cluster centers are recorded. Each time different set of data points are considered and the distances are measured.While comparing the different segmentation process, the swollen region is not efficiently detected using other segmentation processes

3. Paper Name: Skin Disease Analysis using Digital Image processing
Author: Ma. Christina R. Navarro,Edward Bustillos, Davood Pour Yousefian Barfeh

Abstract: This study is focused on the detection and classification of skin diseases with the use of the Improved Bag of Features Algorithm. The needed data for this study are the sample images taken from a user of Acne and Boil both as training datasets and test data. Training and test data will be used in the process of skin disease detection and classification using the Bag of Features Algorithm.

Method: Improved Bag of Features Algorithm

Concept: Bag of Features detects features that consist of images, objects, scenes, texts, and visual words while the Bag of Words was made for detecting frequencies of words in a string. This algorithm extracts features of an object and stores them into a visual dictionary and making visual words by using the SURF algorithm.

4. Paper Name: Skin surface detection in 3D optoacoustic mesoscopy based on dynamic programming
Author Name: Suhanyaa Nitkunanantharajah, Guillaume Zahnd, Malini Olivo, Nassir Navab, Pouyan Mohajerani

Abstract: Optoacoustic mesoscopy offers unique capabilities in skin imaging and resolves skin features associated with detection, diagnosis and management of disease. first step in the quantitative analysis of clinical optoacoustic images is to identify the skin surface in a rapid, reliable and automated manner.

Method: Raster Scan Optoacoustic Mesoscopy (RSOM)

Concept: RSOM depicts very fine anatomical structures such as microvasculature in superficial tissue and is therefore particularly suitable for dermatological applications. Those applications mostly either require a flattened skin surface in the image or knowledge of the exact skin location. Such an approach will enable automated analysis of large amounts of RSOM volumes and facilitate the usage of RSOM for several dermatological applications.

5. Paper Name: Progressive Transfer Learning and Adversarial Domain Adaptation for Cross-Domain Skin Disease Classification
Author: Yanyang Gu, Zongyuan Ge, C. Paul Bonnington, and Jun Zhou

Abstract: Most of the time Deep learning has been used to analyze and diagnose skin diseases. But the study shows that a well-trained deep learning model may not generalize well to data from different cohorts due to domain shift. Some data techniques such as combining disease samples from different data sources are not effective to solve this problem. So in this paper, two methods for a novel task of cross-domain skin disease recognition are used.

Method: Transfer learning

Concept: Transfer learning is a very effective concept. A narrow scope of transfer learning was exploited in the early stage of deep learning, in that unsupervised pre-train of representations were transferred to facilitate prediction. In many deep learning applications without sufficient training data, the shallow layers of the pre-trained model are kept to retain the generalized transferable knowledge.

3. SYSTEM ARCHITECTURE

In this system we used CNN over image classification. To detect skin disease user have to upload an image of infected area of skin. Then disease analysis done by matching that image with previous trained

dataset. Here we used the dermnet dataset and some images of most common diseases are collected from the internet.

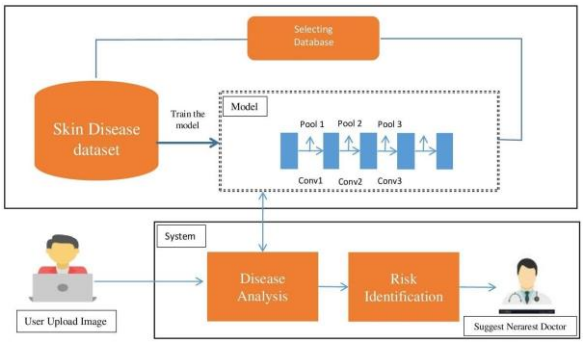

Fig -1: System Architecture

After that risk level of disease is identified on basis of detected skin disease and the information given from user about their illness like how long the user suffering from illness, its condition like itching, redness, rashes etc. System also suggest nearest doctor in case of high risk level.

4. DIAGRAM

Fig -2: Flow Diagram

5. CONCLUSION

This system has been successfully implemented for detection of skin disease at early stage. So the user/patient will cure the disease before it gets dangerous. Our classifier can accurately classify 70% of skin diseases. Our classifier can accurately classify 70% of skin diseases. Result accuracy will increase with image quality and by adding more images to dataset.

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