
Skin disease Prediction using Convolutional neural networks

An Image processing project by
Avinash 18BCE0363
Shubham 18BCE0356
Neetigya 18BCE0794

Abstract

With ever growing pollution and climate disruptions, our way of living and lifestyle is giving rise to many skin related diseases. For some of which early and accurate detection becomes utmost necessary in order to save the patient. Given availability of skin doctors in hospitals and huge expenditure associated with appointments, it becomes almost impossible for a poor to afford even diagnosis related to a skin disease. The project aims at providing skin disease prediction technology made with using deep learning. The system makes use of deep learning technology to train itself with the various skin images. Then it is tested with the test set to check for accuracy. Finally, web application to facilitate user interface.



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The Problem

The expensive and inefficacy public human operated skin medication centers highlighting the lack of automated proficient skin detection systems based on deep learning.

Most of the dermatologists start their appointment fees from **400 Rupees**. Not to mention most public ones reside major amount of time at their private clinic.



Introduction

Inspiration

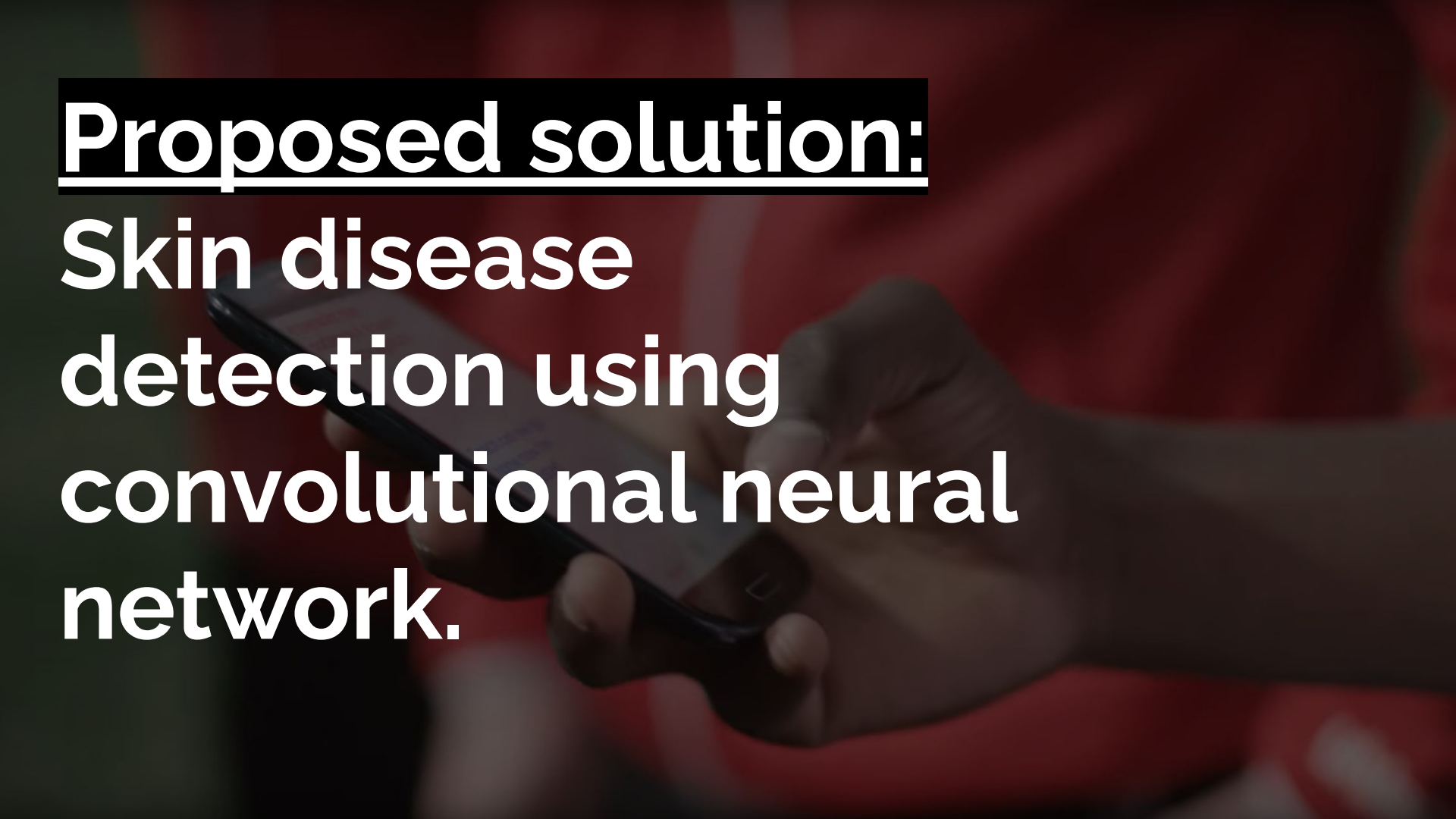
I suffered from lichen planus two years back. It took 5 doctors and 6 months to diagnose not to mention plenty of money to go with that.

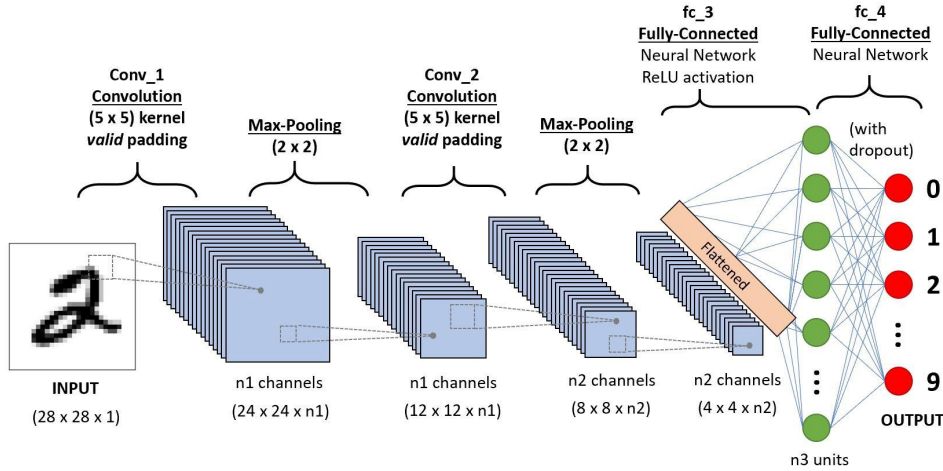
Existing solution(s)

Most of the existing solutions are either a mere decision making tool which assist dermatologist to diagnose a particular disease or a classification setup that needs user to input details of the disease like lesion type, color etc. The learning models that do exist have limited accuracy.

Proposed solution:

**Skin disease
detection using
convolutional neural
network.**

A hand holding a smartphone, with a blurred background of a person in a red shirt. The text is overlaid on the left side of the image.

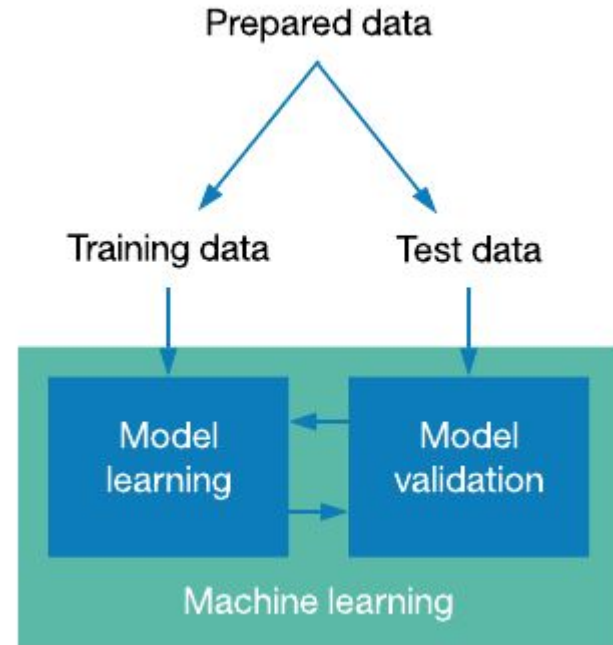


Convolutional neural network

Deep Learning algorithm which can take in an input image, assign importance (learnable weights and biases) to various aspects/objects in the image and be able to differentiate one from the other.

ALGORITHM

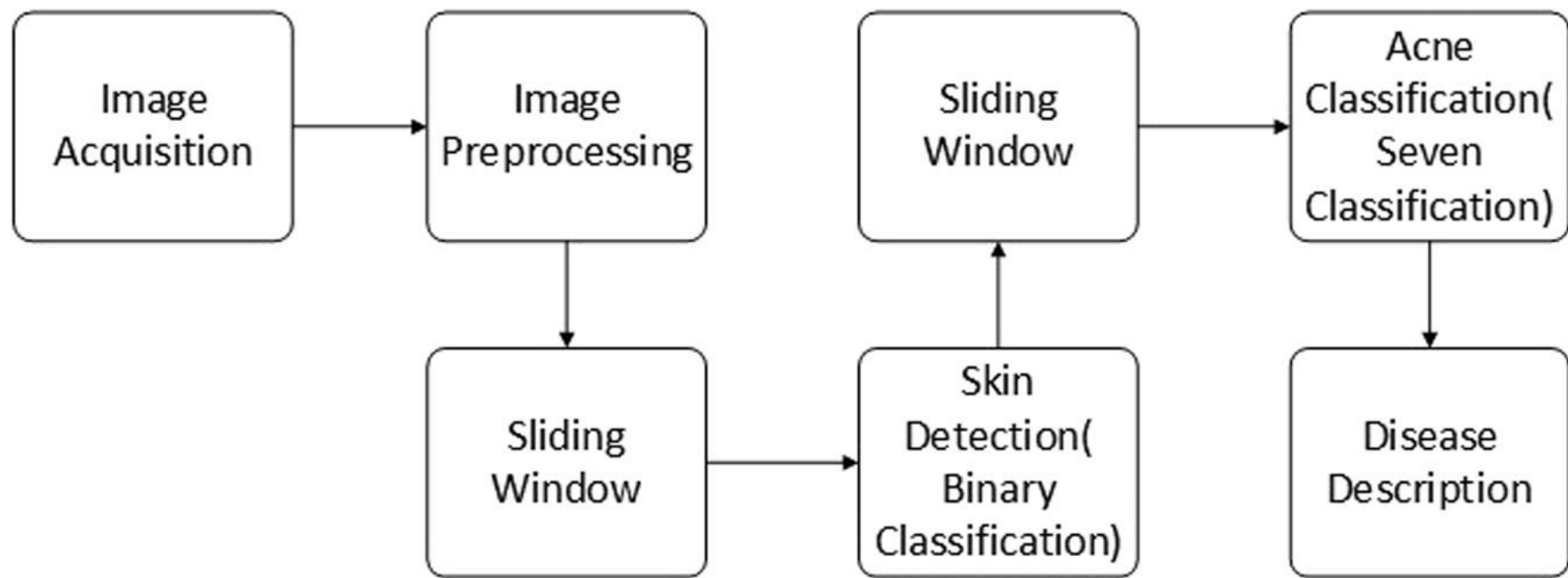
1. The dataset will be collected images will be preprocessed.
2. Data augmentation to enrich dataset.
3. Training our model on training images.
4. Testing on testing set to verify accuracy.
5. User interface implementation in the form of web Application.



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We are doing this project on small number of diseases to begin with which can be extended as per requirement.

We have taken 7 diseases to begin with from The HAM10000 dataset, which provides large collection of multi-source dermatoscopic images. This is a collection of 10,000 images.



Base paper

Name	Authors	Year	Dataset	Methodology
Skin Disease Classification using CNN[2]	Prof. Jyotsna Gharat, , Anjali Bhatt, Maitreyee Nath, Pranali Yamgar	2020	MNIST: HAM10000 dataset of dermatoscopic images.	The dataset images were resized and cleaned before augmenting them for the purpose of enriching the training set using keras deep learning. Then the classifier model using convolutional neural networks is formed which is integrated and deployed as an android application.

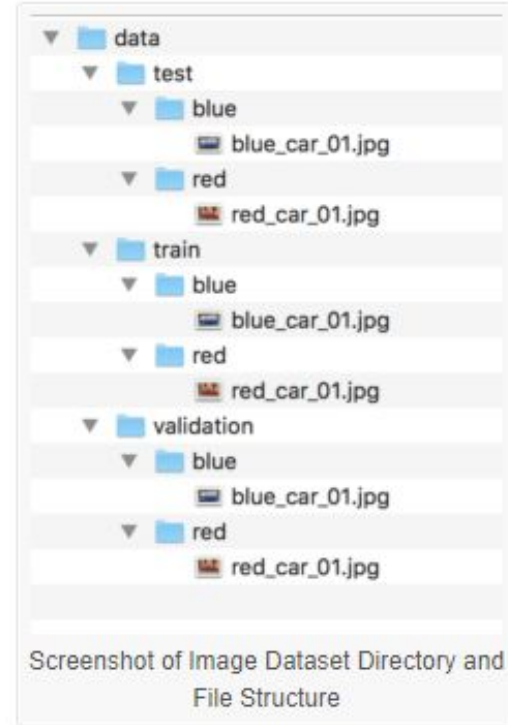
The dataset



We have taken 7 diseases to begin with from The **HAM10000 dataset**, which provides large collection of multi-source dermatoscopic images.

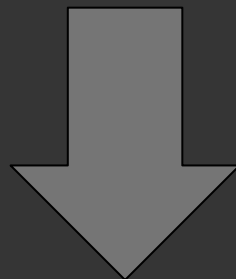
[Link for dataset](#)



Preprocessing





For Using keras we have to preprocess the directory structure as this:



	HAM10000_images_part_1	1/10/2020 10:21 AM	File folder
	HAM10000_images_part_2	1/10/2020 10:21 AM	File folder

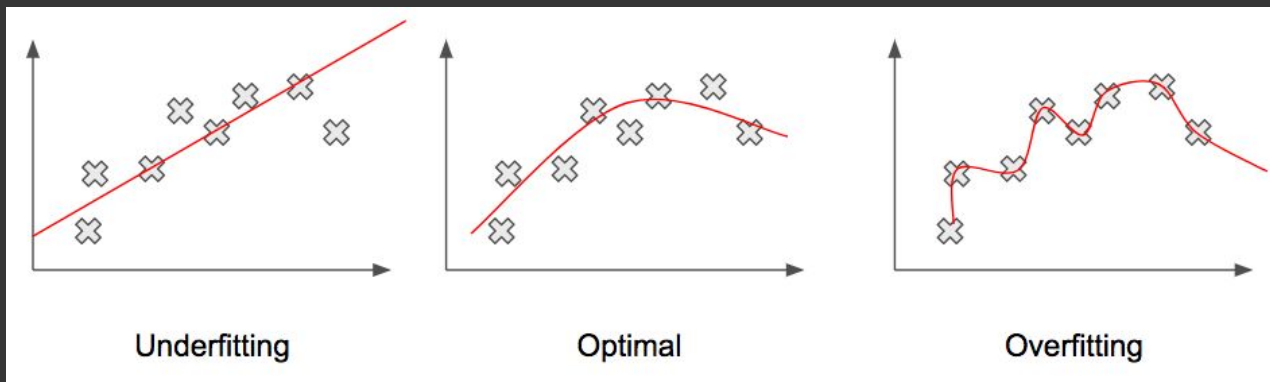


skin-cancer-mnist-ham10000 > base_dir		
	Type	
		 train_dir
		 val_dir
5/2020 11:15 AM	File folder	
5/2020 11:15 AM	File folder	

skin-cancer-mnist-ham10000 > base_dir > train_dir		
		
akl	df	mel
		
		akiec
		bcc
		bkl
		df
		mel
		nv
		vasc

Augmentation

1. To increase the dataset, hence the accuracy.
2. To avoid overfitting.



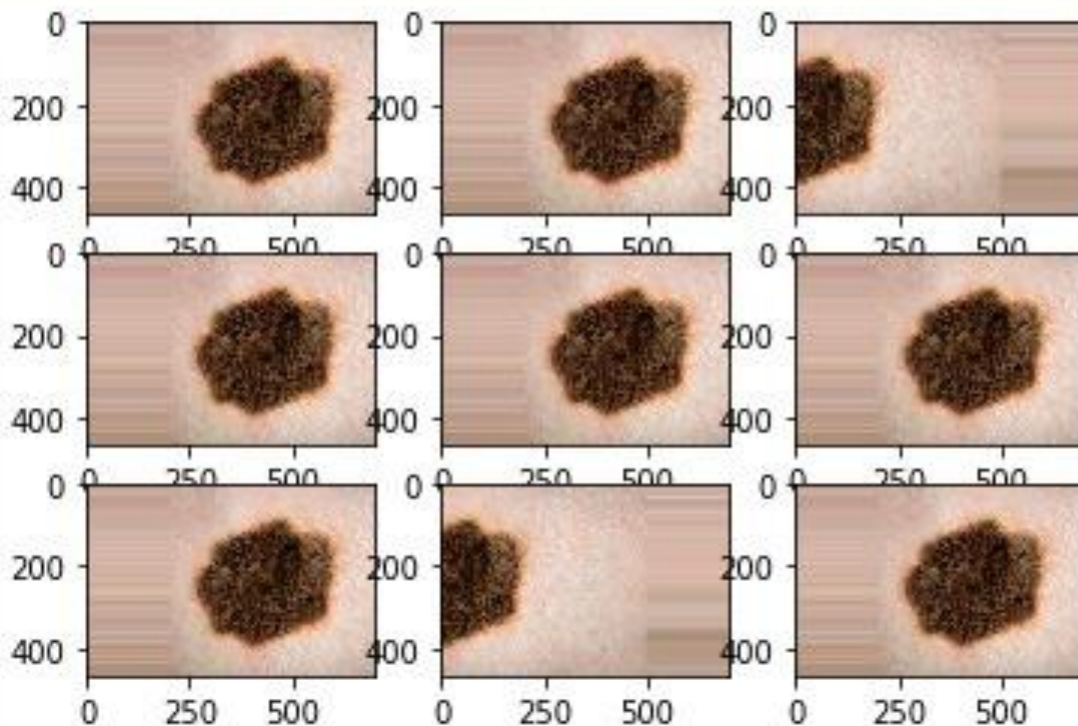
Original image of melanoma

original image of melanoma.jpg



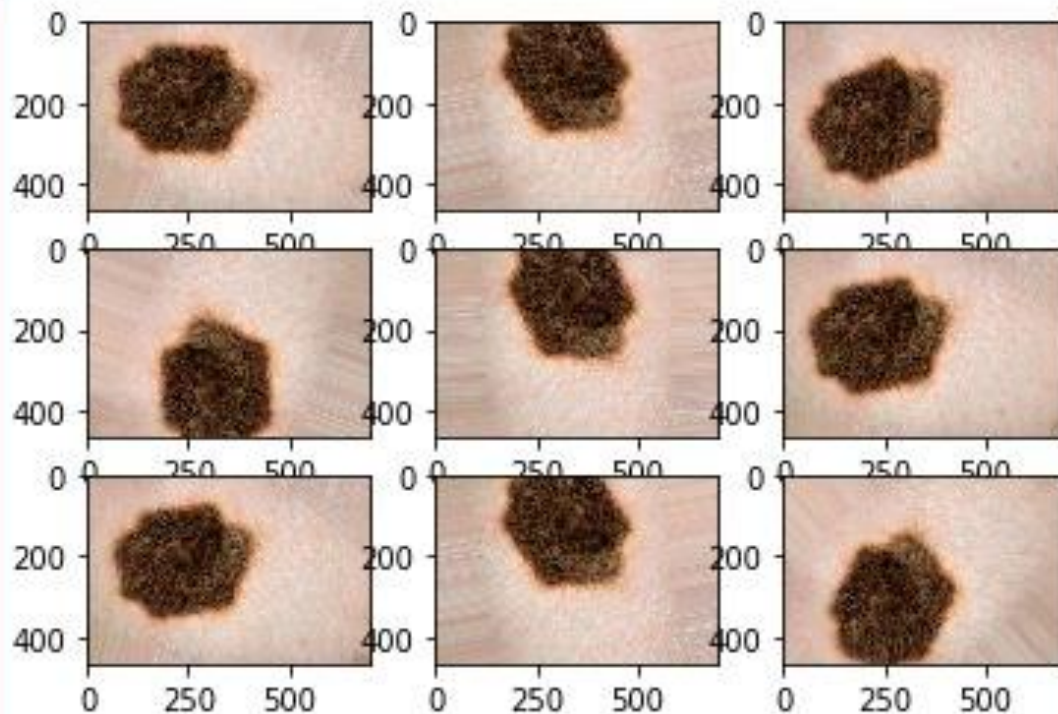
Horizontal shift

horizontal shift



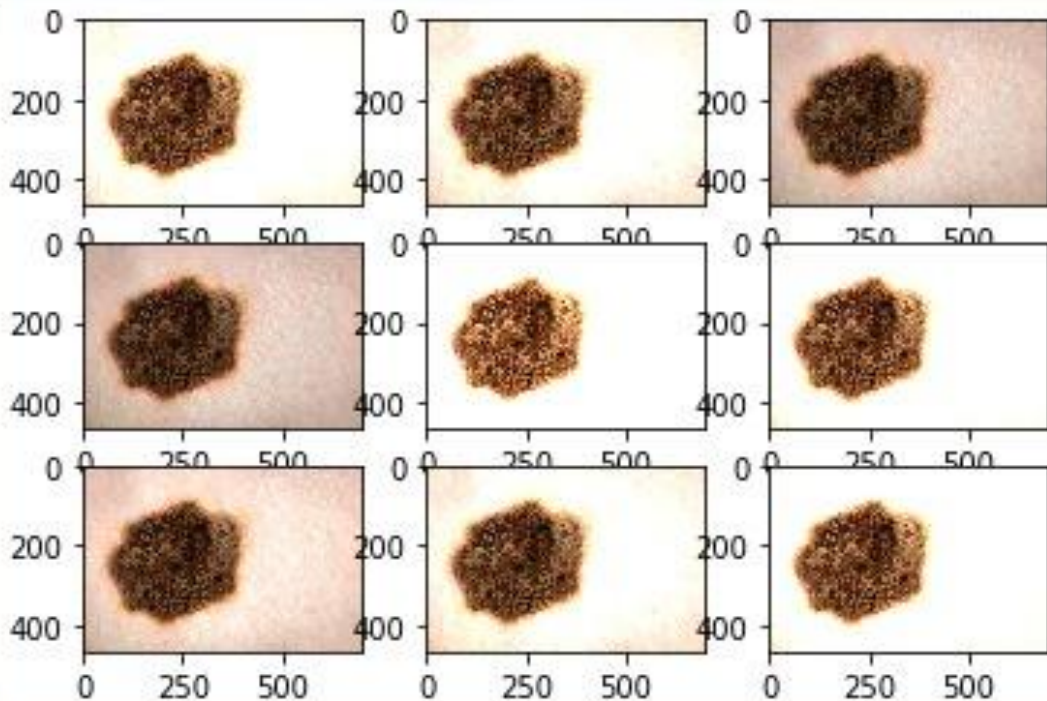
Random rotation

Random rotation



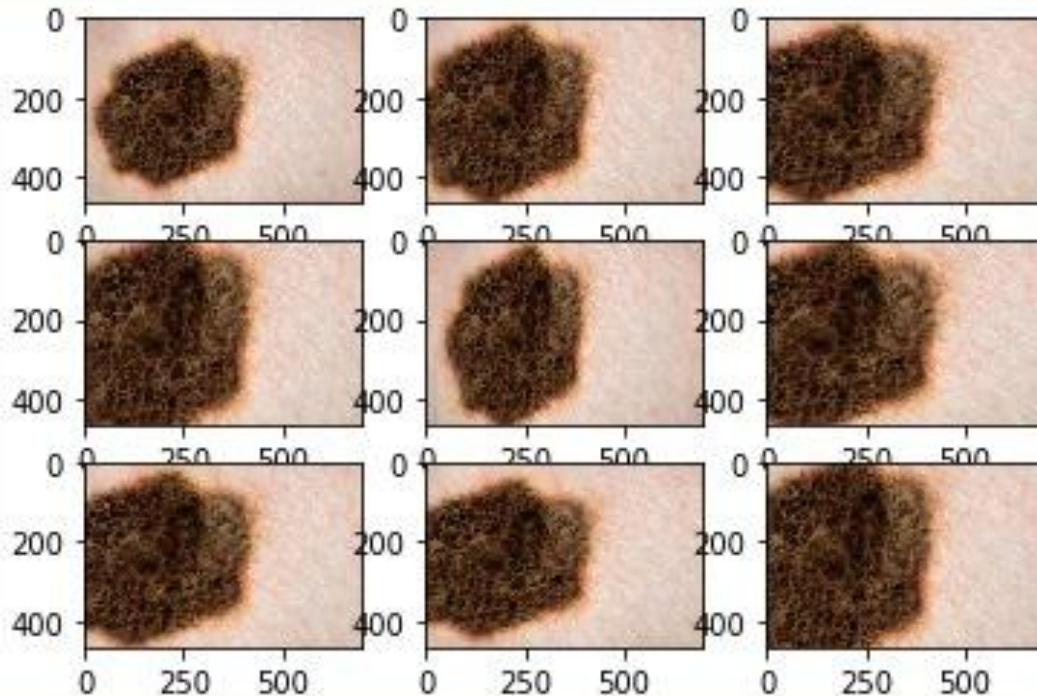
Brightness augmentation

Brightness Augmentation



Zoom augmentation

Zoom Augmentation



Choosing the model

Mobile Net Transfer flow model

As the dataset is less.

```
In [1]: runfile('E:/sem4/iip/project/python code/skin-cancer-mnist-ham10000/cnn_skin
detectionj.py', wdir='E:/sem4/iip/project/python code/skin-cancer-mnist-ham10000')
Using TensorFlow backend.
Found 38704 images belonging to 7 classes.
Found 1002 images belonging to 7 classes.
Found 1002 images belonging to 7 classes.
Model: "mobilenet_1.00_224"
```

Training the model

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Testing the model
and evaluating final
accuracy.

```
val_top_3_accuracy: 0.9082
```

Web implementation

localhost:3000/skinpredict1.html

Apps nail it! Excel 2016 training... image hackster speed FOX FITNESS 26 IN... Shortcut to Move b... Coursera Coursera Jana Gana Mana ho... _goliath

Skin disease prediction with Convolutional neural networks and Image Processing


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Cancer Choose File melanoma.jpg Predict

Predictions

#1 mel, Melanoma: 0.894074
#2 nv, Melanocytic Nev: 0.104088
#3 bkl, Benign Keratosis: 0.001830

Image



Demonstration link

https://drive.google.com/file/d/1h3l7puX44rmxC8BYw-G3uDy_uWltWEdT/view?usp=sharing

Source code link

<https://github.com/neetigyachahar/Skin-disease-classifier>

Thank You.

Avinash - 18BCE0363

Shubham - 18BCE0356

Neetigya - 18BCE0794
