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Skin Disease Detection using Machine Learning Framework's CNN Algorithm

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ABSTRACT: The most frequent ailment in the world is a skin disease. Dermatologists must have high skill and accuracy when diagnosing skin diseases. Hence a computer-aided skin disease diagnosis model is offered as a more objective and dependable option. Many studies have been conducted to detect skin illnesses such as skin cancer and tumors. However, recognising the right disease by the following factors is complicated: low contrast between lesions and skin, visual similarity between the disease, and non-disease areas. This project will detect skin disease from a skin image. Further, it will analyze it using a filter to reduce noise or undesired objects. Then it will convert the image to grey to aid in processing and to extract valuable data using Machine Learning algorithms. This project can demonstrate emergency orientation and provide evidence for any form of skin illness.

KEYWORDS: Image Processing; Machine Learning; Convolution Neural Networks; Skin Disease; Dermatologists

I. INTRODUCTION

A. **MOTIVATION:** Lesions, pigmentation, plaques, scales, and other indications of skin illnesses can be seen on the skin's surface. These symptoms lead to prolonged discomfort and pain. Such damage is harmful to anyone's physical health and causes serious mental health problems. Patients with primary skin illnesses (such as vitiligo, seborrheic dermatitis, and psoriasis) had a higher risk of mental problems such as anxiety and depression. Moreover, several vitiligo treatments might result in mental health issues. For example, isotretinoin, an acne treatment, can cause severe depression.

B. **OBJECTIVES**

- To detect skin diseases
- To check skin health in their daily life
- Try to improve accuracy using deep learning

II. LITERATURE SURVEY

The present study suggests a possible relationship between F1F0-ATP synthase, InATP and keratinocyte differentiation. It also provides new insights into the mechanisms by which energy metabolism is possibly controlled [1] Skin disease may elicit psychosocial comorbidities, and psychosocial stresses may elicit skin disease, a perfect spiral of cause and effect[2]. Skin cancer, the most common human malignancy 1-3, is diagnosed primarily visually, followed by initial clinical screening, preferably dermoscopic analysis, biopsy, and histopathological examination.[3]. In this paper, a deep neural network algorithm is applied to classify dermoscopic images of common skin diseases. Based on the results, summarize the diagnostic / classification scenarios by emphasizing the importance of combining the efforts of both human skills and computer algorithms in dermatological diagnosis.[4]

III. PROBLEM DEFINITION

To build and implement a skin disease detection system using a machine learning framework.

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IV. SOFTWARE REQUIREMENT SPECIFICATION

A. FUNCTIONAL REQUIREMENTS:

■ System Features:

Here we propose skin disease detection using machine learning.

■ External Interface Requirements:

IV.A.■.1 User Interface:

Home page
Upload Skin Image
Preprocess image
Feature Extraction
Classification
Disease Detection

IV.A.■.2 Hardware Interfaces:

The entire software requires a completely equipped computer system including monitor, keyboard, and other input output devices

IV.A.■.3 Software Interfaces:

The system can use Microsoft as the operating system platform. System also makes use of certain GUI tools. To run this application we need JDK 1.8 and above as java platform and Apache tomcat as server. To store data we need a MySQL database.

B. NON-FUNCTIONAL REQUIREMENTS

■ Performance Requirements:

The performance of the system lies in the way it is handled. Every user must be given proper guidance regarding how to use the system. The other factor which affects the performance is the absence of any of the suggested requirements.

■ Safety Requirements:

To ensure the safety of the system, perform regular monitoring of the system so as to trace the proper working of the system. An authenticated user is only able to access the system.

■ Security Requirements:

Any unauthorized user should be prevented from accessing the system. Password authentication can be introduced.

■ Software Quality Attributes

IV.B.■.1 Accuracy:

The level of accuracy in the proposed system will be higher. All operations would be done correctly and it ensures that whatever information is coming from the center is accurate. Result is organic results.

IV.B.■.2 Reliability:

The reliability of the proposed system will be high due to the above stated reasons. The reason for the increased reliability of the system is that now there would be proper storage of information.

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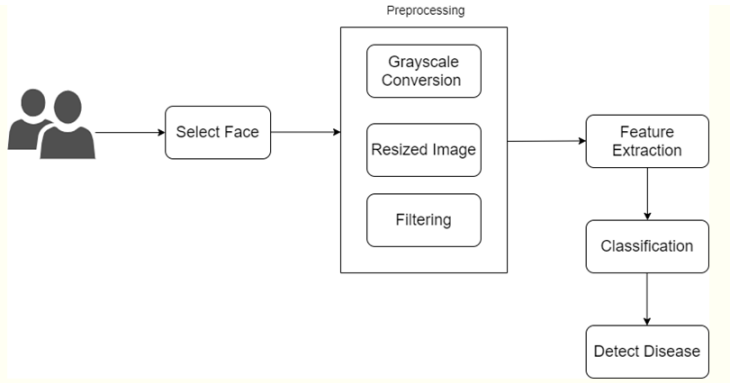

V. METHODOLOGY

The proposed system of detection, extraction and classification of images of skin diseases is described. The program will be very helpful in diagnosing various types of skin diseases. The entire structure can be divided into several modules including pre-processing, feature extraction, and fragmentation.

VI. PREPROCESSING

To achieve a high performance of skin disease detection and prediction we required to overcome few problems which occur during loading the data. Such as color contrast and image size. To overcome this problem, we have a module in our application which takes care of this problem. The image resizer program in python resizes all the images for us before loading them onto the server for processing. Therefore the main target of this step is to removes the background noises such as hair and air bubbles and other noises in the skin disease image.To resolve the problem Preprocessing is done in three steps:

A. Grayscale Conversion

Grayscale image contains only brightness information. Each pixel value in a grayscale image corresponds to an amount or quantity of light. The brightness graduation can be differentiated in grayscale images. Grayscale image measures only light intensity. In grayscale conversion color image is converted into grayscale image. Grayscale images are easier and faster to process than colored images. All image processing techniques are applied on grayscale images.

B. Resized Image

To resolve the problem of different image sizes in the database an input image is either increased or decreased 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.

C. Filtering

In image processing filters are mainly used to suppress either the high frequencies in the image, i.e. smoothing the image, or the low frequencies, i.e. enhancing or detecting edges in the image. An image can be filtered either in the frequency or in the spatial domain.

VIII. FEATURE EXTRACTION AND CLASSIFICATION

Feature extraction and classification will be done using CNN Algorithm. CNN is a supervised neural network, and its basic structure comprises an input layer, convolutional layers, pooling layers (sub-sampling layers), fully connected layers, and an output layer. A single CNN typically has several convolutional layers. Meanwhile, the pooling layer is dispensable because Its application is governed by a specific model. When a pooling layer is used in a CNN architecture, this layer is commonly connected after a convolutional layer

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Convolution neural networks layers:

A.CONVOLUTION LAYER

Convolutional layers are the larger building blocks used in convolutional neural networks. Convolution is the top layer to extract features of an image input. Convolution preserves the relationship between pixels by learning image features by utilizing small squares of the input data. This is a mathematical operation that takes two inputs like an image matrix and a filter or kernel. Convolution of an image with various filters can perform operations like edge detection, blur and sharpen by applying filters i.e. identity filter, edge detection, sharpen, box blur and Gaussian blur filter.

B.POOLING LAYER

When the photos are too huge, pooling layers would lower the number of parameters. Spatial pooling is also called subsampling or down sampling which reduces the dimensionality of each map but retains important information. Pooling can be done in following ways : Max-pooling : It selects the maximum element from the feature map. The resulting max-pooled layer holds important features of the feature map. It is the most common approach as it gives better results.Average pooling: It involves average calculation for each patch of the feature map.

C.FULLY CONNECTED LAYER

In this layer the Feature map matrix will be translated as vectors (x1, x2, x3, . . .). With the fully connected layers, we combined these features together to create a model.Fully connected layers are an essential component of Convolutional Neural Networks (CNNs), which have been proven most useful for recognizing and classifying images for computer vision. The CNN process starts with convolution and pooling, breaking down the image into features, and analyzing them independently. The result of this process feeds into a fully connected neural network structure that drives the final classification decision.

D.SOFTMAX CLASSIFIER

Finally, we have an activation function like soft-max or sigmoid to predict the outputs. The soft-max function, also known as soft-arg-max or normalized exponential function, is a generalization of the logistic function to multiple dimensions. It is used in multinomial logistic regression and is mostly used as the last activation function of a neural network to normalize the output of a network to a probability distribution over predicted output classes. The output from last layer of fully connected layer is directed to soft max layer, which converts it into probabilities.Here soft-max assigns decimal probabilities to each class in a multi-class problem, these probabilities sum equals 1.0.This allows the output to be interpreted directly as a probability.

IX. DATASET

Xiangya-Derm has 150,223 clinical pictures representing 543 different skin disorders. Each image is taken with a digital camera and has related pathology and medical records. The Department of Dermatology at Central South University's Xiangya School of Medicine created this construct. It is the most significant clinical imaging dataset of the skin disease for CADx (computer-aided diagnosis).

X. RESULTS

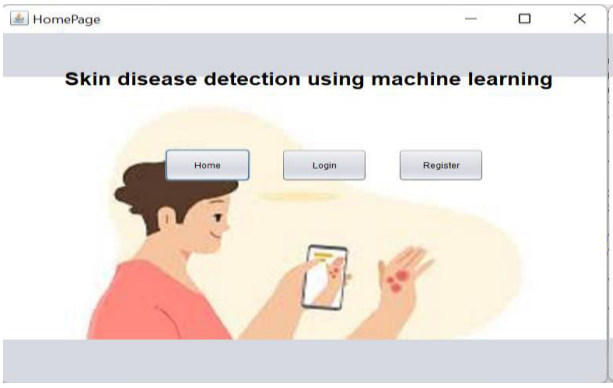

Fig 1. Home Page

Fig 2. Registration Page

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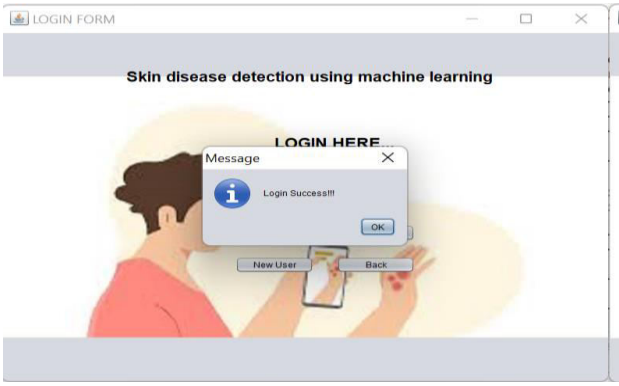

Fig 3. Login Page

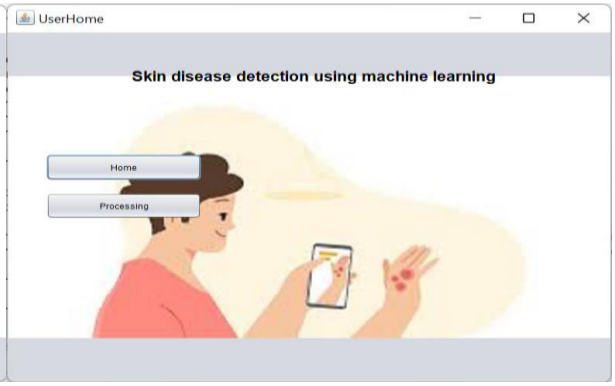

Fig 4. User Home Page

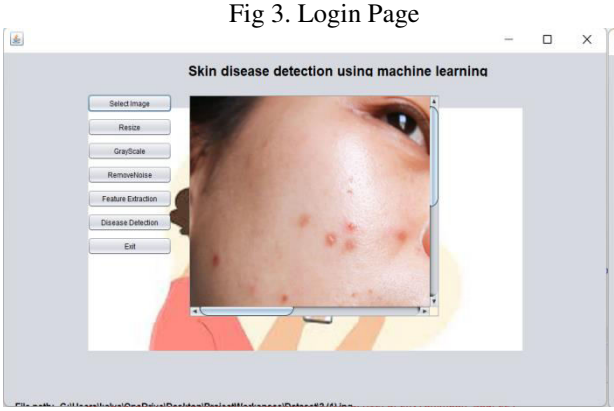

Fig 5. Select Image

Fig 6. Resized Image

Fig 7. Grey Scale

Fig 8. Noise Reduction

Fig 9. Feature Extraction

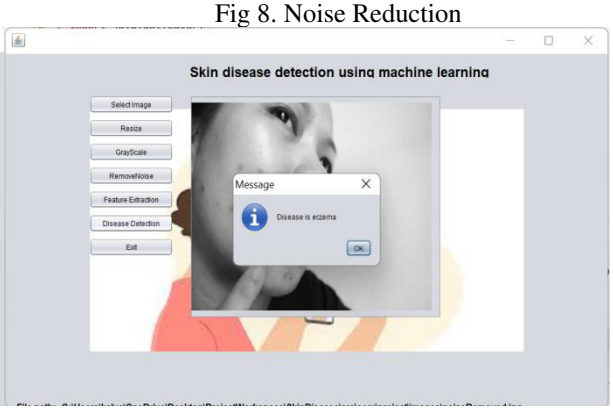

Fig 10. Disease Detection

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XI. SUMMARY

We are proving that CNNs can recognize skin disorders. Our research established that distinct models for diagnosing disorders in different body areas should be employed. Furthermore, our experiment demonstrated that a more usable net-work structure might increase the model's performance. In several disorders, the present network topology has performed well. However, general performance has to be improved.

VII. CONCLUSION AND FUTURE WORK

A. Conclusion:

In this project, we have build and implement a desktop application system for identification of facial skin disease in clinical images using machine learning CNN topology

B. Future Work:

- Now a day's health industry plays important role in curing the diseases of the patients so this is often also some quite help for the health industry to inform the user and also it's useful for the user just in case he/she does not want to travel to the hospital or the other clinics, so just by entering the images and every one other useful information within the form user can get to know the disease he/she is affected by and therefore the health industry also can get enjoy this technique by just asking the images from the user and entering within the system and in only few seconds they will tell the precise and up to some extent the accurate diseases.
- If the health industry adopts this project then the work of the doctors is often reduced and they can easily predict the disease of the patient.
- This project will detect facial skin disease from skin images, demonstrate emergency Orientation and provide evidence of any form of facial skin disease.
- It is recommended to consider lightweight security when transmitting physiological and biological data in health networks, and a user-friendly smart device app, which can display alarms and communicate between patients and physicians in an eHealth and telehealth environment to securely exchange and transmit data.
- This project will suggest medicines and primary precautions to affected people.

REFERENCES

1. X. Xiaoyun, H. Chaofei, Z.Weiqi, C. Chen, L. Lixia, L. Queping, P. Cong, Z. Shuang, S. Juan, and C. Xiang, ``Possible involvement of F1F0-ATP synthase and intracellular ATP in Keratinocyte differentiation in normal skin and skin lesions," Sci. Rep., vol. 7, Feb. 2017, Art. no. 42672.
2. A. Bewley, ``The neglected psychological aspects of skin disease," Brit. Med. J., vol. 358, p. 3208, Jul. 2017.
3. A. Esteva, B. Kuprel, R. A. Novoa, J. Ko, S. M. Swetter, H. M. Blau, and S. Thrun, ``Dermatologist-level classification of skin cancer with deep neural networks," Nature, vol. 542, pp. 115118, Feb. 2017.
4. X. Zhang, S. Wang, J. Liu, and C. Tao, ``Towards improving diagnosis of skin diseases by combining deep neural network and human knowledge," Med. Inform. Decis. Making, vol. 18, no. 2, p. 59, 2018.
5. Y. Gurovich, Y. Hanani, O. Bar, G. Nadav, N. Fleischer, D. Gelbman, L. Basel-Salmon, P. M. Krawitz, S. B. Kamphausen, M. Zenker, L. M. Bird, and K.W. Gripp, ``Identifying facial phenotypes of genetic disorders using deep learning," Nature Med., vol. 25, pp. 6064, Jan. 2019.
6. A. Melina, N. N. Dinh, B. Tafuri, G. Schipani, S. Nisticò, C. Cosentino, F. Amato, D. Thiboutot, and A. Cherubini, ``Artificial intelligence for the objective evaluation of acne investigator global assessment," J. Drugs Dermatology, vol. 17, no. 9, pp. 10061009, 2018.

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