Skin Disease Detection Using Deep Learning

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ABSTRACT: Dermatology is one of the most unpredictable and difficult terrains to diagnose due to its complexity. In most development countries, it is expensive for large number of people. According to World Health Organization (WHO), skin diseases are most the common non-communicable diseases in India. The ubiquitous use of smartphone in developing countries like India has opened new avenues for inexpensive diagnosis of diseases. The camera in smartphones can uses to exploit the image processing capabilities of the device for diagnosis. The proposed system deals with the creation of an application that helps in diagnosis of Skin disease. It uses image processing and machine learning technology to detect diseases. The system consists of two parts- image processing and machine learning. The image processing part deal with applying various filters to the image to remove noise and make them uniform. It is necessary to remove the unwanted elements from the image before processing else it will affect the output efficiency. The machine learning part deals with the processing of data and generation of result.

1.INTRODUCTION

Now a day's skin disease is major problem human beings are facing, to recognize skin disease new methodology for the diagnosing skin cancer by images of dermatologic spots using image processing presented. Currently in skin cancer one the most frequent diseases humans. This methodology-based Fourier spectral analysis using filters such classic, inverse and to k-law nonlinear. The sample images are obtained by a specialist as a replacement spectral to technique is developed and quantitative measurement in the complex pattern found cancerous skin spots. Finally, in which spectral index calculated get a variety spectral index defined carcinoma. Our results show confidence of level in 95.4%. carcinoma mainly occurs thanks to exposure of sunlight. Ozone is depletion and maintained chemical exposures in other factors involved precipitating carcinoma. Mutations of p53 gene involved UV- induced as carcinogenesis. P53 gene acts vital development in SCC.

Skin disease alarming is disease for mankind, the need early diagnosis the skin diseases are increased due to the rapid climb rate of Melanoma skin disease, its high treatment Costs, and death rate. The cancer cells are detected manually and it takes time to cure in most of the cases. This project proposed a man-made carcinoma detection system using image Processing and machine learning method. The features of the affected skin cells are extracted after the segmentation of the pictures using feature extraction technique. A deep learning-based method Convolutional neural network classifier is employed for the stratification of the extracted features.

Skin disease is an alerting issue and it must be detected as early as possible. The diagnostic is a manual process that is time consuming as well as expensive. But today's world science has become advanced by using machine learning make easy detecting cancerous cells to the machine learning specially convolution neural network is employed to detect cancerous cell more in quickly, and to efficiently.

II.SIGNIFICANCE OF THE SYSTEM

Proposed system will help in prediction of Skin disease at early stage. Machine learning (ML) techniques have emerged as powerful tools in cancer research, offering the potential to analyse complex datasets and identify patterns that may not be easily recognizable by human experts. This project uses neural networks to achieve the results. The image processing is done using the pillow and OpenCV modules whereas the machine learning is done using Keras module in python. System will be used for detecting skin disease with the help of images.

III.LITERATURE SURVEY

The purpose of this project is to use TensorFlow, an open-source dataflow and machine learning library, to build an image classifying Convolutional Neural Network (CNN) for classifying the skin disease image. TensorFlow, in addition

to providing developers a simple way to build neural network layers, can also be run on mobile platforms such as Android. The ultimate goal of this project is to design and optimize a convolutional neural network for use with flower classification, and eventually build a simple classification app for mobile devices around the trained network.

Sr No.	PAPER TITLE	AUTHOR NAME	PUBLICATION DETAILS	ISSUES ADRESSED
1	Face Recognition	Ahmad Tolba Ali El-Baz Ahmed A El-Harby	January 2005	FACE RECOGNITION
2	Skin Disease Recognition Method Based on Image Color and Texture Features	John Mitchell	Received10 Apr 2018 Article ID 8145713	Disease recognition
3	Methodology for diagnosing of skin cancer in images of dermatologic sports by spectral analysis	Josué ÁlvarezBorrego	DOI: 10.1364/BOE.6.003876	Diagnosing skin cancer
4	A review on skin cancer	S. Ramya Silpa V. Chidvila	DOI: 10.7897/2230-8407.04814	Review of skin cancer
5	Public Opinion Polls	Rachel Macreadie	July 2011 DOI: 10.13140/2.1.2546.4646 Affiliation: Parliament of Victoria	POLLS
6	Opinion research	Paul J. Lavrakas	2008 Encyclopedia in of Survey such Research Methods	public opinion

IV.METHODOLOGY

The proposed methodology of the research work is as follows.

- The problem is defined over a research problem which includes the target domain such as – skin disease problem which is to be worked on and listed the literature survey papers which are related to this domain.

- Literature survey is done and we found that SVM is mostly used for classifying the skin diseases using machine learning.
- Based on the recommendation of literature review, Support Vector Machine algorithm (SVM) is selected as a classification algorithm. We formulated the problem and research questions based upon SVM.
- The SVM is applied to skin disease dataset and results are presented. The appropriate conclusion is drawn.

Data Description

Dataset used for proposed work is extracted from Kaggle towards skin cancer Detection.¬ It consists of 10000 images of skin cancer. The training data consists of 8000 images and testing data consists of 2000 images. The data has been divided into two parts, training set and test sets. The training set data is used to train our model and the test set is used to check if our model is working good or not. Our dataset is then classified into various parts based upon the types of diseases to be trained for each one of them.


Figure: Image of Skin disease

A. Image Processing

To achieve a high performance of skin disease detection and prediction we required to overcome few problems which occur during loading the data. Such as color contrast and image size. To overcome this problem, we have module in our application which takes care of this thing. The image resizer program in python resizes all the image for us before loading them onto the server for processing. Therefore, the main target of this step is to removes the background noises such as hair and air bubbles and other noises in the skin disease image. To eliminating those noises from the particular skin image and to get smoothing image, median filtering, mean, var and histogram is used. Then the post processing is applied to improve the shape and edges of skin disease image.

B. Feature Extraction

For the feature extraction of the image, we have to use an algorithm which will work on various layer of the image for the feature extraction from the image. Therefore, the proposed system tries to implement more algorithms which lead us to using the CNN. Convolutional Neural Network (CNN) is combination of various stacks which has linear and non-linear processes. The CNN consists of three main blocks which are 1. Connected layer 2. Pooling layer 3. ReLU layer (non-linear Rectified Linear units) which are connected to a regular multi-layer fully connected layer.

C. System Design
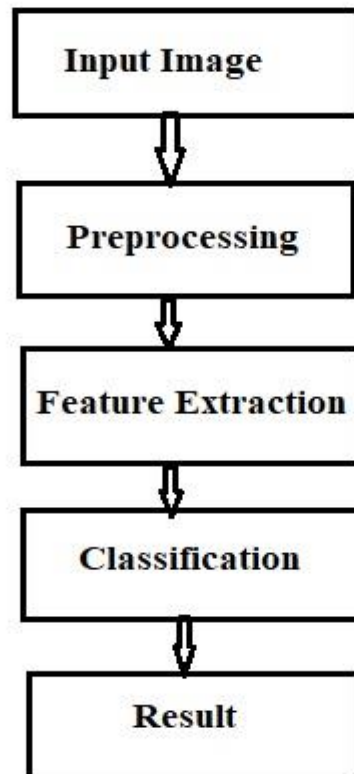
Figure 1System Design

D. Convolutional Neural Network

CNN is the one of the most famous deep learning approaches where multiple layers are training. It is very successful in computer vision, especially, in an annual competition called the Large-Scale Visual Recognition Challenge (ILSVRC). It is done on a very large database ImageNet containing 1.2 million images with 1000 classes. Some famous CNN are Lenet, Alexnet, Clarifai, SPP, VGG, Google Net, Resnet. A CNN typically comprises multiple convolutional and sub-sampling layers, optionally followed by the fully-connected layers like a standard multi-layer neural network.

E. Classification

Deep learning is one of the best techniques for image classification. Based on the texture features we are training the dataset for classification. Here first we are giving Extracted feature to the Neural network for checking performance of image classification then we are using CNN (Convolutional Neural Network) it is one of the deep learning techniques for classification, Dermoscopic images classification is done in 7 classes. Melanocytic nevi','Melanoma','Benign keratosis',' Basal cell carcinoma', 'Actinic keratoses', 'Vascular lesions', ' Dermatofibroma ' it is done by using automated extracted features by CNN images. In this step, we are passing Preprocess Images to the CNN classification.

V EXPERIMENTAL RESULT

In this system image is taken as input. So first have to upload image using choose file button we can upload an image after uploading image have to click the predict button. After taking few seconds it will shows the skin disease.
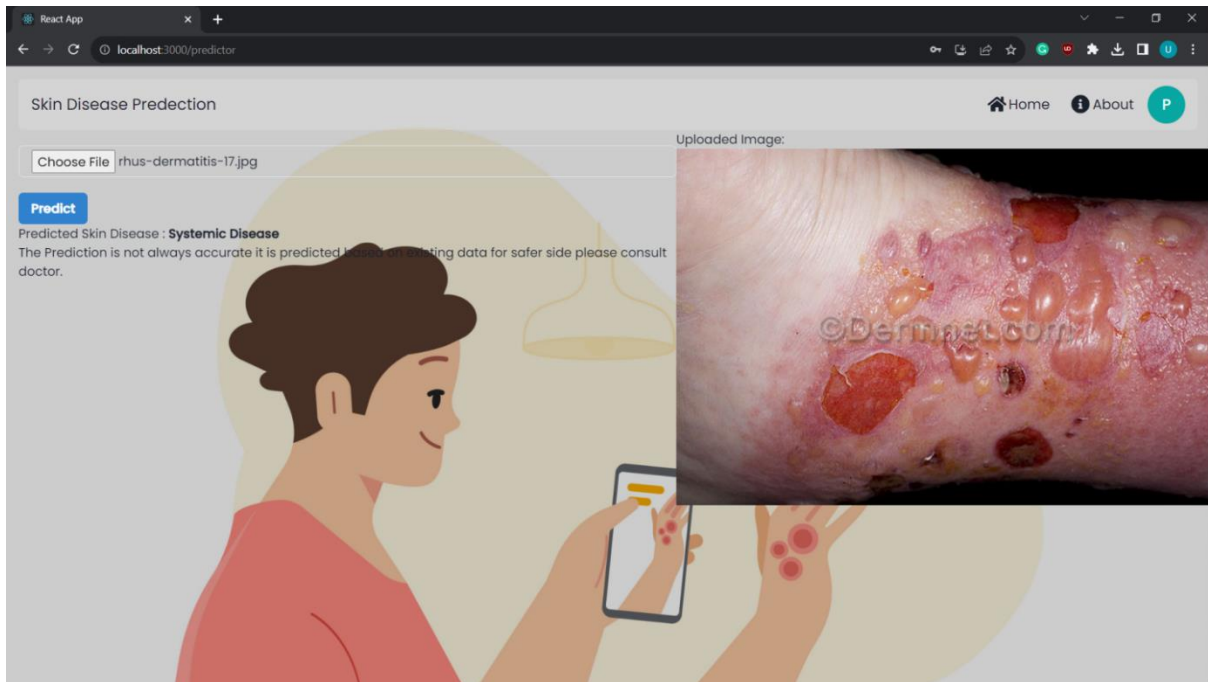

Figure: The user interface displays detected disease as systemic disease

	Molluscum Contagiosum	Warts Molluscum and other Viral Infections
	Hormonal Acne	Acne and Rosacea
	Hand Eczema/Hand dermatitis	Eczema
	Fungal Nail Infection	Tinea Ringworm Candidiasis and other fungal Infections

Table shows the original disease and system predicted disease

VI. CONCLUSION

In the proposed system, Image Pre-Processing, Image Segmentation and Image Classification steps are performed for categorizing skin lesion images into melanoma or benign. Data augmentation technique is used in Convolutional Neural Network for increasing the number of images which leads to better performance of proposed method. Experimental results show an accuracy of CNN algorithm developed with data augmentation is higher than the CNN algorithm created without data augmentation. The proposed method detects melanoma faster than the biopsy method. The proposed method can be extended to identify different types of skin related diseases. In this project we also designed for the reference of doctors and a feedback form which is used to know the experience of the patients.

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