AI Assignment 3

Name : Gangisetty Krishna Vamsi

Reg.No : 20BDS0281

college : VIT Vellore

email :gangikrishna.vamsi2020@vitstudent.ac.in

```
from google.colab import drive
drive.mount('/content/drive')
```

```
Mounted at /content/drive
```

```
!unzip /content/drive/MyDrive/birds.zip
```

```
Archive:  /content/drive/MyDrive/birds.zip
  inflating: test_data/test_data/blasti/DSC_6396.jpg
  inflating: test_data/test_data/blasti/DSC_6397.jpg
  inflating: test_data/test_data/blasti/DSC_6398.jpg
  inflating: test_data/test_data/blasti/DSC_6399.jpg
  inflating: test_data/test_data/blasti/DSC_6400.jpg
  inflating: test_data/test_data/blasti/DSC_6401.jpg
  inflating: test_data/test_data/blasti/DSC_6402.jpg
  inflating: test_data/test_data/blasti/DSC_6403.jpg
  inflating: test_data/test_data/blasti/DSC_6405.jpg
  inflating: test_data/test_data/blasti/DSC_6406.jpg
  inflating: test_data/test_data/blasti/DSC_6407.jpg
  inflating: test_data/test_data/blasti/DSC_6408.jpg
  inflating: test_data/test_data/blasti/DSC_6409.jpg
  inflating: test_data/test_data/blasti/DSC_6410.jpg
  inflating: test_data/test_data/blasti/DSC_6411.jpg
  inflating: test_data/test_data/bonegl/DSC_4587.jpg
  inflating: test_data/test_data/bonegl/DSC_4588.jpg
  inflating: test_data/test_data/bonegl/DSC_4589.jpg
  inflating: test_data/test_data/bonegl/DSC_4590.jpg
  inflating: test_data/test_data/bonegl/DSC_4591.jpg
  inflating: test_data/test_data/bonegl/DSC_4592.jpg
  inflating: test_data/test_data/bonegl/DSC_4593.jpg
  inflating: test_data/test_data/brhkyt/D72_0473.jpg
  inflating: test_data/test_data/brhkyt/D72_0474.jpg
  inflating: test_data/test_data/brhkyt/D72_0475.jpg
  inflating: test_data/test_data/brhkyt/D72_0477.jpg
  inflating: test_data/test_data/brhkyt/D72_0478.jpg
  inflating: test_data/test_data/brhkyt/D72_0479.jpg
  inflating: test_data/test_data/cbrtsh/_D32_10310.jpg
  inflating: test_data/test_data/cbrtsh/_D32_10311.jpg
  inflating: test_data/test_data/cbrtsh/_D32_10312.jpg
  inflating: test_data/test_data/cbrtsh/_D32_10313.jpg
  inflating: test_data/test_data/cbrtsh/_D32_10314.jpg
  inflating: test_data/test_data/cbrtsh/_D32_10317.jpg
  inflating: test_data/test_data/cbrtsh/_D32_10318.jpg
  inflating: test_data/test_data/cmnmyn/DSC_2443.jpg
  inflating: test_data/test_data/cmnmyn/DSC_4681.jpg
  inflating: test_data/test_data/cmnmyn/DSC_5137.jpg
  inflating: test_data/test_data/cmnmyn/DSC_7625.jpg
  inflating: test_data/test_data/cmnmyn/P1050277.jpg
  inflating: test_data/test_data/cmnmyn/_D32_12426.jpg
  inflating: test_data/test_data/cmnmyn/_D32_12427.jpg
  inflating: test_data/test_data/cmnmyn/_D32_12428.jpg
  inflating: test_data/test_data/gretit/11620454726_31a35c26da_o.jpg
  inflating: test_data/test_data/gretit/11776135285_ccf938fa2e_o.jpg
  inflating: test_data/test_data/gretit/11905645146_6a5d4ff9f9_o.jpg
  inflating: test_data/test_data/gretit/8537646712_0b282c4c6a_o.jpg
  inflating: test_data/test_data/gretit/D72_0693.jpg
  inflating: test_data/test_data/gretit/D72_0694.jpg
  inflating: test_data/test_data/gretit/D72_0695.jpg
  inflating: test_data/test_data/hilpig/DSC_6359.jpg
  inflating: test_data/test_data/hilpig/DSC_6362.jpg
  inflating: test_data/test_data/hilpig/DSC_6364.jpg
  inflating: test_data/test_data/hilpig/DSC_6368.jpg
  inflating: test_data/test_data/hilpig/DSC_6403.jpg
  inflating: test_data/test_data/hilpig/DSC_6404.jpg
  inflating: test_data/test_data/hilpig/P1000319.jpg
```

```
import tensorflow as tf
tf.keras.backend.clear_session()
```

```
# Data Augmentation
from tensorflow.keras.preprocessing.image import ImageDataGenerator
from tensorflow.keras.layers import Convolution2D,MaxPooling2D,Flatten,Dense
from tensorflow.keras.models import Sequential
import cv2 as cv


train_gen = ImageDataGenerator(rescale=(1./255),horizontal_flip=True,shear_range=0.2)
test_gen = ImageDataGenerator(rescale=(1./255))


train = train_gen.flow_from_directory('/content/train_data/train_data',
target_size=(120, 120),
class_mode='categorical',
batch_size=8)
test = test_gen.flow_from_directory('/content/test_data/test_data',
target_size=(120, 120),
class_mode='categorical',
batch_size=8)
```

```
Found 150 images belonging to 16 classes.
Found 157 images belonging to 16 classes.
```

```
print(train.class_indices)
print(test.class_indices)
```

```
{'blasti': 0, 'bonegl': 1, 'brhkyt': 2, 'cbrtsh': 3, 'cmnmyn': 4, 'gretit': 5, 'hilpig': 6, 'himbul': 7, 'himgri': 8, 'hsparo': 9,
{'blasti': 0, 'bonegl': 1, 'brhkyt': 2, 'cbrtsh': 3, 'cmnmyn': 4, 'gretit': 5, 'hilpig': 6, 'himbul': 7, 'himgri': 8, 'hsparo': 9,
```

```
# CNN
from tensorflow.keras.layers import Convolution2D,MaxPooling2D,Flatten,Dense
from tensorflow.keras.models import Sequential


model = Sequential([
Convolution2D(20,(3,3),activation = 'relu',input_shape=(120,120,3)),
MaxPooling2D(2,2),
Flatten(),
Dense(45,activation = 'relu'),
Dense(16,activation = 'softmax')
])


model.compile(optimizer='adam',loss='categorical_crossentropy',metrics=['accuracy'])


model_fit = model.fit(train,epochs =20,validation_data = test ,batch_size=5)
```

```
Epoch 1/20
19/19 [==============================] - 137s 7s/step - loss: 4.4637 - accuracy: 0.0533 - val_loss: 2.7665 - val_accuracy: 0.1210
Epoch 2/20
19/19 [==============================] - 135s 7s/step - loss: 2.7453 - accuracy: 0.1267 - val_loss: 2.7618 - val_accuracy: 0.1274
Epoch 3/20
19/19 [==============================] - 129s 7s/step - loss: 2.7231 - accuracy: 0.1267 - val_loss: 2.7556 - val_accuracy: 0.1210
Epoch 4/20
19/19 [==============================] - 128s 7s/step - loss: 2.7547 - accuracy: 0.1000 - val_loss: 2.7653 - val_accuracy: 0.1210
Epoch 5/20
19/19 [==============================] - 128s 7s/step - loss: 2.7281 - accuracy: 0.1267 - val_loss: 2.7581 - val_accuracy: 0.1338
Epoch 6/20
19/19 [==============================] - 127s 7s/step - loss: 2.6675 - accuracy: 0.1933 - val_loss: 2.6926 - val_accuracy: 0.1783
Epoch 7/20
19/19 [==============================] - 131s 7s/step - loss: 2.6551 - accuracy: 0.1533 - val_loss: 2.7774 - val_accuracy: 0.0828
Epoch 8/20
19/19 [==============================] - 127s 7s/step - loss: 2.6343 - accuracy: 0.1933 - val_loss: 2.7132 - val_accuracy: 0.1592
Epoch 9/20
19/19 [==============================] - 127s 7s/step - loss: 2.5605 - accuracy: 0.2067 - val_loss: 2.6963 - val_accuracy: 0.1847
Epoch 10/20
19/19 [==============================] - 128s 7s/step - loss: 2.5071 - accuracy: 0.1933 - val_loss: 2.6669 - val_accuracy: 0.1975
Epoch 11/20
19/19 [==============================] - 127s 7s/step - loss: 2.4563 - accuracy: 0.2333 - val_loss: 2.6632 - val_accuracy: 0.2166
Epoch 12/20
19/19 [==============================] - 129s 7s/step - loss: 2.4411 - accuracy: 0.2467 - val_loss: 2.7032 - val_accuracy: 0.1911
Epoch 13/20
19/19 [==============================] - 126s 7s/step - loss: 2.3936 - accuracy: 0.2267 - val_loss: 2.6544 - val_accuracy: 0.2739
Epoch 14/20
19/19 [==============================] - 126s 7s/step - loss: 2.3271 - accuracy: 0.3133 - val_loss: 2.7951 - val_accuracy: 0.1975
Epoch 15/20
19/19 [==============================] - 128s 7s/step - loss: 2.3058 - accuracy: 0.3133 - val_loss: 2.7786 - val_accuracy: 0.1975
Epoch 16/20
19/19 [==============================] - 133s 7s/step - loss: 2.2765 - accuracy: 0.3200 - val_loss: 2.6488 - val_accuracy: 0.1338
Epoch 17/20
19/19 [==============================] - 128s 7s/step - loss: 2.1724 - accuracy: 0.2533 - val_loss: 2.6621 - val_accuracy: 0.2038
Epoch 18/20
19/19 [==============================] - 128s 7s/step - loss: 2.0709 - accuracy: 0.2800 - val_loss: 2.5972 - val_accuracy: 0.1720
Epoch 19/20
```

```
19/19 [==============================] - 126s 7s/step - loss: 1.9787 - accuracy: 0.3000 - val_loss: 2.6668 - val_accuracy: 0.1911
Epoch 20/20
19/19 [==============================] - 128s 7s/step - loss: 1.8228 - accuracy: 0.2933 - val_loss: 2.7496 - val_accuracy: 0.1529
```

```
model.save('birds.h5')
```

```
model_new = tf.keras.models.load_model('/content/birds.h5')
```

```
import numpy as np
from tensorflow.keras.preprocessing import image
```

```
output = ['rebimg','wcrsrt','jglowl','ibicrw','mgprob','hsparo',
'indvul','himgri','himbul','gretit','hilpig','cbrtsh',
'cmnmyn','bonegl','brhkyt','blasti']
print(output)
```

```
['rebimg', 'wcrsrt', 'jglowl', 'ibicrw', 'mgprob', 'hsparo', 'indvul', 'himgri', 'himbul', 'gretit', 'hilpig', 'cbrtsh', 'cmnmyn',
```

```
img1 = image.load_img("/content/train_data/train_data/mgprob/100_5590.JPG",target_size=(120,120))
img1 = image.img_to_array(img1)
img1 = np.expand_dims(img1,axis=0)
pred = np.argmax(model.predict(img1))
print(pred)
print(output[pred])
```

```
1/1 [==============================] - 0s 400ms/step
14
brhkyt
```

```
img1 = image.load_img("/content/train_data/train_data/cmnmyn/100_5763.JPG",target_size=(120,120))
img1 = image.img_to_array(img1)
img1 = np.expand_dims(img1,axis=0)
pred = np.argmax(model.predict(img1))
print(pred)
print(output[pred])
```

```
1/1 [==============================] - 0s 32ms/step
8
himbul
```

```
img1 = image.load_img("/content/train_data/train_data/gretit/100_5043.JPG",target_size=(120,120))
img1 = image.img_to_array(img1)
img1 = np.expand_dims(img1,axis=0)
pred = np.argmax(model.predict(img1))
print(pred)
print(output[pred])
```

```
1/1 [==============================] - 0s 27ms/step
14
brhkyt
```