Chapter 7
Comparative Analysis and Automated Eight-Level Skin Cancer Staging Diagnosis in Dermoscopic Images Using Deep Learning

Auxilia Osvin Nancy V.
https://orcid.org/0000-0002-4254-0537
Department of Computer science and Engineering, College of Engineering and Technology, SRM Institute of Science and Technology, Vadapalani Campus, Chennai, India

P. Prabhavathy
Department of Computer science and Engineering, College of Engineering and Technology, SRM Institute of Science and Technology, Vadapalani Campus, Chennai, India

Meenakshi S. Arya
Department of Transportation, Iowa State University, USA

B. Shamreen Ahamed
Deparment of Computer science and Engineering, College of Engineering and Technology, SRM Institute of Science and Technology, Vadapalani Campus, Chennai, India

ABSTRACT

The challenge in the predictions of skin lesions is due to the noise and contrast. The manual dermoscopy imaging procedure results in the wrong prediction. A deep learning model assists in detection and classification. The structure in the proposed handles CNN architecture with the stack of separate layers that use a differential function to transform an input volume into an output volume. For image recognition and classification, CNN is specifically powerful. The model was trained using labeled data with the appropriate class. CNN studies the relationship between input features and class labels. For model building, use Keras for front-end development and

DOI: 10.4018/978-1-6684-7659-8.ch007

Tensor Flow for back-end development. The first step is to pre-process the ISIC2019 dataset, splitting it into 80% training data and 20% test data. After the training and test splits are complete, the dataset has been given to the CNN model for evaluation, and the accuracy on each lesion class was calculated using performance metrics. The comparative analysis has been done on pretrained models like VGG19, VGG16, and MobileNet.

INTRODUCTION

Melanoma is the type of skin cancer that begins to grow out of control of the development of melanocytes (PS Staff, 2016). In this regard, the main factors for detecting skin cancer and distinguishing between benign and melanoma, such as symmetry, colour, size and shape (PS Staff, 2016). Many countries worldwide, especially the United States, report growing death rates from skin cancer (Marks, 1995). Recent cancer statistics and figures show that the calculable range of recent cancer cases of this kind is around 1.9 million and that in the United States the death rate will be around 608,570 (Siegel et al., 2023). Earlier diagnosis is likely to reduce the death rate. Daylight exposure is associated with the greatest risk of carcinoma development with every malignant melanoma and non-melanoma cancer in the skin. Current carcinoma encompasses malignant melanoma and NMSC malignancies, made up of basal (BCC) and squamous cell carcinoma (SCC), as indicated by Figure1 (Gordon, 2013). Melanoma is the deadliest type of cancer occurring in human beings that leads to coloured markings or skin moles. Clinical testing, dermoscopic image analysis, histological investigation, and ultimate biopsy are the initial diagnosis of carcinoma (Mane & Shinde, 2018).

Skin lesion classes:

Lesions images of skin are classified into seven classes.

Classification of Lesion images of Skin:

Figure 1. Skin cancer types

Automatic Multiface Expression Recognition Using Convolutional Neural Network

Padmapriya K.C., Leelavathy V.and Angelin Gladston (2021). *International Journal of Artificial Intelligence and Machine Learning (pp. 1-13).*
www.irma-international.org/article/automatic-multiface-expression-recognition-using-convolutional-neural-network/279275