

SKIN DISEASE SEGMENTATION AND CLASSIFICATION USING DEEP LEARNER NETWORK MODEL

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ABSTRACT—

In recent years, the skin disease detection and classification are considered as the essential topic to identify the affected people. In literature review, cycle-consistent Generative Adversarial Network (cycle-GAN) is analyzed with the consideration of two step progressive transfer learning and domain adaptation. This cycle-GAN is mainly utilized to pre-trained the images by fully supervised Deep Convolutional Neural Network (DCNN) which is utilized to skin disease classification. This DCNN is not an efficient method for skin images. In this paper, modified SegNet is developed to segment the images during training period and it is augmented with the consideration of cycle-GAN method. This method operates the dilated convolution operation in its place of general convolution to normally extract the multi-scale contextual features without considering resolution. This extracted feature of multi-scale high resolution is encoded with the assistance of encoder and send to the decoder model. After that, the dropout layer with the addition of Dynamic Conditional Random Fields (DCRFs) to reduce the overfitting issue. Additionally, the dropout layer is defined as the segmented skin images. This segmented image is sent to the ResNet18 to type classification of skin diseases. Hence, this proposed model is defined as segmentation and classification (SegClassNet) model. At last, the outcomes show that the projected technique attains the mean accuracy of 91.28% for HAM image dataset contrasted to different conventional classification methods.

Keywords—Skin diseases classification, Deep transfer learning, Deep convolutional neural network, Cycle-GAN, SegNet, Conditional random fields, Dilated convolution

I. INTRODUCTION

Skin or dermatological illnesses are the foremost complicated subfields of science because of its difficulties in the treatment of syndromes and their variations in different environments. Skin sicknesses are usual among many illnesses, especially prone to expand and may verify to be fatal providing to skin tumor if not treated in its prior periods. In recent days, the fraction of skin sicknesses is increasing drastically compared to the fraction of other categories of sicknesses [1-2]. Analysis encourages which one-fifth of the human can be likely to be pretentious through the skin sicknesses in their lifestyle in addition therefore creating the aforementioned taxonomy highly difficult.

As a result, automated categorization of these sicknesses emerges into the primary role by considering different visual symptoms such as the skin lesion morphology, the human skin dimension distribution, arrangement of lesions, scaling and color. Through evaluating every human skin features separately, the classification complexity is raised in addition the normal feature extraction cannot apt aimed at categorization [3]. The major techniques developed for the categorization of skin sicknesses is transfer learning which may be used to train the DNNs.

In transfer learning, a pre-trained network model is employed through adjusting its weight via recurrent backpropagation rather than learning the network with the aid of randomly initialized variables [4]. There are many open pre-trained DCNN models accessible to implement certain task [5]. These design structures are ResNet, VGGNet and GoogleNet. These remain also known as transfer learning such that the variable training aimed at an unknown problem is not beginning after scrape in addition may employ the pre-trained CNN towards rapidly train the proper variable. From