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Detection of Skin cancer using Deep Learning

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ABSTRACT_ Skin Cancer Classification is a net application. Skin most cancers is a very large fitness problem in today's quickly developing populace now not solely for historical age humans however for all age groups. Skin Cancer is the most frequent human malignancy, is principally identified visually, establishing with an preliminary medical screening and accompanied probably through dermoscopic analysis, a biopsy and histopathological examination. Classification of skin lesions automatically The fine-grained heterogeneity in the appearance of skin lesions makes using pictures a challenging task. Therefore, this web app is useful for determining whether or not a person has cancer and, if so, what kind of cancer they have. A deep learning model with seven convolution layers and three neural layers was used to classify dermoscopic images from the HAM10000 dataset, which has seven classes. The proposed model was determined to have a test data accuracy of 99.01 percent. Experts in the field of skin cancer diagnosis can use this information to better understand how the proposed model can assist them in their work.

1.INTRODUCTION

One of the leading causes of death in the globe [1] is skin cancer. Melanoma and non-melanoma are two kinds of skin cancer. The cure rate for these lesions can rise to 90% if they are discovered early [2]. As a result, the visual examination might be difficult and may result in incorrect diagnosis [3]. Because of this, an automated approach is needed to classify skin lesions. Image processing and artificial intelligence were employed in the development of this classification system.

The Different Classes of Skin Cancer are:

1. Melanocytic Nevi
2. Melanoma
3. Benign Keratosis-like lesions
4. Basal Cell Carcinoma
5. Actinic Keratoses
6. Vascular Lesions
7. Dermatofibroma

2.LITERATURE SURVEY

2.1 Milton Md. Ashraful Alam Automated Skin Lesion Classification with Deep Neural Networks for the 2018 ISIC Skin Lesion Analysis for Melanoma Detection Challenge

In this study, we delve further into the topic of utilising specialised, deep-learning-based methods for detecting malignant melanomas and other skin lesions. One form of skin cancer, melanoma, is extremely dangerous. Accurately diagnosing melanoma in its earliest stages is crucial to increasing the likelihood of a complete recovery. Dermoscopy images showing both benign and malignant forms of skin cancer can be processed by a computer vision system, simplifying the process of detecting skin cancer. We conducted experiments with many neural networks in this paper, including PNASNet-5-Large,

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InceptionResNetV2, SENet154, and InceptionV4. These networks are all based on current deep learning techniques. The dermoscopic images are enhanced and processed properly before being uploaded to the cloud. Using the 2018 assignment dataset from the International Skin Imaging Collaboration (ISIC), we evaluated our methods. For the PNASNet-5-Large model, our device received a perfect 0.76 validation rating. Perhaps the proposed methods' performances could benefit from further improvement and optimization with a larger training dataset and carefully selected hyper-parameter.

2.2 Serban Radu S.J., L.I. Ichim, et al. Skin cancer is a type of cancer that develops in the skin tissue and can cause injury to the surrounding tissue, disability, and even death (Bucharest, Romania: The XIth International Symposium on Advanced Topics in Electrical Engineering, March 28-30, 2019).

After cervical and breast cancer, skin cancer accounts for a third of all cancer diagnoses in Indonesia. Early detection and effective treatment of skin cancer can significantly lessen or even reverse its potentially deadly effects. Doctors spend more time trying to determine if a lesion is cancerous or benign because of its similarities in structure. In this study, a system was built to automatically distinguish between skin cancer and benign tumour lesions using a Convolutional Neural Network (CNN). The suggested model has three discrete hidden layers, each with an associated output channel size (16), (32), and (64). The suggested model employs a number of optimizers, including SGD, RMSprop, Adam, and Nadam, and has a learning rate of 0.001. Adam optimizer has top overall performance, with an accuracy rate of 66%, in dividing the skin lesions in the ISIC dataset into four classes: dermatofibroma, nevus pigmentosus, squamous mobile phone carcinoma, and melanoma. The results obtained perform better than the present skin cancer classification scheme.

3.PROPOSED SYSTEM

The HAM10000 dataset, which consists of seven classes and includes dermoscopic images, was classified using a deep learning model with seven convolution layers and three neural layers. The proposed model's test data accuracy percentage was found to be 99.01 percent. Using this data, specialists in the field of skin cancer diagnosis can use the proposed model.Overfitting of models is reduced.

- Accuracy is improvedandaccuracyofourmodelis78%.
- Model building takes less time.

3.1 CNN ALGORITHM

Deep Learning is turning into a very famous subset of laptop studying due to its excessive degree of overall performance throughout many sorts of data. A amazing way to use deep gaining knowledge of to classify pix is to construct a Convolutional Neural Network (CNN). The Keras library in Python makes it extraordinarily easy to construct a CNN. Computers see pictures the usage of pixels. Pixels in pix are typically related. For example, a sure team of pixels may additionally signify an part in an photograph or some different pattern. Convolutions use this to assist become aware of images. A Convolution multiplies a matrix of pixels with a filter matrix or kernel and sums up the multiplication values. Then the convolution slides over to the subsequent pixel and repeats the identical technique till all the photograph pixels have been covered.

As with regular Neural Networks, Convolutional Neural Networks are built from neurons with trainable weights and biases. To process its inputs, each neuron first does a dot product and then, if desired, adds a non-linearity to its output.

Common Neural Networks struggle when presented with complete visuals. Given a 32 by 32 by 3-inch image with three colour channels, a single fully connected neuron in the first hidden layer of a typical Neural Network would require 32 times 32 times 3 weights, or 3072 weights in total. This seems like a manageable amount, however this fully connected design doesn't work for very huge photos. For instance, a picture with dimensions of 200 by 200 by 3 would result in neurons with 200 by 200 by 3 weights, or 120,000 in total. Also, we'd all like to have plenty of these neurons, so the numbers would soon accumulate! Overfitting would occur quickly due to the large number of parameters, therefore it's clear that this kind of full connection is unnecessary.

By using the fact that the input is a series of images, Convolutional Neural Networks are able to limit the network's architecture for optimal performance. In particular, a ConvNet differs from a traditional Neural Network in that its neurons are laid out across the layers in three dimensions rather than just two. For instance, given an input image of size X, Y, and Z, each layer's neurons would only be connected to a small region of the layer before it rather than all of the neurons in a fully-connected manner. This would result in an output layer of size (1, 1), 1 (C), as the final stage of the ConvNet architecture would compress the entire image into a single vector of category scores, organised along the depth dimension..

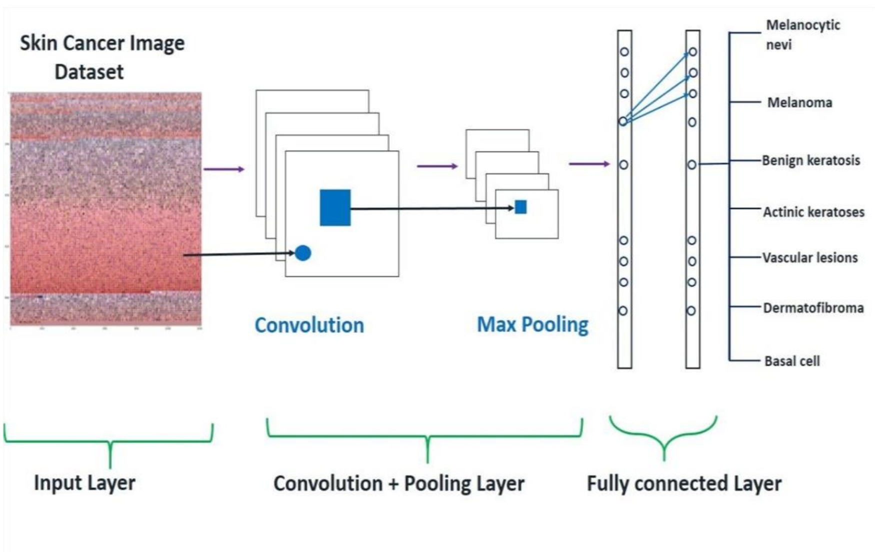

Fig 1: Convolutional- layer representation

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4. DATASET

This the HAM10000 ("Human Against Machine with 10000 training images' ') dataset. It consists of dermatoscopic images(Kaggle) and renamed into 'SKIN CARE' which are used to train our model According to the different classifications. The ratio of the train and test set is 80:20.

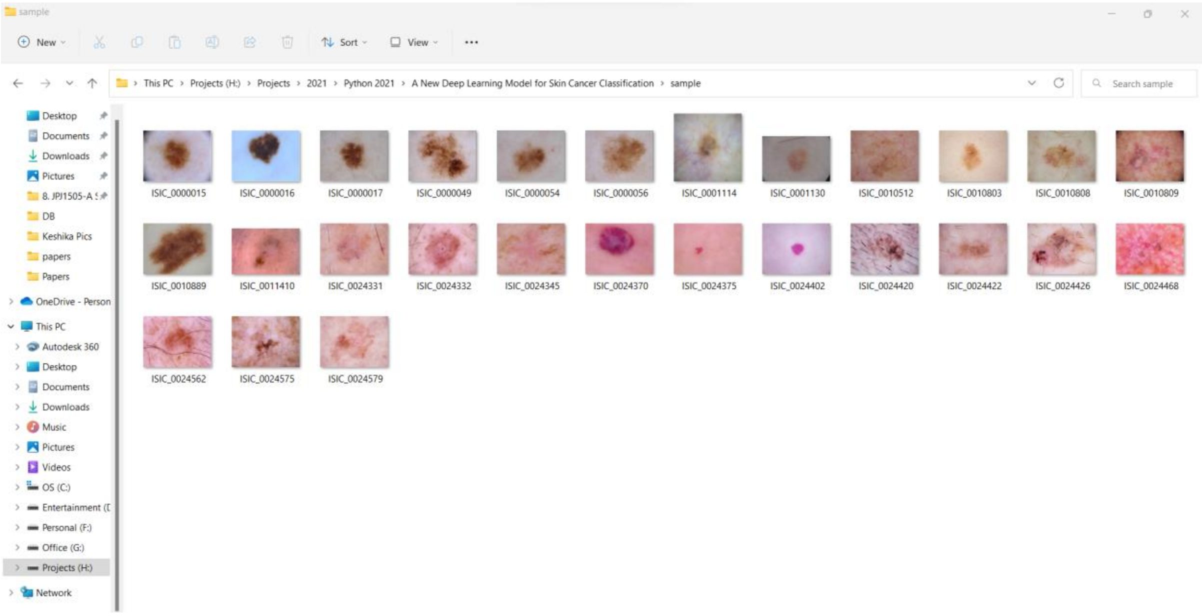
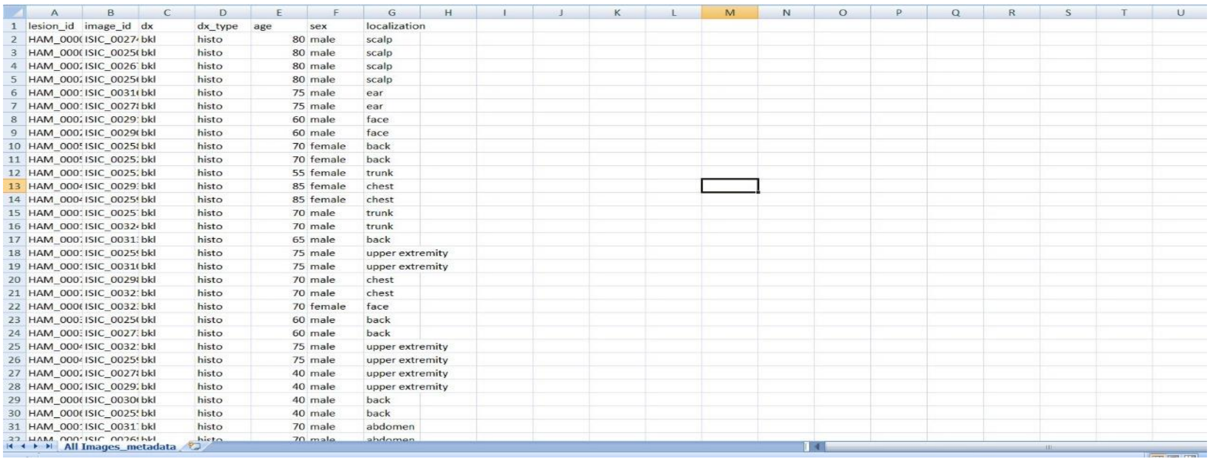


Fig 1:Diseases Images

Fig 2: Dataset Values

5.RESULTS AND DISCUSSION



	lesion_id	image_id	dx	dx_type	age	sex	localization
2	HAM_000(	ISIC_0027	bkl	histo	80	male	scalp
3	HAM_000(	ISIC_0025(	bkl	histo	80	male	scalp
4	HAM_000:	ISIC_0026	bkl	histo	80	male	scalp
5	HAM_000:	ISIC_0025(	bkl	histo	80	male	scalp
6	HAM_000:	ISIC_0031(	bkl	histo	75	male	ear
7	HAM_000:	ISIC_0027	bkl	histo	75	male	ear
8	HAM_000:	ISIC_0029:	bkl	histo	60	male	face
9	HAM_000:	ISIC_0029(	bkl	histo	60	male	face
10	HAM_000!	ISIC_0025	bkl	histo	70	female	back
11	HAM_000!	ISIC_0025:	bkl	histo	70	female	back
12	HAM_000:	ISIC_0025:	bkl	histo	55	female	trunk
13	HAM_000	ISIC_0029:	bkl	histo	85	female	chest
14	HAM_000	ISIC_0025	bkl	histo	85	female	chest
15	HAM_000:	ISIC_0025	bkl	histo	70	male	trunk
16	HAM_000:	ISIC_0032	bkl	histo	70	male	trunk
17	HAM_000:	ISIC_0031:	bkl	histo	65	male	back
18	HAM_000:	ISIC_0025	bkl	histo	75	male	upper extremity
19	HAM_000:	ISIC_0031(	bkl	histo	75	male	upper extremity
20	HAM_000:	ISIC_0029	bkl	histo	70	male	chest
21	HAM_000:	ISIC_0032:	bkl	histo	70	male	chest
22	HAM_000(	ISIC_0032:	bkl	histo	70	female	face
23	HAM_000:	ISIC_0025(	bkl	histo	60	male	back
24	HAM_000:	ISIC_0027:	bkl	histo	60	male	back
25	HAM_000	ISIC_0032:	bkl	histo	75	male	upper extremity
26	HAM_000	ISIC_0025	bkl	histo	75	male	upper extremity
27	HAM_000:	ISIC_0027	bkl	histo	40	male	upper extremity
28	HAM_000:	ISIC_0029:	bkl	histo	40	male	upper extremity
29	HAM_000(	ISIC_0030(	bkl	histo	40	male	back
30	HAM_000(	ISIC_0025!	bkl	histo	40	male	back
31	HAM_000:	ISIC_0031	bkl	histo	70	male	abdomen
32	HAM_000:	ISIC_0026	bkl	histo	70	male	abdomen

All Images_metadata

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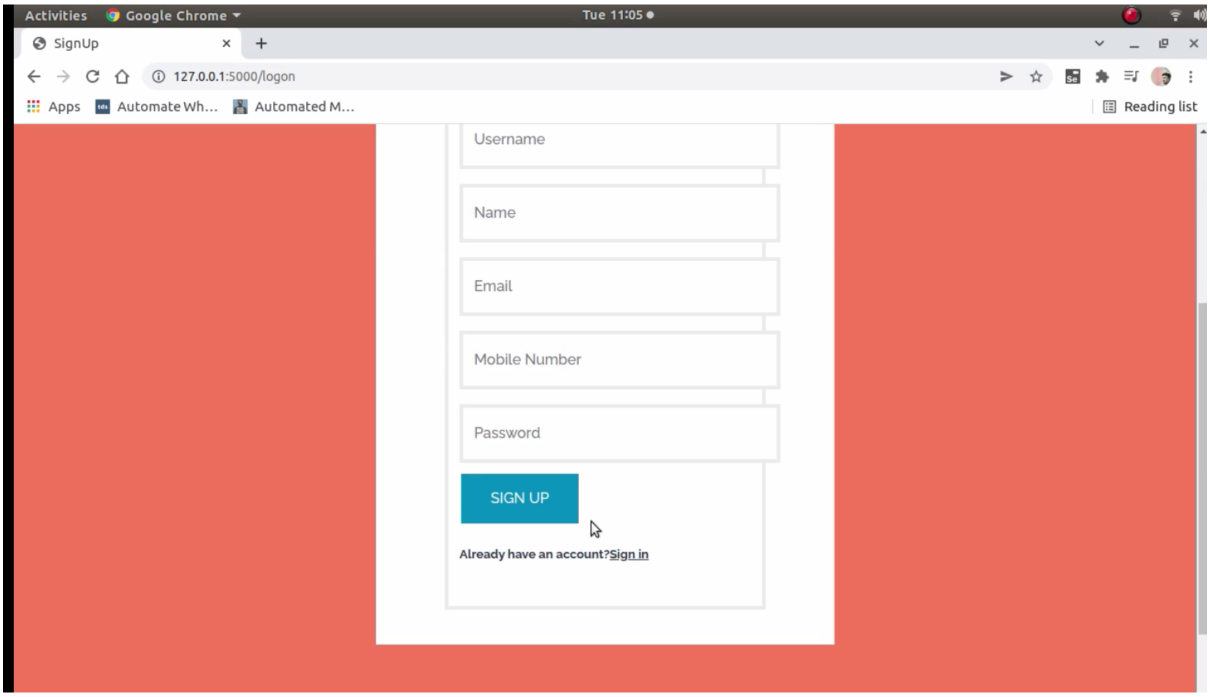

Fig 3;Signup page

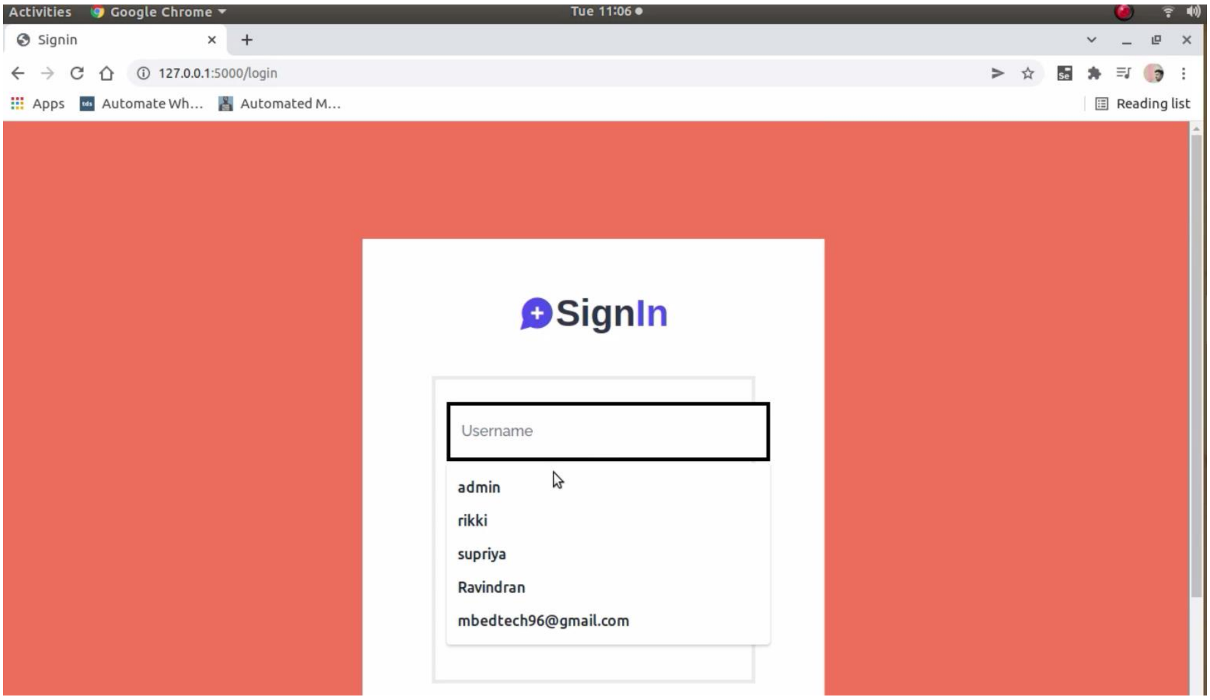

Fig 4:Login Page

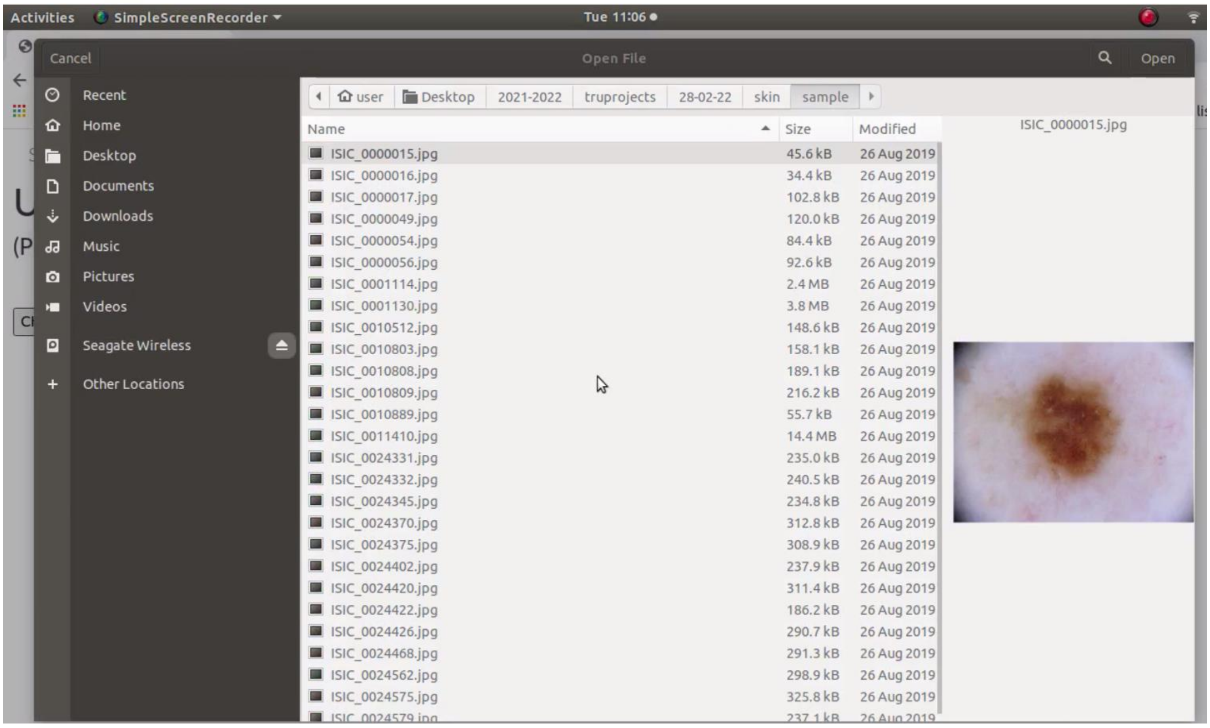

Fig 5:In the above screenshots we are uploading image for skin cancer detection

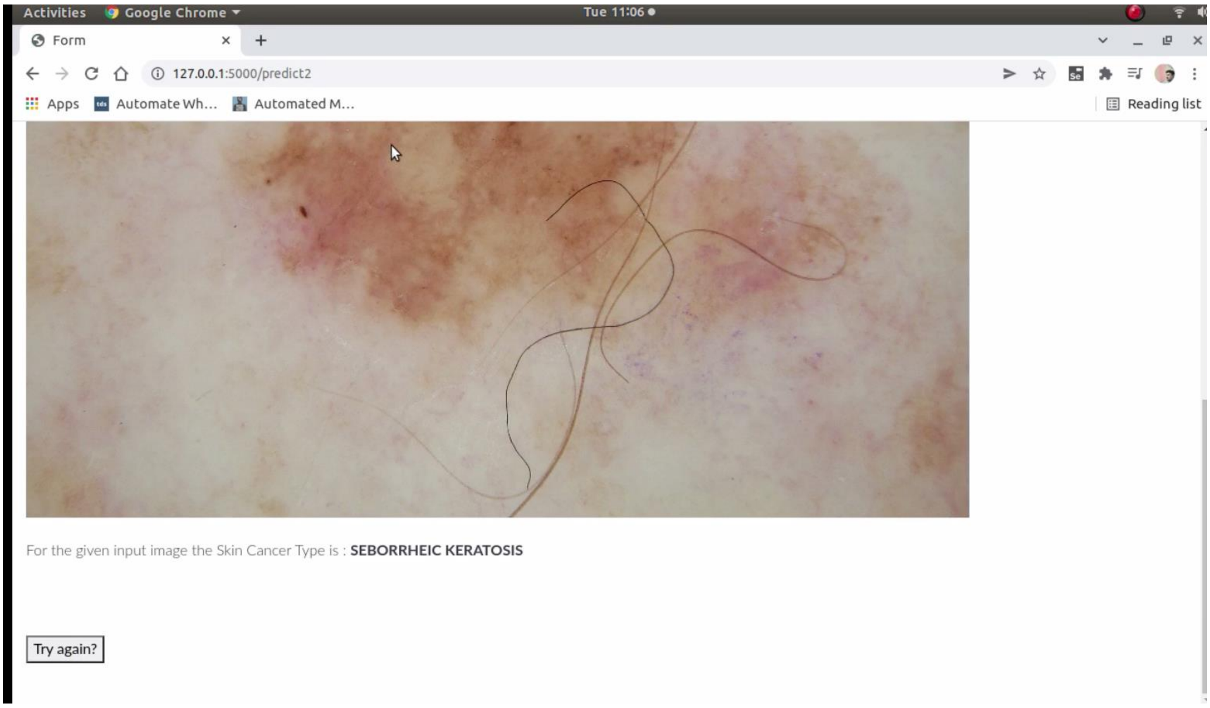

Fig 6:In the above screen we got result based on input image

6.CONCLUSION

We hereby conclude that **Skin Cancer Classification using CNN** is implemented in three modules, the first module is about performing image preprocessing. All the images are resized into a dimension of 100 x 75 in order to train, test, predict the classes and to calculate the accuracy of the model efficiently. In the second module, Convolution Neural Network is applied to train the model and test it. To provide better accuracy and to avoid computational complexity the model is built using the Convolutional Neural Network algorithm with good accuracy.

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