Type of Skin Disease Identification by Machine Learning Using Python

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Abstract: **It is a challenging factor for doctors even with the existence of emerging technology, to diagnose the skin disease symptoms. Because many people are exposed to serious skin diseases that require them to go to hospitals and go through a number of different expensive medical examinations which takes up to days. The proposed work can solve the above problem to an approachable extent, through the design of a program by Python Machine Learning. A method is based on vectors and pixels classification of the images, and is proposed to identify the five various   types of skin diseases: The diseases are namely Melanoma, Psoriasis, Rosacea, Vitiligo and Xanthelasma. It is a process to detect the type of disease in just a few seconds, making the diagnosis more fast and realistic. The aim of this project is to classify the different diseases based on images given as input. The project is purely based on python software platform. The images are collected from various publicly available databases like DermWeb, Dermnet etc. Here the proposed method is the use of Machine Learning with tensor flow for training the dataset and the SVM Algorithm to classify the five types of skin diseases in Python software. The types of diseases like Psoriasis, Melanoma, Rosacea, Vitiligo and Xanthelasma can be identified and shows the output as the name of the disease in python Software as the output.**

Keywords: **Diseases, Fast Classification, Python, SVM, Machine Learning.**

I.INTRODUCTION

In the day to day life the skin diseases is the disease which is the most common disease of all human health afflictions and it affects millions of people in the world at any time. The ranking of the skin disease in the world is about fourth because it is a common cause of human illness, but many affected people do not consult doctors. To include people who check with the doctors at the time screening examinations were performed randomly on participating visitors. According to the study for about 2700 individual people, at least one skin abnormality was observed in 1,660 of the participants that is for about 64.5 percent [4]. The Psoriasis (26.6 percent), Rosacea (25.5 percent), Xanthelasma (15.2 percent), Vitiligo (23.3%) and Melanoma (11.7 percent). Now a day's the skin diseases are increased with the age due to the atmospheric condtions and they are frequent in men (71.9 percent) than in women (59.5 percent). Most of the affected participants were unaware of their abnormal findings of their skin. The skin diseases are the one varying from small problems like psoriasis to high level skin diseases like cancerous diseases like melanoma [12] and so on. It occurs mostly and affects the diabetic's patients like drying of skin.

The Image processing is one of the emerging technologies which has been growing rapidly in field of medicine. The following equipment like magnetic resonance imaging (MRI), computed tomography (CT) and digital subtraction angiography (DSA) was same of the equipment that are wildly used on people's life that is based on digital image technology. [13]

The aim of the project is to identify the five types of skin diseases which normally occurs to the common human beings and leads to severity and causes death too. The need of the project is the database which consists of two categories: training and testing. Because the training dataset images are used to train the computer and make the computer to learn about the types of diseases. The testing dataset is used for verification and evaluation of the disease [14].

The flow is to collect sample data which will be trained using Python with help of dependencies modules tensor flow with its classification using the SVM Algorithm [12] and processed through the image processing in Python software with the testing data then the types of diseases like Psoriasis, Melanoma, Rosacea, Vitiligo and Xanthelasma can be identified and shows the output as the name of the disease in python Software.

The main objective of this paper is to design a program using the python to detect human skin diseases [14] at an early stage. The outcomes are stated below:

1. To be able to classify the images based on the type of disease by SVM Classifier.
2. To come up with a training model that can be used for testing.
3. To create a Graphical User Interface (GUI) for making it easy to understand.

II. PROPOSED SYSTEM

The objective of this project is to classify the different diseases based on the test image which is given as input. The project is based on python software platform. The dataset images are collected from publicly available databases like Dermnet, DermWeb, etc. In the First Step, the sample images of five skin diseases need to be pre-processed using the SVM [11] and tensor flow. Secondly, the SVM is needs to train with the tensor flow and made corresponding geometric transformation pixels. Based on this, five types of

skin diseases features are extracted, and their correlated parameters of pixels of skin areas are collected from image segmentation which is done by pillow and numpy. Finally, by running the program the testing image is uploaded in the a GUI interface appears which will appear, then the random image is run for testing which will show up that what kind of disease it is whether it is Melanoma or Psoriasis or Rosacea or Vitiligo or Xanthelasma by utilizing the support vector machine (SVM) [12] for the classification of the diseases and the name of the disease is shown as the output.

It has two sections:
- a) Preparing / Training Section
- b) Classification / Testing Section
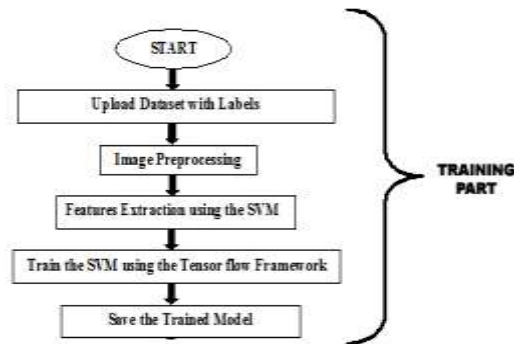
a) Preparing / Training Section

Fig 1. Preparing / Training Section

Start: Initially the required software and the supporting modules should be installed in the computer as the dependencies to create, train and test the program.

Upload Dataset With Labels: The Data set which are collected from the various well known websites or from the doctors are to be loaded in to the program with the help of tensor flow minimum of hundred images can help in the better training and able to give good accuracy and the classes needed for image identification is the labeling which can give the output as the required name for the dataset. So the database of the images should be uploaded with labels for classification at the testing part.

Image Pre-processing: The image pre-processing is a technique that firstly the images collected will be resized using the modules pillow and the Numpy and converted them in to array of the images as the matrices. Then the image is processed with the pixels and saved the nearest matching with the pre-processed images can give the relatable output for the excellent outcome.

Feature Extraction Using SVM: The features which mainly extracted from the image are the pixels and vectors in it. The normal or database images are loaded in to the program then the features will get classified when the training process gets started.

Train The SVM Using The Tensor Flow Framework: In this project tensor flow is a main framework which is used to build the model based on the pixels of the image and need not extract any features from the image and the tensor flow has a greater accuracy of training and testing of about 91% accuracy so it is used for training the images as SVM is the algorithm which is presented inbuilt with the tensor flow which is used for the classification purpose of the image. The SVM (Support Vector Machine) will classify the images based on the vectors of the images by drawing a linear line in the image and the pixels of the images which has higher amount is used to classify the image.

Save The Trained Model: The model which has a collection of images with its features has to save for the further proceedings to classify the images. The Model trained has been extracted as .h5 keras file which contains the trained dataset as the numerical values and arrays in to it which helps the SVM for classifying the differences between them.
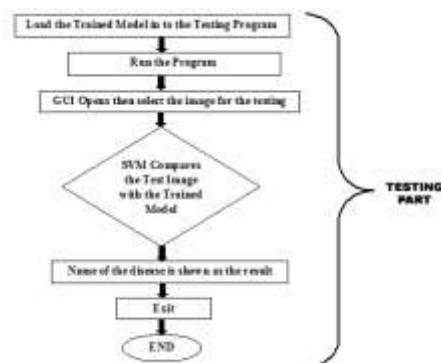
b) Classification / Testing Section

Fig 2. Classification / Testing Section

Load The Trained Model In To The Program: The model which has been saved before will be using here to match with the testing dataset for the classification of the skin disease using the SVM Algorithm. The testing will be done in the further steps.

Run The Program: After the further procedures the testing program has to be run with all the required dependencies. The required dependencies are tensorlow, keras, pillow, numpy , tkinter trained .h5 keras model these are all the required dependencies to run the program for the further classification of the skin disesase all are set then the run the program.

GUI Opens Then Select The Image For Testing: The GUI (Graphical User Interface) it is box opens with the tkinter and pillow dependencies they opens the popup window for selecting the images. Then the testing image for the classification of skin disease needs to be uploaded.

SVM Compares The Testing Image With The Trained Model: The Testing image will match as it is machine learning the hidden work will be taking place within the period of 10-15 seconds the testing image which will match with the trained disease model will be given as the output
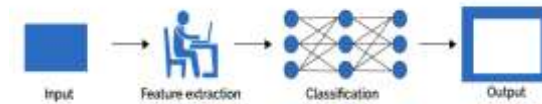

Fig 3. Flow of Classification of the Image

Name Of The Disease Is Shown As A Result: After all the process the upload image will be processed and the name of the classified skin disease will be shown as the output. Whether it is Psroriasis or Rosaciea or Melanoma or Viltiligo or Xanthelasma.

Exit: After the identification the exit has been given ther press enter to exit to avoid the confusion between the results of the image.

III. ALGORITHM USED

Support Vector Machine:
Support Vector Machines (SVM) is considered to be a classification approach, it but can be employed in both types of classification and regression problems. But it can handle the multiple continuous and categorical variables easily. SVM then constructs a hyperplane in multidimensional space to separate the different classes. SVM then generates optimal hyperplane in an iterative manner, which is used to minimize an error in it. The main idea is to detect a maximum marginal hyperplane with the SVM that best divides the dataset into various classes for classification.
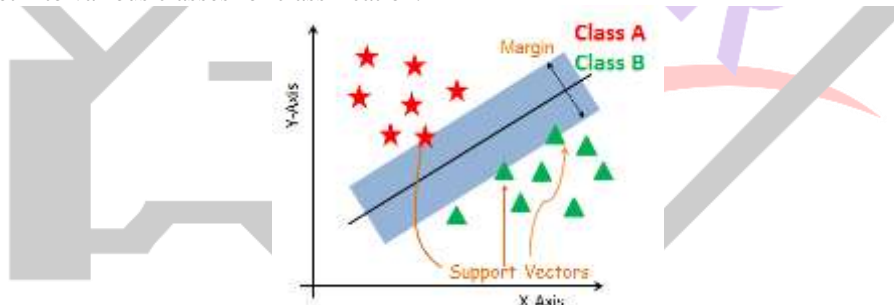

Fig 4. SVM Classification

The dataset given should be segregate in the best possible way is the main objective. The margin is known as the distance between nearest points. The objective is to pick out a hyperplane with the utmost potential margin between support vectors within the given dataset.

Steps followed in SVM Training and Classification

1. Load The Data
First load the required dataset which you   are going to use.
2. Explore The Data
After loading the dataset you can have a check of feature and target names.
3. Split The Data
To understand the performance of model, the dataset should be divided into a training set and a test set is a good strategy for classification.
4. Generate The Model
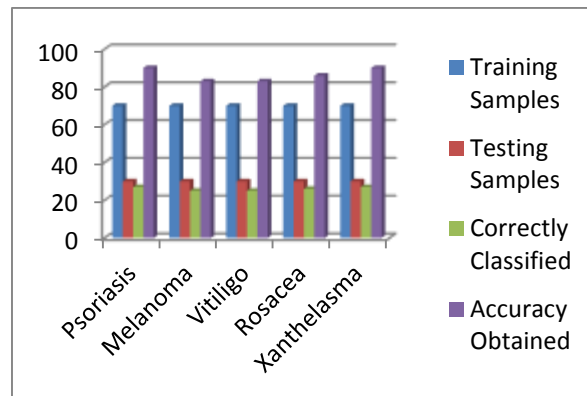Then build support vector machine model.
First, import the tensorflow module and create support vector classifier object with the help of and save the model .h5keras.
Then, fit your model on train set and perform prediction on the test set.
5. Evaluate The Model
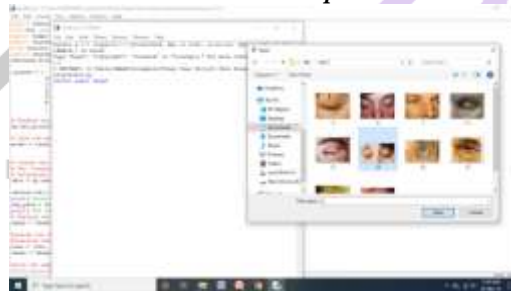Then finally estimate the accuracy by the classifier or model can predict effectively.
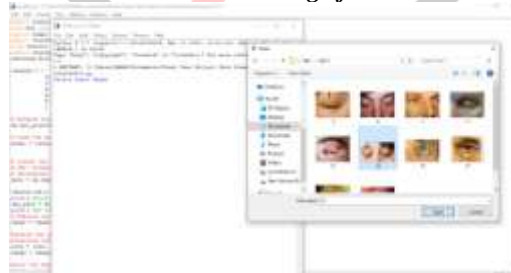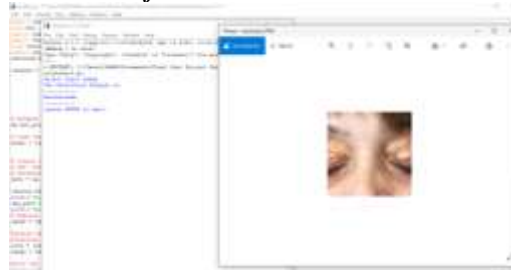
IV.RESULTS

STEP 1: Run the Module

STEP 2: GUI Opens

STEP 3: Select the test image from the dataset

STEP 4: The classified skin disease name will be the output

V. CONCLUSION

Skin diseases seriously affect people's lives and health. The current project proposes an effective approach to identifying five types of skin disease. It is necessary to change traditional methods and develop automatic methods to increase diagnostic accuracy of multi-species dermatological diseases. In this project, five types of skin diseases were identified as Melanoma, Psoriasis, Rosacea, Vitiligo, and Xanthelasma. The program is designed through the PYTHON program using machine learning technology which will detect and identify dermatology pixels of the skin. This project will serve a large segment of the society and solve the problem of the difficulty of identifying the types of skin diseases that are exposed to the human, because of the similar effects and symptoms that the patient feels and will certainly contribute to the discovery of skin diseases early and faster.

The devise of skin disease detection has been gone through a several of testing stages in order to achieve more accurate image processing for that we have done testing using PYTHOn program on three five diseases. This project was very useful to increase our understanding in programming using python language as we conformed the testing result by performing images to confidence on identification for Psoriasis, Melanoma, Xanthelasma, Rosacea and Vitiligo diseases. As we have predicted the outcome of system detection has been used with GUI technology to make it as an assistant for all users including doctors and nurses so it can be used on the hand of any person whether he/she was a professional, programmer or a normal person.

As the objective listed in the first chapter we have achieved the five main basics of classifying images using the tensoflow module and SVM algorithm and predicting the disease each time when an image is loaded in the testing system and a training model has been successfully compare the testing image image with the trained model and the accurate results. Graphical User Interface GUI in to the system to make it much easier to be used and we have completed these five diseases classifiction in a very successful way including feature like pixels extraction classification on images of different diseases that has been fetched from the user and not included in database system but will be compared with this particular database. The use of the skin diseases detection device is one of the most important devices that will positively affect the medical field in terms of detecting the disease early and determine the quality of drugs faster and also work to reduce the number of patients because they will not need to spend long time in the hospital to carry out the examination procedures that Also take the time of nurses and doctors so that the process becomes faster and we keep time for other diseases that require several procedures to complete the examination. The development of the skin diseases detection system in all aspects, including the method of receiving the system of images, how to extract the features from the images and increase the accuracy of the work of the project will make a significant difference for users in the community benefit and reduce diseases.

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