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SKIN DISEASE DETECTION USING AI

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ABSTRACT

Skin illnesses are the most frequent around the globe, since people contract them as a result of genetics and environmental factors. Many people overlook the effects of skin illness when it is still in its early stages. The patient's mental health is harmed by the painful symptoms of skin illness. A thorough diagnosis can lead to effective medication, which helps alleviate the agony of those who are suffering. We attempted to create a prototype utilizing neural networks to detect skin disorders in this study. We selected CNN, which stands for convolutional neural networks, as our neural network of choice. This method was created to diagnose skin conditions. Our proposed method is straightforward, quick, and inexpensive, requiring only a camera and a computer. The method is applied on the inputs of a color image. The image is resized to extract features using a convolutional neural network that has been pre-trained. Finally, the user is presented with the results, which include the type of sickness, its distribution, and severity. The technology is capable of accurately detecting the majority of prevalent ailments.

I. INTRODUCTION

Because of the lack of understanding and understanding, skin illness is one of the most frequent and difficult diseases to diagnose. Many people in poor countries visit a dermatologist for skin disease treatment and prevention. People are unsure of the dermatologist's pharmaceutical prescription, and there is no reason in the current system. The necessity of recognizing and treating skin disease early on is critical, as skin protects the human body from fungal and bacterial diseases. Many people develop skin illness as a result of their ancestors, jobs, lack of nourishment, regular environments, and chemical exposure, among other factors. Climate, summer season, and winter season are all elements that influence the presence of skin disease. As a result, detecting and diagnosing skin illness at an early stage is critical. In the early stages of skin illnesses, they are frequently overlooked and given little consideration. People's ignorance may contribute to the development of skin cancer. The majority of people are unaware of the type and stage of skin illness. Some skin illnesses manifest signs months later, causing the condition to progress and spread. This is owing to the general public's lack of medical expertise. A dermatologist (skin specialist doctor) may find it challenging to diagnose the skin illness and may need to order expensive laboratory tests to determine the kind and stage of the condition. Skin disorders may now be diagnosed much more rapidly and correctly because to advances in laser and photonics-based medical technologies. However, the cost of such a diagnosis is currently limited and prohibitively high. As a result, we present a skin disease diagnosis method based on image processing. This method uses image analysis to determine the type of disease by taking a digital photograph of the diseased skin area. Our proposed method is straightforward, quick, and inexpensive, requiring only a camera and a computer.

II. METHODOLOGY

The proposed system's methodology for detecting, extracting, and classifying skin disease photos is detailed. Melanocytic nevi, melanoma, benign keratosis-like lesions, basal cell carcinoma, actinic keratosis, vascular lesions, and dermatofibroma will all benefit from the system. The input image, preprocessing, feature extraction, and classification are all components that make up the overall architecture.

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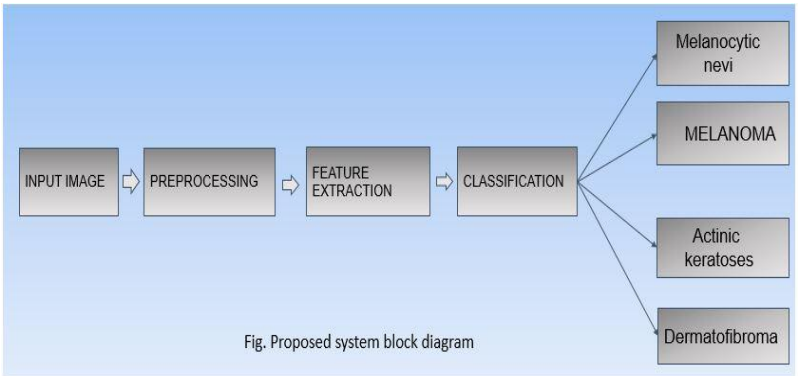

Fig. Proposed system block diagram

- **Preprocessing:**

Images come in a variety of sizes and shapes. They also come from a variety of places. Some photographs, for example, are classified as "natural photos," meaning they were captured in colour in the real world. For example:

A picture of a DISEASES is a natural image.

An X-ray image is not a natural image.

We must perform some pre-processing on any image data in order to account for all of these variations. The most common encoding format is RGB, and most “natural images” we encounter are RGB. Making the photos the same size is also the initial step in data pre-processing. Now we'll look at how we can alter the shape and form of images. The RGB (red/green/blue) Matrix is created from a raw binary image. The RGB Matrix is initially processed for Contrast Enhancement and turned to a contrast-enhanced RGB Matrix, which is done to identify each pixel from its neighbor. The major goal of this stage is to increase the quality of the skin photographs by removing unconnected and superfluous components from the image's background so that it may be processed further. A well-chosen set of preprocessing procedures can considerably increase the system's accuracy. The preprocessing stage's goal can be accomplished in three stages: picture enhancement, image restoration, and hair removal. To achieve excellent performance in a skin disease detection system, some main challenges must be overcome. For instance, creating a database and standardizing image dimensions. The process for image scaling is detailed in the following section.

- **Image Resizing:**

An input image is either increased or decreased in size to solve the problem of varying image sizes in the database. By reducing the image size, all photographs will have the same number of characteristics. Furthermore, shrinking the image cuts down on processing time, improving system speed.

- **Feature Extraction:**

The classification of skin diseases relies heavily on the extraction of features. A pre-trained convolutional neural network was used to build the detecting algorithm in this study. Color extraction, texture removal, image width and height are all examples of feature extraction.

- **Classification:**

The process of determining which category the input data belongs to is known as classification. It could be because of the CNN algorithm.

- **CNN:**

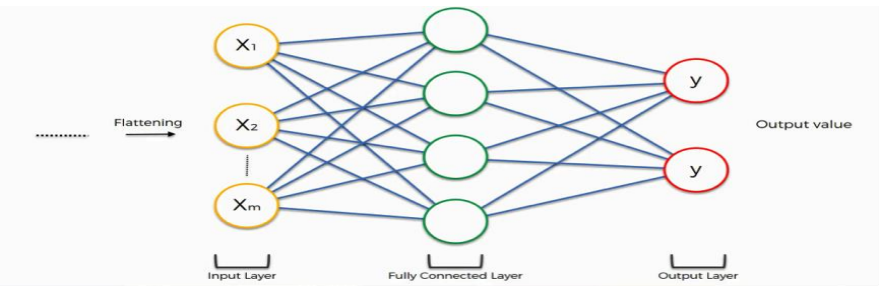

Fig: CNN (A convolutional neural network)

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A convolutional neural network (CNN) differs from a multilayer perceptron by a small amount. A CNN can either have one convolution layer or several convolution layers. These layers can be linked together or pooled. On the input, a convolution operation is conducted, and the results are then transmitted to the subsequent layers. In semantic parsing and paraphrase detection, convolutional neural networks produce accurate results. This is the primary rationale for using CNN to detect skin diseases. To train and test skin disease images, the CNN classifier is used.

III. MODELING AND ANALYSIS

We begin by feeding the image into the preprocessing unit. Images arrive in a variety of shapes and sizes. The extraction of features thus plays a crucial part in classifying skin disorders and determining which group the supplied data belongs to. To train and test skin disease images, a CNN classifier is used. The sickness will be successfully classified by CNN with great accuracy.

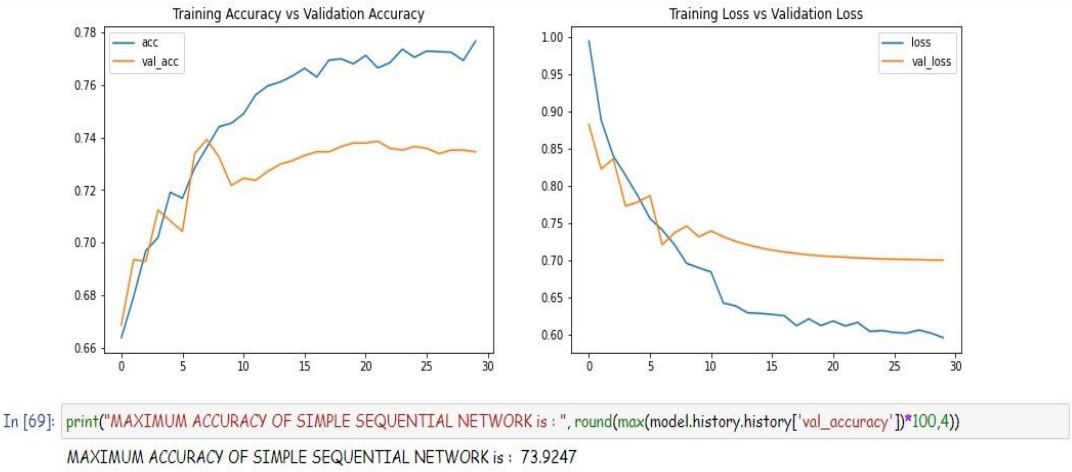

Fig. Analysis

IV. RESULTS AND DISCUSSION

Recognizes skin disorders and provides the results to the user as identified disease, advised therapies, and the user must upload an image to do so. Image dispensation begins with a digitised colour image of the afflicted part. Finally, the CNN skin illness can be seen by smearing. The dataset includes photos of sick skin as well as healthy skin. The training dataset is used to learn data, while the testing dataset is used to match images. The train model's accuracy is 73.9247 percent.

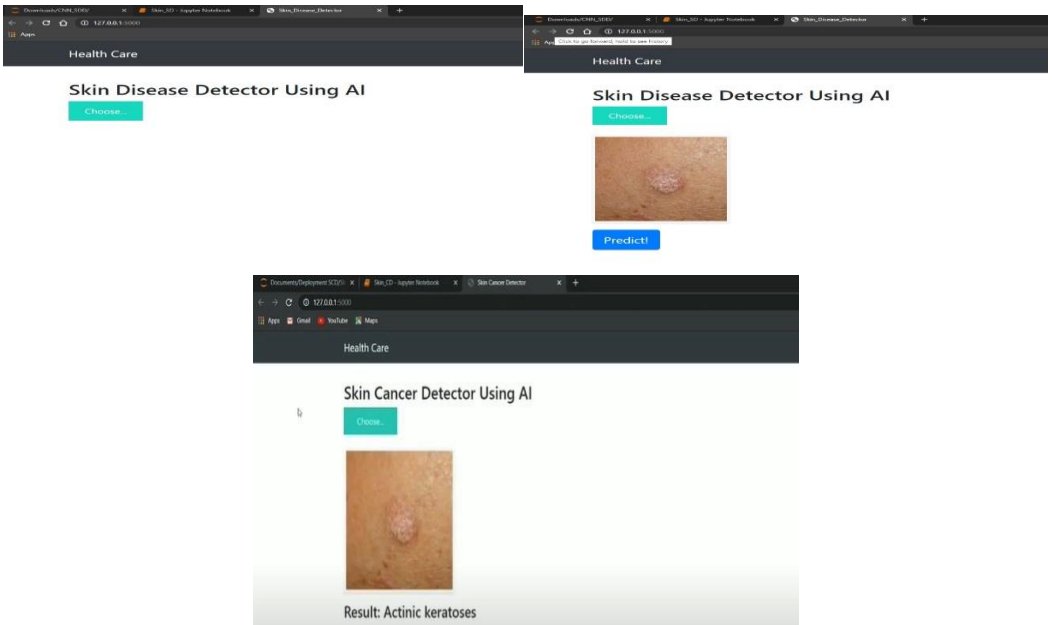

Fig. Output

V. CONCLUSION

Skin illness detection is a critical step in lowering death rates, illness transmission, and skin disease progression. Clinical approaches for diagnosing skin diseases are both costly and time-consuming. Image processing techniques aid in the development of an automated dermatology screening system for early-stage illnesses.

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