Skin Disease Detection

Submitted in partial fulfilment of the requirements of

the degree **B.Tech.**

(Computer Engineering)

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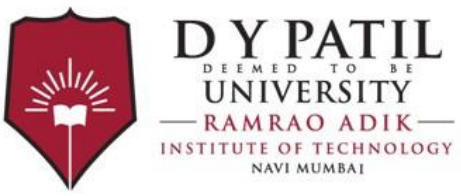

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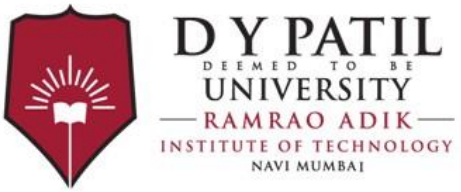
November 2022



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Certificate

This is to certify that, the Mini Project – III entitled

"Skin disease detection" is

a bonafide work done by

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and is submitted in the partial fulfillment of the requirement for the degree of

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to the
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Supervisor

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Mini Project Coordinator | Head of Department | Principal

Mini Project - III Approval

This Mini Project - III entitled **"Skin Disease Detection"** by **Narottam Sahu 20CE1012, Avirat Sudam 20CE1162, Aman Shrivastava 20CE1093, Prathamesh Raut 20CE1017** is approved in the partial fulfillment of the requirement for the degree of **B. Tech. in Computer Engineering**

Examiners

1……
(Internal Examiner Name & Sign)

2……
(External Examiner name & Sign)

Date:

Place:

Abstract

This is a working prototype for a free online tool that can tell doctors and lab technologists the three most likely diagnoses for a given skin lesion. It could aid them in quickly identifying high-risk patients and accelerating their workflow. The app will return a result in under 3 seconds.

To protect user privacy, images submitted by users are pre-processed and analyzed locally before being uploaded to an external server.

Artificial Intelligence powers this app. The goal of this project was to create a complete solution, beginning with model creation and ending with a live web app.
Users can submit a photo of a skin lesion and receive an instant prediction.

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Chapter 1
Introduction

1.1 Overview:

Dermatological diseases are one of the most complex branches of science due to the complexities in disease diagnosis and their variation in changing environments. Skin diseases are the most common, especially because they are easily spread and can lead to skin cancer if not treated early. The occurrence of skin cancer is now increasing faster than the occurrence of other new types of lungs and breast cancer combined. According to research, one-fifth of the population will be affected by skin cancer in their lifetime, making diagnosis more difficult.

1.2 Motivation:

A variety of visual cues, such as individual lesion morphology, body size distribution, color, scaling, and arrangement of lesions, can be used to identify a skin disease. The complexity of the recognition process is greatly increased when the individual components are examined separately, and the human-engineered feature extraction method is inapplicable for its classification. So, this is where our app will assist users in determining the potential disease they may be developing.

1.3 Objectives:

- To make it easier for patients to detect the skin lesions in a easy and accessible manner.
- To provide a web UI which can be accessed by mobile, desktop etc and can detect disease in just a few seconds.
- To spread awareness and propagate the seriousness these skin related issues can have on one’s body at a very early stage.

1.4 Organization of the report:

The paper of the organization is as follows: The following report paper explains the development of the Skin Disease Detection and how we built it. Chapter 1 is a brief overview of the application and discusses the objective and motivation taken the project. Chapter 2 provides the literature survey and limitations of the existing attendance recording systems whereas Chapter 3 depicts the targeted problem statement, and it also gives a brief explanation of the proposed methodology and techniques of the application, design of the system, and details of software and hardware requirements. Chapter 4 discusses the implementation details and results of the application and finally concludes in chapter 5 with the results, conclusion and future work

Chapter 2 Literature Survey-

We tested the image of various Diseases and prepared table

TABLE I. SURVEY OF TRADITIONAL TECHNIQUES FOR SKIN DISEASE CLASSIFICATION

Sr No	References	Disease[a]	No. of images	Performance Measure
1	Amarathunga et.al. [2]	, Melanoma	-	Accuracy: 90%
2	Chakraborty et.al [3]	Melanocytic nevi	-	Accuracy: 90.56%
				Precision: 88.26%
				Recall:93.64%
				F-measure: 90.87%
3	Manerkar al. [11]	Benign keratosis	45	Accuracy: 9698%
4	Zaqout [14]	e Basal cell t carcinoma	200	Accuracy: 90%
				Sensitivity: 85%
				Specificity: 92.22%
5	Chatterjee al. [10]	Actinic Keratoses	6,838	Accuracy: 98.79%
				Sensitivity: 99.01%
				Specificity: 95.35%

6	Arifin et.al. [19]	Vascular skin lesions	704	Accuracy: 94.04%

Limitations

The Ai brain (model) that powers this app is not skilled enough to consistently assign the highest score to the correct lesion. Also, the model is not very good at detecting melanoma. That said, during testing the correct lesion was regularly among the top three predicted lesions.

The model was not trained using photos that were taken with a mobile phone. Therefore, the model's prediction accuracy could be affected by variations in the quality of mobile phone images.

Chapter 3

Proposed System

3.1 Problem Statement

- Creating a web application for detecting skin lesions at the click of a button.
- This project aims at developing an anonymous,easy to access platform for users who want to get an accurate idea of the lesion associated with their skin.
- People can get a result in under 3 seconds and based on this they can go for further professional medical consultation.

3.2 Proposed methodology

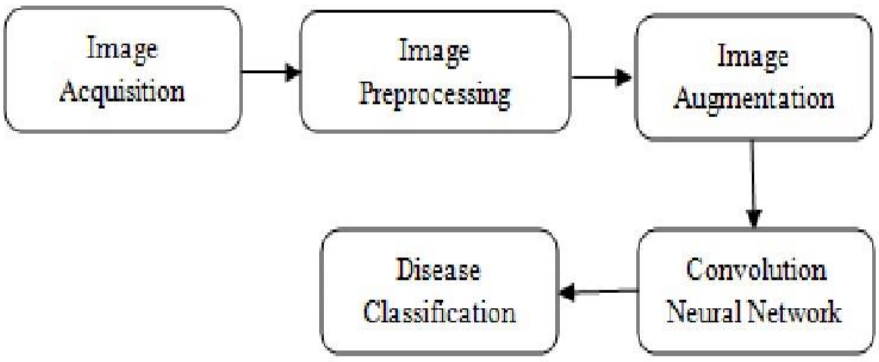


Figure-3.1 Workflow

3.3 System Design

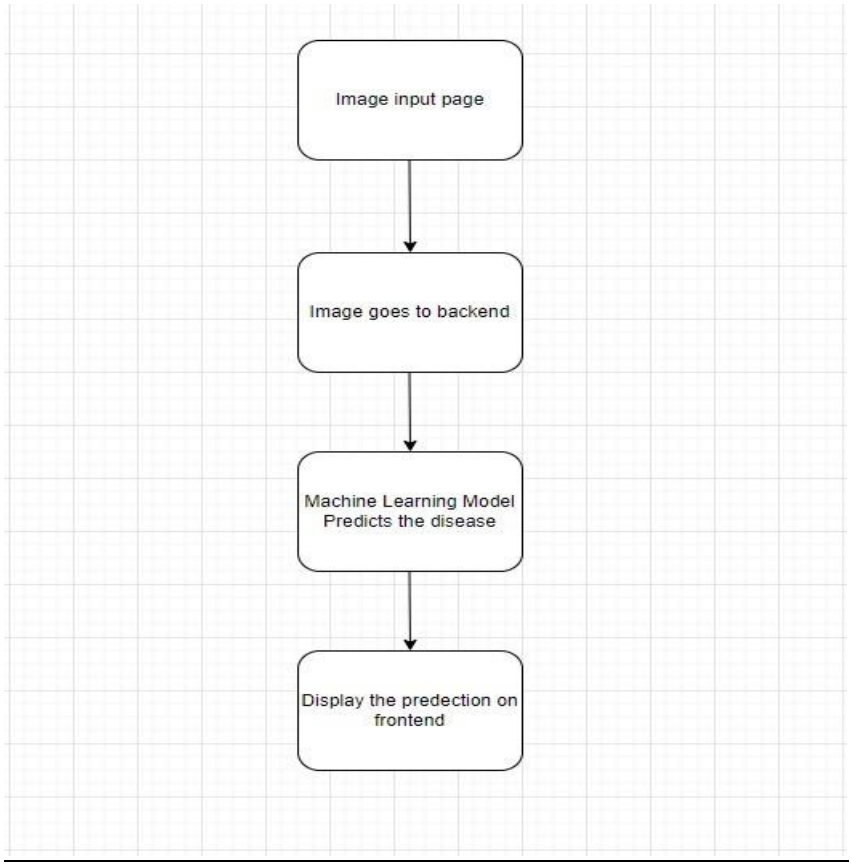


Figure 3.2: System Design

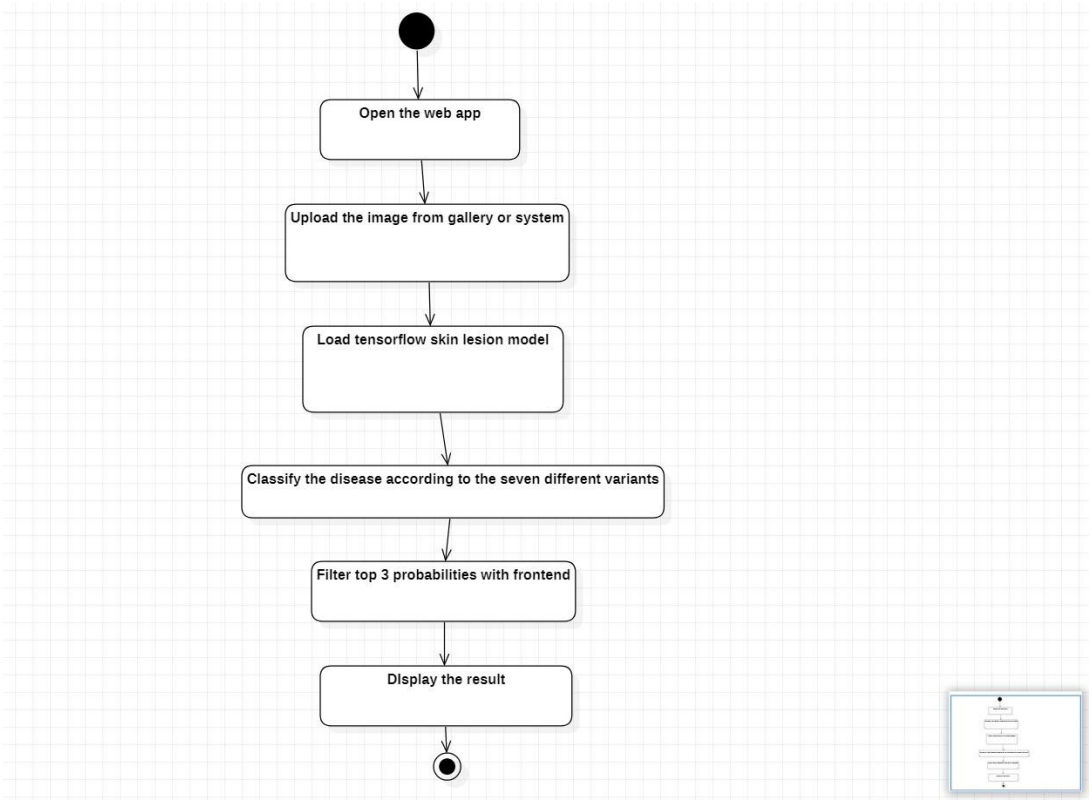


Figure 3.3: Activity Diagram

3.4 Details of Hardware and Software Requirements

TABLE II. Hardware Software Requirements

Details		
	Windows requirements	**Linux requirements**
Processor	Intel Pentium 4 or later	Intel Pentium 4 or later
Memory	2.5 GB minimum, 6 GB recommended	
Screen resolution	1280 x 1024 or greater	
Application window size	1024 x 680 or greater	

3.4.1 Software Requirements-

- Python
- Tensorflow
- Keras
- JavaScript
- Tensorflo

Chapter 4

Results and Discussion

Here are different results and implementations of our projects for different user inputs. We have tested photos from different camera resolutions and different phones like iPhone 14 pro, iPhone 11, Oppo F19 pro, Oneplus 8t, Redmi and Vivo. The clarity of the picture also gives different outputs, as a clearer picture gives the model a better idea to classify it into a particular category.

We have also prepared a True Positive,False Positive,False Negative,True Negative evaluation metrics table wherein we tested our different inputs and categorised them into one of these four accordingly.

Figure 4.1 Result

Figure 4.2 Result

Figure 4.3 Result

Figure 4.4 Result

Figure 4.5 Result

Result Analysis

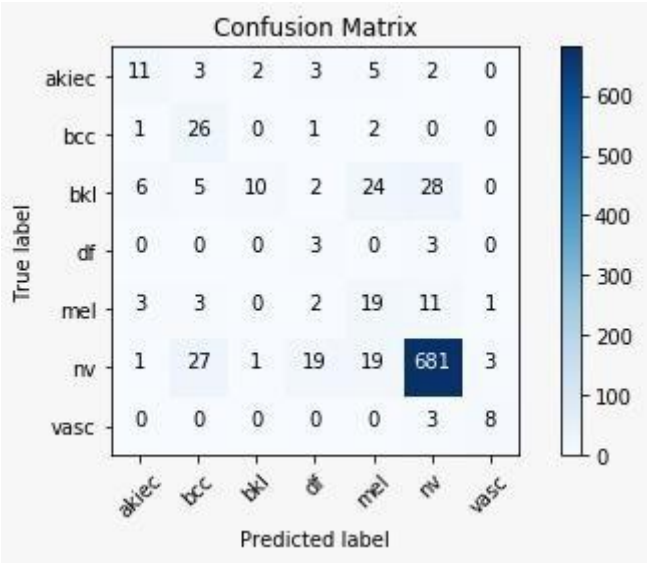


Figure 4.6 Confusion Matrix

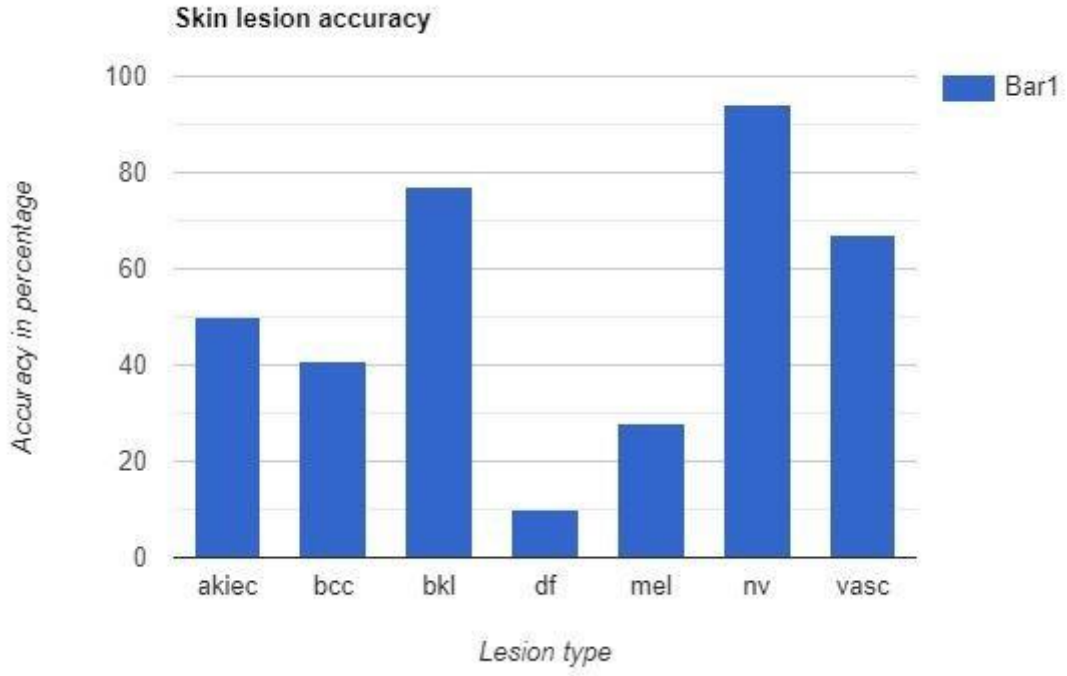
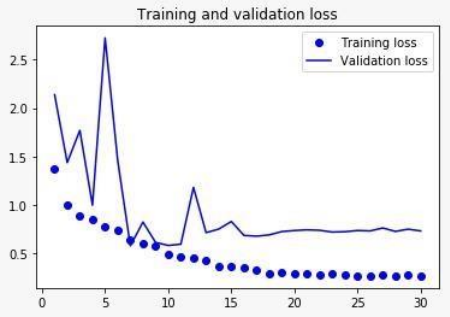


Figure 4.7 Accuracy Bargraph



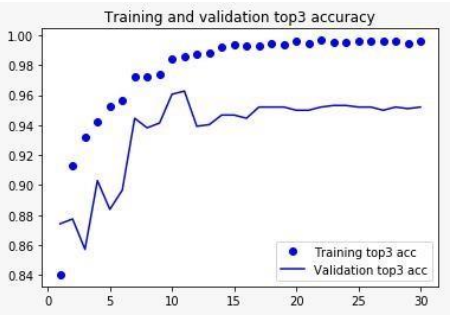


Figure 4.8 Loss And Accuracy Graph

TABLE III. Result Analysis Table

Actual Class\Predicted Class	Skin Cancer=Yes	Skin Cancer=No	Total
Skin Cancer=Yes	TP=50	FN=11	61
Skin Cancer=No	FP=8	TN=100	108
Total	58	111	169

Recall=TP/(TP+FN)=0.82

Precision=TP/(TP+FP)=0.86

Accuracy=TP+TN/Total=0.887

Chapter 5 Conclusion and Future Work

Successfully created Skin Lesion Detection using Python, Tensorflow, JavaScript,Tensorflow JS etc. Our project gives the top 3 categories out of the 7 with the highest probability. It works on different camera resolutions and different phone or desktop models. The photo can be uploaded from your gallery or other files folders or you can even click a photo from your mobile then and there itself to upload the picture. Thus, we have implemented a skin lesion classification with an accuracy of 88.7 percent and this can give our users an approximate idea of their associated lesion, upon which they can take further action.

Future scope

We will try to broaden the scope of our projects from seven skin lesions to various skin diseases in collaboration with DY medical college and medical professionals.

We will also attempt to develop an Android and iOS app and submit it to the Google Play Store.

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