Skin Disease Detection Using Convolutional Neural Network

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Abstract : Skin is the like powerful protection of important organs in the human body. It acts as a shield to protect our internal body to get damaged. But this important part of the human body can be affected by serious infections caused by some fungus or viruses or even dust too. Due to acne problems to eczema people suffer a lot. A proper diagnosis can result in proper medication that can degrade the miseries of the people suffering. The goal of this system is to develop a prototype to detect skin diseases using neural networks. In the choice of neural networks, we have chosen CNN (Convolutional Neural Network). In this application picture handling strategies are used. Users have to take a photo of the contaminated region of their skin and transfer it to the system. The transferred pictures of illness will be handled in the focal server and it will answer with the disease name. Convolutional neural network (CNN) have been applied in this study for the identification of skin diseases.

IndexTerms **- Disease detection, CNN (Convolutional Neural Network),**

Introduction

The largest organ of human body is “Skin”, an adult carry 2 square meters and around 3.6 kg of it. Skin acts as a waterproof, insulating shield, guarding the body against extremes of temperature, damaging UV lights, and harmful chemicals. With the rate of 10-12, the population affected across India from skin disease is estimated at nearly 15.1 Crore in 2013 and which increases to 18.8 crores by 2015[3]. According to statistics provided by the World Health Organization [4] around 13 million melanoma skin cancer occurs globally each year, which shows skin diseases are growing very rapidly. Therefore many factors responsible for a disease to occur such as UV lights, pollution, poor immunity, and an unhealthy lifestyle. There are two significant categories in which the lesions (spot) of skin disease are classified; benign and malignant skin lesions. Most of the skin lesions are benign in nature which is gentle and non-dangerous, whereas those which are dangerous for patient’s health and evil in nature are malignant skin lesions such as melanoma skin cancer.

However, the cost of such diagnosis is still limited and costly. The Deep learning models [4,5,6,7] are comparatively efficient in performing the classification process from the images and the data. It has been a demand in the field of healthcare diagnosis in precise identification of the abnormality and classifying the category of the disease from the X-ray, Magnetic Resonance Imaging (MRI), Computer Tomography (CT), Positron Emission Tomography (PET) images, Electroencephalogram (EEG),and the signal data like the Electrocardiogram (ECG), and Electromyography(EMG)

This study used a dataset consisting of seven skin diseases: Melanoma ,Melanocytic nevi, Benign keratosis-like lesions, Vascular lesions, Dermatofibroma, Actinic keratoses, Intraepithelial carcinoma and Basal cell carcinoma. This dataset contains more than 2,000 dermatoscopic images. A random (rand) function is applied to split the data into the training data (1224) and validation data (255). The considered dataset is almost imbalanced because some skin diseases are more, and some are less in number. To conquer such problems, we used data augmentation, and this technique balances the data and generates more images either by rotations Or transformations from the existing data.

Literature survey:

Sr.No	Paper Name/Year	AuthorName	Strengths	Limitations
1	Skin Disease Classification from Image(2020)	Tanvi Goswami , Vipul K. Dabhi , Harshad kumar B. Prajapati	automated computer based system for skin disease identification and classification through images to improve the diagnostic accuracy	Many skin diseases have highly similar visual characteristics, which add more challenges to the selection of useful features from the image.
2	Image Analysis Model For Skin Disease Detection (2019)	Alaa Haddad ,Shihab .A Hamid	Help in initial diagnoses and to know the type of disease.	The data set is not sufficient in order to recognize distinct classes.
3	Deep convolutional neural network for face skin diseases identification (2019)	Rola EL SALEH LISSI , Sambit BAKHSH	It achieves an accuracy of 88 % and classifies successfully the facial skin images given for test with an accuracy of 98.5 %	size of our database limited.
4	Diagnosis of skin diseases using Convolutional Neural Networks(2018) (2018)	Jainesh Rathod, Vishal Waghmode, Aniruddh Sodha, Dr. Prasenjit	TResolve difficulties that's created from challenges faced from the	Lots of trainingdata is required.

		Bhavathankar	dermatologist to recognize the different skin diseases easily.	

Algorithm & System Model:

In this system we are 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 dermat dataset and some images of most common diseases are collected from the internet.

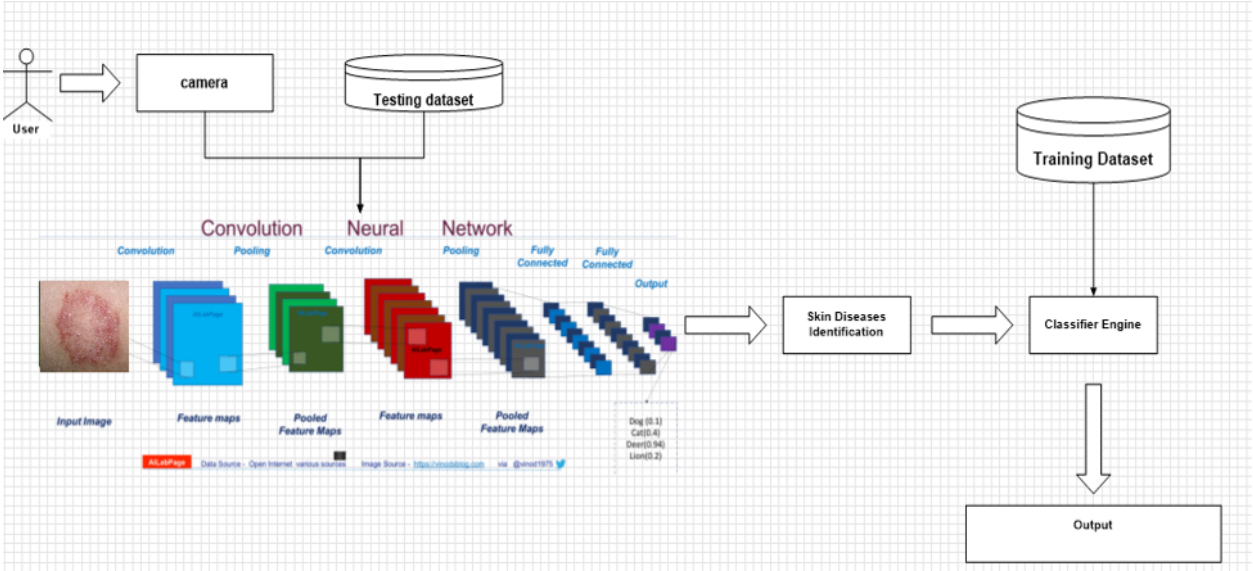


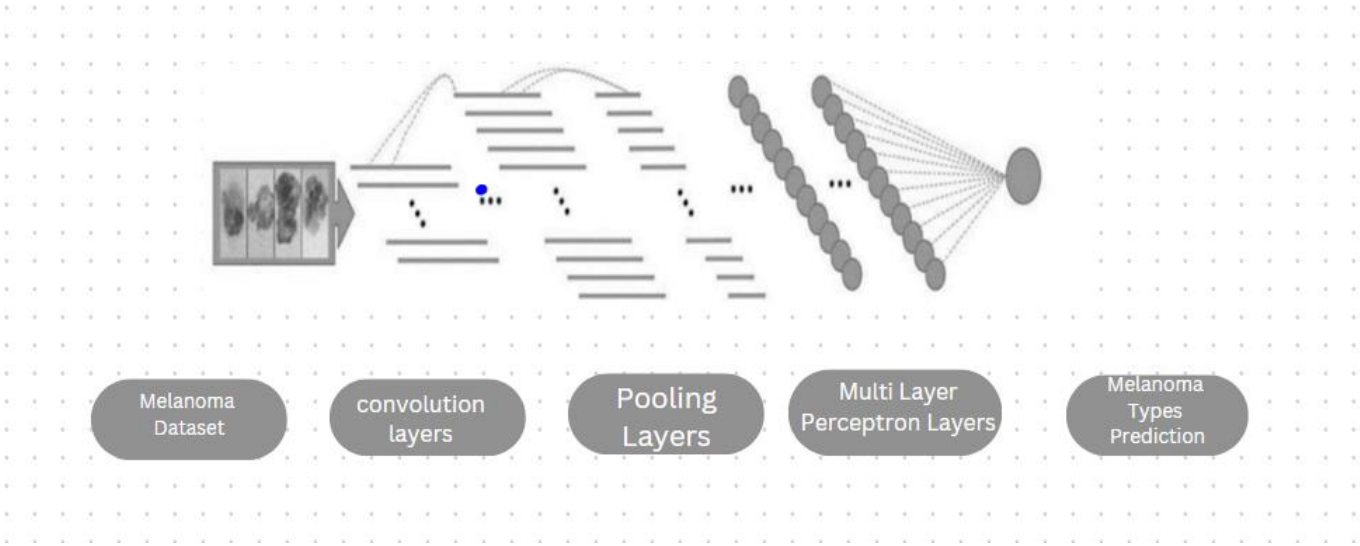
Fig.1

Working Methodology

The following are the stages that must be completed in order for our system proposed to be implemented. 1. As input, the system will be take a dataset of picture data. 2. It increase the quality of the image and eliminate hairs from it, which was before is carried out before to printing. 3. A training file is formed as a consequence of the extraction of a number of features from the input image dataset. 4. In this experiment,

the CNN classification approach is applied for both the newly constructed training file collection and the freshly created test input images, which were both made from scratch. 5. Melanomas are detected by using the CNN algorithm, which determines whether or not melanoma is present in the input test data set. Finally, in order to determine the overall performances of the proposed technique and provide recommendations, a graphic evaluation is carried out at the conclusion

Fig.2



Conclusion:

We observe that the CNN model is quite accurate, and with better data, careful analysis and close examination, it can become even more accurate. We saving the model's results in an H5 file format, in this we can efficiently store its parameters, weights, and architecture, making it easy to access for future use. We develop software that rapidly predicts skin issues when users upload a photo of their skin problem, providing quick and reliable predictions. This software will process the images, analyze them using the CNN model, and provide fast and dependable predictions about the detected skin conditions.

The application of Convolutional Neural Networks(CNNs) for skin disease detection in Python is a powerful and promising approach. By collecting a diverse dataset, training a CNN model, and developing user-friendly software, we can

create a tool that provides rapid and predictable predictions for various skin conditions. It has the potential to assist in precocious diagnosis, aiding both individuals seeking to monitor their skin health and healthcare professionals in their evaluation . However, it's crucial to continuously update and improve the model and software to maintain correct and ensure user data privacy and security. Skin disease detection using CNNs is a significant step toward more accessible and effective healthcare solutions.

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