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Research Article

Deep Learning Based Skin Disease Prediction And Recommendation System

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ABSTRACT

Skin diseases are more frequent among the people across the globe because of increased air pollution, medicinal intakes, air pollution, genetics etc. Also many researches state that people provide less importance to skin disease during the initial stage which medicinal treatment complex. In the existing approach, the skin diseases are inspected manually from the biopsy results, which always have the risk of human dependency and less accurate prediction. To address this problem statement, in this paper we propose a computer vision and deep learning based technique to inspect and predict skin diseases at the early stage. For deep learning based classifier we have used convolutional neural network (CNN). Thus our proposed would have a greater impact towards society benefits thus helping people among rural locations in where access to dermatologists are less. For experimental results, we use jupyter tool with python script for image analysis and prediction.

Keywords: Skin disease, computer vision, deep learning, convolutional neural network

INTRODUCTION

Skin diseases are one of the most common-and most difficult-to-diagnose illnesses, and because of their lack of awareness and lack of knowledge among the people. In many developing countries, people consult a dermatologist for skin disease, and perform the preventive measures. People are not sure about the prescriptions made by a dermatologist, and there is no accurate image analysis with machine learning system to assist the current system. The importance of the skin disease detection is predicting and diagnosing at an early stage is very important thus protecting the human body from fungi, and harmful bacterial infections. A lot of people have developed illnesses, suffering because of this disease as a result of genetics, working nature, lack of nutrious food intake, exposure to chemicals, etc., etc. Environmental factors also increase the presence of skin diseases, such as climate, season, summer, winter season. Therefore, the identification of the skin diseases, and the diagnosis at an early stage is of utmost importance [1].

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Thus with the advent of smart phones, the image processing on the basis of the disease, the analysis is more essential, since it is able to produce promising results in a short amount of time. With the help of webcam people can able to provide input, and integration of image processing and machine learning techniques, the relevant skin diseases can be identified, and the diagnosis would be recommended. Input analysis is carried out using a two-step approach to solving the problem. In the first approach using an image processing method, and the second one is using a machine-learning method to learn a model. This trained model is constantly trained in order to predict the different types of skin diseases. Because of the features and characteristics of a variety of diseases are different, the machine, the algorithm needs to learn how to tell it effectively [2].

Skin diseases are usually ignored, and always lower value is been provided by the people during the initial stage. A little bit of ignorance among the people, and can lead to skin cancer. With the current approach, and increased skin diseases occur at a later stage, is been manually inspected with a biopsy based approach only. The study is carried out manually, taking into account many of the histopathological features. Therefore this approach can lead to human error, and it takes 1-2 days for the biopsy results and human dependency. It is difficult for the physician to determine the type of the skin disease and the stage of the disease, in the analysis phase. That is why suggestion of medicines becomes hard for the physicians. This problem can be solved with the help of machine learning and deep learning techniques to analyze the image. The proposed approach is based on deep learning technique that can be an effective tool for the identification of clinical trial data, and the ability to communicate the results in a short period of time. Such an approach can provide promising results for the combination of computer vision and machine learning methods [3].

The identification of skin diseases in the microscopic images are provided as input to the model. Preprocessing and feature extraction are implemented in the image processing stage. Image processing is a model that identifies and analyzes the color, the texture, and the involvement of the symptoms. The output from the image processing phase is provided to the deep learning model. This classifier model can able to predict whether the input image is of normal, benign and malignant type.

RELATED WORKS

[4] In this paper, the researchers have proposed a model for the use of medical imaging to detect skin diseases from the input medical images taken using camera. In this paper, they propose methods to identify the skin disease. The goal of this paper is to predict the skin diseases from the medical input based on the texture features weightage extracted and integration of neural network helps in detecting and diagnosing the skin disease.

[5] In this research paper, the input medical images are received from the patients and processed to identify skin disease presence or absence. In this paper they have experimented the input images frm the android application. In this mobile application, the app would ask the patients lots of questions, and the ability to predict the nature of the disease and based on the model been trained, the peoposed system can able to recommend drug prescriptions based on the model. This paper could analyze certain skin diseases such as Eczema, Fungal infection and Urticaria. This app based on the questions and the answers, doesn’t render promising results.

[6] In this paper, the authors have proposed to handle many types of skin disease from the input medical images taken from phone and provided to the system for analysis. In this paper, matlab tool is been used for identifying different types of diseases such as cancer, melanoma, psoriasis,dermo-case, based on the extracted features of the image. This system will also allow the notification to the nearby medical equipment if any abnormality is detected. This method has a problem of segmentation challenges, in which the classification model is less accurate.

[7] This article is to briefly show the importance of the diseases of the skin, skin diseases are the most common in modern times, as skin allergies, the growth rate was due to changes in the environment. Both image processing and data analysis methods, which are presented in this article. The experimental results have been obtained with the help of the matlab program. The input images are taken from a data set.

PROPOSED ARCHITECTURE:

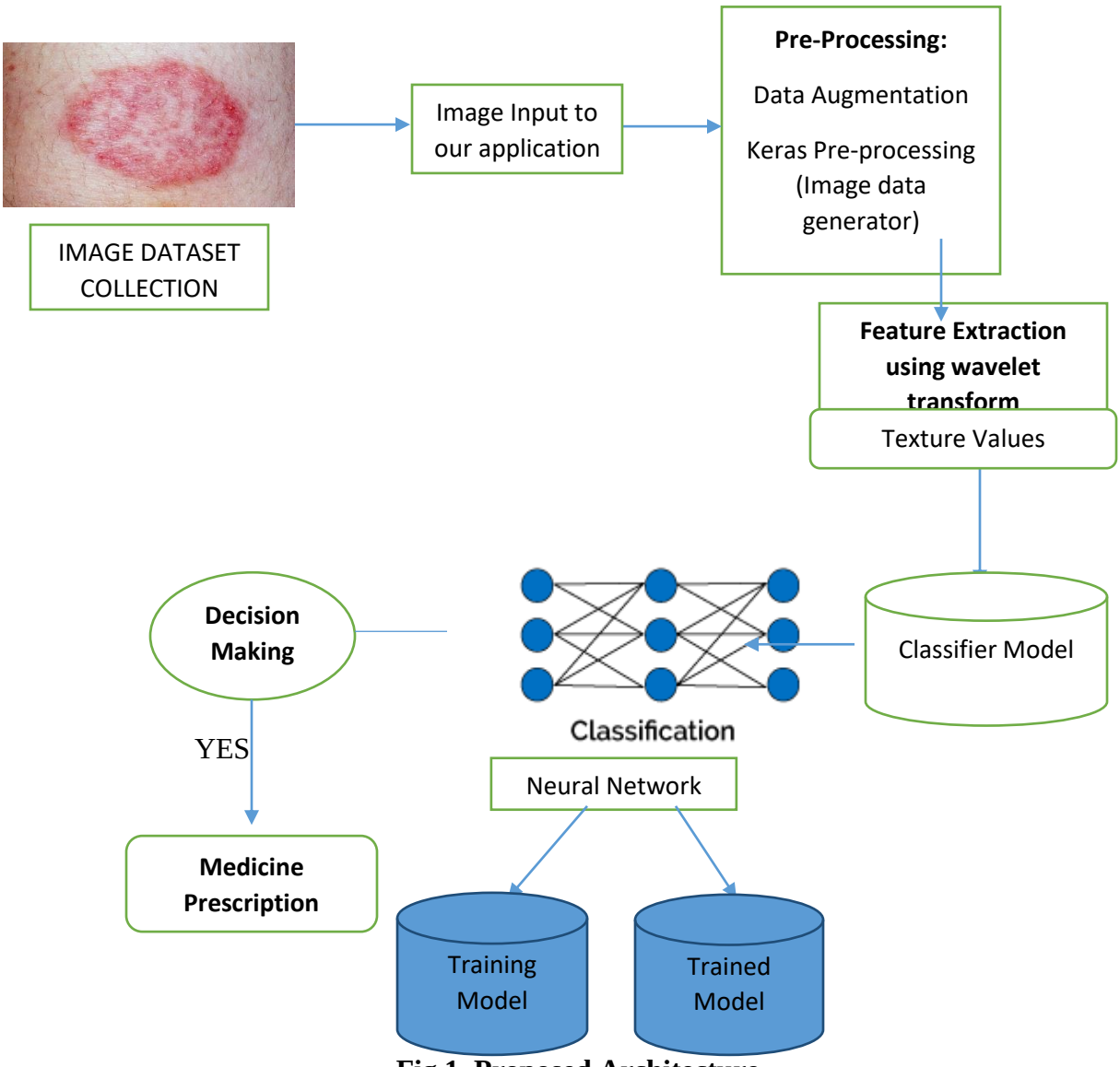

Fig 1. Proposed Architecture

PROPOSED METHODOLOGY

Our proposed methodology is an efficient tool for analyzing the skin diseases from the human input medical images. In this proposed system, we propose a hybrid architeure invoking both image processing and machine learning methods to predict the type of skin diseases with accurate results in a short period of time. In the image processing stage, steps like pre-processing, segmentation, feature extraction are performed. Features like colors, textures are extracted from the input patients medical image. These extracted values are passed to the machine leatning stage. In the deep learning stage, we use convolutional neural network for the classification. CNN model is capable of producing efficiecnt results redcing false positive and false negative values. Thus our proposed classifier model to detect the most common skin diseases such aslike Psoriasis, Lichen Planus, PityriasisRosea.The integration of neural networks and provides a high accuracy of results.The proposed system acts as a general knowledge base for the identification of diseases of the skin, and the prescription of drugs. In this proposed system, analyzes the various types of skin conditions that can be analyzed, thus saving time. For this proposed system, we use a python script in Jupyter tool for the experimental results.

EXPERIMENTAL RESULTS

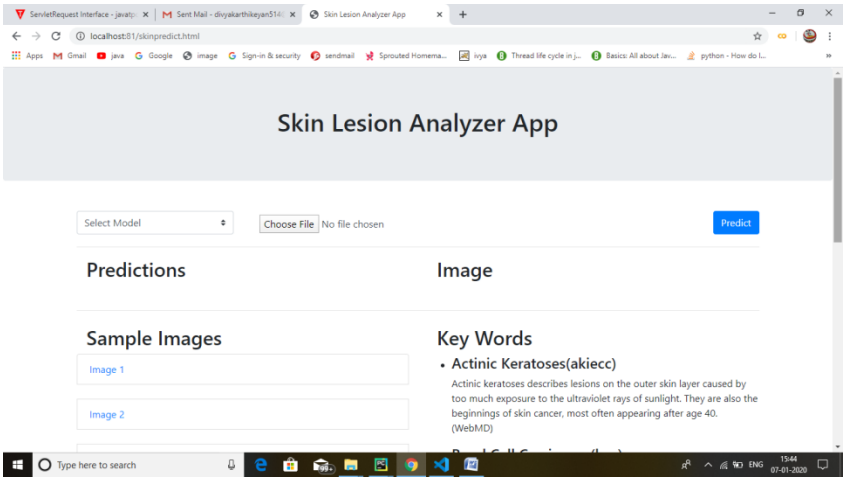

Fig 2. Input image for proposed model

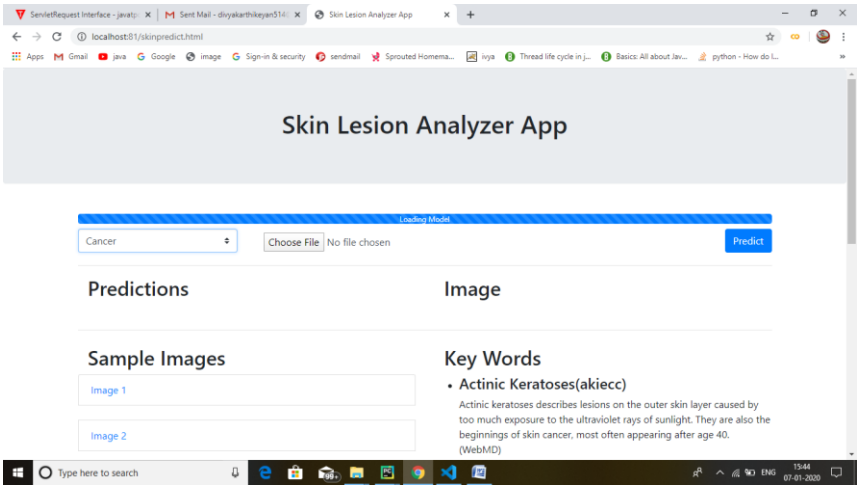

Fig 3. Image processing and machine learning algorithm is performed at the backend.

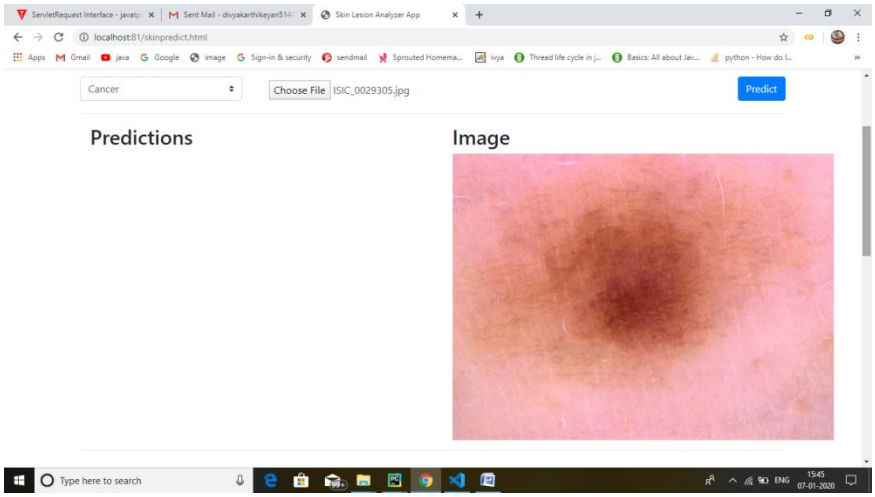

Fig 4. After processing, the image is displayed.

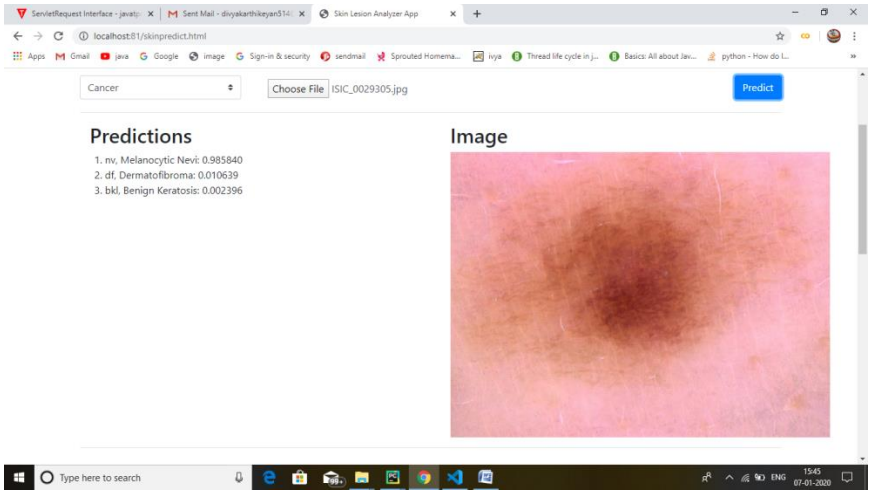

Fig 5. Skin type of disease is predicted

CONCLUSION

In this paper, we propose a system which can able to assist physician in detecting skin diseases and its type using image processing and deep learning techniques. This could help the patients to detect the skin diseases at the early stage and recommend medicinal prescriptions. Also this proposed system help the physicians to make decision making faster and accurate. In this project study we invoke detection of skin diseases such as Psoriasis, Lichen Planus, PityriasisRosea efficiently. Thus integration of convolutional neural network renders promising results.

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