International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 07 Issue: 08 | Aug 2020 www.irjet.net p-ISSN: 2395-0072

Skin Disease Detection and Analysis using Machine Leaning Techniques

Sujatha R[1], Ranjitha S[2], Anitha E[3]

[1]*Student, Dept. of computer Science and Engineering, St.Joseph's Institute Of Technology, Chennai-119, Tamil Nadu, India*
[2]*Student, Dept. of computer Science and Engineering, St.Joseph's Institute Of Technology, Chennai-119, Tamil Nadu, India*
[3]*Student, Dept. of computer Science and Engineering, St.Joseph's Institute Of Technology ,Chennai-119, Tamil Nadu, India*

Abstract - *Dermatological diseases are the foremost prevalent diseases worldwide. Despite being common, its diagnosis is extremely difficult and requires extensive experience within the domain. During this project, we provide an approach to detect various types of these diseases. The infected skin is subjected to RESNET classifier and RESUNET segmentation model on the histopathological attributes of the skin. The RESNET is a type of Convolutional Neural network (CNN) that can be used for prediction models. Our objective of the project is to detect the type of skin cancer easily with accuracy and recommend the simplest and global medical suggestions. The patient provides a picture of the infected area of the skin as an input to the prototype. . The input is passed on the RESNET classifier and RESUNET Segmentation model where the model predicts the type of skin cancer. These methods are being applied on a data set of skin cancer images. The proposed system is very beneficial in rural areas where access to dermatologists is restricted. For this proposed system, we use Pycharm based python script for experimental results.*

***Key Words*: RESNET, RESUNET, Machine Learning, Pycharm.**

1. INTRODUCTION

Dermatology is one among the foremost unpredictable and tough terrains to diagnose due its complication. In most developing countries, it's costly for an oversized range of individuals to consult a medical specialist. The ever present use of smart phones in an exceedingly developing country has opened new avenues for inexpensive identification of diseases. Skin disease is an abnormal condition of the skin. Skin plays an important role in protecting the body from harmful bacterial, fungal and parasitic infections. Hence the correct diagnosis of skin disease is crucial. Various factors causing skin diseases and affecting skin disorder pattern are genetics, occupation, nutrition, habits, etc. Geographical factors like season and climate also affect. In developing countries, overcrowding and poor hygiene are responsible for spreading of skin diseases. The type of skin diseases varies among different countries. Moreover, remote areas are severely affected. We will use the camera technology present in all Smartphone and exploit the image processing capabilities of the device for diagnosing. We've developed an application to tackle the matter. The RESNET classifier model is used for a near fool proof answer. Problem for the medical diagnosis is that a sickness might show the options of one sickness within the initial stage and will have the characteristic options of another within the following stages.

1.1 TECHNIQUE

Usually a biopsy is necessary for the diagnosis but these diseases share many histopathological features as well. This issue is solved by using RESNET classifier and RESUNET segmentation models on the clinically evaluated features which are determined by an analysis of the skin samples under the microscope. Our model uses the process od masking and Run Length Encoding (RLE) is being passed onto the CNN where the model is built on a IMAGENET model where its being trained upon the training data and the precited result is being passed on to the next phase of RESUNET Segmentation model where the results from the image segmentation is done on each pixel values and the specific parts of the defective products is being highlighted and shown to the user. Owing to the subjective nature of diagnosis, medical students find it difficult to verify their diagnosis. This system acts as an effective learning tool, aiding verification of their results as they have access to clinical data. We have achieved higher accuracies using an ensemble of Machine Learning algorithms.

1.2 APPROACH

The identification of skin condition from dermotoscopy images are treated as image classification problem. The tradition approach of image classification needs strong feature illustration that is feed to the classifier for training. Image analysts are using various fundamentals of the interpretation while we are using these visual techniques. The image processing is not confined to area that has to be studied only on knowledge of analyst. Association is one another important tool in image processing through the visual techniques. So, the analysts apply a combination of personal knowledge and collateral data to image processing using the computers. As, the raw data from imaging sensors

from satellite platform contains some deficiencies. To get over such deficiencies and to get the original information, it has to undergo various stages of pre-processing. There is this three general stages that all types of the data have to undergo while using the digital technique are Pre-processing, Enhancement and display, Information extraction**.** This project aims to detect the skin cancer from the input images given by the patients and also provide the percentage of the cancer.

The purpose of this is to explain brief in analysis task and also to establish the complete information about the concept, behavior and other constraints such as performance measures and system optimization. The goal of System Analysis is to completely specify the technical details for the main concept in a precise and unambiguous manner. So, inspired by the medical diagnostic procedure several color, texture and form features are accustomed to characterize the skin lesion. However, it's significantly difficult to develop strong feature illustration to handle the dermotoscopy images obtained from totally different acquisition devices and captured in numerous illumination conditions.

2. METHODOLGY

The whole system would be implemented in Python using Pycharm. The image of the infected skin is captured and pre-processed. The next step involves in the training of all the input images to train the system. Then, it will produce the result of the infected skin by machine learning algorithm. Then it involves in the training of all the input images to train the system. After which, it will produce the result of the infected skin by machine learning algorithm. The entire system would be implemented in Python using open source libraries. System Architecture diagram roughly summarizes the entire process that takes place in the prediction of the skin cancer from the automated process. Obtaining data set from Ham10000 website in the form of both image and csv linked together via a image id.

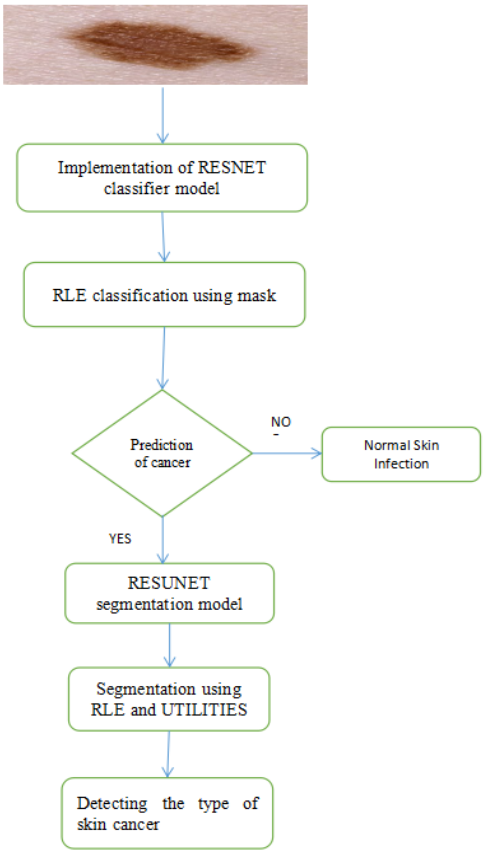

Fig -1: Architecture Diagram for Skin Cancer Detection

We use a combination of two models RESNET Classifier and RESUNET Segmentation model. RESNET and RESUNET are types of CNN models where there are trained on a Image Net pretrained Model where the weights are feezed. The predicted image is generated with pixel level defect detection. . Here we also know that 25% of the data is used for testing purposes and the other 75% is used for training of the data.In RESNET Classifier Model, the input image is being resized into a specific size. The mask is being applied onto the model to detect the type of cancer. To reduce to length of the mask RLE is used and the same process is carried out on the input image which gives lossless compression of the image. The input image is then passed onto the ImageNet network and the model is being trained. The trained classifier predict whether the skin disease is cancer or not. The cancer images got to next step to find the type of cancer and next RESUNET classifier Model helps to Create a list to pass classid, imageid and RLE onto the image generator. A user-defined process to pass the classid, imageid and RLE to create image generator. In this, the feature rich images are fed into the training set. For the implementation, we have used the Keras library in Pyhton to run the machine learning algorithm. At first two layers are added with a rectifier function and then adding a pooling layer of 2*2 matrix. Then the pooled images are converted into a continuous vector, the hidden layer is then added.

The implementation of the model is done to classify whether the input image of the skin is infected or not. Each infected skin image is being masked with infected part and sent to the next model to segment the affected area of the skin. The RESNET model consists of a convolution, polling and flattering process and at last it is being passed onto the hidden layers of the model. It also gives the Confusion Matrix of 2*2 matrix for 2 classes. The implementation of the model is done to locate the specific area of the affected/infected skin in a pixel level and show it to the user. User defined loss functions is preferred than the normal loss functions for the better accuracy. The input image is passed a normal image where the trained model predicts the infected area with the help of available class id, image id, RLE and the image which is merged and passed onto the model predicts the infected area of the skin in the image.

Once all the layers are added, the model is compiled and saved as a h5 file which is loaded on the front end so that we don't have to train the model everytime. The interface is made using tkinter module in Python. It is given a button in which we can open the file explorer to select the file. After this, to show the result there is another button which is to be pressed will analyze the image and display the output. In this step, Convolution operation is performed on the input and the results are passed to the further layers. By the training, at this stage the system will predict the chance of having skin cancer. Loss functions are defined by the user. Model is trained and prediction output is obtained.

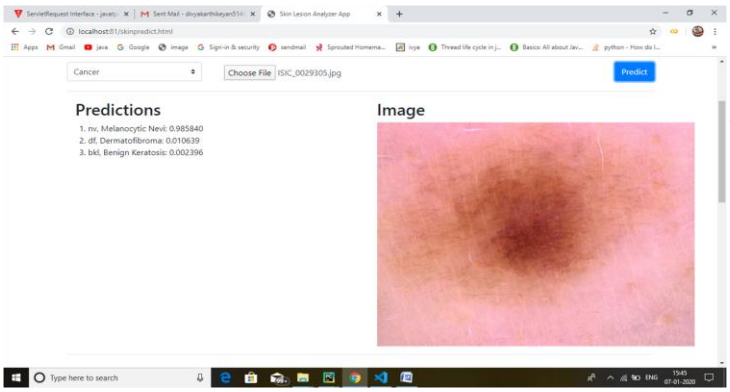

Fig -2: User Interface of Skin Cancer Detection

3. CONCLUSIONS

The proposed system is able to successfully detect the dermatological disease present in the image. It can be used to help people from all over the world and can be used in doing some productive work. The tools used are free to use and are available for the user, hence, the system can be deployed free of cost. Though the machine learning data-set was small, the system was able to identify the disease with minimum error. The application developed is light-weight and can be used in machines with low system specifications. It has also a simple user interface for the convenience of the user. The image processing and machine learning algorithms were successfully implemented. Furthermore this project can be enhanced by suggesting the Medical prescription for the type of the skin disease.

ACKNOWLEDGMENT

I would like to thank Ms. E. Anitha, Assistant Professor, Department of Computer Science, St. Joseph's Institute of Technology, Chennai, India for guiding us in every aspect of this project and provided us knowledge to complete it.

REFERENCES

[1] Okuboyejo, Damilola A, et al. Automating Skin Disease Diagnosis Using Image Classification.|| Proceedings of WCECS 2013, October 23 - 25, 2013, San Francisco, USA, IAENG Open Access Publication, 24 Oct. 2013, www.iaeng.org/publication/WCECS2013/.

[2] Ajith, Archana, et al. Dermatological Disease Detection Using Image Processing and Artificial Neural Network.|| Dermatological Disease Detection Using Image Processing and Artificial Neural Network - IEEE Conference Publication, 15 June 2015, ieeexplore.ieee.org/document/7026918/.

[3] Ambad, Pravin S., and A. S. Shirat. A Image Analysis System to Detect Skin Diseases.|| Index of /Iosr-Jvlsi/Papers/vol6-issue5/Version-1, 1 Oct. 2016, www.iosrjournals.org/iosrjvlsi/papers/vol6-issue5/Version-1/.

[4] Gound, R. S., et al. Number 16 (ISBN: 973-93-80898-01-6).|| IJCA - Number 16 (ISBN: 973-93- 80898-01-6), 16 Jan. 2018, www.ijcaonline.org/archives/volume179/number16/.

[5] Kumar, Vinayshekhar Bannihatti, et al. Dermatological Disease Detection Using Image Processing and Machine Learning.|| Dermatological Disease Detection Using Image Processing and Machine Learning - IEEE Conference Publication, 20 Sept. 2016, ieeexplore.ieee.org/document/7585217/.

[6] Yadav, Prashant B., and S. S. Patil. Dermatological Disease Diagnosis Using Color-Skin Images - IEEE Conference Publication, ieeexplore.ieee.org/document/6359626/

[7] —OpenCV Library.|| OpenCV Library, opencv.org/.

[8] —Keras: The Python Deep Learning Library.|| Keras Documentation, keras.io/..