

## Automated Skin Disease Recognition Using CNN

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### Abstract-

*This paper proposed a system of detection of skin diseases that can be applied to Teledermatology. Our system will classify skin diseases on Database images using the Deep Learning algorithm, Convolutional Neural Network (CNN). Skin problems not only injure physical health but further psychological problems, especially for patients whose faces are damaged or even disfigured. Using smart devices, most people can obtain convenient clinical images of their face skin condition. On the other hand, the convolutional neural networks (CNN) have achieved near or even better performance than citizenry within the imaging field. Therefore, this paper studied different CNN algorithms for face disease of the skin classification supported the clinical Database images. Skin diseases have caused immense economic burdens both in high-income and low-income countries. for each individual, skin problems can have adverse effects on all aspects of life, including interpersonal relationships, work, social functioning, physical activity, and mental state.*

**Keywords--** Disease, Deep Learning, Convolutional Neural Network, Data Augmentation

### I. INTRODUCTION

Based on a survey skin diseases had the fourth leading reason behind nonfatal disease burden within the world, and 3 of the world's most typical diseases were skin diseases may be a major downside among individuals worldwide. Completely different machine learning techniques are often applied to spot categories of disease of the skin. Herein, we've got applied machine CNN algorithms to categories categories of disease of the skin victimization ensemble techniques, so a feature choice technique is used to check the results obtained.

The most unpredictable and troublesome terrains to diagnose because of its quality. In most developing countries, it's expensive for an outsized variety of individuals. in keeping with World Health Organization (WHO), skin diseases area unit the foremost common non-communicable diseases in Asian nation. the ever present use of smartphones in developing countries like Asian nation has spread out new avenues for cheap designation of diseases. The camera in smartphones will accustomed exploit the image process capabilities of the device for designation. The planned system deals with the creation of AN application that helps in designation of disease of the skin..

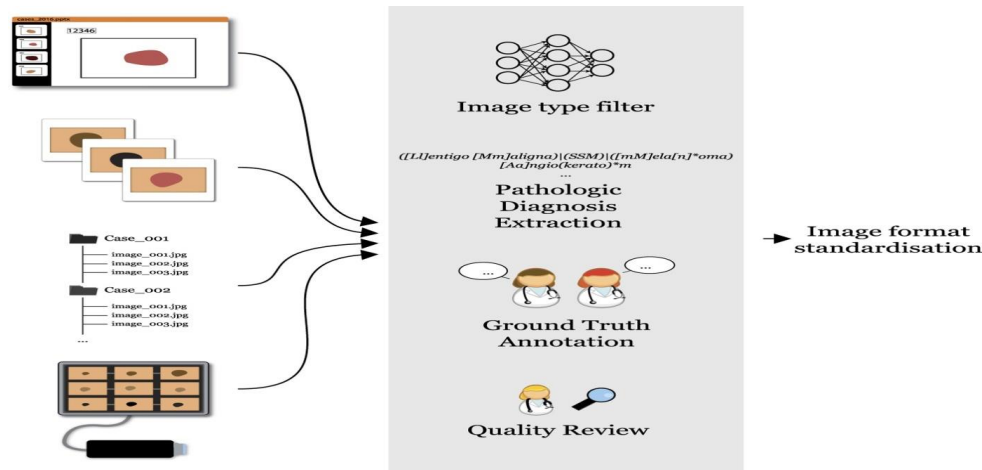


Figure :1. Background Diagram

Skin is that the outer most region of our body and it's probably to be exposed to the atmosphere which can get in touch with mud, Pollution, micro-organisms and additionally to UV radiations. These {may be could additionally } the explanations for any reasonably Skin diseases and also Skin connected diseases area unit caused by instability within the genes this makes the skin diseases additional advanced.

One of the developing countries that require tons of attention so as to enhance the life variety of its voters. Technology must be improved on several aspects, particularly within the medical field, owing to its sensitivity and impact in human lives which needs correct and objective designation, one among the necessary and customary regions is that the branch of medication that coping with the skin, nails, hair and its diseases that is termed medical specialty.

With the rise in medical technology the conception of pc being employed for the designation of skin diseases has been around recently. Use of technology will build it easier to notice the diseases simply from the pictures of the infected skin image and will assist the human's ability to research advanced data. computing is absorbing automation all told fields of application even within the attention field

## II. LITERATURE SURVEY

Automated Skin disease prediction system exploitation Image process and Machine Learning International Journal of pc Applications (0975 –8887)Volume a hundred and eighty –No.19, February2018 The approach of exploitation two stage method for prediction of skin diseases, wherever the region is born-again into a feature vector so used for coaching of network is novel to better of our data with AN overall accuracy of ninetieth. Correlation of our work with connected works during this space has uncovered stark contrasts within the execution and performance.[2]Skin Diseases Prediction exploitation Deep Learning Framework.

The better outcome achieved to predict and stop the medical specialty diseases exploitation the techniques in Deep Learning Neural Networks (CNN) and Residual Neural Networks (ResNet)to predict skin diseases and so provides a lot of accuracy than different neural networks. [3]Machine Learning Algorithms based mostly disease Detection ijitee If embraced well, the techniques will definitely give applicable help and a unified approach to skin issues bar. this can assist patients and

physicians cure skin diseases in a very timely manner. analysis and execution of restricted medical data square measure accessible.

Machine Learning Algorithms are based mostly on disease Detection[4]. Detection of disease is one amongst the most important issues within the medical trade and may be well and retrieved if properly diagnosed at an early purpose. Literature study demonstrates that totally different disease observation techniques square measure getting used. [5]A Method Of disease Detection exploitation Image process And Machine Learning science direct assets In this analysis the methodology of detection was designed by exploitation pretrained convolutional neural network (AlexNet) and SVM. last, we tend to should not forget that this analysis has a good role within the detection of skin diseases in Saudi Arabia as a result of it has a terribly hot weather for the presence of deserts; this indicates that skin diseases square measure widespread.[6] The previous publication by Damilola A. Okuboyejo, Oludayo O. Olugbara, and male monarch A. Odunaike, titled ‘Automating skin condition identification exploitation Image Classification’[1] examines an analogous premise.

Here a study has been created to style and model a system that uses medical imaging to cut back serious dependencies on doctor for identification procedure of Pigmented skin Lesion (PSL) in patients. The methodology of this work is predicated on soft science style to understand a image system for the identification of skin condition pictured by a skin image. The intention being the utilization of feature supported texture analysis and classifies the lesion exploitation techniques like thre sholding and neural networks to develop and image a replacement formula for skin condition identification.

In the within the skin disease predication System exploitation Image process and information Mining’ by R. S. Gound, Priyanka S. Gadre, Jyoti B. Galikwad, Priyanka K. Wagh[7], a system has been projected a picture obtained from the user is processed and segmental to make a model that may predict the illness for a replacement image of a skin condition. Feature extraction is finished on every image to extract options that may be accustomed produce classification model.

With this classification model, system finally will predict the illness for a replacement image of a skin condition which can be obtained by the user through golem application. And supported this foreseen illness, system can raise question from the user and supported answer, system can decide illness sort. Finally, the system suggests medical treatment or the recommendation supported foreseen skin condition result.

The diseases taken into thought square measure skin disease, mycosis and urticatio. Another paper ‘A Image analysis System to find Skin Diseases’ by Pravin S. Ambad and A. S. Shirsat[8] presents the image analysis system to find totally different skin diseases, wherever user are going to be able to take pictures of various moles or skin patches and also the system can analyse and method the image and classifies the image to a range of skin condition. this method captures image from commonplace information and place in to the system to tell the user for preventing the threats joined to skin diseases.

The system can analyse and method the image and classifies the image to traditional, melanoma, skin condition or dermo case based mostly extraction the image options. associate degree alert are going to be provided to the user to hunt medical facilitate if the mole belongs to the atypical or malignant melanoma class. this technique additionally suffers from the problems with segmentation. another paper is [9] Skin disease detection using artificial neural network Neural Network by: D.s Zingade, Manali Joshi, Viraj Spare, Rohan Giri present the Image preprocessing, Back propogation, ANN algorithm.[10] An Intelligent System to diagnosis the skin disease by Manish Kumar and Rajiv Kumar in October 2016 under observation Dermatology, KNN, active contour, ROI, contrast, mean value.

### III. PRAPOSED METHODOLOGY

The basic OCR system consists of 4 stages as shown in figure

- A. input images
- B. image-processing
- C. CNN
- D. Output Prediction

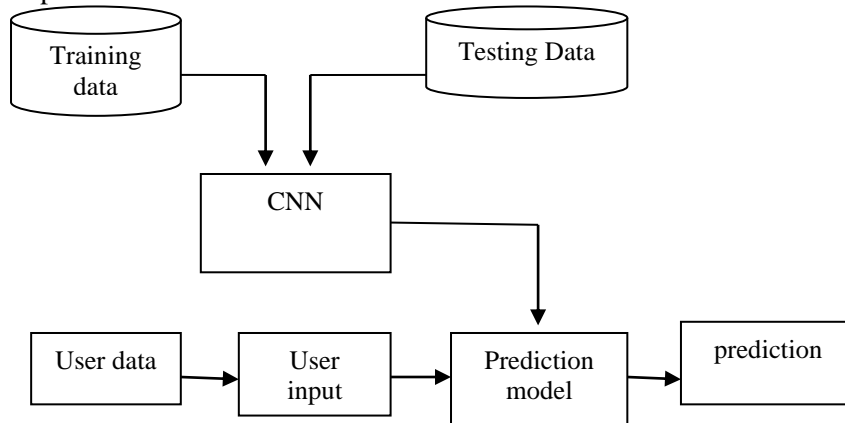


Figure :2.Block Diagram

#### A) *INPUT*

Database as shown below :



Figure 1: Training Data Set

Figure : 3. Data base

#### B) *PRE PROCESSING:*

In this study, a sample data from the complete dataset employed to train the system model is presented in [Fig. 3]. The database is split into; training set, validating/testing set. A training set is adopted for learning to fit the parameters and is specifically applied to alter the varying weights and errors of the system in each training run. Validation/testing set tunes the parameters and is used only to assess the effectiveness and efficiency of the system.

In this method, the divide mode is set to 90% for the training of the data, 10% for the validating/testing of the data.

### C) CNN ( CONVOLUTIONAL NEURAL NETWORK)

One of the classes of deep learning neural networks is CNN or the convolutional neural network (CNN). CNN is a machine learning algorithm that can take in an input image, assign importance (learnable weights and biases) to various aspects/objects in the image, and can differentiate one from the other. CNN works by extracting features from the images. Any CNN consists of the following:

ConvNets consist of multiple layers of overlapped tiling collections of small neurons to achieve a better representation of the original image. For image and video recognition ConvNets are widely used.

CNN Layers:-

- 1.Convolutional Layer
2. MaxPooling Layer
- 3.ReLU Layer
4. Fully Connected Layer
5. Softmax Layer

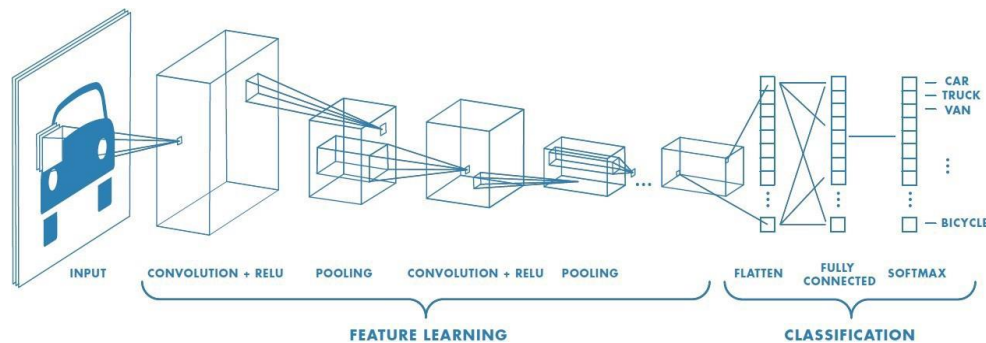


Figure: 4.CNN Architecture

**1) Convolutional Layer-** To extract high-level features from the image the convolution operation is important. while building the neural network, We can always add more than one convolution layer, where the first Convolution Layer is responsible for capturing gradients whereas the second layer captures the edges. According to the complexity of the image more. of layers are added.

**2) MaxPooling Layer:-** Max Pooling, which returns the maximum value from the portion of the image covered by the Pooling Kernel. This is mainly to reduce the computational complexity required to process the huge volume of data linked to an image.

**3) ReLU Layer:-** A ReLU implements the function  $y = \max(x,0)$ , so the input and output sizes of this layer are the same. The network trains many times faster because of ReLU Layer.

**4) Fully Connected Layer:-** In the case of a fully connected layer, all the elements of all the features of the previous layer get used in the calculation of each element of each output feature. Figure 13 explains the fully connected layer L. Layer L-1 has two features, each of which is  $2 \times 2$ , i.e., has four elements. Layer L has two features, each having a single element.

5) Softmax Layer:- It is a function that turns a vector of  $K$  real values into a vector that sum to 1. For this reason, usually, a softmax function as the final layer of the neural network. Here CNN architecture is used for transfer learning. Resized image dataset has been applied to this CNN architecture. It consists of 8 layers. Basic features from input images are extracted by convolutional layer followed by RELU and Max-pooling layer. All neurons at the end are connected in the fully connected layer. Multiclass support vector machine is fitted using extracted features and predicted labels. Image is read and their features are extracted and then given to classifier to predict the output class.

#### IV. RESULT AND DISCUSSION



Fig.1 Welcome screen

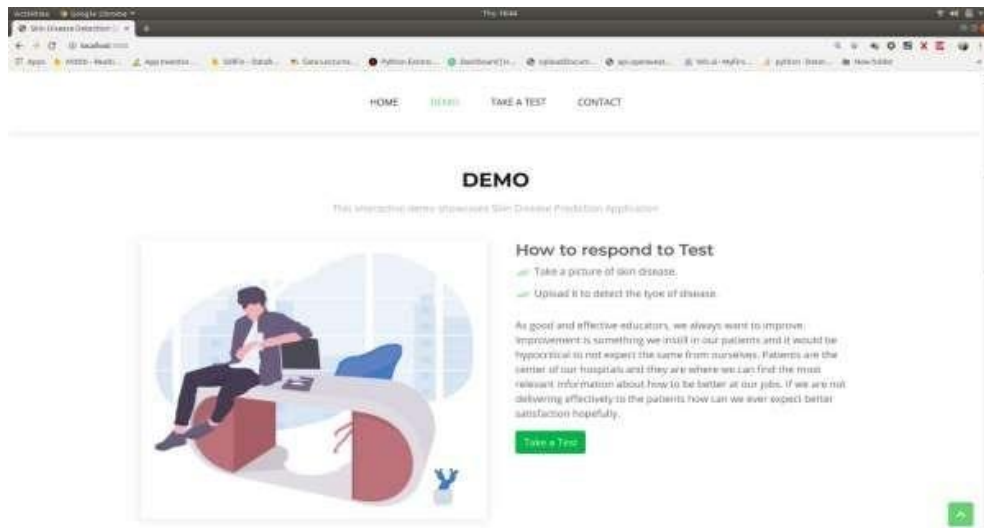


Fig 2 Demo

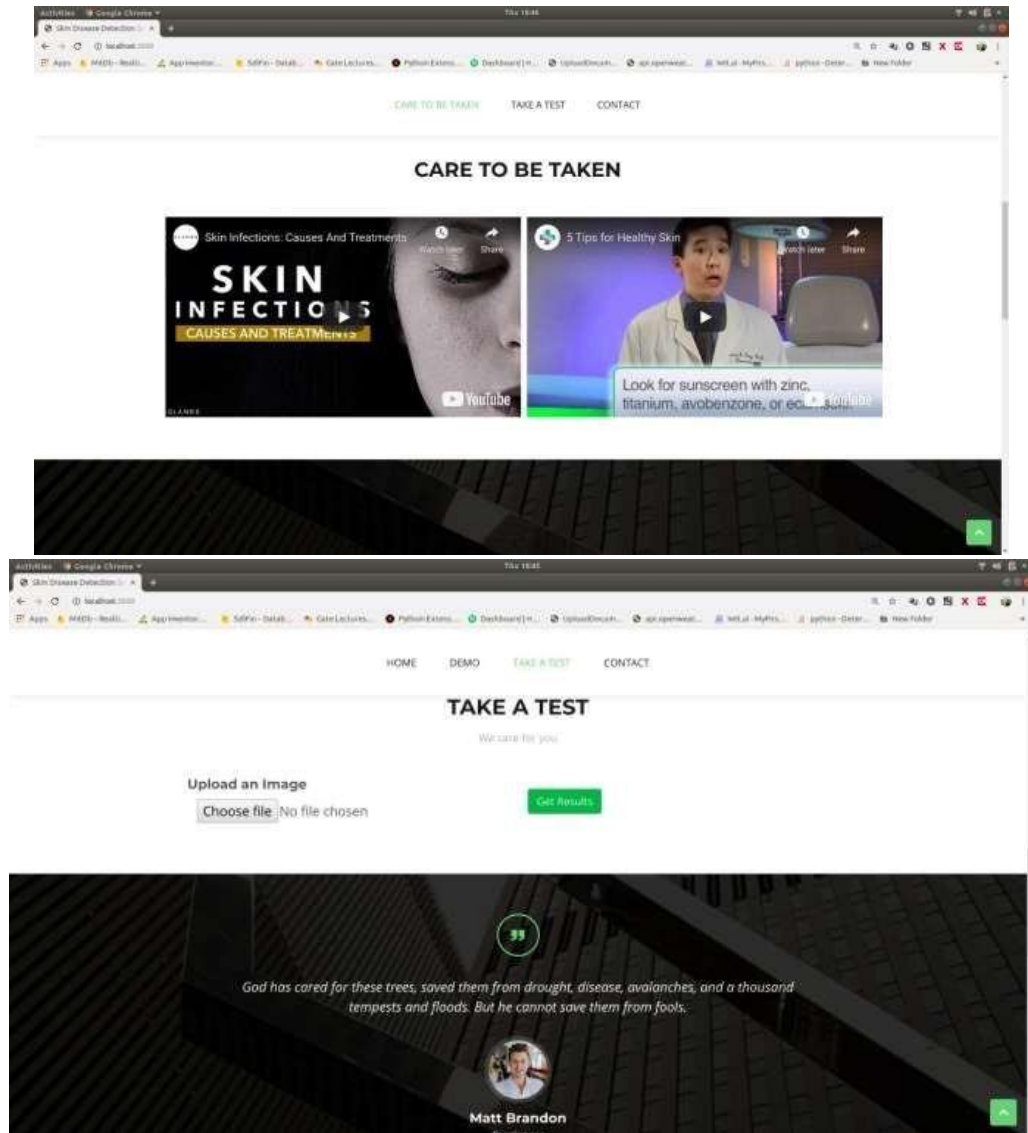


Fig 3 Test window

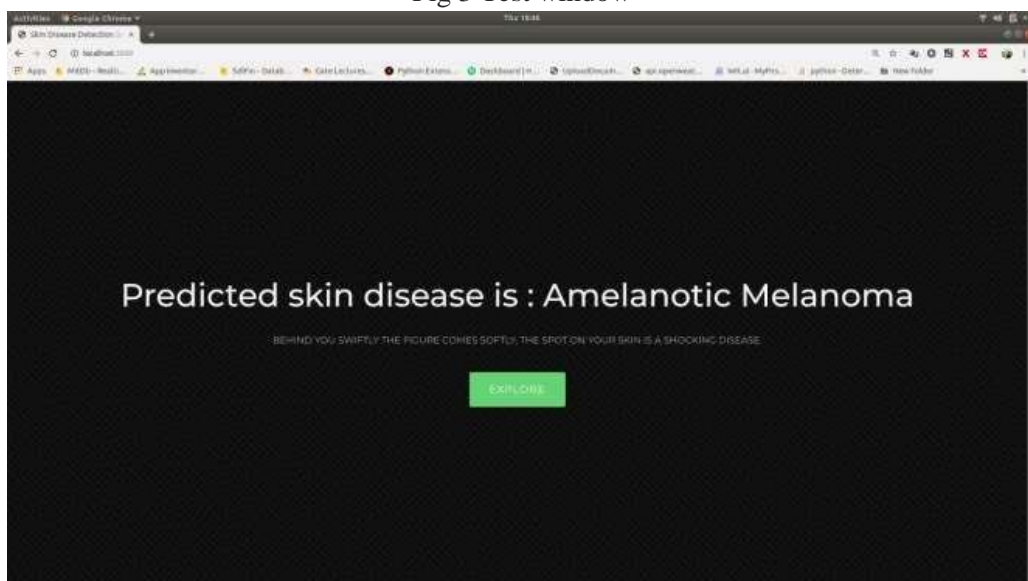


Fig 4 Final result

## V. CONCLUSION

A model is made employing a deep learning rule, convolutional neural network, that helps in predicting the disease of the skin. Knowledge augmentation is finished to improve the accuracy of the model. The planned model may be a consecutive model with high accuracy of eighty two it's found that by exploitation deep learning rule, deliver the goods higher accuracy and that we can predict more diseases by making a much better model that desires a decent infrastructure facility. The long run work is to attain higher accuracy so it will be as tending.

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