EAST WEST UNIVERSITY

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Course Title : Artificial Intelligent

Section : 03

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Assignment-3

Submitted to:

Dr. Mohammad Rifat Ahmmad Rashid

Assistant Professor

Department of Computer and Science Engineering

East West University

Submitted by:

Tasmia Islam

ID : 2021-2-60-062

Department of Computer and Science Engineering

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Title : Computer Vision Assignment

Objective :
This assignment is designed to give us practical experience in developing and training deep learning models for computer vision tasks. We had the option to focus on either image classification or object detection, using specific datasets and model architectures.

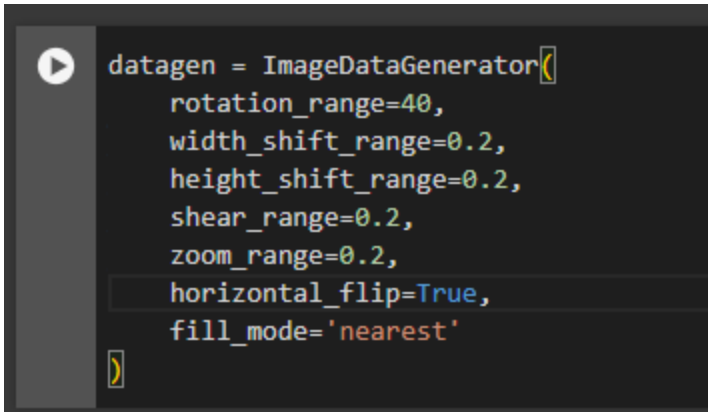
Option 1: Image Classification

Dataset : CoLeaf DATASET
Description of the Dataset : The dataset contains 1006 leaf images grouped according to their nutritional deficiencies (Boron, Iron, Potasium, Calcium, Magnesium, Manganese, Nitrogen and others). CoLeaf dataset contains images that facilitate training and validation during the utilization of deep learning algorithms for coffee plant leaf nutritional deficiencies recognition and classification.

Class	Frequency
boron-B	101
calcium-Ca	162
iron-Fe	65
magnesium-Mg	79
manganese-Mn	83
nitrogen-N	64
phosphorus-P	246
potassium-K	96
more-deficiencies	104
healthy	6

Link : https://data.mendeley.com/datasets/brfgw46wzb/1

Data Augmentation : Performed augmentation on the dataset to reduce noise in the existing dataset.



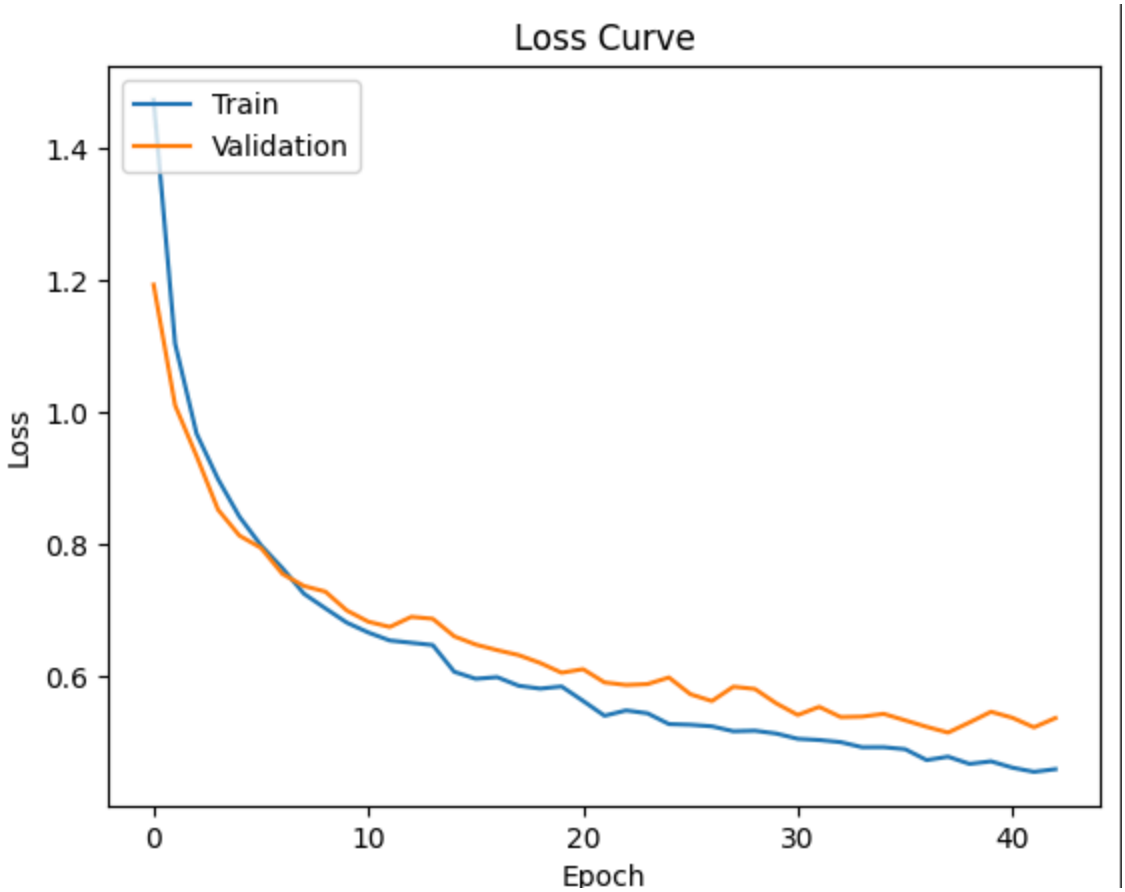
```
datagen = ImageDataGenerator(
    rotation_range=40,
    width_shift_range=0.2,
    height_shift_range=0.2,
    shear_range=0.2,
    zoom_range=0.2,
    horizontal_flip=True,
    fill_mode='nearest'
)
```

Here, implemented two models for image classification :

- EfficientNetB3
- DenseNet121

EfficientNet : EfficientNet stands as a groundbreaking series of deep neural network architectures, redefining efficiency, and performance in image classification tasks. This family of models, ranging from EfficientNet B0 to B7, showcases a unique approach to scaling and optimizing neural networks.

EfficientNetB3 :

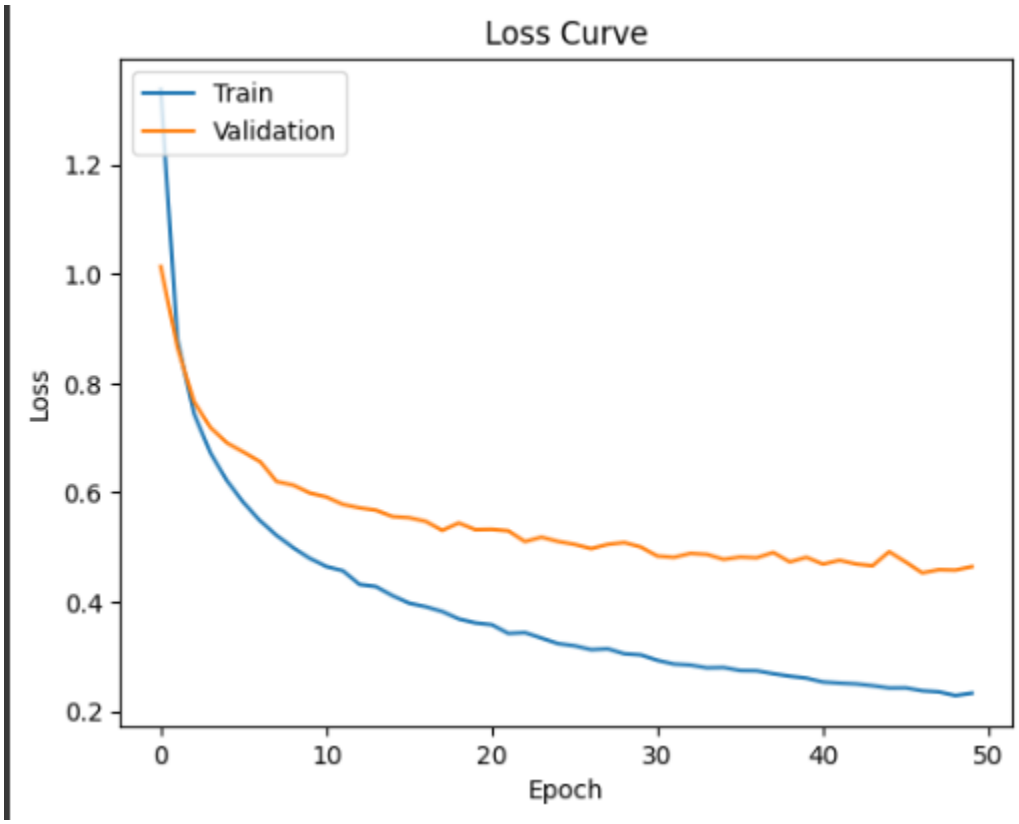

Loss Curve
Train
Validation
1.4
1.2
1.0
0.8
0.6
Loss
0
10
20
30
40
Epoch

```
# Evaluate the model
loss, accuracy = model.evaluate(validation_generator)
print(f'Validation Loss: {loss}, Validation Accuracy: {accuracy}')
```

```
27/27 [==============================] - 7s 251ms/step - loss: 0.5362 - accuracy: 0.8132
Validation Loss: 0.5361645817756653, Validation Accuracy: 0.8132250308990479
```

DenseNet : DenseNet is a flexible architecture applicable to a variety of computer vision applications including picture classification, object identification, and semantic segmentation.

DenseNet121 :




```
# Evaluate the model
loss, accuracy = model.evaluate(validation_generator)
print(f'Validation Loss: {loss}, Validation Accuracy: {accuracy}')
```

```
28/28 [==============================] - 8s 283ms/step - loss: 0.4636 - accuracy: 0.8349
Validation Loss: 0.4635515511035919, Validation Accuracy: 0.8348729610443115
```