Deep Learning Fundus Image Analysis for Early Detection of Diabetic Retinopathy

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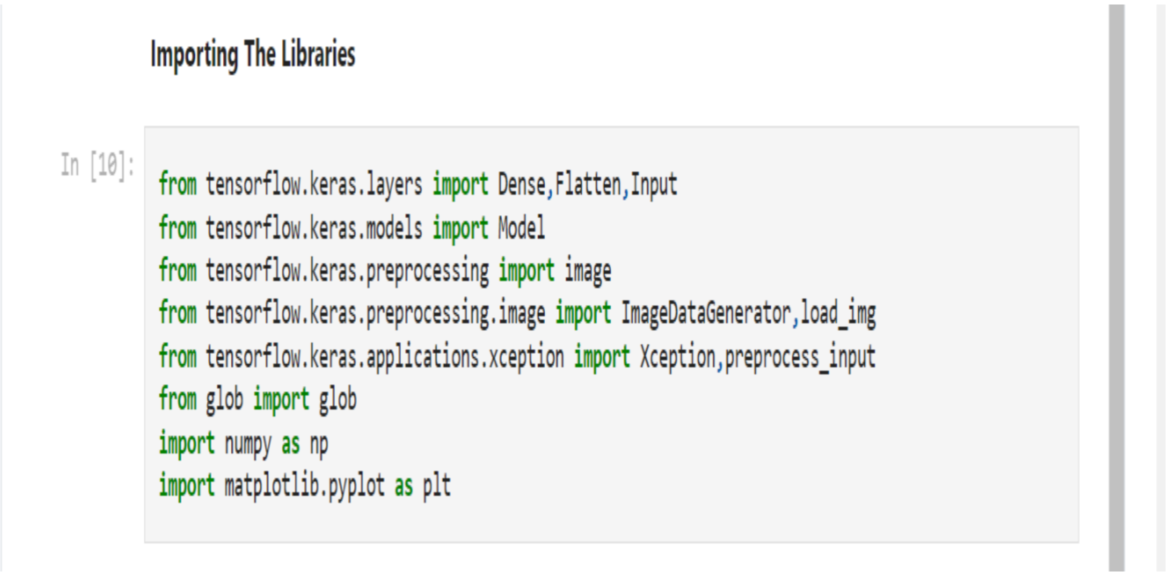
Data Pre-Processing

We will be improving the image data that suppresses unwilling distortions or enhances some image features important for further processing, although perform some geometric transformations of images like rotation, scaling, translation, etc.

Importing the Libraries

import the necessary libraries as shown in the image.



Importing The Libraries

```
In [10]:
from tensorflow.keras.layers import Dense,Flatten,Input
from tensorflow.keras.models import Model
from tensorflow.keras.preprocessing import image
from tensorflow.keras.preprocessing.image import ImageDataGenerator,load_img
from tensorflow.keras.applications.xception import Xception,preprocess_input
from glob import glob
import numpy as np
import matplotlib.pyplot as plt
```

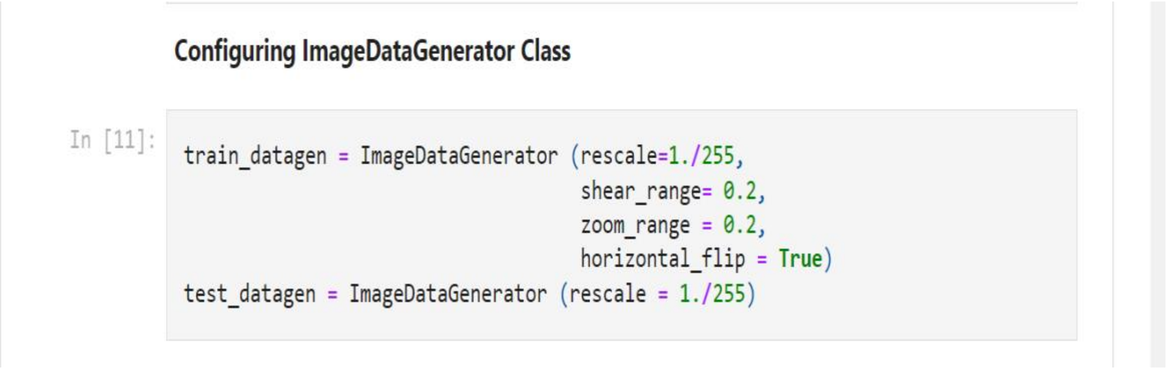
Configure ImageDataGenerator Class

ImageDataGenerator class is instantiated and the configuration for the types of data augmentation

There are five main types of data augmentation techniques for image data; specifically:

- Image shifts via the width_shift_range and height_shift_range arguments.
- The image flips via the horizontal_flip and vertical_flip arguments.
- Image rotations via the rotation_range argument
- Image brightness via the brightness_range argument.
- Image zoom via the zoom_range argument.

An instance of the ImageDataGenerator class can be constructed for train and test.



Configuring ImageDataGenerator Class

In [11]:

```
train_datagen = ImageDataGenerator (rescale=1./255,
                                    shear_range= 0.2,
                                    zoom_range = 0.2,
                                    horizontal_flip = True)
test_datagen = ImageDataGenerator (rescale = 1./255)
```

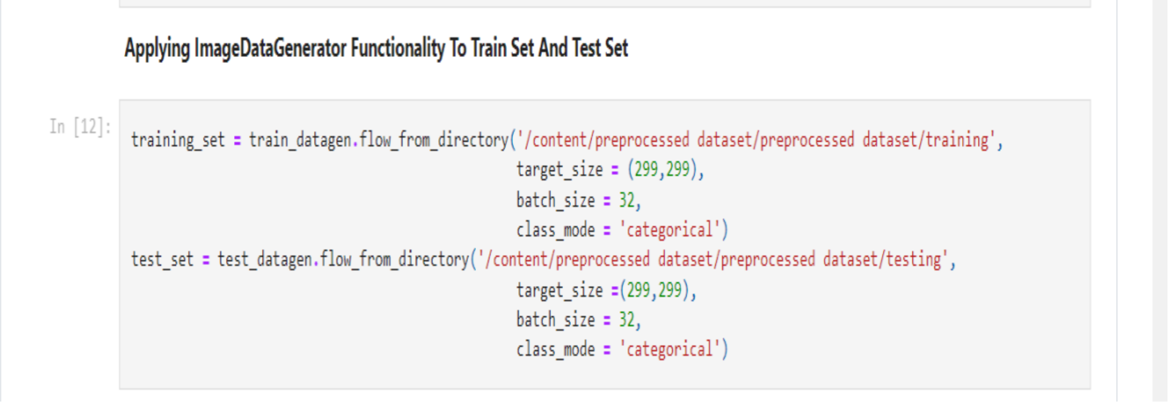
Apply ImageDataGenerator Functionality To Train Set And Test Set

Let us apply ImageDataGenerator functionality to the Train set and Test set by using the following code. For Training set using flow_from_directory function.

This function will return batches of images from the subdirectories

Arguments:

- directory: Directory where the data is located. If labels are "inferred", it should contain subdirectories, each containing images for a class. Otherwise, the directory structure is ignored.
- batch_size: Size of the batches of data which is 64.
- target_size: Size to resize images after they are read from disk.
- class_mode:
  - ‘int': means that the labels are encoded as integers (e.g. for sparse_categorical_crossentropy loss).
  - 'categorical' means that the labels are encoded as a categorical vector (e.g. for categorical_crossentropy loss).
  - 'binary' means that the labels (there can be only 2) are encoded as float32 scalars with values 0 or 1 (e.g. for binary_crossentropy).
  - None (no labels).



Applying ImageDataGenerator Functionality To Train Set And Test Set

In [12]:

```
training_set = train_datagen.flow_from_directory('/content/preprocessed dataset/preprocessed dataset/training',
                                                 target_size = (299,299),
                                                 batch_size = 32,
                                                 class_mode = 'categorical')
test_set = test_datagen.flow_from_directory('/content/preprocessed dataset/preprocessed dataset/testing',
                                                 target_size =(299,299),
                                                 batch_size = 32,
                                                 class_mode = 'categorical')
```