In [3]:
```
import os # The OS module in python functions for interacting with the operati
ng system.

import numpy as np
import matplotlib.pyplot as plt

import seaborn as sns
import pandas as pd


import tensorflow.keras.callbacks as callbacks

from keras.models import Sequential
from keras.layers import Dense
from keras.layers import Convolution2D
from keras.layers import MaxPooling2D
from keras.layers import Flatten



import warnings
warnings.filterwarnings('ignore')
```

In [4]:
```
DATASET_PATH = "D:\Prasoona\Mini Project dataset"

os.listdir(DATASET_PATH)
```

Out[4]:
```
['.DS_Store', 'fer2013.bib', 'fer2013.csv', 'Test', 'Train']
```

In [5]:
```
from keras.preprocessing.image import ImageDataGenerator#IDG IMPORT THE FEATUR
ES OF DATASET,AUGMENT
train_datagen=ImageDataGenerator(rescale=1./255,shear_range=0.2,zoom_range=0.2
,horizontal_flip=True)
test_datagen=ImageDataGenerator(rescale=1./255)
```

In [6]:
```
train_set=os.path.join(DATASET_PATH, 'Train')
test_set=os.path.join(DATASET_PATH, 'Test')
```

In [7]:
```
x_train=train_datagen.flow_from_directory(train_set,target_size=(64,64),batch_
size=128,class_mode="categorical")
x_test=test_datagen.flow_from_directory(test_set,target_size=(64,64),batch_siz
e=128,class_mode="categorical")
```

```
Found 28789 images belonging to 7 classes.
Found 3589 images belonging to 7 classes.
```

In [8]:
```
x_train.class_indices
```

Out[8]:
```
{'0.Angry': 0,
 '1.Disgust': 1,
 '2.Fear': 2,
 '3.Happiness': 3,
 '4.Sadness': 4,
 '5.Surprise': 5,
 '6.Neutral': 6}
```

In [9]:
```
# In machine learning, early stopping is one of the most widely used regulariz
ation techniques to combat the overfitting issue.
early_stopping = callbacks.EarlyStopping(patience=5, restore_best_weights=True
)
```

In [11]:
```
model=Sequential()
```

In [13]:
```
model.add(Convolution2D(128,(3,3),input_shape=(64,64,3),activation="relu"))
```

In [15]:
```
model.add(MaxPooling2D(pool_size = (2,2)))
```

In [16]:
```
model.add(Flatten())
```

In [17]:
```
model.add(Dense(units=64,init="uniform",activation="relu"))
```

In [18]:
```
model.add(Dense(units=7,init="uniform",activation="softmax"))
```

In [20]:
```
model.compile(optimizer="adam",loss="categorical_crossentropy",metrics=["accur
acy"])
```

In [ ]:
```
model.fit_generator(x_train,steps_per_epoch=225,epochs=100,validation_data=x_test,validation_steps=28)
```

```
WARNING:tensorflow:From C:\Users\91939\anaconda3\lib\site-packages\tensorflow\python\ops\math_grad.py:1250: add_dispatch_support.<locals>.wrapper (from tensorflow.python.ops.array_ops) is deprecated and will be removed in a future version.
Instructions for updating:
Use tf.where in 2.0, which has the same broadcast rule as np.where
WARNING:tensorflow:From C:\Users\91939\anaconda3\lib\site-packages\keras\backend\tensorflow_backend.py:986: The name tf.assign_add is deprecated. Please use tf.compat.v1.assign_add instead.

Epoch 1/100
225/225 [==============================] - 1064s 5s/step - loss: 1.7227 - acc: 0.3097 - val_loss: 1.6260 - val_acc: 0.3691
Epoch 2/100
225/225 [==============================] - 924s 4s/step - loss: 1.5396 - acc: 0.4070 - val_loss: 1.6137 - val_acc: 0.3753
Epoch 3/100
225/225 [==============================] - 866s 4s/step - loss: 1.4502 - acc: 0.4405 - val_loss: 1.5292 - val_acc: 0.4161
Epoch 4/100
 60/225 [=======>......................] - ETA: 9:54 - loss: 1.4073 - acc: 0.4572
```

In [ ]:
```

```