

ASSIGNMENT – 3

Assignment Date	17-october-2022
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Student Roll No.	510919205014
Maximum marks	2 marks

PROBLEM STATEMENT: Build CNN Model for Classification of Flowers.

QUESTION – 1:

DOWNLOAD THE DATASET



The screenshot shows a Jupyter Notebook interface. The cell is titled "Loading Dataset" and contains the command `!unzip 'M:\software\AI_TRAINING_IBM\Flowers-Dataset.zip'`. Below the command, an error message is displayed: `unzip: cannot find or open M:\software\AI_TRAINING_IBM\Flowers-Dataset.zip, M:\software\AI_TRAINING_IBM\Flowers-Dataset.zip.zip or M:\software\AI_TRAINING_IBM\Flowers-Dataset.zip`. The error message is truncated on the right side.

QUESTION – 2:

DATA/ IMAGE AUGMENTATION



The screenshot shows a Jupyter Notebook interface. The cell is titled "Data Augmentation" and contains the code snippet `[3]: from tensorflow.keras.preprocessing.image import ImageDataGenerator`. The code is highlighted in yellow.

QUESTION – 3:

TRAINING & TESTING

▾ Training and Testing

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

```
In [9]: xtrain=train_datagen.flow_from_directory('M:\\software\\AI_TRAINING_IBM\\flowers', class_mode='categorical', target_size=(64,64), batch_size=100)
```

Found 4317 images belonging to 5 classes.

```
In [10]: xtest=test_datagen.flow_from_directory('M:\\software\\AI_TRAINING_IBM\\flowers', class_mode='categorical', target_size=(64,64), batch_size=100)
```

Found 4317 images belonging to 5 classes.

QUESTION

- 4 &

QUESTION 5:

CREATE

MODEL:

ADD LAYERS

▾ Importing the models and the layers

```
✓ 0s [7] from tensorflow.keras.models import Sequential
      from tensorflow.keras.layers import Convolution2D, MaxPooling2D, Flatten, Dense
```

```
✓ 1s ▶ model=Sequential()
      model.add(Convolution2D(64, (3,3), activation='relu', input_shape=(64,64,3)))
      model.add(MaxPooling2D(pool_size=(2,2)))
      model.add(Flatten())
      model.add(Dense(300, activation='relu'))
      model.add(Dense(150, activation='relu'))
      model.add(Dense(5, activation='softmax'))
```

QUESTION – 6:

COMPILE THE MODEL:

▼ Compile



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

QUESTION – 7:

FIT THE MODEL:

Fit the model.

```
model.fit_generator(xtrain,
                    steps_per_epoch=len(xtrain),
                    epochs=20,
                    validation_data=xtest,
                    validation_steps=len(xtest))
```

C:\Users\mm\AppData\Local\Temp\ipykernel_6696\312721451.py:1: UserWarning: `Model.fit_generator` is deprecated and will be removed in a future version. Please use `Model.fit`, which supports generators.
model.fit_generator(xtrain,

Epoch 1/20

44/44 [=====] - 37s 835ms/step - loss: 1.9038 - accuracy: 0.3836 - Val loss: 1.1672 - Val accuracy: 0.5219 Epoch 2/20

44/44 [=====] - 34s 779ms/step - loss: 1.0908 - accuracy: 0.5606 - Val loss: 1.0398 - Val accuracy: 0.5965 Epoch 3/20

44/44 [=====] - 36s 815ms/step - loss: 1.0262 - accuracy: 0.5925 - Val loss: 1.0038 - Val accuracy: 0.6185 Epoch 4/20

44/44 [=====] - 36s 823ms/step - loss: 0.9335 - accuracy: 0.6410 - Val loss: 0.8923 - Val accuracy: 0.6560 Epoch 5/20

44/44 [=====] - 36s 809ms/step - loss: 0.8781 - accuracy: 0.6604 - Val loss: 0.8886 - Val accuracy: 0.6646 Epoch 6/20
 44/44 [=====] - 34s 764ms/step - loss: 0.8512 - accuracy: 0.6713 - Val loss: 0.8784 - Val accuracy: 0.6771 Epoch 7/20
 44/44 [=====] - 33s 758ms/step - loss: 0.7922 - accuracy: 0.6931 - Val loss: 0.7586 - Val accuracy: 0.7121 Epoch 8/20
 44/44 [=====] - 35s 811ms/step - loss: 0.7471 - accuracy: 0.7107 - Val loss: 0.6955 - Val accuracy: 0.7262 Epoch 9/20

44/44 [=====] accuracy: 0.7311 - Val loss: 0.6671 - Val Epoch 10/20	- 35s 795ms/step accuracy: 0.7482	- loss: 0.7157	- ac
44/44 [=====] accuracy: 0.7336 - Val loss: 0.6537 - Val Epoch 11/20	- 36s 817ms/step accuracy: 0.7524	- loss: 0.6867	- ac
44/44 [=====] accuracy: 0.7628 - Val loss: 0.6081 - Val Epoch 12/20	- 37s 851ms/step accuracy: 0.7751	- loss: 0.6314	- ac
44/44 [=====] accuracy: 0.7744 - Val loss: 0.6052 - Val Epoch 13/20	- 34s 773ms/step accuracy: 0.7716	- loss: 0.6109	- ac
44/44 [=====] accuracy: 0.7853 - Val loss: 0.5747 - Val Epoch 14/20	- 34s 777ms/step accuracy: 0.7760	- loss: 0.5710	- ac
44/44 [=====] accuracy: 0.7924 - Val loss: 0.4951 - Val Epoch 15/20	- 33s 763ms/step accuracy: 0.8112	- loss: 0.5516	- ac
44/44 [=====] accuracy: 0.8019 - Val loss: 0.4531 - Val Epoch 16/20	- 34s 769ms/step accuracy: 0.8334	- loss: 0.5265	- ac
44/44 [=====] accuracy: 0.8177 - Val loss: 0.3755 - Val Epoch 17/20	- 32s 721ms/step accuracy: 0.8631	- loss: 0.4957	- ac
44/44 [=====] accuracy: 0.8272 - Val loss: 0.5578 - Val Epoch 18/20	- 32s 739ms/step accuracy: 0.7797	- loss: 0.4737	- ac
44/44 [=====] accuracy: 0.8274 - Val loss: 0.3953 - Val Epoch 19/20	- 30s 680ms/step accuracy: 0.8511	- loss: 0.4653	- ac
44/44 [=====] accuracy: 0.8395 - Val loss: 0.3990 - Val	- 25s 578ms/step accuracy: 0.8550	- loss: 0.4252	- ac

Epoch 20/20				
44/44 [=====]	- 26s 597ms/step	- loss:	0.3946	- ac
curacy: 0.8529 - Val loss: 0.3112 - Val	accuracy: 0.8888			

Out[19]:

<Keras.callbacks.History at 0x2b10b08c370>

QUESTION – 8:

SAVING THE

MODEL

```
{x}
Saving Model
[11] model.save('Flower.h5')
from tensorflow.keras.preprocessing import image
import numpy as np
```

QUESTION – 9:

TEST THE MODEL

Testing the model

```
In [22]: img=image.load_img('M:\\software\\AI_TRAINING_IBM\\flowers\\sunflower\\6953297_8576bf4ea3.jpg',target_size=(64,64))
x=image.img_to_array(img)
x=np.expand_dims(x,axis=0)
prediction=np.argmax(model.predict(x))
op=['daisy','dandelion','rose','sunflower','tulip']
op[prediction]
```

1/1 [=====] - 0s 22ms/step

Out[22]: 'sunflower'

QUESTION -10:

TESTING THE MODEL

```
In [24]: img=image.load_img('M:\\software\\AI_TRAINING_IBM\\download.jpg',target_size=(64,64))#randomly downloaded testing
x=image.img_to_array(img)
x=np.expand_dims(x,axis=0)
prediction=np.argmax(model.predict(x))
op=['daisy','dandelion','rose','sunflower','tulip']
op[prediction]
```

```
1/1 [=====] - 0s 22ms/step
```

```
Out[24]: 'sunflower'
```

```
In [ ]:
```
