Artificial Intelligence for Curing Skin Disorders

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Abstract

Skin disorder is something that everyone goes through in their life time. Skin disorder can lead to major problems and disease both physically and psychology. A person having skin diseases have to go through both physical and mental pain, as when the person goes out he is discriminated in the society. And the skin specialist cost a lot to just tell you which disease he is going through and what medicine he should take. In this paper we will discuss about an AI model which we will train using image classification algorithm to detect skin disorders and tell the user which medicines he should take. By implementing and using this model we can provide a global solution for skin disorders treatment.

Keywords: *image classification algorithm, skin disorder, skin specialist, model.*

I. INTRODUCTION

There are different types of skin disorders, this disorders varies from location to location due to climatic factor. Skin disorders vary greatly depending on symptoms, some skin disorders are permanent and some are temporary. Some skin disorders are painful and some are pain less. Some skin disorders are minor whereas some are life threatening.

Skin disorder not only gives us pain but it's something that one can't keep private ,sometime skin disorder makes the person embarrassed, maybe the person may also suffer from discrimination due to visible skin disorder. Few of the common skin disorder that is found globally are listed below:

A. Acne

This one of the most common disorders, it commonly can be seen on the face, neck, shoulders, chest and few other portions of human body. And this mostly needs treatment and if left un-treated then it can leave scars and may make the skin darker.

B. Hives

This occurs when one come in contact with allergen, this are red and warm. And it's also painful to touch. They can be in small round shapes or in ring shape or any other random shape.

C. Latex allergy

It is one of the skin disorders whom urgent treatment should be provided. This disorder is said to be medical emergency. This allergy occurs due to latex particles, latex particles when come in contact to skin can cause rash, itchy red wheals and all this within minutes of getting exposed to latex particles.

D. Eczema

Eczema cause hair loss in the area where the rashes are formed and eczema makes area red, itchy, oily and white and scary.

E. Measles

Measles symptoms conclude of fever, sore, throat, watery eyes etc. In 3-5 days from the first symptom is appeared red rash spread from face to body. Small red spots with blue-white centers appear inside the mouth.

This was few examples of skin disorders. Now let's talk about other problems that one has to face when they visit a skin specialist. The problems are listed below:

i. Skin specialists are too much expensive, and if we have disorders that do not affect us much than, we mostly avoid seeing a doctor.
ii. There is mostly a big line at the door of skin specialist and one have to wait there for hours in order to see a skin specialist. And it wastes a lot of their productive time.
iii. Sometimes one has to travel long distances in order to see a skin specialist.

II. MODEL DESCRIPTION

Our model uses classification algorithm to train a model that can classify different images of skin disorders in different categories. We use simple image classification algorithm to do the training. Basically what a classification algorithm does is that it trains a model by giving it lots of images with labels and machine takes those images, labels and trains itself for giving back the label whenever it sees a similar image that could be a proper match for its model.

So once the model is trained we do testing, as knowing how accurate our machine is very important as our model will be used to suggest medicine to patents of different skin disorders and wrong detection can led to wrong medication and wrong medication can result in dangerous reaction in body. So for

designing a proper model we have to be sure that we provide exactly equal amount of images with proper labels for all skin disorders. And also as many images we provide the model will be that much accurate. And the images should be taken from possible all direction so to create a very accurate model that gives result very precisely.

Let's say N is the total number of images that one is providing to train a model and n is total number of images for each disorders, D is total number of disorders then

$$D= N/n$$

And,

$$N \text{ directly proportional to Accuracy}$$

But as D will be some constant for a model, so n will also be directly proportional to N, and if N increase then n will also increase to keep D constant.

III. DATASET CREATION

We will need a very big dataset to make an accurate model, and our dataset should be created keeping all image requirements in mind. So for making proper dataset we can go to different skin specialist and then take images of skin disorders from patents directly and make sure we take images from all possible angle and once we have a good amount of images we should then add labels to them and create our dataset. At least if we design a model then we will be taking 44 common disorders in consideration, so for designing an accurate model for detecting a proper classification of image of skin disorder from this 44 common disorder. So for making an accurate model of

$$D=44$$

We need

$$n=10000,$$

For training 60000 images and for testing and validation 40000 images
We know

$$D=N/n$$
$$N= D*n$$

$$N=44*10000$$

$$N=440000 \text{ images}$$

Therefore for making an accurate model for 44 different common skin disorders we will need 440000 images.

IV. DEPLOYING MODEL IN APPLICATION

According to theverge there are more than 2 billion active android devices out there globally. So we can start by making an application using java, xml and kotlin for android and later we can create applications for all remaining platforms or instead we can use react.js to create a native application. So we can create an application for providing an interactive and easy to understand UI to our users. And we can upload our model to the server. The basic function will be something like, user will boot our application from his device and take image of the disorder and then our application will automatically upload that image to the server and return back the label for image, label will be the disorder name and then our application will look into its database and prescribe medication for the disorder that our model detected.
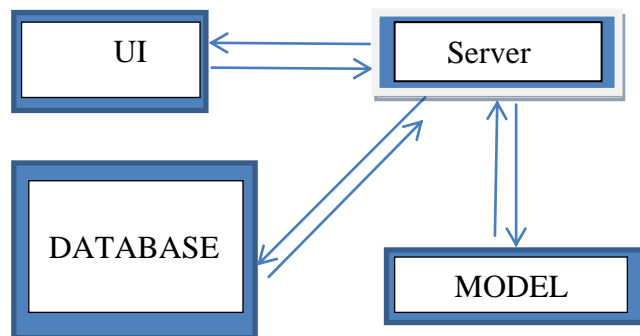
V.FUNCTIONS OF MODEL

In this portion of paper we will learn about how the model functions, how our UI passes the image and then how our model return the name of the disease in that image.
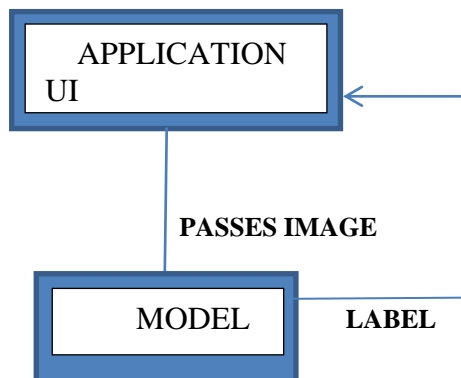
Our application passes the image to the model that's stored on the server, so once the model get the image it basically convert it into the data it has in its model using Application programming interface of tensor flow. And then compare it will all different value it have in its model for different disorders and at last returns the one that either matches or is closest to the value. Instead of returning the value , it convert the matched value into string that represent that value, string is the name of the disorder and the pass the string, which also the label.

VI. CONCLUSION

We can use this model along with application to help all the patents suffering from skin disorder and it will cost no money to just use this application to find out which medication to take and what is the name of

disease one is suffering from. It can help the patent to save both money and time, and in case the disorder is very dangerous we can

Simply suggest nearest skin specialist to our patent. It can be further modelled and designed to detect and suggest medication for other types of skin disorders too.

REFERENCES

[1] K.Fukushima, "Neocognitron: A self-organizing neural network model for a mechanism of pattern recognition unaffected by shift in position," Biological cybernetics, vol. 36, no. 4, pp. 193–202, 1980.

[2] Y.LeCun, L. Bottou, Y. Bengio, and P. Haffner, "Gradient-based learning applied to document recognition," Proceedings of the IEEE, vol. 86, no. 11, pp. 2278–2324, 1998.

[3] Y.LeCun, Y. Bengio, and G. Hinton, "Deep learning," Nature, vol. 521, no. 7553, pp. 436–444, 2015.

[4] "Online: available at http://www.technologyreview.com/featuredstory/ 513696/deep-learning/,."

[5] C.Szegedy, W. Liu, Y. Jia, P. Sermanet, S. Reed, D. Anguelov, D. Erhan, V. Vanhoucke, and A. Rabinovich, "Going deeper with convolutions," arXiv preprint arXiv:1409.4842, 2014.

[6] K.Simonyan and A. Zisserman, "Very deep convolutional networks for large-scale image recognition," arXiv preprint arXiv:1409.1556, 2014.

[7] M.D.Zeiler and R. Fergus, "Visualizing and understanding convolutional networks," in Computer Vision–ECCV 2014. Springer, 2014, pp. 818–833.

[8] D.Eigen, J. Rolfe, R. Fergus, and Y. LeCun, "Understanding deep architectures using a recursive convolutional network," arXiv preprint arXiv:1312.1847, 2013.

[9] D.Erhan, P.-A. Manzagol, Y. Bengio, S. Bengio, and P. Vincent, "The difficulty of training deep architectures and the effect of unsupervised pre-training," in International Conference on artificial intelligence and statistics, 2009, pp. 153–160.