Data Mining and Warehousing

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Title:

Different Skin Disease Recognition System

Abstract

There are many different skin diseases that can affect people of all ages, and it can often be difficult to accurately diagnose these diseases. Usually, these conditions are analyzed by several doctors and if no able doctor is present or if someone cannot afford such doctors then such conditions are often never identified. Our AI project aims to create a system that can detect different skin diseases with a high degree of accuracy. This system could be used by doctors and dermatologists to help quickly and accurately diagnose patients. People could also just upload their pictures and the system would accurately be able identify if they have a skin condition or not. The project aims to develop a system for the recognition of different types of skin diseases using computer vision techniques. The system will be trained on a dataset of images of skin lesions, which will be labeled with the corresponding disease. Once trained, the system will be able to accurately classify an input image of a skin lesion into one of the known diseases. This will enable the system to assist healthcare professionals in the diagnosis of skin diseases, potentially leading to faster and more accurate diagnosis and treatment.

Introduction

Background:

There are many different types of skin diseases. Some are acute whereas some can be chronic and cause harm. The common population is not very aware of these and is often unable to differentiate, especially when most of them look like the other. Usually, they have to go to a doctor who examines them thoroughly to diagnose the skin condition. Sometimes these doctors can be expensive, and the poor cannot afford them at all. Which is why most of the people in Pakistani population does not really care about their skin that much and often such conditions are left unchecked and cause problems later in life. This is why we are creating an algorithm that takes pictures of a skin condition, matches it with its database and is accurately able to identify what the skin condition is. By doing this we will not only be able to help providers reduce their workload but this will also be a huge benefactor to those who cannot afford such services. Through our algorithm they will be able to upload a picture and get a proper diagnosis.

Experiment Methodology:

The project aims to develop a deep neural network-based system for the recognition of different types of skin diseases using computer vision techniques. The system will be trained on a dataset

of images of skin lesions, which will be labeled with the corresponding disease. We will be using around 15000 images gathered from all over the internet. The skin diseases that we will be working on are as follows.

- Acne and Rosacea
- Actinic Keratosis Basal Cell Carcinoma
- Atopic Dermatitis
- Bullose Disease
- Cellulitis Impetigo and other Bacterial infections
- Eczema
- Exanthems and Drug Eruptions
- Hair Loss
- Herpes HPV
- Light Diseases and Disorder of Pigmentation
- Lupus and other Connective Tissue Diseases
- Melanoma Skin Cancer Nevi and Moles
- Nial Fungus
- Poison Ivy
- Psoriasis
- Scabies Lyme
- Seborrheic Keratoses
- System Disease
- Tinea Ringworm
- Urticaria Hives
- Vascular Tumors
- Vasculitis
- Warts Molluscum

The deep neural network will learn to recognize patterns in the images that are indicative of specific diseases. To train the system, the dataset will be split into training, validation and test sets. The training set will be used to train the network, while the validation set will be used to evaluate the performance of the network during training. Once the network has been trained, it will be tested on a separate test set to evaluate its overall performance. To improve the accuracy of the system, several techniques will be used, such as data augmentation and transfer learning. Data augmentation involves artificially increasing the size of the dataset by applying various transformations to the existing images. This can help the network to generalize better and improve its performance. Transfer learning involves using a pre-trained model as the starting point for the network, and then fine-tuning it for the specific task of skin disease recognition. This can help the network to learn more efficiently and improve its accuracy. Once the system has been trained and tested, it will be able to run in a real-world setting, where it will be used to assist healthcare professionals in the diagnosis of skin diseases. The system will be able to classify an input image of a skin lesion into one of the known diseases, potentially enabling

faster and more accurate diagnosis and treatment. Overall, the project has the potential to make a significant impact on the field of skin disease recognition and diagnosis.

Results:

After proper training of the model and running some sample tests we were able to get the following results. The Epoch was 50/50 with 6s52ms per step and loss of 0.0471. The screen shot below shows this information

```
Epoch 50/50
121/121 [==============================] - 6s 52ms/step - loss: 0.0471 - accuracy: 0.9894

<keras.callbacks.History at 0x242e0ea2e30>
```

There was a total of 3850 tests done and the system was correctly able to predict 3819 results and the wrong predictions were 31. This shows that we had an accuracy of 99.19%. Only less than 1% of the results were predicted incorrectly.

```
Total Test Data = 3850
Predicted Right = 3819
Predicted Wrong = 31
```

```
model.evaluate(X_Test,y_Test)
```

The Figure below shows the F1 score we were able to achieve out of the algorithm.

```
from sklearn import metrics
f1_score = metrics.f1_score(y_Test, predicted_result,average="weighted")
f1_score
```

```
[70] ✓ 0.6s
0.99198752291008
```

Conclusion:

After successful tests we can conclude that we have succeeded in creating a good algorithm that can be used by doctors to diagnose skin conditions. Although there is always room for improvement, we can say that our algorithm can detect skin conditions.

References:

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