


Assignment -3

Assignment Date	08 October 2022
Student Name	Rashmi AB
Student Roll Number	310819104067
Maximum Marks	2 Marks

PDF LINK:  Rashmi AB ibm assignment 3.pdf

In []:

In []:

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

Drive already mounted at /content/drive; to attempt to forcibly remount, call drive.mount("/content/drive", force_remount=True).

In []:

```
!unzip /content/drive/MyDrive/Flowers-Dataset.zip
```

Archive: /content/drive/MyDrive/Flowers-Dataset.zip
inflating: flowers/daisy/100080576_f52e8ee070_n.jpg
inflating: flowers/daisy/10140303196_b88d3d6cec.jpg
inflating: flowers/daisy/10172379554_b296050f82_n.jpg
inflating: flowers/daisy/10172567486_2748826a8b.jpg
inflating: flowers/daisy/10172636503_21bededa75_n.jpg
inflating: flowers/daisy/102841525_bd6628ae3c.jpg
inflating: flowers/daisy/10300722094_28fa978807_n.jpg
inflating: flowers/daisy/1031799732_e7f4008c03.jpg
inflating: flowers/daisy/10391248763_1d16681106_n.jpg
inflating: flowers/daisy/10437754174_22ec990b77_m.jpg
inflating: flowers/daisy/10437770546_8bb6f7bdd3_m.jpg
inflating: flowers/daisy/10437929963_bcl3eebe0c.jpg
inflating: flowers/daisy/10466290366_cc72e33532.jpg
inflating: flowers/daisy/10466558316_a7198b87e2.jpg
inflating: flowers/daisy/10555749815_13a12a026e.jpg
inflating: flowers/daisy/10555815624_dc211569b0.jpg
inflating: flowers/daisy/10555826524_423eb8bf71_n.jpg
inflating: flowers/daisy/10559679065_50d2b16fed.jpg
inflating: flowers/daisy/105806915_a9c13e2106_n.jpg
inflating: flowers/daisy/10712722853_5632165b04.jpg
inflating: flowers/daisy/107592979_aaa9cdfc78_m.jpg
inflating: flowers/daisy/10770585085_4742b9dac3_n.jpg
inflating: flowers/daisy/10841136265_af473efc60.jpg
inflating: flowers/daisy/10993710036_2033222c91.jpg
inflating: flowers/daisy/10993818044_4n19h86c82.jpg

inflating: flowers/daisy/14221848160_7f0a37c395.jpg
inflating: flowers/daisy/14245834619_153624f836.jpg
inflating: flowers/daisy/14264136211_9531fbc144.jpg
inflating: flowers/daisy/14272874304_47c0a46f5a.jpg
inflating: flowers/daisy/14307766919_fac3c37a6b_m.jpg
inflating: flowers/daisy/14330343061_99478302d4_m.jpg
inflating: flowers/daisy/14332947164_9b13513c71_m.jpg
inflating: flowers/daisy/14333681205_a07c9f1752_m.jpg
inflating: flowers/daisy/14350958832_29bdd3a254.jpg
inflating: flowers/daisy/14354051035_1037b30421_n.jpg
inflating: flowers/daisy/14372713423_61e2daae88.jpg
inflating: flowers/daisy/14399435971_ea5868c792.jpg
inflating: flowers/daisy/14402451388_56545a374a_n.jpg
inflating: flowers/daisy/144076848_57e1d662e3_m.jpg
inflating: flowers/daisy/144099102_bf63a41e4f_n.jpg
inflating: flowers/daisy/1441939151_b271408c8d_n.jpg
inflating: flowers/daisy/14421389519_d5fd353eb4.jpg
inflating: flowers/daisy/144603918_b9de002f60_m.jpg
inflating: flowers/daisy/14471433500_cdaa22e3ea_m.jpg
inflating: flowers/daisy/14485782498_fb342ec301.jpg
inflating: flowers/daisy/14507818175_05219b051c_m.jpg
inflating: flowers/daisy/14523675369_97c31d0b5b.jpg
inflating: flowers/daisy/14551098743_2842e7a004_n.jpg
inflating: flowers/daisy/14554906452_35f066ffe9_n.jpg
inflating: flowers/daisy/14564545365_1f1d267bf1_n.jpg
inflating: flowers/daisy/14569895116_32f0dc0bf9.jpg
inflating: flowers/daisy/14591326135_930703dbed_m.jpg
inflating: flowers/daisy/14600779226_7bbc288d40_m.jpg
inflating: flowers/daisy/14613443462_d4ed356201.jpg
inflating: flowers/daisy/14621687774_ec52811acd_n.jpg
inflating: flowers/daisy/14674743211_f68b13f6d9.jpg
inflating: flowers/daisy/14698531521_0c2f0c6539.jpg
inflating: flowers/daisy/147068564_32bb4350cc.jpg
inflating: flowers/daisy/14707111433_cce08ee007.jpg
inflating: flowers/daisy/14716799982_ed6d626a66.jpg
inflating: flowers/daisy/14816364517_2423021484_m.jpg
inflating: flowers/daisy/14866200659_6462c723cb_m.jpg
inflating: flowers/daisy/14907815010_bff495449f.jpg
inflating: flowers/daisy/14921511479_7b0a647795.jpg
inflating: flowers/daisy/15029936576_8d6f96c72c_n.jpg
inflating: flowers/daisy/15100730728_a450c5f422_n.jpg
inflating: flowers/daisy/15207766_fc2f1d692c_n.jpg
inflating: flowers/daisy/15306268004_4680ba95e1.jpg
inflating: flowers/daisy/153210866_03cc9f2f36.jpg
inflating: flowers/daisy/15327813273_06cdf42210.jpg

inflating: flowers/daisy/15813862117_dedcd1c56f_m.jpg
inflating: flowers/daisy/15853110333_229c439e7f.jpg
inflating: flowers/daisy/158869618_fla6704236_n.jpg
inflating: flowers/daisy/16020253176_60f2a6a5ca_n.jpg
inflating: flowers/daisy/16025261368_911703a536_n.jpg
inflating: flowers/daisy/16056178001_bebc2153fe_n.jpg
inflating: flowers/daisy/16121105382_b96251e506_m.jpg
inflating: flowers/daisy/16161045294_70c76ce846_n.jpg
inflating: flowers/daisy/162362896_99c7d851c8_n.jpg
inflating: flowers/daisy/162362897_1d21b70621_m.jpg
inflating: flowers/daisy/16291797949_alb1b7c2bd_n.jpg
inflating: flowers/daisy/16323838000_3818bce5c6_n.jpg
inflating: flowers/daisy/16360180712_b72695928c_n.jpg
inflating: flowers/daisy/163978992_8128b49d3e_n.jpg
inflating: flowers/daisy/16401288243_36112bd52f_m.jpg
inflating: flowers/daisy/16482676953_5296227d40_n.jpg
inflating: flowers/daisy/16492248512_61a57dfec1_m.jpg
inflating: flowers/daisy/16527403771_2391f137c4_n.jpg
inflating: flowers/daisy/16577886423_9b23622f1d_n.jpg
inflating: flowers/daisy/16737503507_431768a927.jpg
inflating: flowers/daisy/16819071290_471d99e166_m.jpg
inflating: flowers/daisy/16833748795_b681b2839f_n.jpg
inflating: flowers/daisy/169371301_d9b91a2a42.jpg
inflating: flowers/daisy/17027891179_3edc08f4f6.jpg
inflating: flowers/daisy/17101762155_2577a28395.jpg
inflating: flowers/daisy/171972704_389cf7a953.jpg
inflating: flowers/daisy/17249393016_093e915012_n.jpg
inflating: flowers/daisy/172882635_4cc7b86731_m.jpg
inflating: flowers/daisy/17357636476_1953c07aa4_n.jpg
inflating: flowers/daisy/174131220_c853df1287.jpg
inflating: flowers/daisy/175106495_53ebdef092_n.jpg
inflating: flowers/daisy/176375506_201859bb92_m.jpg
inflating: flowers/daisy/17821980772_35164ae1e8_n.jpg
inflating: flowers/daisy/18023717391_e2c9089e10.jpg
inflating: flowers/daisy/181007802_7cab5ee78e_n.jpg
inflating: flowers/daisy/18195689904_46619b7e16_n.jpg
inflating: flowers/daisy/18203367608_07a04e98a4_n.jpg
inflating: flowers/daisy/18354545086_693ea7bc2a.jpg
inflating: flowers/daisy/18400014056_2e4c601ed5.jpg
inflating: flowers/daisy/18442919723_d1251d3e14_n.jpg
inflating: flowers/daisy/18474740346_ffdaa18032.jpg
inflating: flowers/daisy/18582579815_4c6637e9ff_m.jpg
inflating: flowers/daisy/18622672908_eab6dc9140_n.jpg

inflating: flowers/rose/17040847367_b54d05bf52.jpg
inflating: flowers/rose/17062080069_36ac7907d2_n.jpg
inflating: flowers/rose/17090993740_ffc8b60b81.jpg
inflating: flowers/rose/17104364030_ee31ee279b_n.jpg
inflating: flowers/rose/17105684129_e2cb69ea24_n.jpg
inflating: flowers/rose/17158274118_00ec99a23c.jpg
inflating: flowers/rose/17165596357_392a12391f.jpg
inflating: flowers/rose/172311368_49412f881b.jpg
inflating: flowers/rose/17291451621_0e39f08b9e_n.jpg
inflating: flowers/rose/17291930305_79deae6a90_n.jpg
inflating: flowers/rose/17302463621_d82bell1f01_n.jpg
inflating: flowers/rose/17305246720_1866d6303b.jpg
inflating: flowers/rose/174109630_3c544b8a2f.jpg
inflating: flowers/rose/17449165090_dfb27af360_n.jpg
inflating: flowers/rose/17554868955_35f48516cd_m.jpg
inflating: flowers/rose/1756973583_4aac7df00d_m.jpg
inflating: flowers/rose/1757822526_fe30b9b3ca_m.jpg
inflating: flowers/rose/1775233884_12ff5a124f.jpg
inflating: flowers/rose/17867791274_25bb3f8a41_n.jpg
inflating: flowers/rose/17869810353_c0d9902bc3_n.jpg
inflating: flowers/rose/17869839663_1445f1efd0_n.jpg
inflating: flowers/rose/17869846573_d6c9c39843_n.jpg

inflating: flowers/rose/1788484468_f73afa6c32_n.jpg
inflating: flowers/rose/1793211631_68c31a74dc.jpg
inflating: flowers/rose/17953368844_be3d18cf30_m.jpg
inflating: flowers/rose/17990320484_93bba345d2_m.jpg
inflating: flowers/rose/1801614110_bb9fa46830.jpg
inflating: flowers/rose/180613732_3a7aba0b80_n.jpg
inflating: flowers/rose/1813435848_7852708394_n.jpg
inflating: flowers/rose/18220342690_f1c20134bd.jpg
inflating: flowers/rose/18302672248_38fe0f70af_n.jpg
inflating: flowers/rose/18302691898_9dc45afae8_n.jpg
inflating: flowers/rose/18302701228_2b5790b199_n.jpg
inflating: flowers/rose/18302780950_9469703544_n.jpg
inflating: flowers/rose/18302793940_8fcc8b4661_n.jpg
inflating: flowers/rose/18302796110_02ef47cd43_n.jpg
inflating: flowers/rose/18302801780_50f9a04639_n.jpg
inflating: flowers/rose/18304294599_2b0b604a8d_n.jpg
inflating: flowers/rose/1831404161_d2df86fd70.jpg
inflating: flowers/rose/18376177250_86060cbdc9.jpg
inflating: flowers/rose/18464052396_6327841e65_n.jpg
inflating: flowers/rose/18464055536_709c8af0b7_n.jpg
inflating: flowers/rose/18464065816_88f194a890_n.jpg

inflating: flowers/sunflower/10306322_73_410c010799_m.jpg
inflating: flowers/sunflower/10386525005_fd0b7d6c55_n.jpg
inflating: flowers/sunflower/10386525695_2c38fea555_n.jpg
inflating: flowers/sunflower/10386540106_1431e73086_m.jpg
inflating: flowers/sunflower/10386540696_0a95ee53a8_n.jpg
inflating: flowers/sunflower/10386702973_e74a34c806_n.jpg
inflating: flowers/sunflower/1043442695_4556c4c13d_n.jpg
inflating: flowers/sunflower/1044296388_912143e1d4.jpg
inflating: flowers/sunflower/10541580714_ff6b171abd_n.jpg
inflating: flowers/sunflower/1064662314_c5a7891b9f_m.jpg
inflating: flowers/sunflower/10862313945_e8ed9202d9_m.jpg
inflating: flowers/sunflower/11881770944_22b4f2f8f6_n.jpg
inflating: flowers/sunflower/1217254584_4b3028b93d.jpg
inflating: flowers/sunflower/12282924083_fb80aa17d4_n.jpg
inflating: flowers/sunflower/12323859023_447387dbf0_n.jpg
inflating: flowers/sunflower/1240624822_4111dde542.jpg
inflating: flowers/sunflower/1240625276_fb3bd0c7b1.jpg
inflating: flowers/sunflower/1240626292_52cd5d7fb1_m.jpg
inflating: flowers/sunflower/1244774242_25a20d99a9.jpg
inflating: flowers/sunflower/12471290635_1f9e3aae16_n.jpg
inflating: flowers/sunflower/12471441503_d188b5f31a_m.jpg
inflating: flowers/sunflower/12471443383_b71e7a7480_m.jpg
inflating: flowers/sunflower/12471791574_bb1be83df4.jpg
inflating: flowers/sunflower/1267876087_alb3c63dc9.jpg
inflating: flowers/sunflower/127192624_afa3d9cb84.jpg
inflating: flowers/sunflower/1297092593_e573c0a3d6.jpg
inflating: flowers/sunflower/13095941995_9a66faa713_n.jpg
inflating: flowers/sunflower/13096076565_72c2c60875_n.jpg
inflating: flowers/sunflower/13117907313_86c99c6441.jpg
inflating: flowers/sunflower/1314584013_fe935fdeb1_n.jpg
inflating: flowers/sunflower/13568621944_d575324b8c_n.jpg
inflating: flowers/sunflower/13648603305_1268eda8b7_n.jpg
inflating: flowers/sunflower/1379256773_bb2eb0d95b_n.jpg
inflating: flowers/sunflower/13959937305_2f5c532886_n.jpg
inflating: flowers/sunflower/14121915990_4b76718077_m.jpg
inflating: flowers/sunflower/14144522269_bc20029375_m.jpg
inflating: flowers/sunflower/1419608016_707b887337_n.jpg
inflating: flowers/sunflower/14244273988_a7484f18b7_m.jpg
inflating: flowers/sunflower/14244410747_22691ece4a_n.jpg
inflating: flowers/sunflower/14266917699_91b207888e.jpg

inflating: flowers/sunflower/14348961225_09bd803317_n.jpg
inflating: flowers/sunflower/14397276020_49f9423614.jpg
inflating: flowers/sunflower/14460075029_5cd715bb72_m.jpg
inflating: flowers/sunflower/14460081668_eda8795693_m.jpg

inflating: flowers/tulip/13997627965_22d81601ce_n.jpg
inflating: flowers/tulip/13997641965_80d5dab542_n.jpg
inflating: flowers/tulip/13999392173_b1411f8b23_n.jpg
inflating: flowers/tulip/13999402743_f563f6b685_n.jpg
inflating: flowers/tulip/14009216519_b608321cf2_n.jpg
inflating: flowers/tulip/14014595475_5892fcda51_n.jpg
inflating: flowers/tulip/14015957646_8317a0f1d9_n.jpg
inflating: flowers/tulip/14017640283_c417141832_n.jpg
inflating: flowers/tulip/14022473102_3b24ca08cb_m.jpg
inflating: flowers/tulip/14024864234_713158c27f_n.jpg
inflating: flowers/tulip/14025589299_eac64c51af_m.jpg
inflating: flowers/tulip/14026857634_500d7b41d6_m.jpg
inflating: flowers/tulip/14027372499_30f934d24f_m.jpg
inflating: flowers/tulip/14039129738_cc3ac0a623_n.jpg
inflating: flowers/tulip/14039130008_f4b2807607_n.jpg
inflating: flowers/tulip/14044685976_0064faed21.jpg
inflating: flowers/tulip/14046760909_0c73e84a1f_n.jpg
inflating: flowers/tulip/14053292975_fdc1093571_n.jpg
inflating: flowers/tulip/14054827092_f359f5fcdb_m.jpg
inflating: flowers/tulip/14054827391_139fb54432.jpg
inflating: flowers/tulip/14055533888_f8e66b5693_n.jpg
inflating: flowers/tulip/14055538059_b826e0ac2b_n.jpg
inflating: flowers/tulip/14055574740_bb6a11e983_n.jpg
inflating: flowers/tulip/14055601247_2e647ba9b0_n.jpg
inflating: flowers/tulip/14057246122_8598b665bd.jpg
inflating: flowers/tulip/14061132852_89122de5f9_n.jpg
inflating: flowers/tulip/14064731501_ea14b58161.jpg
inflating: flowers/tulip/14064735842_a946fba1ef_n.jpg
inflating: flowers/tulip/14066056226_d8564a083e_m.jpg
inflating: flowers/tulip/14067456066_87e15792d0.jpg
inflating: flowers/tulip/14067476586_36bcdff111.jpg
inflating: flowers/tulip/14067761295_7cfe6a42e9.jpg
inflating: flowers/tulip/14067778605_0285b7cc3a.jpg
inflating: flowers/tulip/14068200854_5c13668df9_m.jpg
inflating: flowers/tulip/14068295074_cd8b85bffa.jpg
inflating: flowers/tulip/14068348874_7b36c99f6a.jpg
inflating: flowers/tulip/14068378204_7b26baa30d_n.jpg
inflating: flowers/tulip/14069837979_5f2d5fec55_n.jpg
inflating: flowers/tulip/14069838099_53d9dlf4af_n.jpg
inflating: flowers/tulip/14069838529_152b5f559d_n.jpg
inflating: flowers/tulip/14069839199_1e3fb92b92_n.jpg
inflating: flowers/tulip/14069841138_e2b403f44f_n.jpg
inflating: flowers/tulip/14069841698_a5dff9cfd2_n.jpg
inflating: flowers/tulip/14069841878_f3ac9d788d_n.jpg
inflating: flowers/tulip/14069841968_fdc9c1d3a4_n.jpg

Image augmentation

```
In [ ]:
```

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

```
In [ ]:
```

```
train_data_aug = ImageDataGenerator(rescale=1./255, zoom_range=0.2, horizontal_flip=True)
```

```
In [ ]:
```

```
test_data_aug = ImageDataGenerator(rescale=1./255)
```

```
In [ ]:
```

```
xtrain = train_data_aug.flow_from_directory('/content/flowers', target_size=(64,64), class_mode='categorical', batch_size=100)
```

Found 4317 images belonging to 5 classes.

```
In [ ]:
```

```
xtest = test_data_aug.flow_from_directory('/content/flowers', target_size=(64,64), class_mode='categorical', batch_size=100)
```

Found 4317 images belonging to 5 classes.

Create Model

```
In [ ]:
```

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

Add Layers (Convolution, Max-Pooling, Flatten, Dense-(Hidden Layers), Output)

```
In [ ]:
```

```
model = Sequential()
model.add(Convolution2D(32, (3,3), activation='relu', input_shape=(64,64,3))) # Convolution layer
model.add(MaxPooling2D(pool_size=(2,2))) # Max pooling layer
model.add(Flatten()) # Flatten layer
# Fully connected layers (ANN)
model.add(Dense(300, activation='relu')) # Hidden layer 1
model.add(Dense(150, activation='relu')) # Hidden layer 2
model.add(Dense(5, activation='softmax')) # Output layer
```

Compile the Model

Compile the Model

```
In [ ]:
```

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

Fit the Model

```
In [ ]:
```

```
model.fit_generator(xtrain,
                    steps_per_epoch=len(xtrain),
                    epochs=10,
                    validation_data=xtest,
                    validation_steps=len(xtest))
```

```
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:5: UserWarning: `Model.fit_generator` is deprecated and will be removed in a future version. Please use `Model.fit`, which supports generators.
"""
```

```
Epoch 1/10
44/44 [=====] - 31s 501ms/step - loss: 1.5369 - accuracy: 0.3915
- val_loss: 1.3281 - val_accuracy: 0.4679
Epoch 2/10
44/44 [=====] - 22s 404ms/step - loss: 1.1927 - accuracy: 0.5444
```

```

44/44 [=====] - 31s 50ms/step - loss: 1.5369 - accuracy: 0.5919
- val_loss: 1.3281 - val_accuracy: 0.4679
Epoch 2/10
44/44 [=====] - 22s 494ms/step - loss: 1.1227 - accuracy: 0.5444
- val_loss: 1.1099 - val_accuracy: 0.5499
Epoch 3/10
44/44 [=====] - 22s 495ms/step - loss: 1.0530 - accuracy: 0.5907
- val_loss: 1.0295 - val_accuracy: 0.6057
Epoch 4/10
44/44 [=====] - 22s 495ms/step - loss: 0.9748 - accuracy: 0.6196
- val_loss: 0.9975 - val_accuracy: 0.6152
Epoch 5/10
44/44 [=====] - 22s 495ms/step - loss: 0.9246 - accuracy: 0.6407
- val_loss: 0.9888 - val_accuracy: 0.6187
Epoch 6/10
44/44 [=====] - 22s 495ms/step - loss: 0.9044 - accuracy: 0.6484
- val_loss: 0.8260 - val_accuracy: 0.6921
Epoch 7/10
44/44 [=====] - 23s 527ms/step - loss: 0.8398 - accuracy: 0.6822
- val_loss: 0.8739 - val_accuracy: 0.6699
Epoch 8/10
44/44 [=====] - 22s 495ms/step - loss: 0.8336 - accuracy: 0.6801
- val_loss: 0.8701 - val_accuracy: 0.6792
Epoch 9/10
44/44 [=====] - 21s 492ms/step - loss: 0.7707 - accuracy: 0.7088
- val_loss: 0.7902 - val_accuracy: 0.7023
Epoch 10/10
44/44 [=====] - 22s 496ms/step - loss: 0.7446 - accuracy: 0.7206
- val_loss: 0.8924 - val_accuracy: 0.6611

```

Out[]:

<keras.callbacks.History at 0x7fc678b91510>

Save the Model

In []:

```
model.save('/content/flowers')
```

WARNING:absl:Found untraced functions such as _jit_compiled_convolution_op while saving (showing 1 of 1). These functions will not be directly callable after loading.

Test the Model

Test the Model

In []:

```
import numpy as np
```

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

In []:

```
img = image.load_img('/content/flowers/tulip/8712282563_3819afb7bc.jpg', target_size=(64, 64))
```

In []:

```
img
```

Out[]:



In []:

```
x = image.img_to_array(img)
x
```

Out[]:

```
array([[ 54.,  72.,  34.],
       [ 82.,  73.,  78.],
       [ 63.,  40.,  34.],
       ...,
       [ 63.,  76.,  69.],
       [ 93.,  84.,  75.],
       [ 97.,  64.,  45.],
       ...,
       [ 73.,  76.,  55.],
       [100., 100., 100.],
       [ 91.,  81.,  80.],
       ...,
       [ 50.,  81.,  47.]])
```

```

[[ 51.,  81.,  47.],
[184., 117., 171.],
[160.,  85., 126.]],

[[ 79.,  75.,  72.],
[ 89.,  89.,  87.],
[ 84.,  65.,  61.],
...,
[106.,  84.,  73.],
[195., 105., 167.],
[187., 103., 165.]],

...,

[[ 45.,  82.,  64.],
[ 51.,  91.,  65.],
[ 56.,  65.,  62.],
...,
[ 40.,  81.,  13.],
[ 53.,  93.,  30.],
[ 68., 104.,  76.]],

[[ 48.,  87.,  69.],
[ 48.,  94.,  57.],
[ 68.,  67.,  72.],
...,
[ 36.,  82.,  18.],
[ 52.,  94.,  30.],
[ 74., 112.,  65.]],

[[ 51.,  88.,  71.],
[ 46.,  89.,  44.],
[ 86.,  91.,  94.],
...,
[ 40.,  84.,  25.],
[ 47.,  93.,  31.],

[ 67., 108.,  50.]]], dtype=float32)

```

In []:

```
x = np.expand_dims(x,axis=0)
```

In []:

```
x = np.expand_dims(x,axis=0)
x
```

Out[]:

```

array([[[[ 54.,  72.,  34.],
[ 82.,  73.,  78.],
[ 63.,  40.,  34.],
...,
[ 63.,  76.,  69.],
[ 93.,  84.,  75.],
[ 97.,  64.,  45.]],

[[ 73.,  76.,  55.],
[100., 100., 100.],
[ 91.,  81.,  80.],
...,
[ 50.,  81.,  47.],
[184., 117., 171.],
[160.,  85., 126.]],

[[ 79.,  75.,  72.],
[ 89.,  89.,  87.],
[ 84.,  65.,  61.],
...,
[106.,  84.,  73.],
[195., 105., 167.],
[187., 103., 165.]],

...,

[[ 45.,  82.,  64.],
[ 51.,  91.,  65.],
[ 56.,  65.,  62.],
...,
[ 40.,  81.,  13.],
[ 53.,  93.,  30.],
[ 68., 104.,  76.]],

[[ 48.,  87.,  69.],
[ 48.,  94.,  57.],
[ 68.,  67.,  72.],
...,
[ 36.,  82.,  18.],

```

```
...,
[ 36., 82., 18.],
[ 52., 94., 30.],
[ 74., 112., 65.]],

[[ 51., 88., 71.],
[ 46., 89., 44.],
[ 86., 91., 94.],
...,
[ 40., 84., 25.],
[ 47., 93., 31.],
[ 67., 108., 50.]]], dtype=float32)
```

In []:

```
model.predict(x)
```

1/1 [=====] - 0s 91ms/step

Out[]:

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

In []:

```
xtrain.class_indices
```

Out[]:

```
{'daisy': 0, 'dandelion': 1, 'rose': 2, 'sunflower': 3, 'tulip': 4}
```

In []:

```
op = ['daisy','dandelion','rose','sunflower','tulip']
pred = np.argmax(model.predict(x))
op[pred]
```

1/1 [=====] - 0s 18ms/step

Out[]:

```
'tulip'
```

In []:

In []:

```
img = image.load_img('/content/flowers/tulip/8712282563_3819afb7bc.jpg',target_size=(64,64))
x = image.img_to_array(img)
x = np.expand_dims(x,axis=0)
pred = np.argmax(model.predict(x))
op[pred]
```

1/1 [=====] - 0s 15ms/step

Out[]:

```
'tulip'
```