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AI BASED LOCALIZATION AND CLASSIFICATION OF SKIN DISEASE WITH ERYTHEMA

ABSTRACT

Now a days people are suffering from skin diseases more than 125million people suffering from Psoriasis also skin cancer rate is rapidly increasing over the last few decades especially Melanoma is most diversifying skin cancer. if skin diseases are not treated at an early stage then it may lead to complications in the body including spreading of the infection from one individual to others. The skin images is diversified so that it is a challenging job to devise an efficient and robust algorithm for automatic detection of skin disease and its severity. Skin tone and skin color play an important role in skin disease detection. Color and coarseness of skin are visually different. Automatic processing of such images are skin analysis requires quantitative discriminator to differentiate the diseases. To overcome the above problem the model is used for prevention and early detection of skin cancer.

LITERATURE SURVEY

Amarathunga et al . [1] have come up with expert system limited to classify three diseases . The system consists of two separate units namely ; data processing and Image processing unit . The data processing unit was responsible for image acquisition , preprocessing for noise removal , segmentation and feature extraction from the skin disease images whereas data processing unit was employed for data mining task or classification.

Chakraborty et al . [2] have proposed a hybrid model using multi objective optimization algorithm NSGA - II and ANN for diagnosis of skin lesion being benign or malignant . The bag of - features approach is applied to classify the skin lesions and are generated using SIFT . SIFT algorithm identifies and locates the keypoints from the input image and generates the feature vector . Also , to handle large number of keypoints k means clustering algorithm was used to get representative keypoints where each cluster contains some representative keypoints and these are the generated bag - of - features .

Estevez et al . [3] were first to report about how the image classifier convolutional neural netwok (CNN) can achieve the performance similar to the 21 board - certified dermatologists for identification of malignant lesions . The 3 - way disease partition algorithm was designed to classify a given skin lesion

to be malignant , benign or non - neoplastic . Also , 9 - way disease partition was performed to classify a given lesion into one of the 9 mentioned categories . The state - of - the art InceptionV3 CNN architecture was used for skin lesion classification [3] has concluded that the CNN can outperform human experts if it is trained with enough data . Also , [4] has concluded that the CNN can outperform human experts if it is trained with enough data .

Chatterjee et al . [4] for identification of skin lesion being benign or malignant . The malignant lesions are further classified into subcategories namely ; melanocytic or epidermal skin lesions . The cross correlation technique is used to extract regional features which are invariant to light intensity and illumination changes . Also , the cross spectrum based frequency domain analysis has been used for retrieving more detailed features of skin lesions . For classification the SVM classifier was used with three non - linear kernels [4] out

of which SVM with RBF kernel gave promising accuracy as compared to other kernels .

Zhang et al. [5] also used Inception V3 architecture with modified final layer to classify 4 diseases. The model was trained on two nearly similar datasets of dermoscopic images. Authors [5] concluded that misclassification can occur due to presence of multiple disease lesions on the single skin image.

Sun et al. [6] have proposed handcrafted feature based as well as CNN based approaches for classification of clinical images. They trained four CNN architectures namely; Caffenet, fine-tuned Caffenet, VGG and fine-tuned VGGNet. Out of these four the fine-tuned VGGNet gave quite good accuracy. The accuracy of VGGNet was similar to that of the handcrafted feature which was generated by 7 different methods namely; SIFT and color

histogram with SVM classifier. However, the architectures and use of benchmark dataset plays an important role for skin disease image classification to achieve good accuracy.

Gessert et al. [7] introduced patch based method to obtain fine-grain differences between various skin lesions from high resolution images. The high resolution images are divided into 5, 9, and 16 crops or patches and these images patches or crops are fed to the standard CNN architectures. Three architectures were used by the authors namely; Inception v3, DenseNet and SE-Resnext50 architecture [7] for prediction of disease from high resolution image patch.

Rehman et al. [8] have proposed CNN architecture by setting 16 different filters of 7*7 kernel size with pooling layers for down sampling. The proposed model was trained for malignant and benign category of diseases namely; melanoma, Seborrheic keratosis and nevus. The RGB channels of the segmented image are normalized with zero mean and unit

variance. This normalized matrix was fed to CNN for feature extraction, further the fully connected layer consists of 3 layer ANN classifier which classify the skin lesion being banign or malignant.