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SKIN DISEASE IDENTIFICATION USING CNN

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ABSTRACT

Skin diseases usually occur more frequently when compared to other diseases. Skin diseases maybe caused by fungal infection, bacteria, allergy, or viruses, etc. The technology of lasers and Photonics has made it possible to diagnose the skin diseases accurately, but it is still limited and not a cost effective way. Automated screening system for skin diseases at initial stages can be build using image processing and machine learning techniques. The extraction of features plays a key role in helping to classify skin diseases and it can be done by using CNN in deep learning. Using the OpenCV technology has a role in the detection of skin diseases in a variety of techniques. This system is an image processing-based method to identify skin diseases by analyzing image of affected skin area. It takes the inputs of a colour image and adjusts the size of the image to extract features using pre-trained models using convolution neural network (CNN). Finally, the results are shown to the user, including the type of Skin disease occurred. A Dataset of 938images has been taken for the Classification of Skin diseases. They include Melanoma, Nevus, Sebborheic Keratosis. By using CNN algorithms, 88% accuracy is achieved in classification of skin disease.

INTRODUCTION

Skin is one of the largest and fastest growing tissue in the human body. Skin diseases are the common health problems in the worldwide. It is the infections that occurring in people among all the ages. Skin is frequently damaged because it is very sensitive part of the body. There are 3000 and more unknown skin diseases. A cosmetically appearance spoiler disorder can have a significant impact, and can cause considerable pain and permanent injury. There are chronic and incurable diseases, like eczema and psoriasis, and malignant diseases like malignant melanoma. Recent researchers have found the availability of cures for these diseases if they are detected in the early stages. Atopic dermatitis, commonly called eczema, is a long-term skin disease whose Most of the chronic skin conditions, such

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as atopic eczema, psoriasis, vitiligo and leg ulcers, are not immediately lethal, they are recognized as a considerable trouble on health status including physical, emotional and financial outcome. On the other hand, skin cancers, like malignant melanoma, are potentially lethal and their trouble is associated with the temporality that they carry. People of almost 73% are affected with skin disorder do not seek medical advice. Chronic and several other incurable skin diseases, like psoriasis and eczema, are associated with significant sickness in the form of physical discomfort and impairment of patient's life; whereas malignant diseases like malignant melanoma carry substantial temporality. The Convolutional Neural Network (CNN) is a category of deep learning neural networks. CNN represents a huge advance in image recognition. They are used to analyse the visual images and image classification. A Convolutional Neural Network (CNN) is used to extract features from images. This eliminates the need of manual feature work extraction. The features from the set of images are not trained they are learned while the network trains on a set of images. It makes extreme accuracy for the deep learning models. Documents in the training set involvement of the learned features. A particular amount dataset will be provided to detecting the skin diseases.

EXISTING SYSTEM:

Skin diseases are mostly caused by fungal infection, bacteria, allergy, or viruses, etc. The lasers advancement and Photonics based medical technology is used in diagnosis of the skin diseases quickly and accurately. The medical equipments for such diagnosis is limited and most expensive. So, Deep learning techniques helps in detection of skin disease at an initial stage.

PROPOSED SYSTEM

We propose an automated image-based system for recognition of skin diseases using machine learning classification. This system will utilize computational technique to analyze, process, and relegate the image data predicated on various features of the images.

ADVANTAGES OF PROPOSED SYSTEM

Applying these ML and DL model may predict the data with high accuracy in less time for treatment initiating.

The results demonstrate that CNNs have the ability to recognize and classify skin diseases. Further, our experiments also showed that a reasonable network structure could improve the performance of the model. The performance of the current network structure is used for classification in some diseases, but the overall

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performance is yet to be improved. As a result, if people want to actually use this technique to check their skin health in their daily life, specialized improvements should be done.

IMPLEMENTATION

1. Dataset Collection: Data from two different sources are collected for training and testing module. The dataset plays a crucial role in the training of our proposed neural networks for automated diagnosis. The dataset named HAM10000 is the skin disease dataset The dataset comes in metadata format such as comma,separatedvaluesfile(.CSV),consistingofage,gender,andcelltype.Thisdataset containsmorethan10,000 dermatoscopic images that are collected from different people around the world. In this dataset, we have seven different types of skin problems in our dataset, namely Melanocytic Nevi (NV), Benign Keratosis-like Lesions (BKL),Dermatofibroma(DF),VascularLesions(VASC),ActinicKeratoses,andIntraepithelialCarcinoma(AKIEC),Basal Cell Carcinoma (BCC), and Melanoma (MEL). There is an imbalance in the number of skin images in each type of lesion present in the dataset.

2. Pre-processing Data: Achieving high performance of skin disease detection system requires overcoming some major difficulties. Such as creating a database and unifying image dimensions. Data pre-processing is a crucial step that helps to remove noise and increases quality of data to perform required operations on data. Data preprocessing in refers to the technique of preparing the raw data to make it suitable for a building and training Deep Learning technique that transforms raw data into an understandable and readable format.

3. Image Pre-processing: The image is transformed into a gray scale image and then reshaped the image to match the input. Three common skin diseases are selected in this paper as the main research objects, which are herpes, paederus dermatitis, and psoriasis, respectively. The main aim of image pre-processing is to enhance the image information contained unwanted distortions or to reinforce some image features for any processing. Preprocessing technique uses various techniques like dynamic image size and form, filtering of noise, image conversion, enhancing image and morphological operations. In this paper, the median filter is adopted to pre-process and smoothen the source images. The used formula is as follows: where is the median of the gray value of the image; is the neighbourhood collection of pixel; is the element of ; is the gray value of ; is expressed as the

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number of the elements in the set of ; is expressed as sequencing; and is the median of the function . The main idea of the median filter algorithm is to run through the signal gray value by gray value, replacing each gray value with the median of neighbouring gray values.

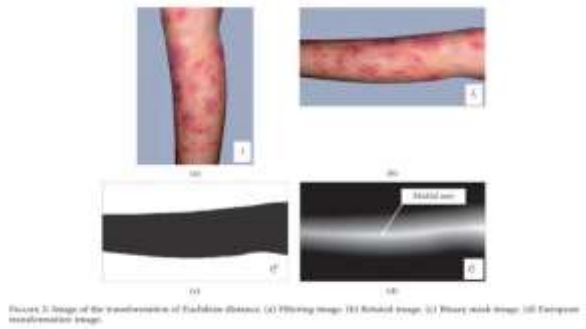
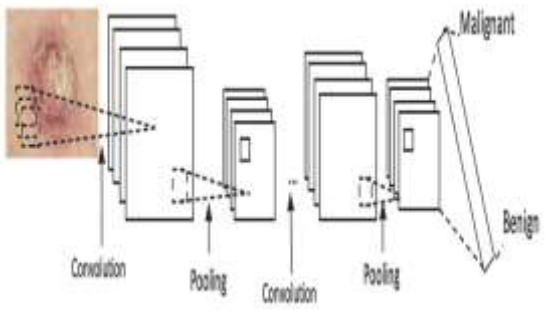


Figure 2. Image transformation

4. Classification:

Classifying skin diseases is done by algorithms stated below.

Convolutional neural network (CNN):A convolutional neural network consists of an input layer, hidden layers and an output layer. In any feed-forward neural network, any middle layers are called hidden because their inputs and outputs are masked by the activation function and final convolution.



ResNet50:

ResNet50 is a convolutional neural network which has a depth of 50 layers. It was build and trained by Kaiming He, Xiangyu Zhang, ShaoqingRen, and Jian Sun in their 2015 and you can access the model performance results on their paper, titled Deep Residual Learning for Image Recognition. This model is also trained on more than 1 million images from the ImageNet database. Just like VGG-19, it can classify up to 1000 objects and the network wastrained on 224x224 pixels colored images. Here is brief info about its size and performance:

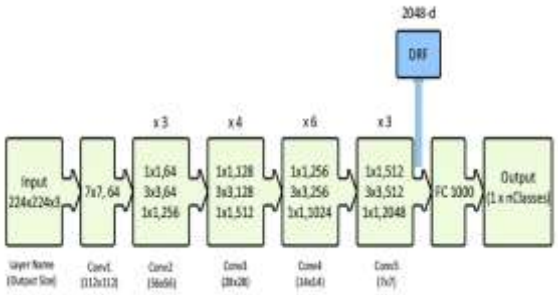


Fig 5.ResNet50 Architecture

To sum up, residual network or ResNet was a major innovation that has changed the training of deep convolutional neural networks for tasks related to computer vision. While the original Resnet had 34 layers and used 2-layer blocks, other advanced variants such as the Resnet50 made the use of 3-layer bottleneck blocks to ensure improved accuracy and lesser training time. Keras is a deep learning API that is popular due to the simplicity of

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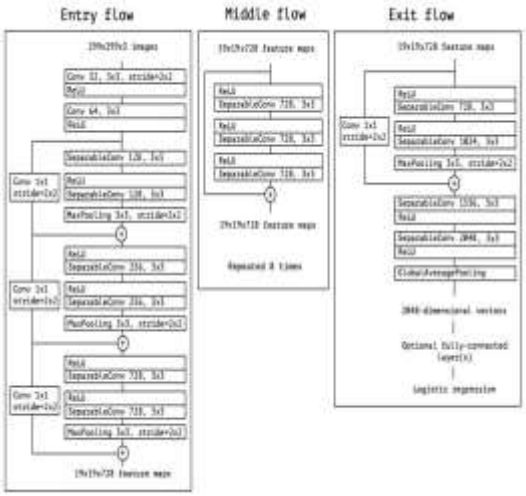
building models using it. Keras comes with several pre-trained models, including Resnet50, that anyone can use for their experiments.

Xception Architecture

Xception is a deep convolutional neural network architecture that involves Depth wise Separable Convolutions. This observation leads them to propose a novel deep convolutional neural network architecture inspired by Inception, where Inception modules have been replaced with depth wise separable convolutions



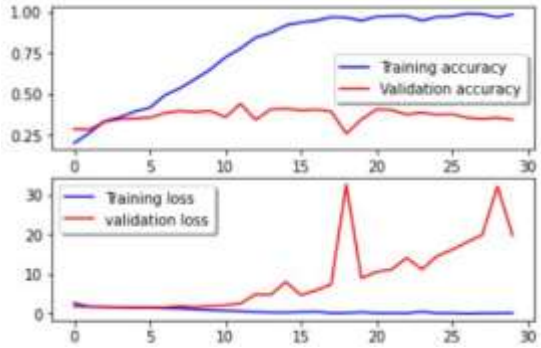
OUTPUT SCREENS

Uploading image:

Upload Image

Classified Disease:

Model Accuracy:



CONCLUSION

This work performed experiments using CNN structure for the skin image diagnosis of three Common skin diseases and had constructed a dataset consisting mainly of skin disease images. The results demonstrate that CNNs have the ability to recognize and classify skin diseases. Further, our experiments also showed that a reasonable network structure could improve the performance of the model. The performance of the current network structure is used for classification in some diseases, but the overall performance is yet to be improved. As a result, if people want

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to actually use this technique to check their skin health in their daily life, specialized improvements should be done. In our opinion, with the increasing amount of image data of various skin diseases and the continuous improvement of the network structure, CNN-based skin disease diagnosis algorithms will continue to improve in performance. Apart from CNN, ResNet50 and Xception, other architecture may also be implemented to improve the accuracy of classification.

REFERENCES

[1] R.J. Hay, N. E.Johns, H.C.Williams, I. W.Bolliger,R. P.Dellavalle, and D. J. Margolis, "The global burden of skin disease in 2010: An analysis of the prevalence and impact of skin

conditions,"J. Investigative Dermatol- *ogy*, vol. 134, no. 6, pp. 1527–1534, 2014.

[2] X.Huang, J. Zhang, J. Li, S. Zhao, Y.Xiao, Y. Huang, D. Jing, L.Chen, X. Zhang, J. Su, Y.Kuang, W. Zhu, M. Chen, X. Chen, and M. Shen, ''Daily intake of soft drinks and moderate-tosevere acne vulgaris in Chinese Adolescents,'' *J. Pediatrics*, vol. 204, pp. 256– 262, Jan. 2018.

[3] Y. Deng, Q. Peng, S. Yang, D. Jian, B. Wang, Y. Huang, H. Xie, and J. Li, ''The rosacea specificquality-of-life instrument (RosQol): Revision and validation among Chinese patients,''

PLoS ONE, vol. 13, no. 2, Feb. 2018, Art. no. e0192487

[4] C. Junchen, W. Zeng, W. Pan, C. Peng, J. Zhang, J. Su, W. Long, H. Zhao, X. Zuo, X. Xie, J.Wu, L. Nie, H.-Y. Zhao, H.-J. Wei, and X. Chen, ''Symptoms of systemic lupus erythematosusare diagnosed in leptin transgenic pigs,'' *PLoS Biol.*, vol. 16, no. 8, Aug. 2018, Art. no.e2005354.

[5] X. Xiaoyun, H. Chaofei, Z. Weiqi, C. Chen, L. Lixia, L. Queping, P.Cong,

Z. Shuang, S. Juan, and C. Xiang, ''Possible involvement of F1F0-ATP synthase and intracellular ATP in Keratinocyte differentiation in normal skin and skin lesions,'' *Sci. Rep.*, vol. 7, Feb. 2017,

Art. no.42672.

[6] Bewley, ''The neglected psychological aspects of skin disease,'' *Brit. Med. J.*, vol. 358, p.

3208, Jul. 2017.

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