IMAGE PRE-PROCESSING
IMPORT IMAGE DATA GENERATOR AND CONFIGURE IT

```python
from tensorflow.keras.preprocessing.image import ImageDataGenerator
```

```python
# Training Datagen
train_datagen = ImageDataGenerator(rescale=1/255,zoom_range=0.2,horizontal_flip=True,vertical_flip=False)
# Testing Datagen
test_datagen = ImageDataGenerator(rescale=1/255)
```

```python
import tensorflow as tf
import os
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Dense, Conv2D, Flatten, Dropout, MaxPooling2D
from tensorflow.keras.preprocessing.image import ImageDataGenerator
import numpy as np
import matplotlib.pyplot as plt
import IPython.display as display
from PIL import Image
import pathlib
```

Apply ImageDataGenerator Functionality To Train And Test set

```python
from google.colab import drive
```

```
!unzip '/content/DATASET.zip'
```

```
 extracting: Dataset/training_set/G/1225.png
 extracting: Dataset/training_set/G/1226.png
 extracting: Dataset/training_set/G/1227.png
 extracting: Dataset/training_set/G/1228.png
 extracting: Dataset/training_set/G/1229.png
  inflating: Dataset/training_set/G/123.png
 extracting: Dataset/training_set/G/1230.png
 extracting: Dataset/training_set/G/1231.png
 extracting: Dataset/training_set/G/1232.png
  inflating: Dataset/training_set/G/1233.png
  inflating: Dataset/training_set/G/1234.png
  inflating: Dataset/training_set/G/1235.png
  inflating: Dataset/training_set/G/1236.png
  inflating: Dataset/training_set/G/1237.png
  inflating: Dataset/training_set/G/1238.png
  inflating: Dataset/training_set/G/1239.png
  inflating: Dataset/training_set/G/124.png
  inflating: Dataset/training_set/G/1240.png
  inflating: Dataset/training_set/G/1241.png
  inflating: Dataset/training_set/G/1242.png
  inflating: Dataset/training_set/G/1243.png
  inflating: Dataset/training_set/G/1244.png
  inflating: Dataset/training_set/G/1245.png
 extracting: Dataset/training_set/G/1246.png
  inflating: Dataset/training_set/G/1247.png
  inflating: Dataset/training_set/G/1248.png
  inflating: Dataset/training_set/G/1249.png
  inflating: Dataset/training_set/G/125.png
  inflating: Dataset/training_set/G/1250.png
  inflating: Dataset/training_set/G/1251.png
  inflating: Dataset/training_set/G/1252.png
  inflating: Dataset/training_set/G/1253.png
  inflating: Dataset/training_set/G/1254.png
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  inflating: Dataset/training_set/G/1256.png
  inflating: Dataset/training_set/G/1257.png
  inflating: Dataset/training_set/G/1258.png
  inflating: Dataset/training_set/G/1259.png
  inflating: Dataset/training_set/G/126.png
  inflating: Dataset/training_set/G/1260.png
  inflating: Dataset/training_set/G/1261.png
 extracting: Dataset/training_set/G/1262.png
  inflating: Dataset/training_set/G/1263.png
  inflating: Dataset/training_set/G/1264.png
  inflating: Dataset/training_set/G/1265.png
  inflating: Dataset/training_set/G/1266.png
  inflating: Dataset/training_set/G/1267.png
 extracting: Dataset/training_set/G/1268.png
  inflating: Dataset/training_set/G/1269.png
  inflating: Dataset/training_set/G/127.png
  inflating: Dataset/training_set/G/1270.png
  inflating: Dataset/training_set/G/1271.png
  inflating: Dataset/training_set/G/1272.png
  inflating: Dataset/training_set/G/1273.png
  inflating: Dataset/training_set/G/1274.png
  inflating: Dataset/training_set/G/1275.png
  inflating: Dataset/training_set/G/1276.png
  inflating: Dataset/training_set/G/1277.png
  inflating: Dataset/training_set/G/1278.png
  inflating: Dataset/training_set/G/1279.png
  inflating: Dataset/training_set/G/128.png
  inflating: Dataset/training_set/G/1280.png
  inflating: Dataset/training_set/G/1281.png
  inflating: Dataset/training_set/G/1282.png
  inflating: Dataset/training_set/G/1283.png
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  inflating: Dataset/training_set/G/1285.png
  inflating: Dataset/training_set/G/1286.png
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  inflating: Dataset/training_set/G/1288.png
  inflating: Dataset/training_set/G/1289.png
  inflating: Dataset/training_set/G/129.png
  inflating: Dataset/training_set/G/1290.png
  inflating: Dataset/training_set/G/1291.png
  inflating: Dataset/training_set/G/1292.png
  inflating: Dataset/training_set/G/1293.png
```

```
inflating: Dataset/training_set/I/96.png
inflating: Dataset/training_set/I/960.png
inflating: Dataset/training_set/I/961.png
inflating: Dataset/training_set/I/962.png
inflating: Dataset/training_set/I/963.png
inflating: Dataset/training_set/I/964.png
inflating: Dataset/training_set/I/965.png
inflating: Dataset/training_set/I/966.png
inflating: Dataset/training_set/I/967.png
inflating: Dataset/training_set/I/968.png
inflating: Dataset/training_set/I/969.png
inflating: Dataset/training_set/I/97.png
inflating: Dataset/training_set/I/970.png
inflating: Dataset/training_set/I/971.png
inflating: Dataset/training_set/I/972.png
extracting: Dataset/training_set/I/973.png
inflating: Dataset/training_set/I/974.png
inflating: Dataset/training_set/I/975.png
inflating: Dataset/training_set/I/976.png
inflating: Dataset/training_set/I/977.png
inflating: Dataset/training_set/I/978.png
inflating: Dataset/training_set/I/979.png
inflating: Dataset/training_set/I/98.png
inflating: Dataset/training_set/I/980.png
inflating: Dataset/training_set/I/981.png
inflating: Dataset/training_set/I/982.png
extracting: Dataset/training_set/I/983.png
inflating: Dataset/training_set/I/984.png
inflating: Dataset/training_set/I/985.png
inflating: Dataset/training_set/I/986.png
inflating: Dataset/training_set/I/987.png
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inflating: Dataset/training_set/I/989.png
inflating: Dataset/training_set/I/99.png
inflating: Dataset/training_set/I/990.png
inflating: Dataset/training_set/I/991.png
inflating: Dataset/training_set/I/992.png
extracting: Dataset/training_set/I/993.png
inflating: Dataset/training_set/I/994.png
inflating: Dataset/training_set/I/995.png
extracting: Dataset/training_set/I/996.png
```

In [ ]:
```python
from tensorflow.keras.preprocessing.image import ImageDataGenerator
print("This dataset has been created and uploaded by IBM-TeamID-IBM-Project-45753-1660732074")
```

This dataset has been created and uploaded by IBM-TeamID-IBM-Project-45753-1660732074

In [ ]:
```python
train_datagen = ImageDataGenerator(rescale=1./255,zoom_range=0.2,horizontal_flip=True, vertical_flip=False)
```

In [ ]:
```python
test_datagen= ImageDataGenerator(rescale=1./255)
```

In [ ]:
```python
x_train = train_datagen.flow_from_directory('/content/drive/MyDrive/dataset/training_set',target_size=(64,64), batch_size=300,
                                            class_mode='categorical', color_mode = "grayscale")
```

Found 15750 images belonging to 9 classes.

In [ ]:
```python
x_test = test_datagen.flow_from_directory('/content/drive/MyDrive/dataset/test_set',target_size=(64,64), batch_size=300,
                                          class_mode='categorical', color_mode = "grayscale")
```

Found 2250 images belonging to 9 classes.

In [ ]:
```python
x_train.class_indices
```

Out[ ]: {'A': 0, 'B': 1, 'C': 2, 'D': 3, 'E': 4, 'F': 5, 'G': 6, 'H': 7, 'I': 8}

In [ ]:
```python
x_test.class_indices
```

Out[ ]: {'A': 0, 'B': 1, 'C': 2, 'D': 3, 'E': 4, 'F': 5, 'G': 6, 'H': 7, 'I': 8}