A Project report on

SKIN LESION DETECTION

A Dissertation submitted to JNTU Hyderabad in partial fulfillment of the academic requirements for the award of the degree.

Bachelor of Technology

in

Computer Science and Engineering

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EXPLORE TO INVENT

CERTIFICATE

This is to certify that the Major Project Phase I report entitled " **Skin Lesion Detection** " being submitted by N.Vinay Reddy (20H51A05F0), B.Ajay Kumar (20H51A05N1), Ch.Varshini (20H51A05N5) in partial fulfillment for the award of **Bachelor of Technology in Computer Science and Engineering** is a record of bonafide work carried out his/her under my guidance and supervision.

The results embodies in this project report have not been submitted to any other University or Institute for the award of any Degree.

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TABLE OF CONTENTS

List of Figures

ABSTRACT

This thesis focuses on the problem of automatic skin lesion detection, particularly on melanoma detection, by applying semantic segmentation and classification from dermoscopic images using a deep learning based approach. For the first problem, a U-Net convolutional neural network architecture is applied for an accurate extraction of the lesion region .For the second problem, the current model performs a binary classification (benign versus malignant) that can be used for narly melanoma detection. The proposed solution is built around the VGG-Net Conv Net architecture and uses the transfer learning paradigm. This work performs a comparative evaluation of classification alone (using the entire image) against a combination of the two approaches in order to assess which of them achieves better classification results. The model is general enough to be extended to multi-class skin lesion classification.

CHAPTER 1
INTRODUCTION

CHAPTER 1

INTRODUCTION

1.1. Problem Statement

Skin lesions are areas of your skin that are different from the skin around them. Skin lesions are common and may be the result of an injury or damage to your skin, like sunburn.They're sometimes a sign of underlying conditions, like infections or autoimmune diseases. skin lesion classification remains challenging due to the visual similarities between benign and melanoma lesions.The skin lesion classification is a difficult challenge as a result of the unique features of the skin lesions and their range of forms, especially because of the identification problem of early melanoma.

1.2.c Research Objective

1. **Skin lesion segmentation:** The first task will perform an automatic prediction of lesion.
2. **Skin lesion classification:** The second task will perform the automatic classification as either melanoma or non-melanoma. In order to find the best classification model, this task. will be divided into three subtasks according to different type of input skin images.
3. **Unaltered lesion classification:** The basic model will perform the classification over the original skin RGB images contained in the ISIC dataset.

CHAPTER 2
BACKGROUND WORK

CHAPTER 2

BACKGROUND WORK

INTRODUCTION

2.1 Skin Lesion Detection based on LBHP-CNN Deep leaning .

Initially, traditional machine learning-based techniques were introduced for melanoma detection and classification. Codella et al. developed a traditional ML-based features extraction method employing the color and edge histogram along with local binary pattern (LBP). The shades of gray algorithm is used for image pre-processing. CNN, a deep learning approach, is used for the segmentation of skin lesions. Morphological operations were performed to remove noise in the images. The detection of skin lesions from dermoscopy images consisting of three steps was performed in , such as image pre-processing to improve the performance of the model dividing them into negative and positive classes, image augmentation applied on data to protect the model from overfitting, the use of Densnet to extract the features and the proposal of a U-net architecture-based lightweight CNN model for lesion .Skin cancer detection was performed by employing a machine learning model, i.e., Support Vector Machine (SVM). Features were extracted by the gray level co-occurrence matrix (GLCM) method and fed to SVM for the detection of skin lesions. The method achieved 95% accuracy; however, it could be improved by utilizing some image pre-processing methods on the dataset to remove noise and improve the training process

2.2 IMPLEMENTION

A new method is proposed for lesion detection and classification using probabilistic distribution based segmentation method and conditional entropy controlled features selection. The proposed method is consists of two major steps. lesion identification. lesion classification. For lesion identification, we first enhance the contrast of input image and then segment the lesion by implementation of novel probabilistic distribution (uniform distribution, normal distribution). The lesion classification is done based of multiple features extraction and Entropy .The detailed flow diagram of proposed method.

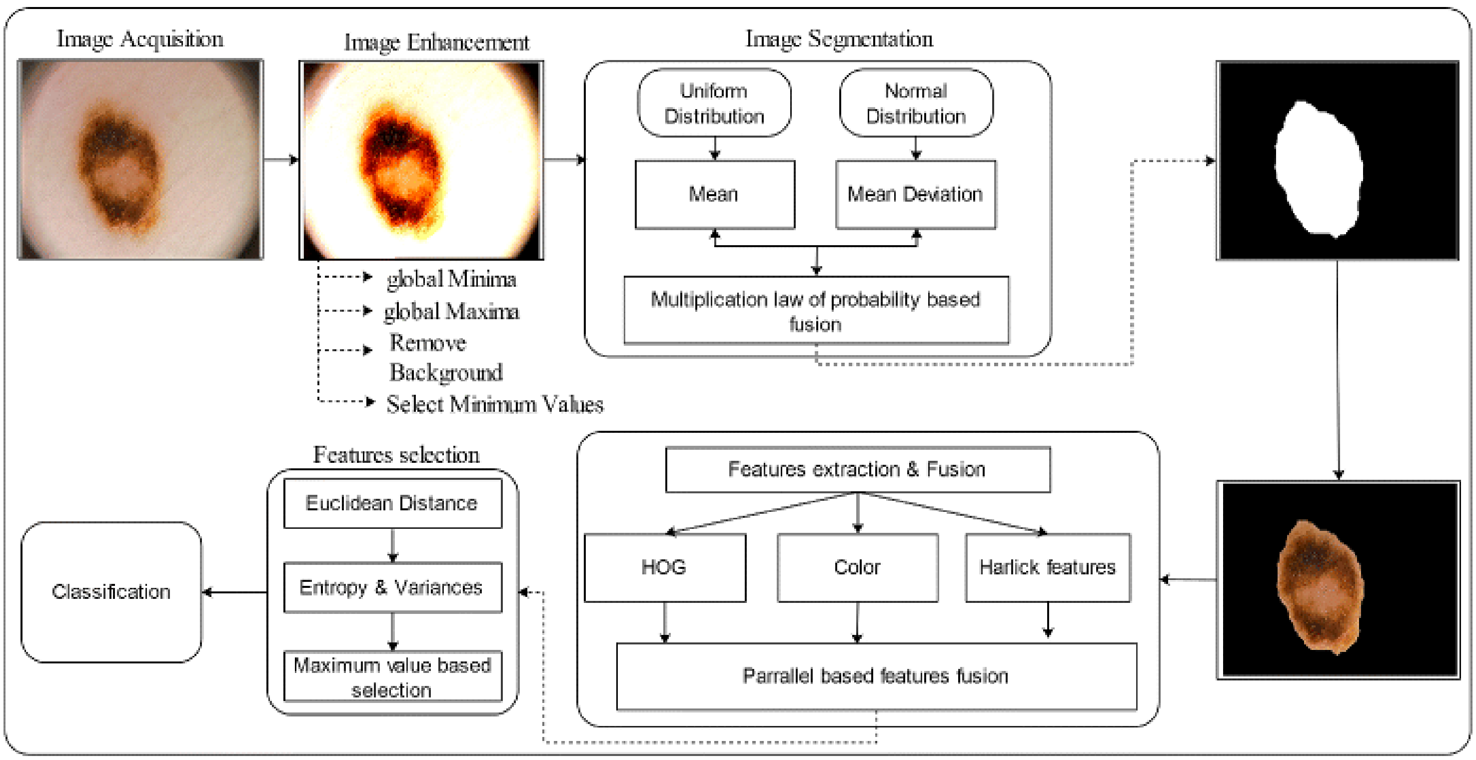
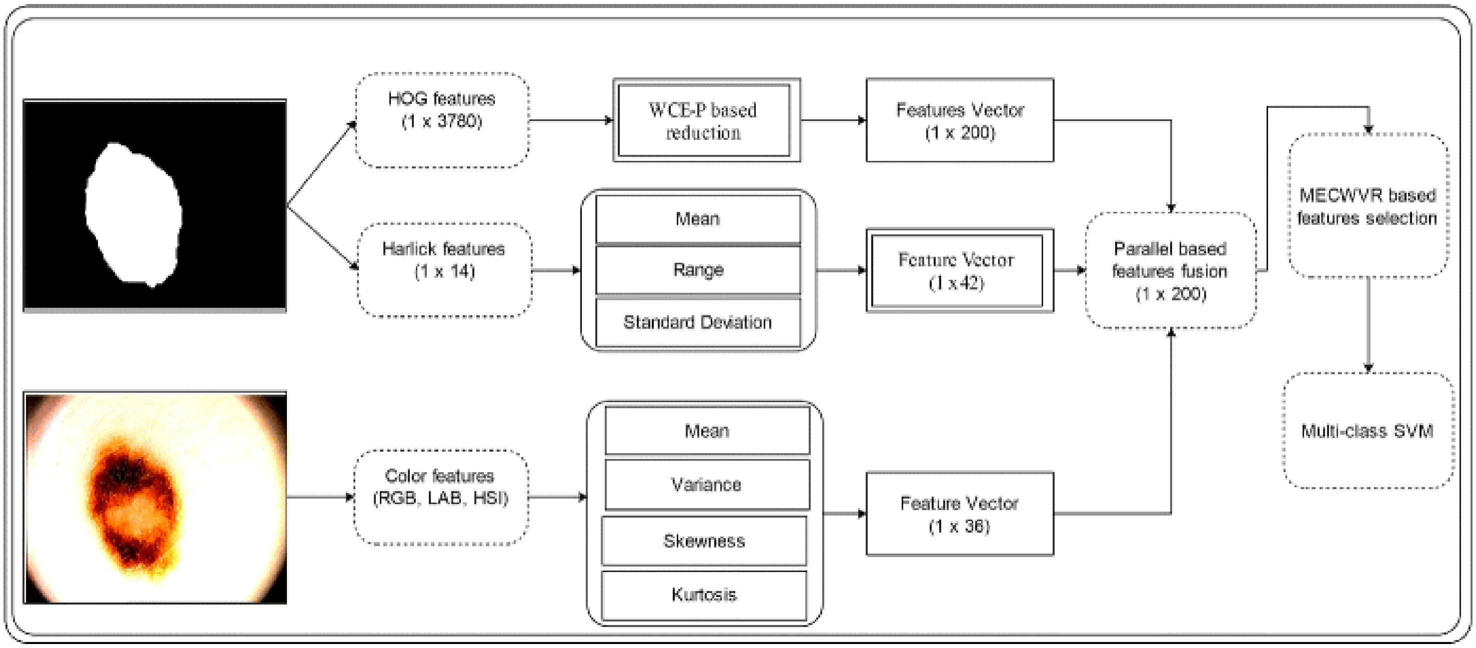


Fig no 2.2: proposed system diagram

2.3 System Architecture :



Figno 2.3: System Architecture

2.4 Methodology:

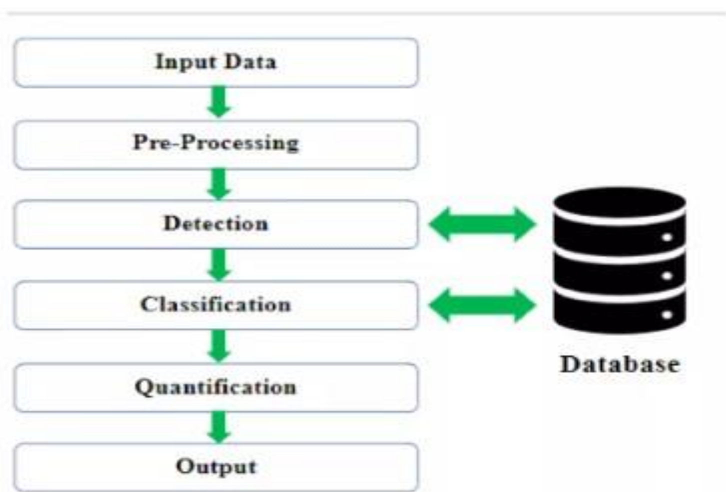


Fig no 2.4:Flowchat

2.5 Detection and Classification:

The model receives images of the troublesome area and uses them to determine whether or not the skin is cancerous. If the skin is malignant, the affected area is represented by a rectangle box.

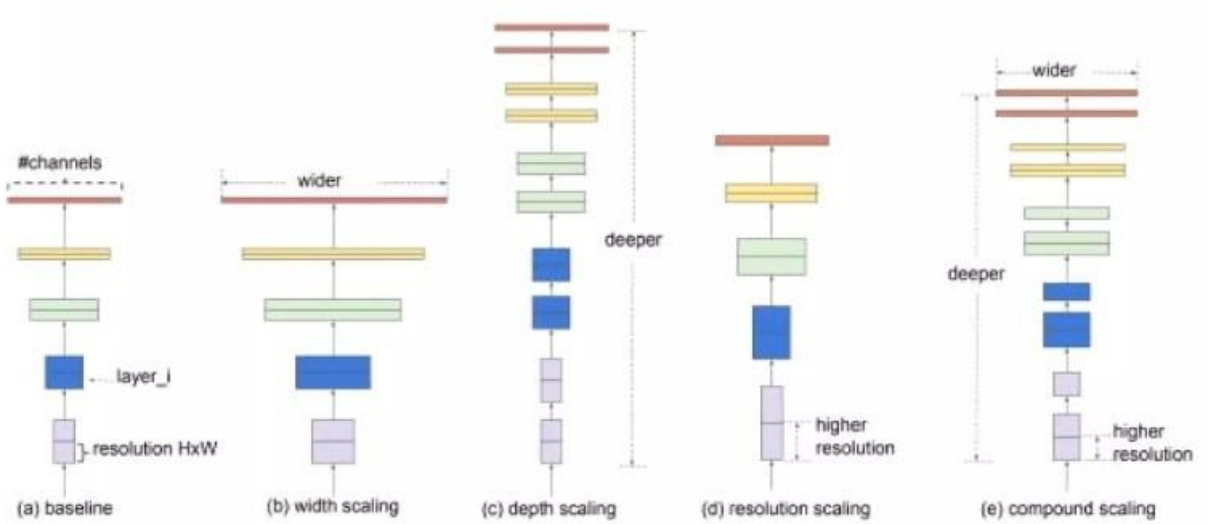


Fig no 2.5:Skin lesion Detection

2.6 Dataset:

The dataset was collected from the skin lesion DermIS dataset, which is available on the Kaggle website There are two classes in the dataset: benign and malignant. Seventy-five percent of the images of each class were used to train the model, and the remaining 25% were used for validation purposes. There were 1000 images in total; 500 images belonged to the benign class and 500 to the malignant class, with dimensions of 600 × 450 pixels. Image pre-processing was performed to resize the images to dimensions of 227 × 227, and the resized images were provided as input to the image input layer. The images of the benign and malignant classes used to train our model are provided in . The employed LSTM classifier’s approach is shown .

Fig no 2.6: Sample Dataset

2.7 Type of Skin Disease:

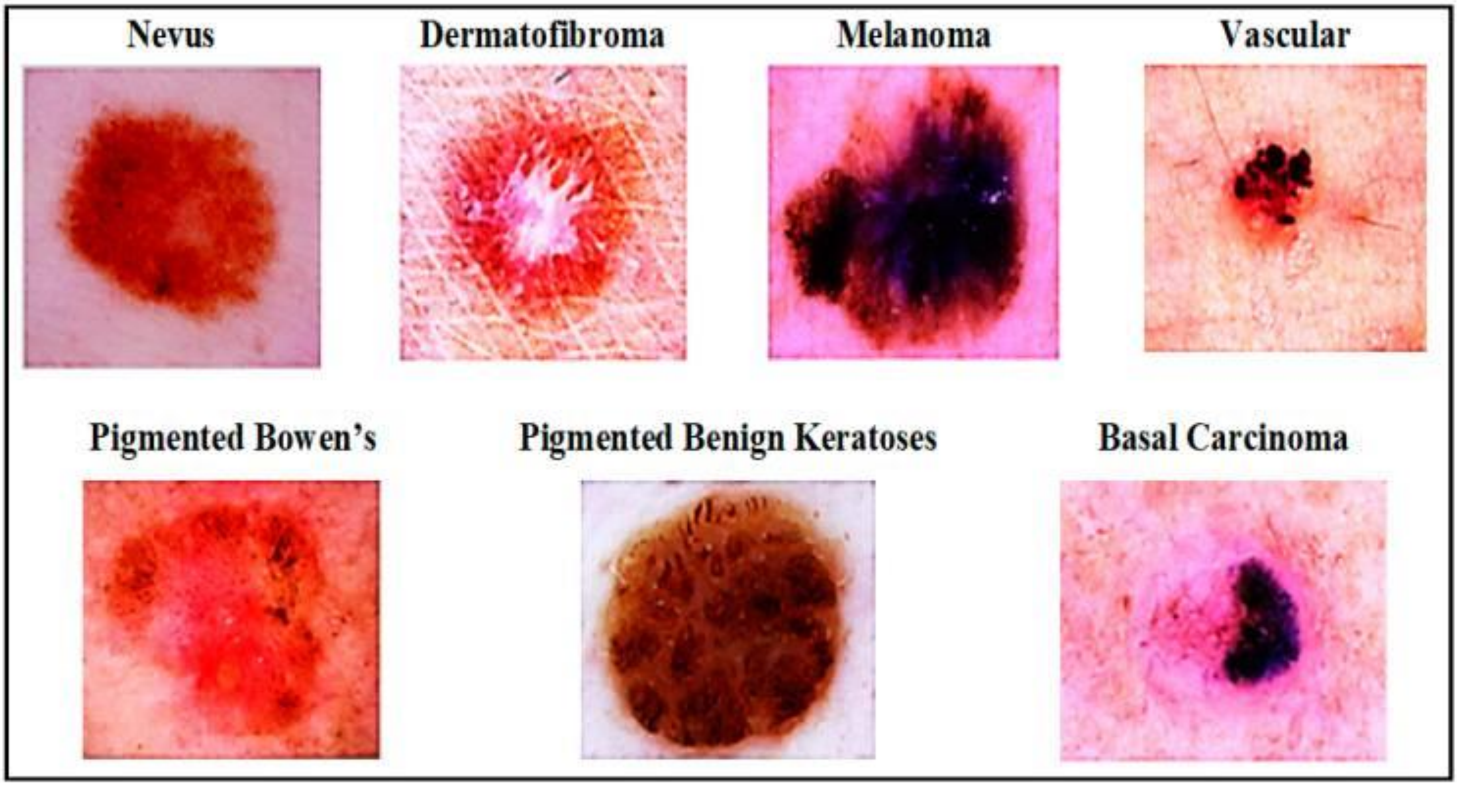


Fig no 2.7: Type of Skin Disease

2.8 Convolutional Neural Network(CNN)-Based Skin Cancer Detection:

A convolution neural network is an essential type of deep neural network, which is effectively being used in computer vision. It is used for classifying images, assembling a group of input images, and performing image recognition. CNN is a fantastic tool for collecting and learning global data as well as local data by gathering more straightforward features such as curves and edges to produce complex features such as shapes and corners . CNN’s hidden layers consist of convolution layers, nonlinear pooling layers, and fully connected layers . CNN can contain multiple convolution layers that are followed by several fully connected layers. Three major types of layers involved in making CNN are convolution layers, pooling layers, and full-connected layers . The basic architecture of a CNN is presented .

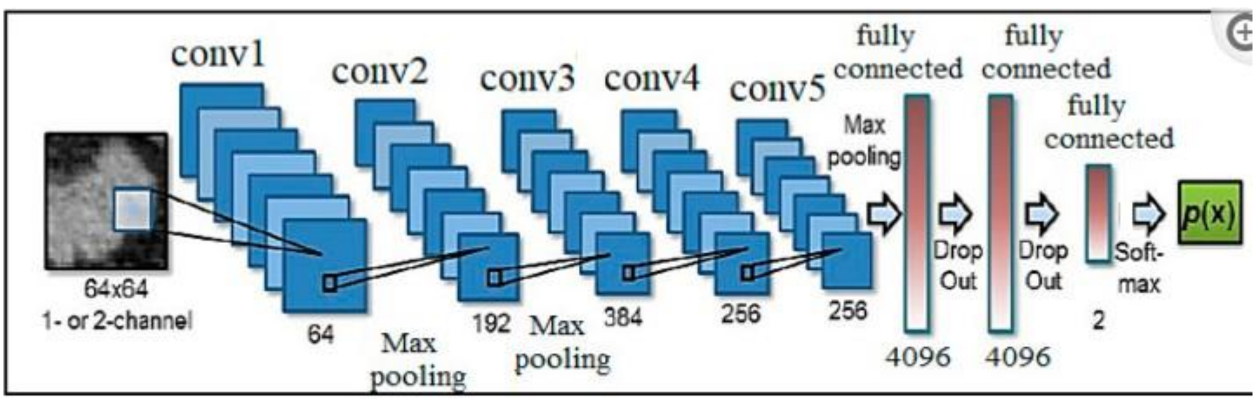


Fig no 2.8: Basic CNN Architecture

SKIN LESION DETECTION

A technique for the classification of four different types of skin lesion images was proposed by . A pre-trained deep CNN named was used for feature extraction, after which error-correcting output coding SVM worked as a classifier. The proposed system produced the highest scores of the average sensitivity, specificity, and accuracy for SCC, actinic keratosis (AK), and BCC: 95.1%, 98.9%, and 94.17%, respectively. proposed a pre-trained deep CNN architecture VGG-16 with a final three fine-tuned layers and five convolutional blocks. The proposed VCG-16 model is represented.

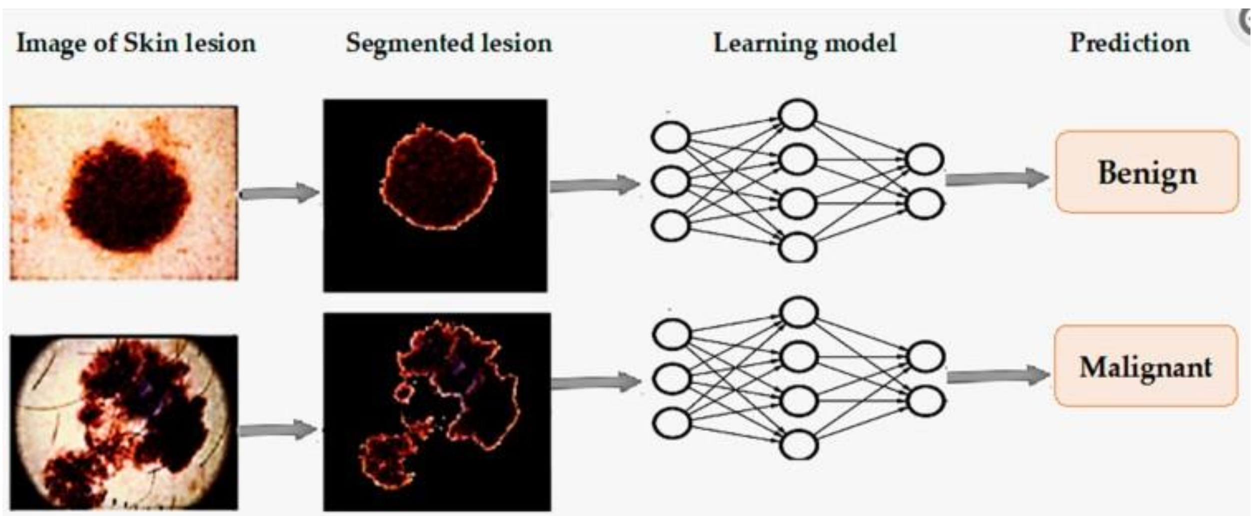


Fig no 2.8: Skin cancer diagnosis using CNN

CHAPTER 3
RESULTS AND DISCUSSION

CHAPTER 3

RESULTS AND DISCUSSION

The proposed method is evaluated on four publicly available datasets including PH2, ISIC, and collective ISBI . The proposed method is a conjunction of two primary steps: a) lesion identification; b) lesion classification melanoma, benign, atypical nevi. The lesion identification results are discussed in their own section. In this section, we discussed proposed lesion classification results. Four classifications three types of features are extracted (i.e. texture, HOG, and color). In this section, we discuss the results achieved by our proposed model during the testing phase. As shown in , the ROC curve exhibits the significant performance of the proposed model. We attained 99.4% accuracy, 98.7% precision, 98.66% recall, and a 98% F-score. More specifically, we employed 750 images to train the proposed technique, including 375 images from the malignant class and 375 images from the benign class**.**

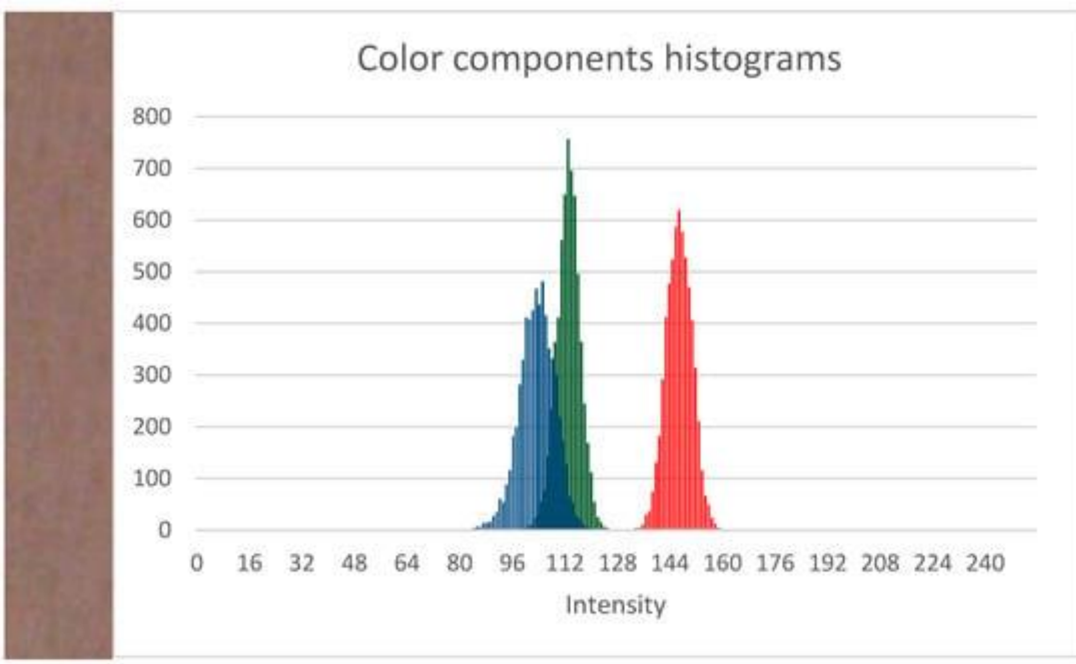


Fig 3.1: Basic Skin Model Accuracy

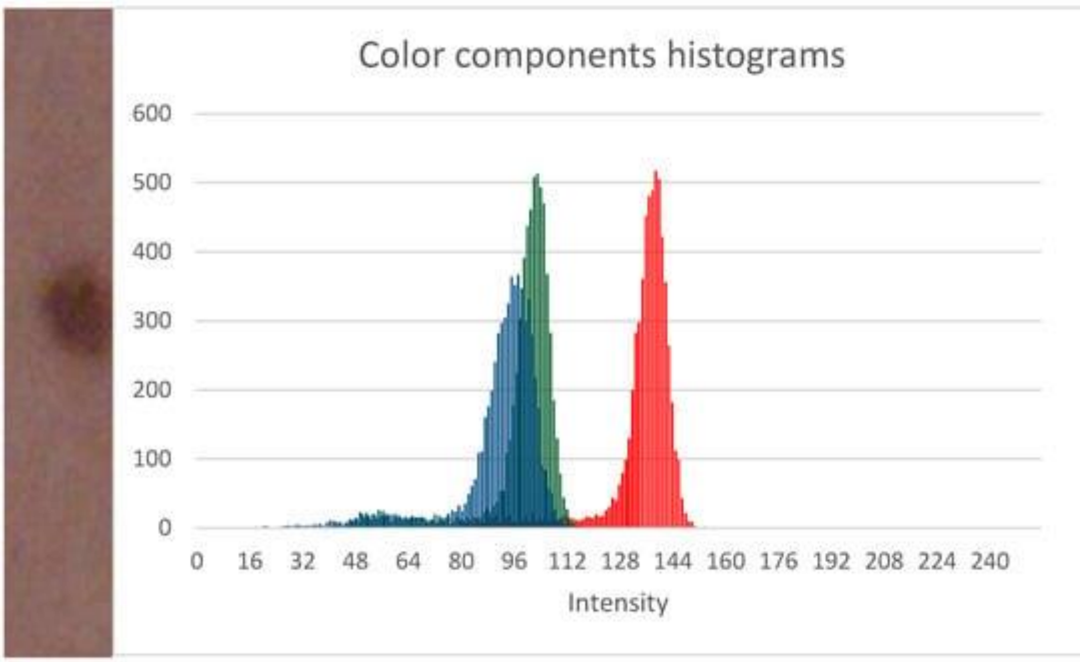


Fig 3.2: Melanoma Skin Model Accuracy

CHAPTER 4
CONCLUSION

CHAPTER 4

CONCLUSION

In this project, the skin lesion detection using LBPH-CNN. Initially, This systematic review paper has discussed various neural network techniques for skin cancer detection and classification. All of these techniques are noninvasive. Skin cancer detection requires multiple stages, such as preprocessing and image segmentation, followed by feature extraction and classification. This review focused on LBPH, CNNs,for classification of lesion images. Each algorithm has its advantages and disadvantages. Proper selection of the classification technique is the core point for best results. Most of the research related to skin cancer detection focuses on whether a given lesion image is cancerous. However, when a patient asks if a particular skin cancer symptom appears on any part of their body, the current research cannot provide an answer. Thus far, the research has focused on the narrow problem of classification of the signal image.

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