SKIN DISEASE DETECTION USING NEURAL NETWORK

Janak Sawale[1], Saloni Jadhav[2], Poonam Gaikwad[3], Prof. Ashok Kalal[4]

[1,2,3]B.E Student, Dept. of Information Technology, Anantrao Pawar College of Engineering and Research, Pune, Maharashtra, India
[4]Professor (Internal Guide), Dept. of Information Technology, Anantrao Pawar College of Engineering and Research, Pune, Maharashtra, India

---***---

Abstract - *This paper proposed an intelligent system to detect skin diseases using neural network. The system have two main parts. In the first part the features are extracted from the image using feature extraction method and in the second part the image is feed to the pre-trained neural network for the detection of skin disease. The TensorFlow library is used for the neural network.*

Key Words: Skin disease, Neural network, Feature extraction, TensorFlow, Intelligent.

1. INTRODUCTION

Skin is the largest organ in the human body. According to National Geographic a human adult has an average of 22 square feet of skin. That's a bit larger than the entirety of a standard door frame. In addition (maybe even consequently) skin-based diseases are some of the most common in the human population. Because of this, dermatologists recommend that people see a certified dermatologist annually for a full-body check-up and if they notice any unusual growths or moles on their skin. But booking an appointment with a dermatologist can be a really frustrating process. Many dermatologists are booked for weeks, some maybe even months. And on top of that, some hospitals require a referral from a primary care physician. That's even more waiting! Currently, there are apps that try to let people skip that wait time by implementing telemedicine solutions in which they ask users for a couple of images of their condition, and then send those images to a dermatologist who reviews them and provides professional advice. But as more people use the apps, we run into the same problem we had in traditional healthcare. There just aren't enough dermatologists to meet demand. Even with telemedicine apps, responses will soon either take more time to get or become more expensive to buy.

To address this, system propose using the latest computer vision and artificial intelligence techniques to build an app that not only detects different types of skin diseases, but also provides related disease information within minutes and at a low cost. All you need to do is take a picture with your phone!

1.1 DATA COLLECTION AND LABELLING:

Skin diseases vary a lot between individuals, so diagnosis is challenging and requires a variety of visual clues such as lesion morphology, scaling, body site distribution, etc. It's hard to train a dermatologist. It's even harder to train a machine to recognize different types of skin diseases with high accuracy. Dermatologists use a variety of magnifying instruments to identify possible bad blemishes, so does deep learning models. We need large amount of high resolution data labelled with accurate ground truth bounding boxes for a model to learn pixel by pixel. In addition, skin disease images usually come with a lot of noise such as different skin colors, skin areas, and even skin hair (you don't want hair to be detected as rashes because of similar distribution). Therefore, being able to exclude noise and find true disease features is also what a model needs to accomplish.

1.2 DEEP LEARNING MODELS:

Models are the most crucial and exciting part when developing an AI application. Now let's take a look at the model we will be implementing using TensorFlow framework: ResNet.

Deep convolutional neural networks detect objects by learning features. Theoretically, adding more layers to a CNN enables it to learn more features and achieve higher accuracies; however, it is not such an ideal case in reality. It has come to be acknowledged that training accuracies tend to reach saturation and are then followed by a rapid degradation when adding more layers. ResNet (short for deep residual networks) makes it possible to train very deep neural networks without losing accuracy as a tradeoff. The Deep convolutional neural networks detect objects by learning features. Theoretically, adding more layers to a CNN enables it to learn more features and achieve higher accuracies; however, it is not such an ideal case in reality. It has come to be acknowledged that training accuracies tend to reach saturation and are then followed by a rapid degradation when adding more layers. ResNet (short for deep residual networks) makes it possible to train very deep neural networks without losing accuracy as a tradeoff. The residual network is characterized by a shortcut connection[8], instead of going from layer to layer in normal cases, two layers (two layers shown in graph, but can be one or more than one layer)

are skipped to perform identity mapping, which means outputs from n-2 layer are directly added to the outputs of current layer n. Such skip connection makes learning accuracy degradation evitable since even if the skipped connections don't achieve anything in learning, the output accuracy from current layer is maintained by the identity mapping from previous n-2 layer. ResNet has been reported to achieve improved accuracy on datasets such as ImageNet and COCO^**3**, therefore it's a proper network to implement on our skin disease dataset for which very deep neural network is needed.

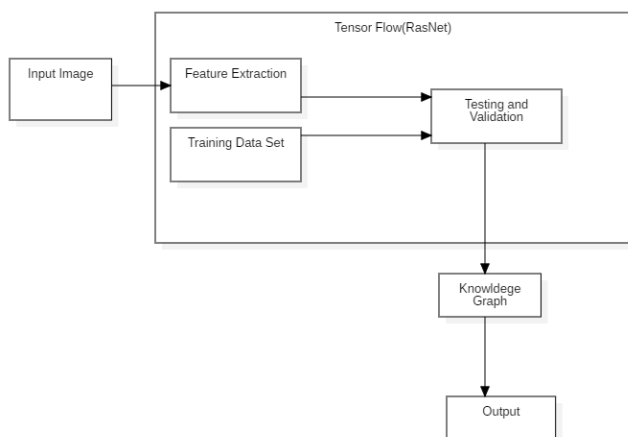## 2. SYSTEM ARCHITECTURE

Fig -1: System architecture

The above image shows system flow. The image will be capture using smartphone and uploaded on the TensorFlow. The features of the image will be extracted. The features will be the input for the neural network. Here system is using the ResNet which is makes possible to trained deep neural network without losing the accuracy. The testing and validation is done. The knowledge graph is build. This graph will not only contain metadata about each disease, but it will also contain information about the relationships between them.

3. IMPELMENTATION

3.1 Graphical User Interface: For initial stages we have design a simple GUI for our application, using this interface the user will be able take a picture of the infected area or upload the existing capture image for detection of skin disease.
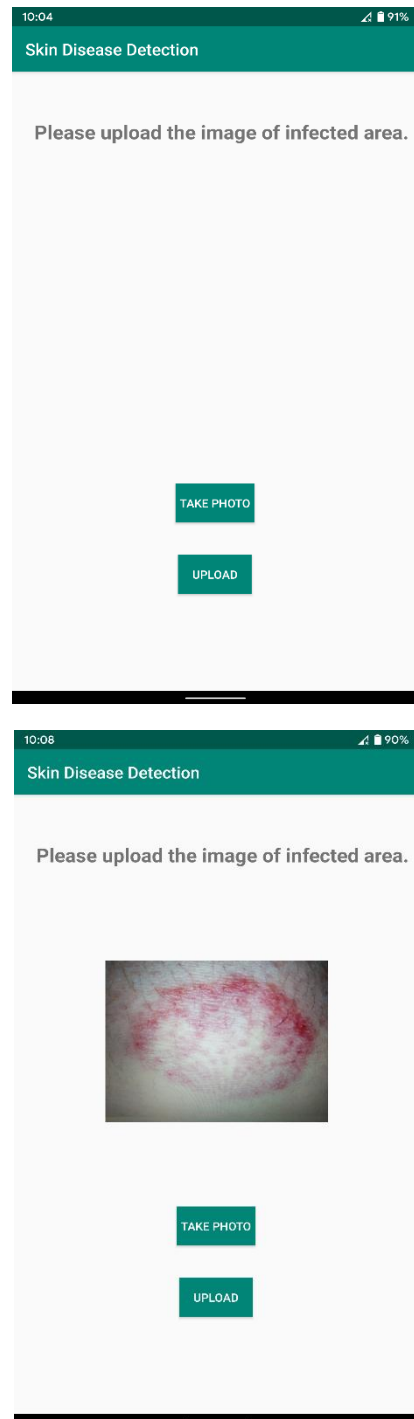

Fig 3.1 Graphical User Interface

4. CONCLUSION

The proposed system will help users to detect the skin disease they have. It will also inform a user whether they should go see a doctor .The system will show the information about the skin disease and the preventions for the same.

REFERENCES

[1] AmirrezaMahbod, Gerald Schaefer, Chunliang Wang, Rupert Ecker, Isabella Ellinger "Skin Lesion Classification Using Hybrid Deep Neural Networks" IEEE, ISSN: 978-1-5386-4658-8, 2019.

[2] ZHE WU, SHUANG ZHAO, YONGHONG PENG, XIAOYU HE, XINYU ZHAO,KAI HUANG "Studies on Different CNN Algorithms for Face Skin Disease Classification Based on Clinical Images" ,IEEE,ISSN-2169-3536,2019.

[3] Nils Gessert, ThiloSentker, Frederic Madesta, Rudiger Schmitz, Helge Kniep, Ivo Baltruschat, Rene Werner, Alexander Schlaefer "Skin Lesion Classification Using CNNs with Patch-Based Attention and Diagnosis-Guided Loss Weighting",2019.

[4] Muhammad Attique Khan, Muhammad YounusJaved, Muhammad Sharif, Tanzila Saba "Multi-Model Deep Neural Network based Features Extraction and Optimal Selection Approach for Skin Lesion Classification", IEEE, ISSN-978-1-5386-8125-1,2019.

[5] Timothy James McBride, NabeelVandayar, Kenneth John Nixon "Comparison of Skin Detection Algorithms for Hand Gesture Recognition", IEEE, ISSN-978-1-7281-0369-3, 2019.

[6] SerbanRadu Stefan Jianu, Loretta Ichim, Dan Popescu, Stefan S. Nicolau "Automatic Diagnosis of Skin Cancer Using Neural Networks", IEEE, ISSN-978-1-7281-0101-9, 2019.

[7] Tammineni Sreelatha, M. V. Subramanyam, M. N. Giri Prasad "Early Detection of Skin Cancer Using Melanoma Segmentation technique", Springer, 2019.