

SPRINT 1

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Project Name : Natural Disaster Intensity Analysis and Classification Using Artificial Intelligence

Import Image Data Generator from keras

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

Image Data Augmentation

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

Loading our data and performing data augmentation

```
x_train = train_datagen.flow_from_directory
('../data/train_set',target_size=(64,64),batch_size=5,color_mode='rgh',
class_mode='categorical')
x_test = test_datagen.flow_from_directory
('../data/test_set',target_size=(64,64),batch_size=5,color_mode='rgh',
class_mode='categorical')
```

Found 742 images belonging to 4 classes.

Found 198 images belonging to 4 classes.

Importing the Required Libraries

```
import numpy as np
import tensorflow
from tensorflow.keras.models import Sequential
from tensorflow.keras import layers
from tensorflow.keras.layers import Dense, Flatten
from tensorflow.keras.layers import Conv2D
from keras.optimizers import Adam
```

```
from keras.utils import np_utils
```

```
(x_train, y_train), (x_test, y_test) = disaster.load_data()
```

```
print (x_train.shape)
print (y_test.shape)
```

(60000, 28, 28)
(10000, 28, 28)

```
x_train[0]
```

```
array([[0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,  
       0, 0, 0, 0, 0, 0, 0],  
 [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,  
   0, 0, 0, 0, 0, 0, 0],  
 [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,  
   0, 0, 0, 0, 0, 0, 0],  
 [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,  
   0, 0, 0, 0, 0, 0, 0],  
 [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,  
   0, 0, 0, 0, 0, 0, 0],  
 [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 3, 18, 18, 126, 136,  
    175, 26, 166, 255, 247, 127, 0, 0, 0, 0],  
 [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 30, 36, 94, 154, 170, 253, 253, 253,  
 253, 253, 225, 172, 253, 242, 195, 64, 0, 0, 0, 0],  
 [0, 0, 0, 0, 0, 0, 0, 0, 49, 238, 253, 253, 253, 253, 253, 253,  
 253, 253, 251, 93, 82, 82, 56, 39, 0, 0, 0, 0, 0],  
 [0, 0, 0, 0, 0, 0, 0, 0, 18, 219, 253, 253, 253, 253, 253, 198,  
 182, 247, 241, 0, 0, 0, 0, 0, 0, 0, 0, 0],  
 [0, 0, 0, 0, 0, 0, 0, 0, 80, 156, 107, 253, 253, 205, 11, 0,  
 43, 154, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0],  
 [0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 14, 1, 154, 253, 90, 0, 0, 0, 0, 0,  
 0, 0, 0, 0, 0, 0, 0, 0, 0],  
 [0,0,0,0,0,0,0,0,0,0,0,0,139,253, 190,2,0,0,0,0,0,0,0,0,0,0,  
 0,0],  
 [0,0,0,0,0,0,0,0,0,0,0,0,11,190, 253,70,0,0,0,0,0,0,0,0,0,0,  
 0,0],  
 [0,0,0,0,0,0,0,0,0,0,0,0,35, 241,225,160,108,1,0,0,0,0,0,0,0,0,  
 0,0],  
 [0,0,0,0,0,0,0,0,0,0,0,0,81,240,253,253,119,25,0,0,0,0,0,0,0,  
 0,0],  
 [0,0,0,0,0,0,0,0,0,0,0,0,0,45,186,253,253,150,27,0,0,0,0,0,0,
```

```

0,0],
[0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,16,93,252,253,187,0,0,0,0,0,0,
0,0],
[0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,249,253,249,64,0,0,0,0,0,0,
0,0],
[0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,46,130,183,253,253,207,2,0,0,0,0,0,
0,0],
[0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,39,
148,229,253,253,253,250,182,0,0,0,0,0,0,0,0],
[0,0,0,0,0,0,0,0,0,0,0,0,24,114,221,
253,253,253,253,201,78,0,0,0,0,0,0,0,0,0,0],
[0,0,0,0,0,0,0,0,0,0,23,66,213,253,253,
253,253,198,81,2,0,0,0,0,0,0,0,0,0,0,0],
[0,0,0,0,0,0,18,171,219,253,253,253,253,
195,80,9,0,0,0,0,0,0,0,0,0,0,0,0,0,0],
[0,0,0,0,55,172,226,253,253,253,253,244,133,
11,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0],
[0,0,0,0,136,253,253,253,212,135,132,16,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0],
[0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0],
[0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0],
[0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,
0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0]], dtype=uint8)

```

```
y_train[0]
```

```
5
```

Reshaping The Data

```
x_train=x_train.shape.reshape (60000,28,28,1).astype ('float32')
```

```
x_test=x_test.shape.reshape (10000,28,28,1).astype ('float32')
```

Applying One Hot Encoding

```
number_of_classes = 10
```

```
y_train=np.utils.to_categorical(y_train, number_of_classes)
```

```
y_test=np.utils.to_categorical(y_test, number_of_classes)
```

y_train[0]

array([0., 0., 0., 0., 0., 1., 0., 0., 0., 0.], dtype=float32