iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 8 **Issue:** IX **Month of publication:** September 2020

DOI: https://doi.org/10.22214/ijraset.2020.31669

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 8 Issue IX Sep 2020- Available at www.ijraset.com

Skin Disease Classification using CNN

Prof. Jyotsna Gharat[1], Anjali Bhatt[2], Maitreyee Nath[3], Pranali Yamgar[4]
[1]*Assistant Professor, Department of Information Technology, Xavier Institute of Engineering, Maharashtra, INDIA*
[2]*BE, Dept of Information Technology, Xavier Institute of Engineering (Mumbai University), INDIA*

Abstract: ***This paper presents the different types of skin cancer, namely, Actinic Keratoses, Basal Cell Carcinoma, Benign Keratosis, Dermatofibroma, Melanocytic Nevi, Vascular Lesions and Melanoma. Melanoma is the most dangerous in which survival rate is very low. Early detection of Melanoma can potentially improve survival rate. Skin cancer detection has been proposed in this system. With the advancement of mobile technology, the mobile enabled systems available which can classify the skin diseases. In this article, we proposed a real-time mobile medical care system for detecting different types of skin diseases. In this system, skin cancer can be detected by taking the picture of skin lesion. The actual affected area of the skin will be extracted using different CNN algorithms and it will give result such as cancerous or not. The system involves several elements, such as the processing of the image and training of the system using CNN.***

Keywords: Actinic Keratosis, Basal Cell Carcinoma, Benign Keratosis, Dermatofibroma, Melanocytic Nevi, Vascular Lesions, Melanoma.

I. INTRODUCTION

The Cancer is uncontrolled growth of cells in the body. The incidence of both melanoma and other skin cancer has been increasing over the past decades. The cure rate can be reached up to 90%, where doctors can save patients' lives if the lesion is detected in the primary stage. In general, visual examination of skin cancer is difficult and can lead to misidentification of lesions, as there are similarities between the different types of skin lesions. Therefore, the automatic classification of images of skin lesions according to the convolutional neural network techniques is the definitive solution for visual inspection.

There are different types of skin cancer which are as follows:

1) Actinic keratoses
2) Basal Cell Carcinoma
3) Benign Keratosis
4) Dermatofibroma
5) Melanocytic Nevi
6) Vascular lesions
7) Melanoma

A. Methodology

1) *The Dataset:* A large collection of dermatoscopic images of pigmented lesions are there in Skin Cancer MNIST: HAM10000 dataset [1]. Each type of skin disease has the number of images present in the dataset.ss

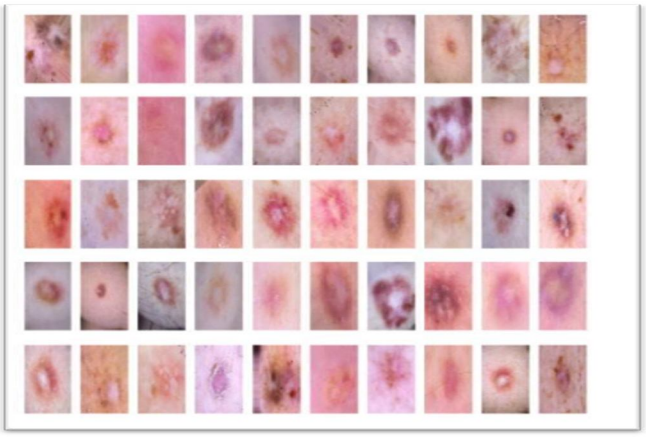

Figure 1.1: Images of the Dataset

The 70% data is used for training phase and 30% data is used for testing phase. The parameters considered in the experiments were as follows: Test accuracy, Epoch, precision, recall, f1-score, support.

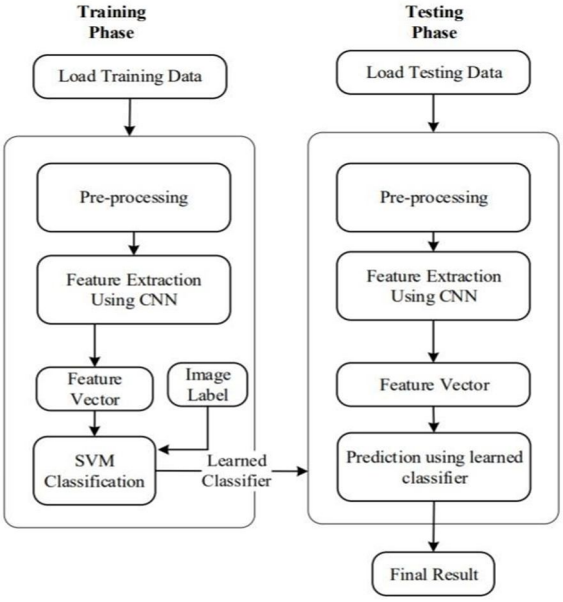

Figure 1.2: System Methodology

2) *Dataset Pre-processing:* Pre-processing the dataset is the technique that transforms raw data into understandable format. The data which we have in real world is incomplete, inconsistent or containing many errors. Using data pre-processing all these issues can be removed and it can make your dataset consistent and for use. The images are resized and various filtering techniques are applied on the various layers of the image and the data is split into training and testing dataset. The dataset will be used to train the data model to identify the skin cancer and calculating the accuracy of cancer. The model will be tested using the testing data and the accuracy of the model is achieved.
3) *Image Augmentation:* The augmentation process is done only to increase the number of the images in the dataset without any reason to improve the performance of your system. There are different methods available such as Mirroring, Random cropping, Rotation, color shifting, shifts and share for the augmentation of the images, out of which Random Cropping is a perfect method for augmentation process. In Random Cropping the images are crop and take only that particular part which system requires. For building a accurate image classifier for a little amount of data, Image Augmentation is the necessary step to improve the performance of the model that system will be going to use. Image data classification is used to extend training data sets to improve model efficiency and generalization. Keras deep learning neural network library offers an increase in image data thanks to the ability to adapt to models. The Keras Deep Learning neural network library offers the ability to implement models using image data enhancement
4) *Cancer Detection and Classification:* The system will take the image of skin and they are used as training and testing datasets for the detection and classification of skin cancer. The various algorithms used to train the model and the classification is done using CNN.

B. Convolutional Neural Network (CNN)

A convolutional neural network is a type of artificial neural network used in image recognition and processing that is specifically designed to process pixel data. CNN levels consist of input levels, grouping levels, fully linked levels and normalization levels. The convolution layer is the central element of a convolutional network that performs most of the heavy computational work. The removal of limitations and increase in efficiency for preprocessing results in a system that is more effective, simpler to train [7].

1) *Creation of a Mobile Application to send and Receive the Data:* The mobile application will be created through which the user will be able to send the send the skin image to the server and then system will check whether it is cancerous or not if the image is cancerous then the system will classify the type of skin cancer and it will send the result of the same to the users mobile application.

II. CONCLUSION

The dataset is first augmented to increase the number of images for better training using different augmentation methods. The system will be first trained by using the training dataset. The training datasets containing the images of different classes of cancer. The system accuracy will then be checked by using a testing dataset to classify the images into appropriate classes. The image is received by the system through the mobile enabled application used by the user. The user will send the infected skin image to the system via mobile application and then the system will detect whether it is cancerous or not and if it is cancerous then it will give the accuracy of cancer. The final result will be sent to the user via mobile application.

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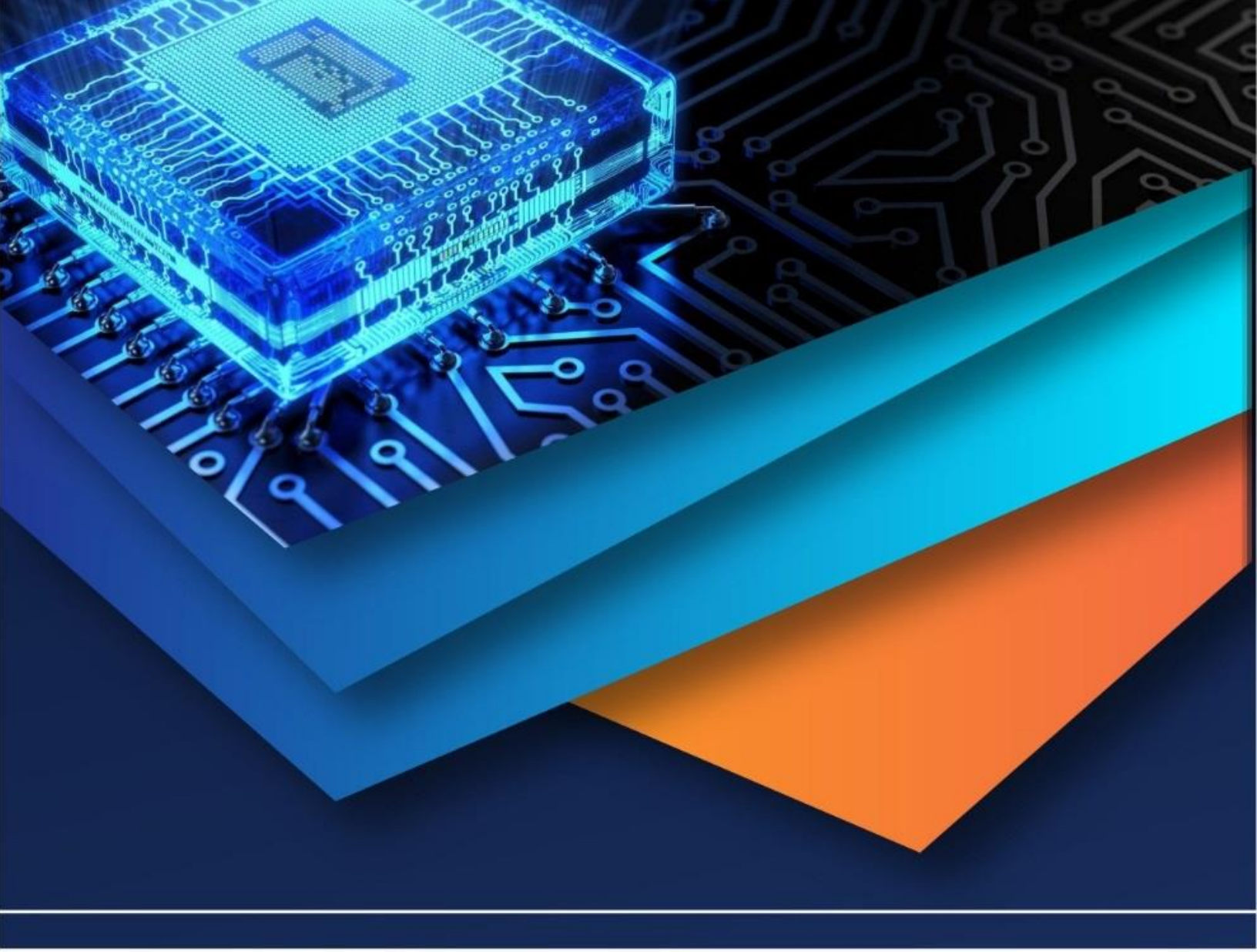

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