{

"cells": [

{

"cell\_type": "markdown",

"source": [],

"metadata": {

"id": "WH5deNkL0qcV"

},

"id": "WH5deNkL0qcV"

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "459862a7",

"metadata": {

"id": "459862a7"

},

"outputs": [],

"source": [

"from tensorflow.keras.models import Sequential\n",

"from tensorflow.keras.layers import Dense"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "9e544b88",

"metadata": {

"id": "9e544b88"

},

"outputs": [],

"source": [

"from tensorflow.keras.layers import Convolution2D\n",

"from tensorflow.keras.layers import MaxPooling2D\n",

"from tensorflow.keras.layers import Flatten"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "9f002c78",

"metadata": {

"id": "9f002c78"

},

"outputs": [],

"source": [

"from tensorflow.keras.preprocessing.image import ImageDataGenerator"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "30c41e3e",

"metadata": {

"id": "30c41e3e"

},

"outputs": [],

"source": [

"train\_datagen = ImageDataGenerator(rescale=1./255,shear\_range=0.2,zoom\_range=0.2,horizontal\_flip=True,vertical\_flip=True)"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "e79891cc",

"metadata": {

"id": "e79891cc"

},

"outputs": [],

"source": [

"test\_datagen = ImageDataGenerator(rescale=1./255)"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "457c5512",

"metadata": {

"id": "457c5512",

"outputId": "bca973cf-2afa-4bdf-c21d-b8946aa29745"

},

"outputs": [

{

"name": "stdout",

"output\_type": "stream",

"text": [

"Found 4317 images belonging to 5 classes.\n"

]

}

],

"source": [

"x\_train = train\_datagen.flow\_from\_directory(r\"D:\\Dataset\\flowers\\Training\",target\_size=(64,64),batch\_size=32,class\_mode=\"categorical\")"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "fc70422c",

"metadata": {

"id": "fc70422c",

"outputId": "4d59cbc1-e3cc-42ef-cc29-b54b1dbdf6e8"

},

"outputs": [

{

"name": "stdout",

"output\_type": "stream",

"text": [

"Found 4317 images belonging to 5 classes.\n"

]

}

],

"source": [

"x\_test = test\_datagen.flow\_from\_directory(r\"D:\\Dataset\\flowers\\Testing\",target\_size=(64,64),batch\_size=32,class\_mode = \"categorical\")"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "4da409a8",

"metadata": {

"id": "4da409a8",

"outputId": "657070fe-e76e-4047-b2d6-861a840d7128"

},

"outputs": [

{

"data": {

"text/plain": [

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

]

},

"execution\_count": 9,

"metadata": {},

"output\_type": "execute\_result"

}

],

"source": [

"x\_train.class\_indices"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "cf04f844",

"metadata": {

"id": "cf04f844"

},

"outputs": [],

"source": [

"model = Sequential()"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "13f7797e",

"metadata": {

"id": "13f7797e"

},

"outputs": [],

"source": [

"model.add(Convolution2D(32,(3,3),input\_shape=(64,64,3),activation='relu'))"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "581dc27f",

"metadata": {

"id": "581dc27f"

},

"outputs": [],

"source": [

"model.add(MaxPooling2D(pool\_size=(2,2)))"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "65d53415",

"metadata": {

"id": "65d53415"

},

"outputs": [],

"source": [

"model.add(Flatten())"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "254a3a31",

"metadata": {

"id": "254a3a31"

},

"outputs": [],

"source": [

"model.add(Dense(units=300,kernel\_initializer=\"random\_uniform\",activation=\"relu\"))"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "06055db3",

"metadata": {

"id": "06055db3"

},

"outputs": [],

"source": [

"model.add(Dense(units=200,kernel\_initializer=\"random\_uniform\",activation=\"relu\"))"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "0c601b22",

"metadata": {

"id": "0c601b22"

},

"outputs": [],

"source": [

"model.add(Dense(units=5,kernel\_initializer=\"random\_uniform\",activation=\"softmax\"))"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "250fad0b",

"metadata": {

"id": "250fad0b"

},

"outputs": [],

"source": [

"model.compile(loss=\"categorical\_crossentropy\",optimizer=\"adam\",metrics=[\"accuracy\"])"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "ca2dcb1d",

"metadata": {

"id": "ca2dcb1d",

"outputId": "641703cc-d918-4584-d3d8-9d57f91262fc"

},

"outputs": [

{

"name": "stderr",

"output\_type": "stream",

"text": [

"C:\\Users\\S.V.D.H.E.N.P\\AppData\\Local\\Temp\\ipykernel\_91844\\3505885595.py:1: UserWarning: `Model.fit\_generator` is deprecated and will be removed in a future version. Please use `Model.fit`, which supports generators.\n",

" model.fit\_generator(x\_train,steps\_per\_epoch=39,epochs=25,validation\_data=x\_test,validation\_steps=10)\n"

]

},

{

"name": "stdout",

"output\_type": "stream",

"text": [

"Epoch 1/25\n",

"39/39 [==============================] - 41s 772ms/step - loss: 1.4446 - accuracy: 0.3438 - val\_loss: 1.4007 - val\_accuracy: 0.4125\n",

"Epoch 2/25\n",

"39/39 [==============================] - 25s 649ms/step - loss: 1.2575 - accuracy: 0.4426 - val\_loss: 1.2572 - val\_accuracy: 0.4500\n",

"Epoch 3/25\n",

"39/39 [==============================] - 23s 582ms/step - loss: 1.2013 - accuracy: 0.4867 - val\_loss: 1.1840 - val\_accuracy: 0.5094\n",

"Epoch 4/25\n",

"39/39 [==============================] - 21s 527ms/step - loss: 1.0973 - accuracy: 0.5361 - val\_loss: 1.2075 - val\_accuracy: 0.4906\n",

"Epoch 5/25\n",

"39/39 [==============================] - 19s 491ms/step - loss: 1.0953 - accuracy: 0.5296 - val\_loss: 1.0235 - val\_accuracy: 0.5938\n",

"Epoch 6/25\n",

"39/39 [==============================] - 19s 481ms/step - loss: 1.0592 - accuracy: 0.5873 - val\_loss: 1.0561 - val\_accuracy: 0.5625\n",

"Epoch 7/25\n",

"39/39 [==============================] - 16s 416ms/step - loss: 1.0648 - accuracy: 0.5743 - val\_loss: 1.2361 - val\_accuracy: 0.5500\n",

"Epoch 8/25\n",

"39/39 [==============================] - 17s 439ms/step - loss: 1.0192 - accuracy: 0.6026 - val\_loss: 1.0726 - val\_accuracy: 0.5688\n",

"Epoch 9/25\n",

"39/39 [==============================] - 17s 429ms/step - loss: 1.0565 - accuracy: 0.5817 - val\_loss: 1.1160 - val\_accuracy: 0.5312\n",

"Epoch 10/25\n",

"39/39 [==============================] - 16s 412ms/step - loss: 0.9856 - accuracy: 0.6082 - val\_loss: 1.2276 - val\_accuracy: 0.4969\n",

"Epoch 11/25\n",

"39/39 [==============================] - 16s 406ms/step - loss: 0.9817 - accuracy: 0.5968 - val\_loss: 1.0653 - val\_accuracy: 0.6000\n",

"Epoch 12/25\n",

"39/39 [==============================] - 16s 408ms/step - loss: 0.9348 - accuracy: 0.6514 - val\_loss: 0.9196 - val\_accuracy: 0.6313\n",

"Epoch 13/25\n",

"39/39 [==============================] - 15s 390ms/step - loss: 0.8876 - accuracy: 0.6474 - val\_loss: 0.8719 - val\_accuracy: 0.6750\n",

"Epoch 14/25\n",

"39/39 [==============================] - 15s 389ms/step - loss: 0.9038 - accuracy: 0.6450 - val\_loss: 0.9047 - val\_accuracy: 0.6562\n",

"Epoch 15/25\n",

"39/39 [==============================] - 16s 398ms/step - loss: 0.9064 - accuracy: 0.6434 - val\_loss: 0.7802 - val\_accuracy: 0.6969\n",

"Epoch 16/25\n",

"39/39 [==============================] - 15s 387ms/step - loss: 0.8594 - accuracy: 0.6827 - val\_loss: 0.9983 - val\_accuracy: 0.6219\n",

"Epoch 17/25\n",

"39/39 [==============================] - 14s 369ms/step - loss: 0.9175 - accuracy: 0.6530 - val\_loss: 1.0273 - val\_accuracy: 0.6062\n",

"Epoch 18/25\n",

"39/39 [==============================] - 14s 368ms/step - loss: 0.8942 - accuracy: 0.6635 - val\_loss: 0.8612 - val\_accuracy: 0.6719\n",

"Epoch 19/25\n",

"39/39 [==============================] - 15s 374ms/step - loss: 0.8763 - accuracy: 0.6731 - val\_loss: 0.7874 - val\_accuracy: 0.7031\n",

"Epoch 20/25\n",

"39/39 [==============================] - 14s 363ms/step - loss: 0.8364 - accuracy: 0.6956 - val\_loss: 0.8431 - val\_accuracy: 0.6469\n",

"Epoch 21/25\n",

"39/39 [==============================] - 15s 371ms/step - loss: 0.8235 - accuracy: 0.6899 - val\_loss: 0.9080 - val\_accuracy: 0.6375\n",

"Epoch 22/25\n",

"39/39 [==============================] - 14s 364ms/step - loss: 0.8146 - accuracy: 0.6867 - val\_loss: 0.7422 - val\_accuracy: 0.7000\n",

"Epoch 23/25\n",

"39/39 [==============================] - 15s 373ms/step - loss: 0.8174 - accuracy: 0.6972 - val\_loss: 0.7344 - val\_accuracy: 0.7188\n",

"Epoch 24/25\n",

"39/39 [==============================] - 14s 359ms/step - loss: 0.8173 - accuracy: 0.6835 - val\_loss: 0.8216 - val\_accuracy: 0.6438\n",

"Epoch 25/25\n",

"39/39 [==============================] - 14s 360ms/step - loss: 0.7858 - accuracy: 0.7100 - val\_loss: 0.8219 - val\_accuracy: 0.6750\n"

]

},

{

"data": {

"text/plain": [

"<keras.callbacks.History at 0x188ae9f4d00>"

]

},

"execution\_count": 23,

"metadata": {},

"output\_type": "execute\_result"

}

],

"source": [

"model.fit\_generator(x\_train,steps\_per\_epoch=39,epochs=25,validation\_data=x\_test,validation\_steps=10)"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "f8e2caf3",

"metadata": {

"id": "f8e2caf3"

},

"outputs": [],

"source": [

"model.save(\"Flowers.h5\")"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "4b3cfc68",

"metadata": {

"id": "4b3cfc68"

},

"outputs": [],

"source": [

"from tensorflow.keras.models import load\_model"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "b041d7cc",

"metadata": {

"id": "b041d7cc"

},

"outputs": [],

"source": [

"from tensorflow.keras.preprocessing import image"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "87ae9f82",

"metadata": {

"id": "87ae9f82"

},

"outputs": [],

"source": [

"import numpy as np"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "4ed7373a",

"metadata": {

"id": "4ed7373a"

},

"outputs": [],

"source": [

"model = load\_model(\"Flowers.h5\")"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "50e05b06",

"metadata": {

"id": "50e05b06"

},

"outputs": [],

"source": [

"img = image.load\_img(r\"C:\\Users\\S.V.D.H.E.N.P\\Pictures\\Saved Pictures\\Daisy.jpg\",target\_size=(64,64))"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "e52eb154",

"metadata": {

"id": "e52eb154",

"outputId": "448754cd-2609-473a-96f5-10d24089433c"

},

"outputs": [

{

"data": {

"image/png": "\n",

"text/plain": [

"<PIL.Image.Image image mode=RGB size=64x64 at 0x1E4A2EBEA60>"

]

},

"execution\_count": 6,

"metadata": {},

"output\_type": "execute\_result"

}

],

"source": [

"img"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "a912e68f",

"metadata": {

"id": "a912e68f",

"outputId": "89ba3bdf-aa0d-4e59-8e5b-5d7267586a60"

},

"outputs": [

{

"data": {

"text/plain": [

"PIL.Image.Image"

]

},

"execution\_count": 7,

"metadata": {},

"output\_type": "execute\_result"

}

],

"source": [

"type(img)"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "25628852",

"metadata": {

"id": "25628852"

},

"outputs": [],

"source": [

"x = image.img\_to\_array(img)"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "aeea8583",

"metadata": {

"id": "aeea8583",

"outputId": "ce84b91a-3d4c-4aa6-c090-da92bb5ee76b"

},

"outputs": [

{

"data": {

"text/plain": [

"array([[[0., 0., 0.],\n",

" [0., 0., 0.],\n",

" [0., 0., 0.],\n",

" ...,\n",

" [0., 0., 0.],\n",

" [0., 0., 0.],\n",

" [0., 0., 0.]],\n",

"\n",

" [[0., 0., 0.],\n",

" [0., 0., 0.],\n",

" [0., 0., 0.],\n",

" ...,\n",

" [0., 0., 0.],\n",

" [0., 0., 0.],\n",

" [0., 0., 0.]],\n",

"\n",

" [[0., 0., 0.],\n",

" [0., 0., 0.],\n",

" [0., 0., 0.],\n",

" ...,\n",

" [0., 0., 0.],\n",

" [0., 0., 0.],\n",

" [0., 0., 0.]],\n",

"\n",

" ...,\n",

"\n",

" [[0., 0., 0.],\n",

" [0., 0., 0.],\n",

" [1., 1., 1.],\n",

" ...,\n",

" [0., 0., 0.],\n",

" [0., 0., 0.],\n",

" [0., 0., 0.]],\n",

"\n",

" [[0., 0., 0.],\n",

" [0., 0., 0.],\n",

" [0., 0., 0.],\n",

" ...,\n",

" [0., 0., 0.],\n",

" [0., 0., 0.],\n",

" [0., 0., 0.]],\n",

"\n",

" [[1., 1., 1.],\n",

" [0., 0., 0.],\n",

" [0., 0., 0.],\n",

" ...,\n",

" [0., 0., 0.],\n",

" [0., 0., 0.],\n",

" [0., 0., 0.]]], dtype=float32)"

]

},

"execution\_count": 9,

"metadata": {},

"output\_type": "execute\_result"

}

],

"source": [

"x"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "38aab9d8",

"metadata": {

"id": "38aab9d8",

"outputId": "7e484701-b608-4331-f059-8643f62090fc"

},

"outputs": [

{

"data": {

"text/plain": [

"(64, 64, 3)"

]

},

"execution\_count": 10,

"metadata": {},

"output\_type": "execute\_result"

}

],

"source": [

"x.shape"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "93ff3a89",

"metadata": {

"id": "93ff3a89"

},

"outputs": [],

"source": [

"x = np.expand\_dims(x,axis=0)"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "b66d60dd",

"metadata": {

"id": "b66d60dd",

"outputId": "888f104f-bd10-40b8-8589-adbf31869a52"

},

"outputs": [

{

"data": {

"text/plain": [

"(1, 64, 64, 3)"

]

},

"execution\_count": 12,

"metadata": {},

"output\_type": "execute\_result"

}

],

"source": [

"x.shape"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "f6355cb8",

"metadata": {

"id": "f6355cb8",

"outputId": "0156ab3f-4f7b-467b-fe72-6d2f92c2420e"

},

"outputs": [

{

"name": "stdout",

"output\_type": "stream",

"text": [

"1/1 [==============================] - 0s 467ms/step\n"

]

}

],

"source": [

"pred\_prob = model.predict(x)"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "867bca61",

"metadata": {

"id": "867bca61",

"outputId": "658df2e1-ed41-4411-93ba-8d1bf426ab73"

},

"outputs": [

{

"data": {

"text/plain": [

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

]

},

"execution\_count": 14,

"metadata": {},

"output\_type": "execute\_result"

}

],

"source": [

"pred\_prob"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "bef49c67",

"metadata": {

"id": "bef49c67"

},

"outputs": [],

"source": [

"class\_name=[\"Daisy\",\"Dandelion\",\"Rose\",\"Sunflower\",\"Tulip\"]\n",

"pred\_id = pred\_prob.argmax(axis = 1)[0]"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "a5a24636",

"metadata": {

"id": "a5a24636",

"outputId": "b1810bd9-cce1-42ba-befc-3426f15c9bfe"

},

"outputs": [

{

"data": {

"text/plain": [

"0"

]

},

"execution\_count": 16,

"metadata": {},

"output\_type": "execute\_result"

}

],

"source": [

"pred\_id"

]

},

{

"cell\_type": "code",

"execution\_count": null,

"id": "8757c2a0",

"metadata": {

"id": "8757c2a0",

"outputId": "4e2cdb5d-5137-4174-c21b-eb6931c57062"

},

"outputs": [

{

"name": "stdout",

"output\_type": "stream",

"text": [

"Predicted Flower is Daisy\n"

]

}

],

"source": [

"print(\"Predicted Flower is \",str(class\_name[pred\_id]))"

]

}

],

"metadata": {

"kernelspec": {

"display\_name": "Python 3 (ipykernel)",

"language": "python",

"name": "python3"

},

"language\_info": {

"codemirror\_mode": {

"name": "ipython",

"version": 3

},

"file\_extension": ".py",

"mimetype": "text/x-python",

"name": "python",

"nbconvert\_exporter": "python",

"pygments\_lexer": "ipython3",

"version": "3.9.12"

},

"colab": {

"provenance": []

}

},

"nbformat": 4,

"nbformat\_minor": 5

}