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Skin Diseases Recognition using machine learning

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Abstract: -

Skin is an Extra-ordinary human structure. People frequently suffer from many known and unknown diseases. There are the large number of spread diseases and some of them are the most common disease in the world. The diagnosis of these diseases are very difficult because of its difficulties in skin texture, presence of hair on skin and color. Due to the lack of medical facilities available in the remote areas, patients usually ignore early symptoms which may be worsen the situation as the time progress. The diagnosis of skin Disease also take longer time. It is required to develop methods of diagnosis using machine learning in order to increase the accuracy of diagnosis for various types of skin diseases. Machine learning techniques are widely used in medical fields for diagnosis. These algorithms use feature values from images as input to make a decision. The process consists of three stages-The feature extraction stage, the training stage and the testing stage. The process makes use of machine learning technology to train itself with the various skin images. The objective of this process is to increase accuracy of skin disease detection. Three important features in image classification are texture, color, shape, and combination of these. In this work, color and texture features are used to classify the skin disease. Normal skin color is different from the skin with disease. Smoothness, coarseness, and regularity is effectively identified using texture features in the images. Hence, these two features are explored to identify skin disease effectively. In this work, entropy, variance and maximum histogram value of Hue-Saturation-Value(HSV) features are used. These features are used to build machine learning algorithm by using Decision Tree(DT)and Support Vector Machine(SVM). At first level, entropy measure is used to split the tree. At second level, variance is used to get leafs for textures. In color features, maximum histogram value of HSV measure is used to split the tree. Accuracy is used to test the performance of the proposed algorithm.

KEYWORDS: SKINDISEASE, CNN, IMAGE CLASSICICATION.

Introduction:-

Artificial Intelligence is taking automation in all field of application even within the health care fields. Skin diseases are more common than other diseases. Skin diseases may be caused by fungal infection, bacteria, allergy, or viruses, etc. The majority of skin diseases is caused by unprotected exposure of UV rays. A skin disease may change texture or color of the skin. In general, skin diseases are chronic, infectious and sometimes may develop into skin cancer. Therefore, skin diseases must be diagnosed early to reduce their development and spread. The diagnosis and treatment of a skin disease takes longer time and causes financial and physical cost to the patient. In general, most of the common people do not know the type and stage of a skin disease. Some of the skin diseases show symptoms several months later, causing the disease to develop and grow further. This is due to the lack of medical knowledge in the public. Sometimes, a dermatologist (skin specialist doctor) may also find it difficult to diagnose the skin disease and may require expensive laboratory tests to correctly identify the type and stage of the skin disease. The advancement of lasers and photonics based medical technology has made it possible to diagnose the skin diseases much more quickly and accurately. But the cost of such diagnosis is still limited and very expensive. Therefore, we propose an image processing-based approach to diagnose the skin diseases. This method takes the digital image of disease effect skin area then use image analysis to identify the type of disease. Our proposed

approach is simple, fast and does not require expensive equipment's other than a camera and a computer.

Literature Review:-

In this, a system is proposed for the dissection of skin diseases using color images without the need for doctor intervention. The system consists of two stages, the first the detection of the infected skin by uses color image processing techniques, k-means clustering and color gradient techniques to identify the diseased skin and the second the classification of the disease type using artificial neural networks. The system was tested on six types of skin diseases with average accuracy of first stage 95.99% and the second stage 94.016

The author of [1] applied the method to nine types of skin diseases with accuracy up to 90%. Melanoma is type of skin cancer that can cause death, if not diagnose and treat in the early stages.

The author of [2], focused on the study of various segmentation techniques that could be applied to detect melanoma using image processing. Segmentation process is described that falls on the infected spot boundaries to extract more features.

The author of[3] proposed the development of a Melanoma diagnosis tool for dark skin using specialized algorithm databases including images from a variety of Melanoma resources.

Similarly, [4] discussed classification of skin diseases such as Melanoma, Basal cell carcinoma (BCC), Nevus and Seborrheic keratosis (SK) by using the technique support vector machine (SVM). It yields the best accuracy from a range of other techniques. On the other hand, the spread of chronic skin diseases in different regions may lead to severe consequences

In [5] Rahat Yasir, Md. Ashiqur Rahman and Nova Ahmed at el. “Dermatological Disease detection using image processing and artificial neural network” has used various kind of different image processing algorithms for feature extraction and feed forwarding using artificial neural network for training and testing the model. The system works on two parts, in the first part the feature extraction has been taken place based upon the color texture and in the second stage the classifier identifies the possible disease.

In [6] Nidhai k, Al Abbadi, Nizzar Saadi at el., “Psoriasis detection using skin color and texture features” has proposed a model for identification of psoriasis using color feature extraction and classification of the skin image.

In [7] Kumar, V., Kumar S., & Saboo, V. at el, “Dermatological disease detection using Image Processing and machine learning” has proposed a model which uses computer vision and machine learning. The features of image are extracted and algorithms are applied onto it to detect six types of diseases with a accuracy of 95%.

In [8] Pollap D. et al. “An intelligent for monitoring skin disease” has proposed a method of clustering image using navi for classification. They have used SIFT method for detection of key points in the image. After that they have used CNN and SVM for classification and segmentation. They have a accuracy of 84% and a precision of 82%.

Research Methodology:-

In the Methodology section, the proposed system of this methodology for detection, extraction and classification of skin diseases images is described in it. This methodology system will help significantly in the detection of melanoma, Eczema and Psoriasis. The whole architecture can be divided into different modules comprising of preprocessing, feature extraction, and classification.

This section disusses overall methodology adopted in this study

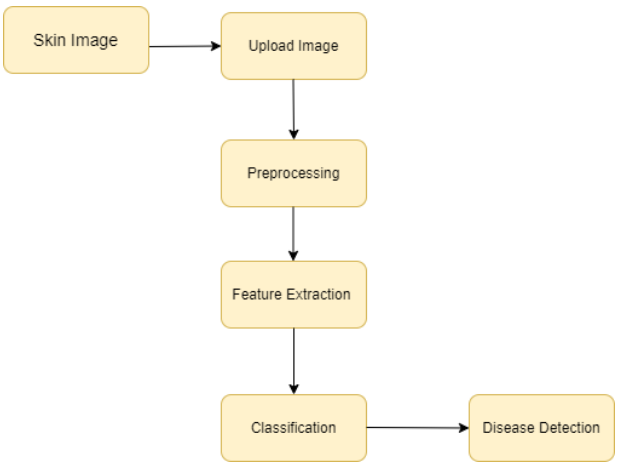


FIG.1:SYSTEM ARCHITECTURE

1]**Preprocessing**: Achieving high performance of skin disease detection system requires overcoming some major difficulties. Such as creating a database and unifying image dimensions. In the following section, the technique used in image resizing is explained. with the help of the image diseases can be identified and can produce the result faster.

2]Image Resizing: To resolve the problem of different image sizes in the database an input image is either increase or decrease in size. Unifying the image size will get the same number of features from all images. Moreover, resizing the image reduces processing time and thus increases system performance. After the process of resizing the view of the image gets clear and helps us to find more accurate result

3]Feature Extraction: At the beginning, Convolutional Neural Network (CNN) is a set of stacked layers involving both nonlinear and linear processes. These layers are learned in a joint manner. The main building blocks of any CNN model are: convolutional layer, pooling layer, nonlinear Rectified Linear Units (ReLU) layer connected to a regular multilayer neural network called fully connected layer, and a loss layer at the backend. CNN has known for its significant performance in applications as the visual tasks and natural language processing AlexNet is a deep CNN model, developed by Krizhevsky et al. to model the 2012 ImageNet for the Large Scale Visual Recognition Challenge (ILSVRC-2012).

4]Convolutional layers: Where a nonlinear ReLU layer is stacked after each convolutional layer. In

addition, the first, second, and fifth layers contain max pooling layers, as shown in Figure 5. Moreover, two normalization layers are stacked after the first and the second convolutional layers.

5]Classification: Classification is a computer vision method. After extracting features, the role of classification is to classy the image via Support Vector Machine (SVM). A SVM can train classifier using extracted features from the training set

6]IMAGE DETECTION:-With the help of the detection it become east to identified the disease as it help to classified the image better much faster

Result:-

We are concluding this survey report by understanding our project even better and are willing to add more features and changes that are required to make our project efficient. This survey showcases our progress up till now and ensures the necessary changes that will be made in future.

The result of our study on Skin care diseases using CNN algorithm are presented in this section. We evaluated our proposal model on a dataset of 800 images which where taken from different websites which are suitable for CNN images. We used 70:30 split for training and testing respectively

We also conducted a sensitivity analysis to evaluate the robustness of our model to change the input data. We introduced random noise and perturbation in the test set, and our model was able to maintain a high level accuracy and performance .Overall, our result demonstrate that our purpose CNN model is an effective model for detecting skin diseases. It outperform existing state-of-the-art model and is robust to change in the input data

SNAPSHOTS :-

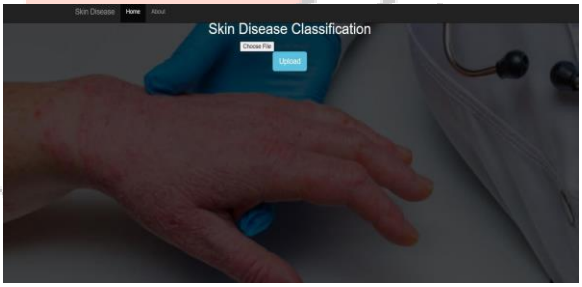


FIG.2:GUI

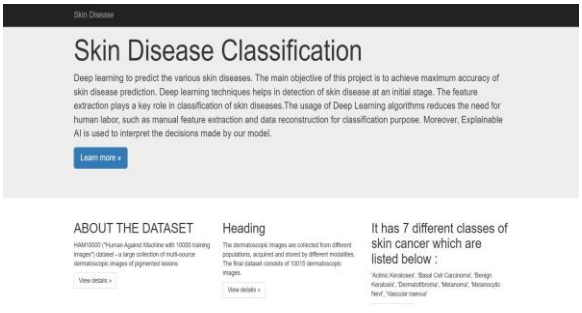
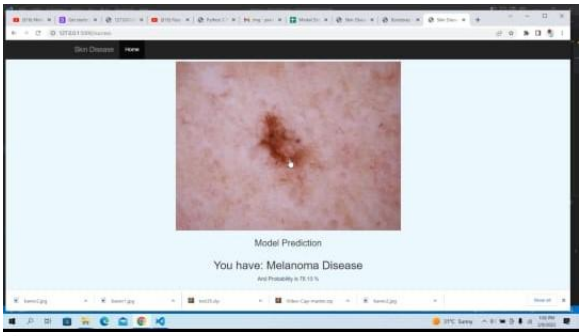


Fig.3:About page



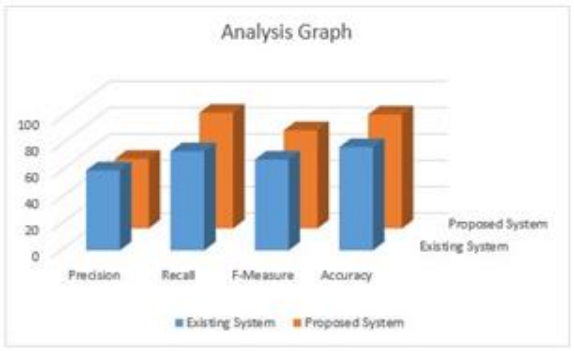


Fig4:Sample result snapshot

Fig.5:Graph analysis

Conclusion:-

Detection of skin diseases is a very important step to reduce death rates, disease transmission and the development of the skin disease. Clinical procedures to detect skin diseases are very expensive and time-consuming. Image processing techniques help to build automated screening system for dermatology at an initial stage. The extraction of features plays a key role in helping to classify skin diseases. In this research the method of detection was designed by using pretrained convolutional neural network (AlexNet) and SVM. In conclusion, we must not forget that this research has an effective role in the detection of skin diseases in Saudi Arabia because it has a very hot weather for the presence of deserts; this indicates that skin diseases are widespread

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