DATA COLLECTION AND PREPROCESSING

Nutrition Image Analysis using CNN

```
!unzip '/content/Dataset-Fruit.zip'
```

```
  inflating: Dataset/TEST_SET/APPLES/n07740461_12841.jpg
  inflating: Dataset/TEST_SET/APPLES/n07740461_12010.jpg
  inflating: Dataset/TEST_SET/APPLES/n07740461_14600.jpg
  inflating: Dataset/TRAIN_SET/APPLES/n07740461_9294.jpg
  inflating: Dataset/TEST_SET/APPLES/n07740461_13931.jpg
  inflating: Dataset/TEST_SET/APPLES/n07740461_12071.jpg
  inflating: Dataset/TRAIN_SET/APPLES/n07740461_9816.jpg
  inflating: Dataset/TRAIN_SET/APPLES/n07740461_9813.jpg
  inflating: Dataset/TRAIN_SET/APPLES/n07740461_9636.jpg
  inflating: Dataset/TEST_SET/APPLES/n07740461_13800.jpg
  inflating: Dataset/TRAIN_SET/APPLES/n07740461_9756.jpg
  inflating: Dataset/TEST_SET/APPLES/n07740461_14211.jpg
  inflating: Dataset/TRAIN_SET/APPLES/n07740461_9582.jpg
  inflating: Dataset/TEST_SET/APPLES/n07740461_12121.jpg
  inflating: Dataset/TRAIN_SET/APPLES/n07740461_958.jpg
  inflating: Dataset/TEST_SET/APPLES/n07740461_12990.jpg
  inflating: Dataset/TRAIN_SET/APPLES/n07740461_9268.jpg
  inflating: Dataset/TEST_SET/APPLES/n07740461_12930.jpg
  inflating: Dataset/TRAIN_SET/APPLES/n07740461_9172.jpg
  inflating: Dataset/TRAIN_SET/APPLES/n07740461_8842.jpg
  inflating: Dataset/TEST_SET/APPLES/n07740461_12101.jpg
  inflating: Dataset/TRAIN_SET/APPLES/n07740461_8689.jpg
  inflating: Dataset/TEST_SET/APPLES/n07740461_14501.jpg
  inflating: Dataset/TRAIN_SET/APPLES/n07740461_9944.jpg
  inflating: Dataset/TEST_SET/APPLES/n07740461_14300.jpg
  inflating: Dataset/TEST_SET/APPLES/n07740461_14721.jpg
  inflating: Dataset/TEST_SET/APPLES/n07740461_14450.jpg
  inflating: Dataset/TRAIN_SET/APPLES/n07740461_9067.jpg
  inflating: Dataset/TEST_SET/APPLES/n07740461_13950.jpg
  inflating: Dataset/TEST_SET/APPLES/n07740461_11910.jpg
  inflating: Dataset/TRAIN_SET/APPLES/n07740461_9.jpg
  inflating: Dataset/TRAIN_SET/APPLES/n07740461_8774.jpg
  inflating: Dataset/TRAIN_SET/APPLES/n07740461_9026.jpg
  inflating: Dataset/TEST_SET/APPLES/n07740461_13171.jpg
  inflating: Dataset/TEST_SET/APPLES/n07740461_14570.jpg
  inflating: Dataset/TEST_SET/APPLES/n07740461_1261.jpg
  inflating: Dataset/TRAIN_SET/APPLES/n07740461_9157.jpg
  inflating: Dataset/TEST_SET/APPLES/n07740461_13580.jpg
  inflating: Dataset/TEST_SET/APPLES/n07740461_12300.jpg
  inflating: Dataset/TRAIN_SET/APPLES/n07740461_8649.jpg
  inflating: Dataset/TEST_SET/APPLES/n07740461_12350.jpg
  inflating: Dataset/TRAIN_SET/APPLES/n07740461_8617.jpg
  inflating: Dataset/TRAIN_SET/APPLES/n07740461_904.jpg
  inflating: Dataset/TEST_SET/APPLES/n07740461_14510.jpg
  inflating: Dataset/TRAIN_SET/APPLES/n07740461_8764.jpg
  inflating: Dataset/TEST_SET/APPLES/n07740461_13030.jpg
  inflating: Dataset/TRAIN_SET/APPLES/n07740461_862.jpg
  inflating: Dataset/TEST_SET/APPLES/n07740461_1191.jpg
```

```
inflating: Dataset/TEST_SET/APPLES/n07740461_13390.jpg
inflating: Dataset/TEST_SET/APPLES/n07740461_11871.jpg
inflating: Dataset/TRAIN_SET/APPLES/n07740461_9129.jpg
inflating: Dataset/TEST_SET/APPLES/n07740461_111.jpg
inflating: Dataset/TRAIN_SET/APPLES/n07740461_8834.jpg
inflating: Dataset/TRAIN_SET/APPLES/n07740461_9074.jpg
inflating: Dataset/TRAIN_SET/APPLES/n07740461_8915.jpg
inflating: Dataset/TEST_SET/APPLES/n07740461_12360.jpg
inflating: Dataset/TRAIN_SET/APPLES/n07740461_9092.jpg
inflating: Dataset/TRAIN_SET/APPLES/n07740461_9023.jpg
```

Importing Neccessary Libraries

```
import numpy as np#used for numerical analysis
import tensorflow #open source used for both ML and DL for computation
from tensorflow.keras.models import Sequential #it is a plain stack of layers
from tensorflow.keras import layers #A layer consists of a tensor-in tensor-out computatic
#Dense layer is the regular deeply connected neural network layer
from tensorflow.keras.layers import Dense,Flatten
#Faltten-used fot flattening the input or change the dimension
from tensorflow.keras.layers import Conv2D,MaxPooling2D,Dropout #Convolutional layer
#MaxPooling2D-for downsampling the image
from keras.preprocessing.image import ImageDataGenerator
```

Image Data Agumentation

```
#setting parameter for Image Data agumentation to the training data
train_datagen = ImageDataGenerator(rescale=1./255,shear_range=0.2,zoom_range=0.2,horizonta
#Image Data agumentation to the testing data
test_datagen=ImageDataGenerator(rescale=1./255)
```

Loading our data and performing data agumentation

```
#performing data agumentation to train data
x_train = train_datagen.flow_from_directory(
    r'/content/Dataset/TRAIN_SET',
    target_size=(64, 64),batch_size=5,color_mode='rgb',class_mode='sparse')
#performing data agumentation to test data
x_test = test_datagen.flow_from_directory(
    r'/content/Dataset/TEST_SET',
    target_size=(64, 64),batch_size=5,color_mode='rgb',class_mode='sparse')
```

```
 Found 4118 images belonging to 5 classes.
 Found 1500 images belonging to 5 classes.
```

```
print(x_train.class_indices)#checking the number of classes
```

```
{'APPLES': 0, 'BANANA': 1, 'ORANGE': 2, 'PINEAPPLE': 3, 'WATERMELON': 4}
```

```
print(x_test.class_indices)#checking the number of classes
```

```
{'APPLES': 0, 'BANANA': 1, 'ORANGE': 2, 'PINEAPPLE': 3, 'WATERMELON': 4}
```

```
from collections import Counter as c
c(x_train .labels)
```

```
Counter({0: 995, 1: 1354, 2: 1019, 3: 275, 4: 475})
```

```
from collections import Counter as c
c(x_test .labels)
```

```
Counter({0: 266, 1: 415, 2: 248, 3: 224, 4: 347})
```