Helwan University
جامعة حلوان
كلية الحاسبات والذكاء الإصطناعي
Faculty of Computers & Artificial Intelligence
Faculty of Computers and Artificial Intelligence

Computer Science Department

2021/2022

CS 396 Selected Topics in CS-2

Research Project

Report Submitted for Fulfillment of the Requirements and ILO's for Selected Topics in CS-2 course for Fall 2021

Team ID No. 51

	ID	Name
1.	20180500	محمد سعيد محمد عطوه
2.	20180516	محمد عبدالفتاح مغاوري مصطفي
3.	20180533	محمد محمود عبدالفتاح
4.	20180488	محمد خالد شعيب
5.	20180519	محمد عزالدين يونس
6.	201900105	احمد منير محمد محمد
7	201900754	محمود احمد صلاح علي
8	201900719	محمد مبارك حسين

Delivered to:

Dr. Wessam El-Behaidy

Eng. Mai Mokhtar

Paper Details

(a)

- Paper Name: A multi-class skin Cancer classification using deep convolutional neural networks
- Authors : Saket S. Chaturvedi1 & Jitendra V. Tembhurne2 & Tausif Diwan2
- year of publication:2020

Received: 10 August 2019 /Revised: 22 June 2020
Accepted: 21 July 2020 # Springer Science+Business Media, LLC, part of Springer Nature 2020

(b)

The dataset used:- HAM10000 dataset.

the implemented algorithms:- convolutional neural network &maxpolling

results:-

Method	Accuracy (%)	Weighted Average		
		Precision (%)	Recall (%)	F1-score (%)
InceptionV3	91.56	89	89	89
ResNetXt101	93.20	88	88	88
InceptionResNetV2	93.20	87	88	88
Xception	91.47	89	88	88
NASNetLarge	91.11	86	86	86

• Project Description

(a)

Datasets: mnist-ham10000
the link of dataset:-
https://www.kaggle.com/datasets/kmader/skin-cancer-mnist-ham10000

It includes 10000 files for (Training & Testing)

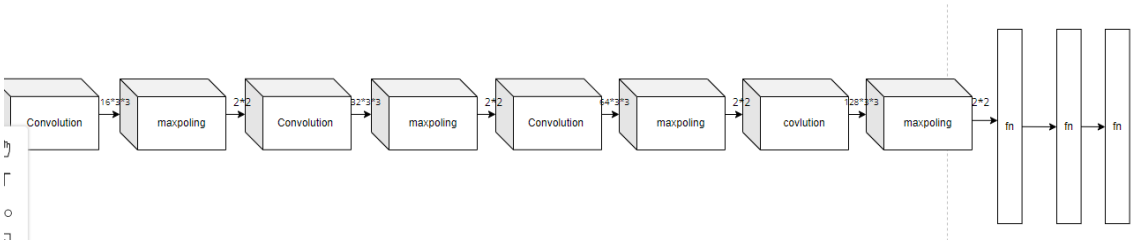
number of classes is 7 and their labels is :-

```
'Melanocytic nevi (nv)',
 'Melanoma (mel)',
 'Benign keratosis-like lesions (bkl)',
 'Basal cell carcinoma (bcc)',
 'Actinic keratoses (akiec)',
 'Vascular lesions (vasc)',
 'Dermatofibroma (df)'
```

dimension of images = 450*600*3

Implementation details

- We split our dataset to 80% training and 20%testing and then split the training set for 80%training and 20% validation set. So The dataset of 10,015 images were split into the training set (6410 images) and validation set (1602 images) and testing set (2003 images).
- Block diagram for model.



- Hyperparameter used in our model is :- learning_rate = 0.001, Optimizer:Adam, Activation functions:Relu & Softmax, number of epochs:50,batch size: 64, number of neurons =(64,32,7)

Result and Visualization

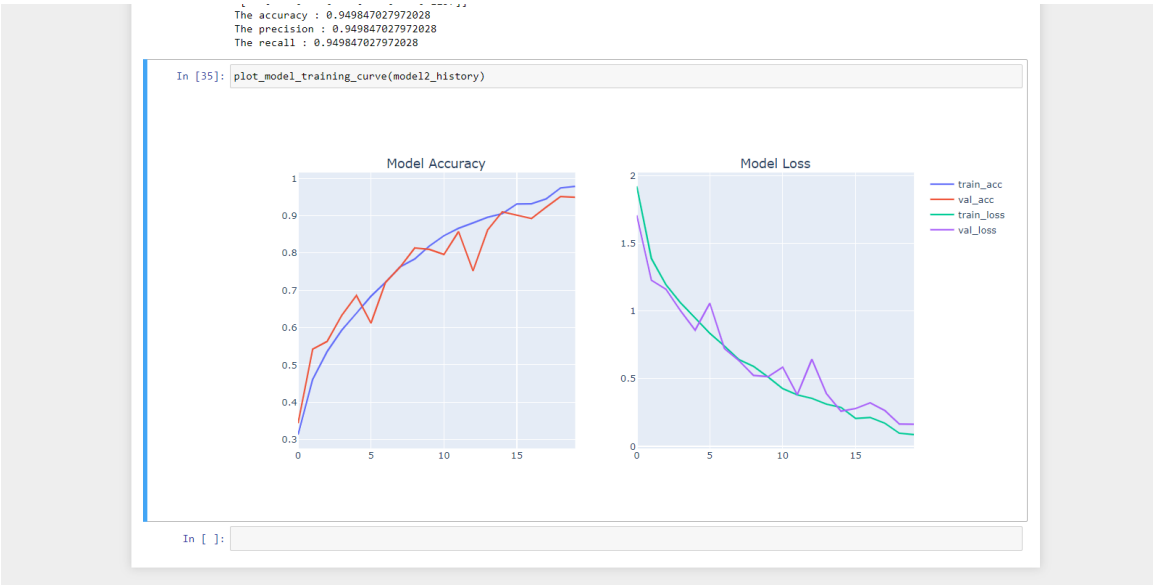
Measures used in evaluation is : Accuracy& precision&recall&f1score.

Test Accuracy: 97.924%

	precision	recall	f1-score	support
nv	0.99	0.88	0.93	1385
mel	0.93	0.99	0.96	1328
bkl	0.95	1.00	0.97	1294
bcc	0.99	1.00	1.00	1325
akiec	1.00	1.00	1.00	1270
vasc	1.00	1.00	1.00	1293
df	1.00	1.00	1.00	1257
accuracy			0.98	9152
macro avg	0.98	0.98	0.98	9152
weighted avg	0.98	0.98	0.98	9152

Model enhancement

When we keep learning rate as 0.003 and use SGD Optimizer:



When we change the learning rate to 0.001 with Adam Optimizer: