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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. 32

|  |  |  |  |
| --- | --- | --- | --- |
|  | ID | Name | Grade |
|  | 20180190 | حسام حسن كمال محمد |  |
|  | 20180650 | ندى خاطر عبده اسماعيل |  |
|  | 20180635 | مي حماده السيد أحمد |  |
|  | 20180424 | كريم اشرف سعيد علي |  |
|  | 20180517 | محمد عبدالله يوسف إبراهيم |  |
|  | 20180672 | هبة الله احمد محمد عبدالعظيم |  |

Delivered to:

**Dr. Wessam El-Behaidy**

**Eng. Salma Doma**

**Eng. Ahmed Nady**

* **Paper Details**
* Paper Name: Plant Seedlings Classification Using Deep Learning.
* Authors : Belal A . M. Ashqar, Bassem S. Abu-Nasser, Samy S. Abu-Naser.
* year of publication: 1, January – 2019

publisher name : International Journal of Academic Information Systems Research (IJAISR)

dataset used : provided by the Aarhus University Signal Processing group, in collaboration with University of Southern Denmark, contains a set of 5608 images of approximately 960 unique plants belonging to 12 species at several growth stages. See Fig. 1 for plant seedling samples.

implemented algorithms :: VGG 16

results. 99.48%

* **Project Description**

Image dataset containing different healthy and unhealthy crop leaves ​

like Number of images of Tomato\_\_Tomato\_YellowLeaf\_\_Curl\_Virus: 3209 || Number of images of Tomato\_Bacterial\_spot: 2127 || Number of images of Tomato\_Early\_blight: 1000 || Number of images of Pepper\_\_bell\_\_\_Bacterial\_spot: 997 || Number of images of Potato\_\_\_Late\_blight: 1000 || Number of images of Tomato\_Leaf\_Mold: 952 || Number of images of Tomato\_Septoria\_leaf\_spot: 1771 || Number of images of Potato\_\_\_healthy: 152 || Number of images of Pepper\_\_bell\_\_\_healthy: 1478 || Number of images of Tomato\_Spider\_mites\_Two\_spotted\_spider\_mite: 1676 || Number of images of Tomato\_\_Tomato\_mosaic\_virus: 373 || Number of images of Tomato\_\_Target\_Spot: 1404 || Number of images of Tomato\_Late\_blight: 1909 || Number of images of Tomato\_healthy: 1591 || Number of images of Potato\_\_\_Early\_blight: 1000 This dataset is recreated using offline augmentation from the original dataset. ​

Total number of images we have 20639 rgb images of healthy and diseased crop leaves​

 which is categorized into 15 different classes. ​

The total dataset is divided into 80/10/10 ratio of training , validation and test

# **Datasets for it** : [PlantVillage Dataset](https://www.kaggle.com/datasets/masoudnickparvar/brain-tumor-mri-dataset?resource=download)

# **[Dataset](https://www.kaggle.com/datasets/masoudnickparvar/brain-tumor-mri-dataset?resource=download)**

It includes 20639 files for (Training &Valid& Testing)

Link of dataset

https://github.com/spMohanty/PlantVillage-Dataset

## **Training (**15 directories)

## Tomato\_\_Tomato\_YellowLeaf\_\_Curl\_Virus'

## 'Tomato\_Bacterial\_spot',

## 'Tomato\_Early\_blight'

## 'Pepper\_\_bell\_\_\_Bacterial\_spot'

## 'Potato\_\_\_Late\_blight'

## 'Tomato\_Leaf\_Mold'

## 'Tomato\_Septoria\_leaf\_spot'

## 'Potato\_\_\_healthy'

## 'Pepper\_\_bell\_\_\_healthy'

## 'Tomato\_Spider\_mites\_Two\_spotted\_spider\_mite'

## 'Tomato\_\_Tomato\_mosaic\_virus'

## 'Tomato\_\_Target\_Spot'

## 'Tomato\_Late\_blight'

## 'Tomato\_healthy'

## 'Potato\_\_\_Early\_blight'

## **Validation (**15 directories)

## Tomato\_\_Tomato\_YellowLeaf\_\_Curl\_Virus'

## 'Tomato\_Bacterial\_spot',

## 'Tomato\_Early\_blight'

## 'Pepper\_\_bell\_\_\_Bacterial\_spot'

## 'Potato\_\_\_Late\_blight'

## 'Tomato\_Leaf\_Mold'

## 'Tomato\_Septoria\_leaf\_spot'

## 'Potato\_\_\_healthy'

## 'Pepper\_\_bell\_\_\_healthy'

## 'Tomato\_Spider\_mites\_Two\_spotted\_spider\_mite'

## 'Tomato\_\_Tomato\_mosaic\_virus'

## 'Tomato\_\_Target\_Spot'

## 'Tomato\_Late\_blight'

## 'Tomato\_healthy'

## 'Potato\_\_\_Early\_blight'

Test(15 directories)

## Tomato\_\_Tomato\_YellowLeaf\_\_Curl\_Virus'

## 'Tomato\_Bacterial\_spot',

## 'Tomato\_Early\_blight'

## 'Pepper\_\_bell\_\_\_Bacterial\_spot'

## 'Potato\_\_\_Late\_blight'

## 'Tomato\_Leaf\_Mold'

## 'Tomato\_Septoria\_leaf\_spot'

## 'Potato\_\_\_healthy'

## 'Pepper\_\_bell\_\_\_healthy'

## 'Tomato\_Spider\_mites\_Two\_spotted\_spider\_mite'

## 'Tomato\_\_Tomato\_mosaic\_virus'

## 'Tomato\_\_Target\_Spot'

## 'Tomato\_Late\_blight'

## 'Tomato\_healthy'

## 'Potato\_\_\_Early\_blight'

dimension of images = 224\*224

* **Implementation details**

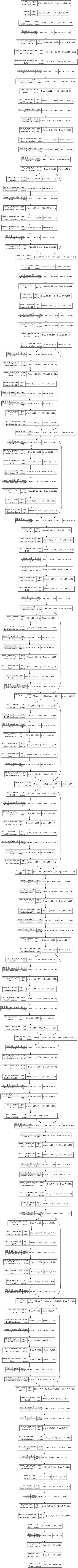
First we split dataset to (training ,validation and test) with 80% 10% 10%

Now we have :

* Training (16505)
* Validation(2057)
* Testing (2076)
* **Our Model**

**layers**

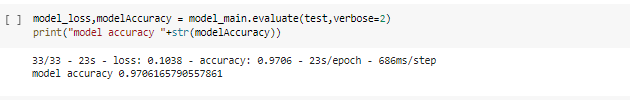
**(input,Conv,Relu,BatchNormalization,MaxPool,Dropout,Fc,Softmax,Classification)**

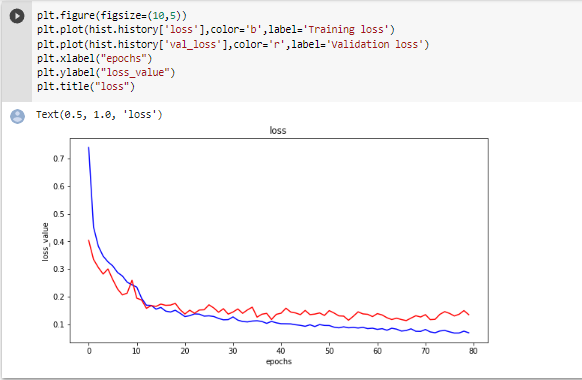


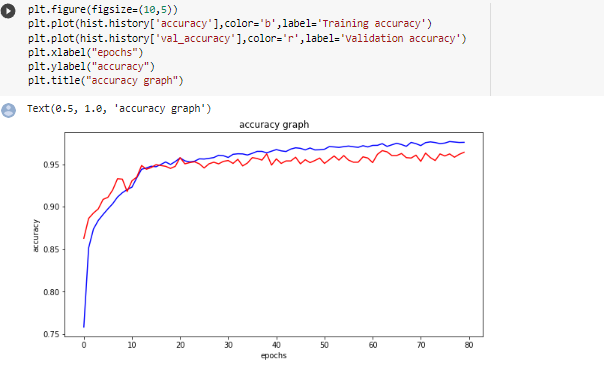
**Hyperparameters and architectures tested before reaching the final model**

* **Testing results**

**Accuracy: 97 %**

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