

SKIN DISEASE USING SVM

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Abstract: - In most developing countries, it is expensive for a large number of people. According to World Health Organization (WHO), skin diseases are the most common non-communicable diseases in India. The ubiquitous use of smartphones in developing countries like India has opened up new avenues for inexpensive diagnosis of diseases. The camera in smartphones can be used to exploit the image processing capabilities of the device for diagnosis. The proposed system deals with the creation of an application that helps in diagnosis of Skin disease. It uses image processing and machine learning technology to detect diseases. The system consists of 2 parts- image processing and the machine learning. The image processing part deals with applying various filters to the images to remove noise and make them uniform. It is necessary to remove the unwanted elements from the image before processing else it will affect the output efficiency. The Machine learning part deals with the processing of data and generation of result.

Keywords-Machine Learning, Support Vector Machine, Artificial Neural Network

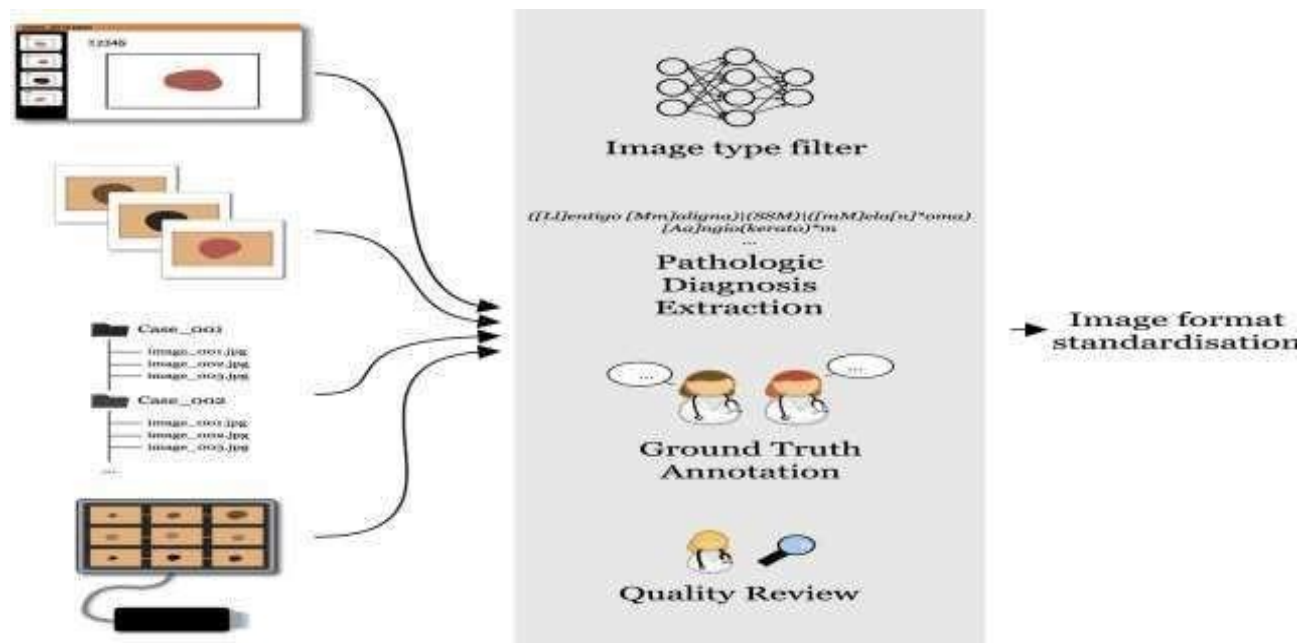
I INTRODUCTION

Skin is the outer most region of our body and it is likely to be exposed to the environment which may get in contact with dust, Pollution, micro-organisms and also to UV radiations. These may be the reasons for any kind of Skin diseases and also Skin related diseases are caused by instability in the genes this makes the skin diseases more complex.

Importance of the project

The most unpredictable and difficult terrains to diagnose due to

its complexity. In most developing countries, it is expensive for a large number of people. According to World Health Organization (WHO), skin diseases are the most common non-communicable diseases in India. The ubiquitous use of smartphones in developing countries like India has opened up new avenues for inexpensive diagnosis of diseases. The camera in smartphones can be used to exploit the image processing capabilities of the device for diagnosis. The proposed system deals with the creation of an application that helps in diagnosis of Skin disease.



Motivation

One of the developing countries that need a lot of attention in order to improve the life style of its citizens. Technology needs to be improved on many aspects, especially in the medical field, because of its sensitivity and effect in human lives which requires accurate and objective diagnosis, one of the important

and common regions is the branch of medicine that dealing with the skin, nails, hair and its diseases which is called Dermatology.

Scope

Assist the human’s ability to analyze complex information. Artificial Intelligence is taking up automation in all fields of application even in the healthcare field.

II LITERATURE SURVEY

Sr. No	Title of the Paper	Authors	Month & Year	Observations
1.	Dermatological Disease Detection using Image Processing and Neural Networks.	Mrs. S.Kalaiarasi,Harsh Kumar,Sourav Patra	April 2018	Dermatology, image Processing, Machine Learning.
2.	Skin disease detection using artificial neural network Neural Network.	D.s Zingade,Manali Joshi,Viraj Spare,Rohan Giri	December 2017	Image preprocessing, Back propogation, ANN algorithm.
3.	Skin disease detection models Using image processing segmentation and feature extraction.	Nisha Yadav Virendra Kumar Narang Utpal shrivastava	March 2016	Image processing, Classification model and skin disease prediction.
4.	Skin disease classification using convolutional neural network	Simon Schafer , Christian LUudwigs	May 2018	Skin Disease Classification, Neural Networks.
5.	An Intelligent System to diagnosis the skin disease	Manish Kumar and Rajiv Kumar	October 2016	Dermatology,KNN, active contour,ROI,contrast,mean value

III RELATED THEORY AND PROBLEM DEFINITION

Problem Definition

Skin diseases rate has been increasing for past few decades, many of these diseases are very dangerous, particularly if not treated at early stages. In Sudan skin diseases are big issue, according to the latest WHO data published in May 2014 Skin Diseases Death in India reached 1,974 or 0.76% of total death. The age adjusted death rate is 9.81 per 100,000 of population.

SkinDiseases Related Theory

This project uses neural networks to achieve the results. Along with this the user interface of the application is developed using module in python. All of the mentioned processes are done in python. The image processing is done using the pillow and Tesorflow modules whereas the machine learning is done using Keras module in python. Conventional neural networks (SVMs) or connectionist systems are computing systems vaguely inspired by the biological neural networks that constitute animal brains. Such systems learn (i.e. progressively improve performance on) tasks by considering examples, generally without task-specific programming. An SVM is based on a collection of connected

units or nodes called artificial neurons (a simplified version of biological neurons in an animal brain). Each connection (a simplified version of a synapse) between artificial neurons can transmit a signal from one to another. The artificial neuron that receives the signal can process it and then signal artificial neurons connected to it.



1. Acne Back Images



2. Amelanotic Melanoma



3. Atypical melanocytic naevus



4. Atypical mycobacterial infection



IV IMPLEMENTATION

Implementation of Proposed System:

Our model is designed in 3 phases as follows:

A. Phase 1 – the first model involves collection of dataset, the images are collected from ISIC dataset (International Skin Imaging Collaboration) Phase 1 also involves the pre-processing of the images where hair removal, glare removal and shading removal are done

B. Removal of these parameters helps us to identify the texture, color, size and shape like parameters in an Efficient way.

C. Phase 2- this phase consists of the segmentation and feature extraction, segmentation is explored via three methods a. Otsu segmentation method b. Modified Otsu segmentation method c. water shed segmentation method. Feature are extracted for color, shape, size and texture.

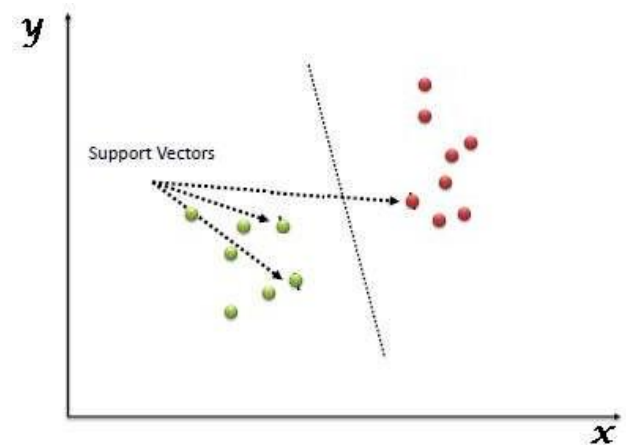
D. Phase 3- this is the most important phase of our model, this phase involves designing of the model and training. Our model

was trained for Back Propagation Algorithm SVM (Support Vector Machine) on the dataset that was collected in the phase 1, the model after training was tested for the accurate output.

Algorithm Used :

SVM (Support Vector Machine)

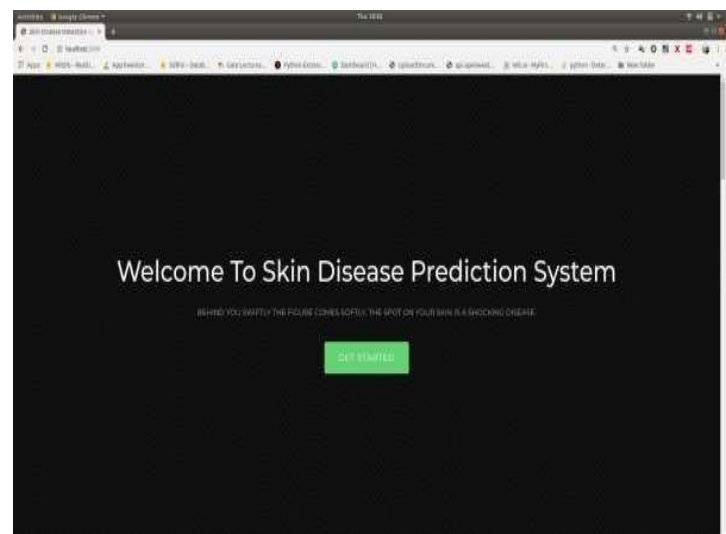
“Support Vector Machine” (SVM) is a supervised machine learning algorithm which can be used for both classification or regression challenges. However, it is mostly used in classification problems. In the SVM algorithm, we plot each data item as a point in n-dimensional space (where n is number of features you have) with the value of each feature being the value of a particular coordinate. Then, we perform classification by finding the hyper-plane that differentiates the two classes very well (look at the below snapshot). Support Vectors are simply the co-ordinates of individual observation. The SVM classifier is a frontier which best segregates the two classes (hyper-plane/line).

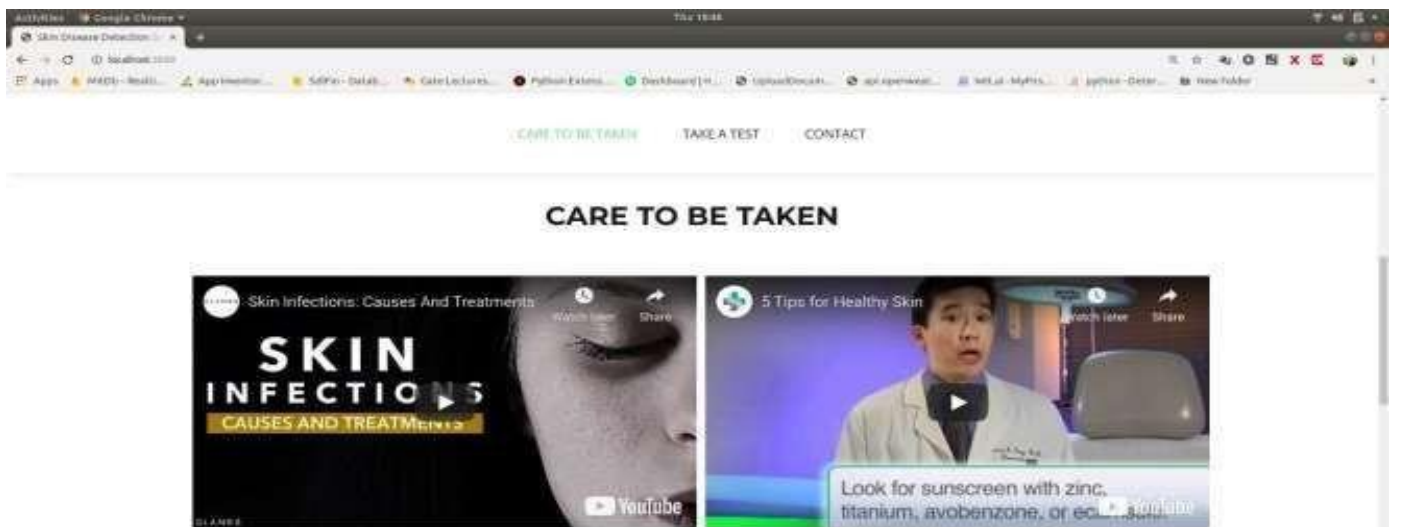
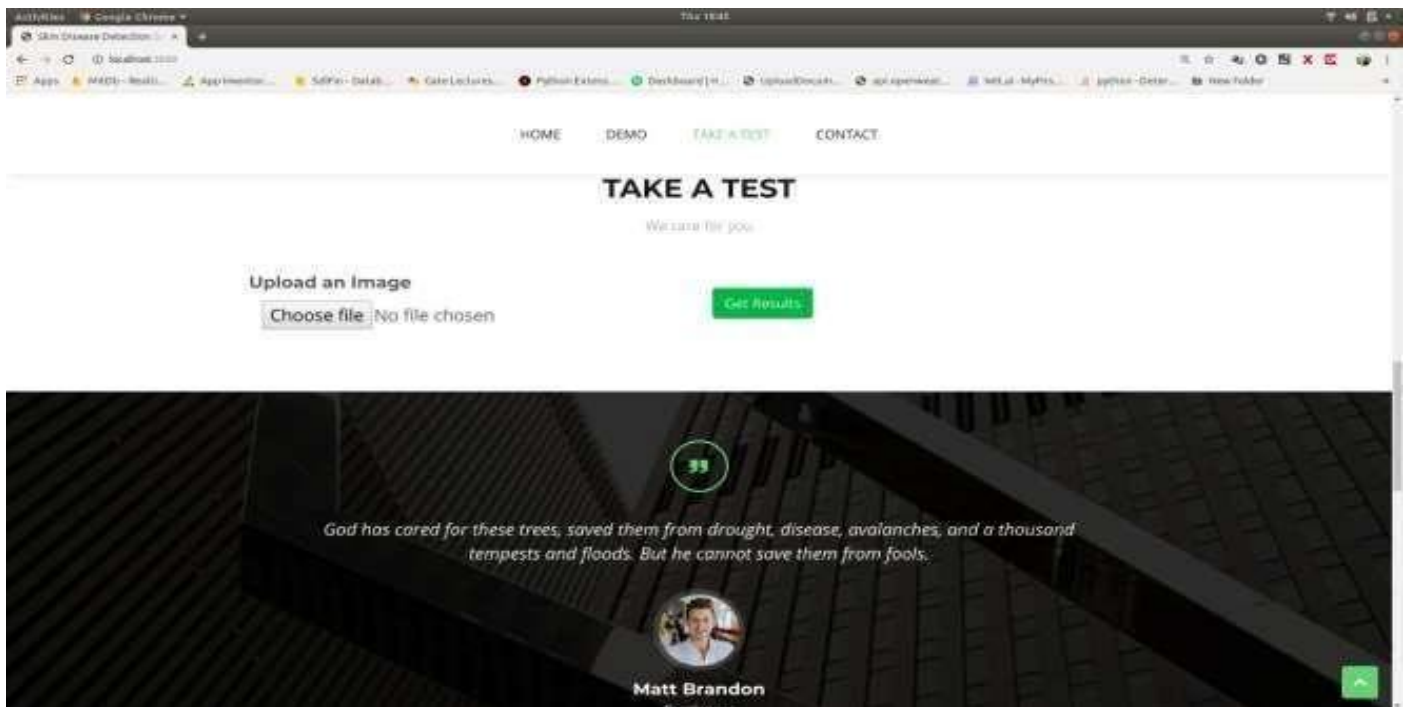


SVM (Support Vector Machine)

V RESULT AND DISCUSSION

Result





VI CONCLUSION AND FUTURE SCOPE

Conclusion

The aim of this project is to determine the accurate prediction of skin cancer and also to classify the skin cancer as malignant or non-malignant melanoma. To do so, some pre-processing steps were carried out which followed Hair removal, shadow removal, glare removal and also segmentation. SVM and Deep Neural networks will be used to classify. classifier will be trained to learn the features and finally used to classify. The novelty of the present methodology is that it should do the detection in very quick time hence aiding the technicians to perfect their diagnostic skills. The dataset used is from the available ISIC (International Skin Image Collaboration) dataset, hence any dataset can be used to find the efficiency.

- Enhance the application interface to be more user friendly for better user experience policies.
- Develop a distributed system for skin diseases diagnosis to resolve the single server limitation, and increase the processing capabilities.
- Enhance the functionality of the system to be more useful by giving advices for the users about the disease treatment
- The system may be combined with other medical systems to propose an integrated medical care services

Future Scope

The proposed modifications of the skin diseases diagnosis system are generally to increase the performance of the system, resolve the system limitations, or to increase its capability. So, there are several suggested modifications to both the system core model and the system mobile interface:

- Increase the training data used for training the model, not only in term of quantity but also obtaining more data from different resources namely collecting data from hospitals and healthcare centers, to increase the learning model generalization.
- Apply better preprocessing techniques to resolve the images distortions.
- Apply training data of more classes, that the model will be capable to recognize and diagnose more diseases.
- Develop a cross-platform application to work on different mobile platforms, which will increase the number of system users.

REFERENCES

- [1]"World life Expectancy," [Online]. Available: <http://www.worldlifeexpectancy.com/sudan-skin-disease>.
- [2]M. I. Antkowiak, "Artificial Neural Networks vs. Support Vector Machines for Skin Diseases Recognition," 2006.
- [3]R. E. Woods, Digital Image Processing, Second Edition,

2001.

- [4]A. A. A. a. H. A. A. M. Hassaballah, Image Features Detection, Description and Matching, Springer International Publishing Switzerland, 2016.
- [5]A. P. J. a. A. P. V. A. Dilipsinh Bheda, "A Study on Features Extraction Techniques for Image Mosaicing," International Journal of Innovative Research in Computer and Communication Engineering, vol. 2, no. 3, 2014.
- [6]J. R. Edouard Oyallon, "An Analysis of the SURF Method," 2015.
- [7]C. Tomasi, "pdfs.semanticscholar.org," [Online]. Available: <https://pdfs.semanticscholar.org/8086/99bacf0cc91a38fa77b6af5a9f91dc25d127.pdf>. [Accessed 10 5 2017].
- [8]N. A. Megha Gupta, "CLASSIFICATION TECHNIQUES ANALYSIS," in NCCI 2010 -National Conference on Computational Instrumentation, Chandigarh, 2010.
- [9]T. N. Phyu, "Survey of Classification Techniques in Data Mining," in International MultiConference of Engineers and Computer Scientists, Hong Kong, 2009.
- [10]S. B. K. • I. D. Z. • P. E. Pintelas, "Machine learning: a review of classification and combining techniques," 2007.