

```
{
  "nbformat": 4,
  "nbformat_minor": 0,
  "metadata": {
    "colab": {
      "provenance": []
    },
    "kernelspec": {
      "name": "python3",
      "display_name": "Python 3"
    },
    "language_info": {
      "name": "python"
    }
  },
  "cells": [
    {
      "cell_type": "markdown",
      "source": [
        "## Assignment 3"
      ],
      "metadata": {
        "id": "ZhTkO_xJNZgz"
      }
    },
    {
      "cell_type": "markdown",
      "source": [
        "Load the Dataset"
      ],
      "metadata": {
```

```
    "id": "IXNu-ZihNmxJ"
  }
},
{
  "cell_type": "code",
  "execution_count": 1,
  "metadata": {
    "colab": {
      "base_uri": "https://localhost:8080/"
    },
    "id": "t1uZKj5bEwwQ",
    "outputId": "a59ef5bc-8a7b-4fef-c4b2-12cdb1c73481"
  },
  "outputs": [
    {
      "output_type": "stream",
      "name": "stdout",
      "text": [
        "\u001b[0m\u001b[01;34msample_data\u001b[0m/\n"
      ]
    }
  ],
  "source": [
    "ls\n"
  ]
},
{
  "cell_type": "code",
  "source": [
    "cd /content/drive/MyDrive/Colab Notebooks/CNN1"
  ],
```

```
"metadata": {
  "colab": {
    "base_uri": "https://localhost:8080/"
  },
  "id": "LHanloDoGrzY",
  "outputId": "d4b2fb1b-23bd-4850-ee47-ddca3e51e44a"
},
"execution_count": 2,
"outputs": [
  {
    "output_type": "stream",
    "name": "stdout",
    "text": [
      "[Errno 2] No such file or directory: '/content/drive/MyDrive/Colab Notebooks/CNN1'\n",
      "\n"
    ]
  }
],
{
  "cell_type": "code",
  "source": [
    "ls"
  ],
  "metadata": {
    "colab": {
      "base_uri": "https://localhost:8080/"
    },
    "id": "lyDGkn-kG6oA",
    "outputId": "7203bca4-5df6-400e-9c77-6c2633051a2e"
  },
}
```

```
"execution_count": 3,
"outputs": [
  {
    "output_type": "stream",
    "name": "stdout",
    "text": [
      "\u001b[0m\u001b[01;34msample_data\u001b[0m/\n"
    ]
  }
],
{
  "cell_type": "code",
  "source": [
    "pwd"
  ],
  "metadata": {
    "colab": {
      "base_uri": "https://localhost:8080/",
      "height": 36
    },
    "id": "YOyE9_5BG8S7",
    "outputId": "9c96e0fc-21c1-411c-8c20-a18b6fd81b59"
  },
  "execution_count": 4,
  "outputs": [
    {
      "output_type": "execute_result",
      "data": {
        "text/plain": [
          ""/content""
        ]
      }
    ]
  }
]
```

```

    ],
    "application/vnd.google.colaboratory.intrinsic+json": {
      "type": "string"
    }
  },
  "metadata": {},
  "execution_count": 4
}
]
},
{
  "cell_type": "code",
  "source": [
    "!unzip Flowers-Dataset.zip"
  ],
  "metadata": {
    "colab": {
      "base_uri": "https://localhost:8080/"
    },
    "id": "l4P1mFeUHFUN",
    "outputId": "ce354296-539c-4c9c-d8a8-6834a89ade91"
  },
  "execution_count": 5,
  "outputs": [
    {
      "output_type": "stream",
      "name": "stdout",
      "text": [
        "unzip: cannot find or open Flowers-Dataset.zip, Flowers-Dataset.zip.zip or Flowers-
        Dataset.zip.ZIP.\n"
      ]
    }
  ]
}

```

```

    }
  ]
},
{
  "cell_type": "markdown",
  "source": [
    "Image Augmentation"
  ],
  "metadata": {
    "id": "pF_AjEokNrd6"
  }
},
{
  "cell_type": "code",
  "source": [
    "from tensorflow.keras.preprocessing.image import ImageDataGenerator"
  ],
  "metadata": {
    "id": "M-iicHQ7HbUM"
  },
  "execution_count": 6,
  "outputs": []
},
{
  "cell_type": "code",
  "source": [
    "train_data = ImageDataGenerator(rescale= 1./255,horizontal_flip = True,vertical_flip =
True,zoom_range = 0.2)"
  ],
  "metadata": {
    "id": "LrpG4TOMI5V5"
  }
}

```

```

},
"execution_count": 7,
"outputs": []
},
{
"cell_type": "code",
"source": [
"test_data = ImageDataGenerator(rescale= 1./255)"
],
"metadata": {
"id": "UA_tym2xl-e0"
},
"execution_count": 8,
"outputs": []
},
{
"cell_type": "code",
"source": [
"x_train = train_data.flow_from_directory(r\"/content/drive/MyDrive/Colab
Notebooks/CNN1/flowers\",target_size = (64,64),\n",
"
class_mode = \"categorical\",batch_size = 40)"
],
"metadata": {
"colab": {
"base_uri": "https://localhost:8080/"
},
"id": "YlvIAQUVJEkc",
"outputId": "367a06b3-6605-4ceb-eb0c-38b626dc8f51"
},
"execution_count": null,
"outputs": [

```

```

{
  "output_type": "stream",
  "name": "stdout",
  "text": [
    "Found 4317 images belonging to 5 classes.\n"
  ]
}
],
{
  "cell_type": "code",
  "source": [
    "x_test = test_data.flow_from_directory(r\"/content/drive/MyDrive/Colab\nNotebooks/CNN1/flowers\",target_size = (64,64),\n",
    "                                     class_mode = \"categorical\",batch_size = 40)",
  ],
  "metadata": {
    "colab": {
      "base_uri": "https://localhost:8080/"
    },
    "id": "O-Nlu-P_M5nH",
    "outputId": "ce335c2c-363a-436c-d61c-7968eeca008"
  },
  "execution_count": null,
  "outputs": [
    {
      "output_type": "stream",
      "name": "stdout",
      "text": [
        "Found 4317 images belonging to 5 classes.\n"
      ]
    }
  ]
}

```



```
    }
  ]
},
{
  "cell_type": "markdown",
  "source": [
    "Creating CNN Model"
  ],
  "metadata": {
    "id": "2nmCuO7LN3X6"
  }
},
{
  "cell_type": "code",
  "source": [
    "from tensorflow.keras.models import Sequential\n",
    "from tensorflow.keras.layers import Convolution2D,MaxPooling2D,Flatten,Dense"
  ],
  "metadata": {
    "id": "2q6Z1dVINFvU"
  },
  "execution_count": 9,
  "outputs": []
},
{
  "cell_type": "code",
  "source": [
    "model = Sequential()"
  ],
  "metadata": {
    "id": "3m9wrrSGN-ql"
```

```
    },
    "execution_count": 10,
    "outputs": []
  },
  {
    "cell_type": "markdown",
    "source": [
      "Adding Layers"
    ],
    "metadata": {
      "id": "0-ZbChbCODbR"
    }
  },
  {
    "cell_type": "code",
    "source": [
      "model.add(Convolution2D(32,(3,3),activation = \"relu\",input_shape = (64,64,3)))"
    ],
    "metadata": {
      "id": "HyiAfTMnOCFI"
    },
    "execution_count": 11,
    "outputs": []
  },
  {
    "cell_type": "code",
    "source": [
      "model.add(MaxPooling2D(pool_size = (2,2)))"
    ],
    "metadata": {
      "id": "aNK9ADG7Psmh"
    }
  }
```

```
},
"execution_count": 12,
"outputs": []
},
{
"cell_type": "code",
"source": [
"model.add(Flatten())"
],
"metadata": {
"id": "-OZXxyf7P9zV"
},
"execution_count": 13,
"outputs": []
},
{
"cell_type": "code",
"source": [
"model.add(Dense(300, activation='relu'))"
],
"metadata": {
"id": "fn8xaafaQCmx"
},
"execution_count": 14,
"outputs": []
},
{
"cell_type": "code",
"source": [
"model.add(Dense(300, activation='relu'))"
],
```

```
"metadata": {
  "id": "Tv3NMFETQYwo"
},
"execution_count": 15,
"outputs": []
},
{
  "cell_type": "code",
  "source": [
    "model.add(Dense(5, activation=\"softmax\"))"
  ],
  "metadata": {
    "id": "1aqyKtr0Qak4"
  },
  "execution_count": 16,
  "outputs": []
},
{
  "cell_type": "markdown",
  "source": [
    "Compile the Model"
  ],
  "metadata": {
    "id": "-E8pQVHwdjBS"
  }
},
{
  "cell_type": "code",
  "source": [
    "model.compile(loss=\"categorical_crossentropy\", metrics=[\"accuracy\"], optimizer='adam')"
```

```
"metadata": {
  "id": "4Ytlphm3Q95a"
},
"execution_count": 17,
"outputs": []
},
{
  "cell_type": "code",
  "source": [
    "len(x_train)"
  ],
  "metadata": {
    "colab": {
      "base_uri": "https://localhost:8080/"
    },
    "id": "qImUDvL1RV0y",
    "outputId": "53a7cad5-5288-4e5b-8e80-75a2fd5c0f5e"
  },
  "execution_count": null,
  "outputs": [
    {
      "output_type": "execute_result",
      "data": {
        "text/plain": [
          "108"
        ]
      },
      "metadata": {},
      "execution_count": 24
    }
  ]
}
```

```

},
{
  "cell_type": "markdown",
  "source": [
    "Fit the Model"
  ],
  "metadata": {
    "id": "eytEyopbdm97"
  }
},
{
  "cell_type": "code",
  "source": [
    "model.fit(x_train, epochs = 5, validation_data=x_test, steps_per_epoch=len(x_train),
validation_steps=len(x_test))"
  ],
  "metadata": {
    "colab": {
      "base_uri": "https://localhost:8080/"
    },
    "id": "fmRZdzd4RbP7",
    "outputId": "ddc35e62-a02e-4fc5-cfc4-82ee857705d1"
  },
  "execution_count": null,
  "outputs": [
    {
      "output_type": "stream",
      "name": "stdout",
      "text": [
        "Epoch 1/5\n",
        "108/108 [=====] - 62s 578ms/step - loss: 1.0442 - accuracy:
0.5789 - val_loss: 1.0239 - val_accuracy: 0.5967\n",

```

```
"Epoch 2/5\n",
"108/108 [=====] - 60s 560ms/step - loss: 0.9752 - accuracy:
0.6101 - val_loss: 0.9477 - val_accuracy: 0.6319\n",
"Epoch 3/5\n",
"108/108 [=====] - 61s 569ms/step - loss: 0.9167 - accuracy:
0.6456 - val_loss: 0.8871 - val_accuracy: 0.6613\n",
"Epoch 4/5\n",
"108/108 [=====] - 61s 565ms/step - loss: 0.8663 - accuracy:
0.6704 - val_loss: 0.8931 - val_accuracy: 0.6595\n",
"Epoch 5/5\n",
"108/108 [=====] - 62s 577ms/step - loss: 0.8402 - accuracy:
0.6706 - val_loss: 0.9205 - val_accuracy: 0.6335\n"
]
},
{
  "output_type": "execute_result",
  "data": {
    "text/plain": [
      "<keras.callbacks.History at 0x7f0ecc3d9890>"
    ]
  },
  "metadata": {},
  "execution_count": 25
}
]
},
{
  "cell_type": "markdown",
  "source": [
    "Save the Model"
  ],
  "metadata": {
```

```
    "id": "Qmv_oD0LdrCo"
  }
},
{
  "cell_type": "code",
  "source": [
    "model.save(\"flower.h5\")"
  ],
  "metadata": {
    "id": "J1QhEn5iSMXx"
  },
  "execution_count": 18,
  "outputs": []
},
{
  "cell_type": "markdown",
  "source": [
    "Test the Model"
  ],
  "metadata": {
    "id": "MagSVFKjdt_W"
  }
},
{
  "cell_type": "code",
  "source": [
    "from tensorflow.keras.models import load_model\n",
    "from tensorflow.keras.preprocessing import image\n",
    "import numpy as np"
  ],
  "metadata": {
```



```
    "id": "8c1ET9KqUO8i"
  },
  "execution_count": 19,
  "outputs": []
},
{
  "cell_type": "code",
  "source": [
    " model = load_model(\"/content/drive/MyDrive/Colab Notebooks/CNN1/flower.h5\")"
  ],
  "metadata": {
    "id": "et9uzSWIUnVP"
  },
  "execution_count": null,
  "outputs": []
},
{
  "cell_type": "code",
  "source": [
    "img = image.load_img(\"/content/drive/MyDrive/Colab\nNotebooks/CNN1/flowers/rose/10090824183_d02c613f10_m.jpg\",target_size=(64,64))"
  ],
  "metadata": {
    "id": "EkgNz_RWVuDz"
  },
  "execution_count": null,
  "outputs": []
},
{
  "cell_type": "code",
  "source": [
```

```
"img"
],
"metadata": {
  "colab": {
    "base_uri": "https://localhost:8080/",
    "height": 81
  },
  "id": "mmucha8AWT5z",
  "outputId": "e78dbade-56f4-43fb-e3a5-0b63795a8d57"
},
"execution_count": null,
"outputs": [
  {
    "output_type": "execute_result",
    "data": {
      "text/plain": [
        "<PIL.Image.Image image mode=RGB size=64x64 at 0x7F0ECC0DFC90>"
      ],
      "image/png":
      "iVBORw0KGgoAAAANSUhEUgAAAAEAAAABACAIAAAAIc+aJAAAKMWIDQ1BJQ0MgUHJvZmlsZQAAeJy
      dIndUU9kWh8+9N71QkhCKINBraFICSA29SJEuKjEJEERaAAiNkRUcERRkaYIMijggKNDkbEiioUBUbHrBB
      IE1HFwFBuWSWStGd+8ee/Nm98f935rn73P3Wfvfda6AJD8gwXCTFgJgAyhWBTh58WljYtnYAcBDPAAA
      2wA4HCzs0IW+EYcmQJ82lxsmRP4F726DiD5+yrTP4zBAP+fILIZIjEAUJiM5/L42VwZF8k4PVecJbdPyZi2N
      E3OMErOllmCmlaTc/IsW3z2mWUPOfMyhDwZy3PO4mXw5Nwn4405Er6MkWAZF+cl+LkyviZjg3RJhk
      DGB+SxGXxONGAoktwu5nNTZGwtY5IoMolt43kA4EjJX/DSL1jMzxPLD8XOzFouEiSniBkmXFOGjZMTi+H
      Pz03ni8XMMA43jSPiMdiZGVkc4XIAZs/8WRR5bRmyljvYODk4MG0tbb4o1H9d/JuS93aWxoR/7hIEH/jD
      9ld+mQ0AsKZltdn6h21pFQBd6wFQu/2HzWAvAlqyvnuOfXEeunxeUsTiLGcrq9zcXEsBn2spl+jv+p8Of0
      NffM9Svt3v5WF485M4knQxQ143bmZ6pkTEyM7icPkM5p+H+B8H/nUeFhH8JL6IL5RFRMumTCBmlrV
      byBOIBZlChkD4n5r4D8P+pNm5lona+BHQllgCpSEaQH4eACgqESAJe2Qr0O99C8ZHA/nNi9GZmJ37z4L+
      fVe4TP7IFiR/jmNHRDK4EIHO7Jr8Wgl0IABFQAPqQBvoAxPABlbAEbgAD+ADAKeoiARxYDHggHsQAUQg
      FxSAtaAYlIKtYCeobnWgETSDNnAYdIFj4DQ4By6By2AE3AFSMA6egCnwCsxAEISyBAVUod0IEPIHLKFW
      JAB5AMFQxFAQHJQIUNCSAIVQOugUqgcqobqoWboW+godBq6AA1Dt6BRaBL6FXoHlZAJpsFasBFsBbN
      gTzgjJoQXwcnwMjgflOk3wJVwA3wQ7oRPw5fgEVgKP4GnEYAQETqiizARFsJGQPf4JAKRlauQEqQCaUD
      akB6kH7mKSJGnyFsUBkVFMVBmIAvKhXWF4qKWovAhNqOqUQdQnag+1FXUKGoK9RfNRmuizdHO6
      AB0LDoZnYsuRlegm9Ad6LPoEfQ4+hUGg6FjjDGOGH9MHCVswKzGbMb0445hRnGjGGmsVisOtYc64o
      NxXKwYmwxtgp7EHsSewU7jn2DI+J0cLY4X1w8TogrxFXgWnAncFdwE7gZvBLEO+MD8Xz8MvxZfhGfA
      9+CD+OnyEoE4wJroRIQiphLaGS0EY4S7hLeEEkEvWITsRwooc4hlhJPEQ8TxwlvivVRSGYkNimBJCftleOnn
      SLdlr0gk8IGZA9yPFIM3kJuJp8h3ye/UaAqWCoEKPAUVivUKHQqXFF4pohXNFT0VFysmK9YoXhEcUjxqR
```

JeyUiJrcRRWqVUo3RU6YbStDJV2UY5VDIDebNyi/IF5UcULMWI4kPhUYoo+yhnKGNUhKpPZVO51HXUR  
upZ6jgNQzOmBdBSaaW0b2iDtCkVioqdSrRKnkqNynEVKR2hG9ED6On0Mvph+nX6O1UtVU9Vvuom1T  
bVK6qv1eaoeajx1UrU2tVG1N6pM9R91NPUt6l3qd/TQGmYaYRr5Grs0Tir8XQObY7LHO6ckjmH59zWh  
DXNNCM0V2ju0xzQnNbS1vLTytKq0jqj9VSbru2hnaq9Q/uE9qQOVcdNR6CzQ+ekzmOGCsOTkc6oZPQx  
pnQ1df11Jbr1uoO6M3rGelF6hXrtevf0Cfos/ST9Hfq9+IMGOgYhBgUGrQa3DfGGLMMUw12G/YavjYyN  
Yow2GHUZPTJWMw4wzjduNb5rQjZxN1lm0mByzRRjyJNM91tetkMNRM3SzGrMRsyh80dzAXmu82HL  
dAWThZCiwaLG0wS05OZw2xlJlrSLYMTcy27LJ9ZGVjFW22z6rf6aG1vnW7daH3HhmlTaFNo02Pzq62ZLd  
e2xvbaXPJc37mr53bPFW5nbse322N3055qH2K/wb7X/oODo4PlOc1h0tHAMdGx1vEGi8YKY21mnXdcO  
3k5rXY65vTW2cFZ7HzY+RcXpkuaS4vLo3nG8/jzGueNueq5clzrXaVuDLdEt71uUnddd457g/sDD30Pnke  
Tx4SnqWeq50HPZ17WXiKvDq/XbGf2SvYpb8Tbz7vEe9CH4hPIU+1z31fPN9m31Xfkz95vhd8pf7R/kP82  
/xsBWgHcgOaAqUDHwJWBfUGkoAVB1UEPgS2CRcE9IXBIYmj2kLvZDecl53eFgtCA002h98KMw5aFfR+  
OCQ8Lrwl/GGETURDRv4C6YMmClgWvIr0iyyLvRJESaJ6oxWjE6Kbo1/HeMeUx0hjrWJXxl6K04gTxHXHY  
+Oj45vipxf6Lny5cDzBPqE44foi40V5iy4s1licvvj4EsUlnCVHETGJMYktie85oZwGzvTSgKW1S6e4bO4u7h  
OeB28Hb5LvYi/nTyS5JpUnPU2Td6ePjninIKR8ITAFILnqf6p9alvk4LTduf9ik9Jr09A5eRmHFUSBGmCfs  
ytTPzMoezzLOKs6TLnJftXDYlChl1ZUPZi7K7xTTZz9SAxESyXjKa45ZTk/MmNzr3SJ5ynjBvYLnZ8k3LJ/J987  
9egVrBXdfBoFuwtmB0pefk+IXQqqWrelfrY5aPb7Gb82BTys1aWt/KLQuLC98u55mXU+RVtGaorH1fut  
bixWKRcU3NrhsqNu12ijYOLhp7qaqTR9LeCUXS61LKOrfb+ZuvviVzVeVX33akrRIsMyhbmM9WzFbh1uvb3  
LcdKFcuzy8f2x6yvXMHY0fJpc7l+y8UGFXUbeLsEuyS1oZXNldZVC1tep9dUr1S1lXTXutZu2m2te7ebuv7  
PHY01anVVda926vYO/Ner/6zgajhop9mH05+x42Rjf2f836urlJo6m06cN+4X7pgYgDfc2Ozc0tmi1lrXCrp  
HXyYMLBy994f9Pdxmyrb6e3lx4ChySHHn+b+O31w0GHe4+wjrR9Z/hdbQe1o6QT6lzeOdWV0iXtjuseP  
hp4tLfHpfaje8vv9x/TPVZzXOV42QnCialTn07mn5w+IXXq6enk02O9S3rvnlk9c60vvG/wbNDZ8+d8z53p  
9+w/ed71/LELzheOXmRd7LrkcKlzwH6g4wf7HzoGHQY7hxyHui87Xe4Znjd84or7ldNXva+euxZw7dLI/JH  
h61HXB95luCG9ybv56Fb6ree3c27P3FlzF3235J7SvYr7mvcbfjT9sV3qID0+6j068GDBgtzj3LEnP2X/9H68  
6CH5YcWEzkTzI9tHxyZ9Jy8/Xvh4/EnWk5mnxT8r/1z7zOTZd794/DlWFTs1/lz0/NOvm1+ov9j/0u5l73TY  
9P1XGa9mXpe8UX9z4C3rbf+7mHcTM7nvse8rP5h+6PkY9PHup4xPn34D94Tz+6TMXDKAACLzSURBVHi  
cTbppuK5pVR641nqmd/jGPZ29zz6nqDqnThVVDFVFDASMSAkaxBijQsfl4NCXVwK2GYxJOoNgoibRS41  
Nd6uBTtsMJhJkuEgQNEEOAUGpAQqsgZrOulezh29/3/eOz7BWfuzK1fn3/nre51nTfa91LxxtuASSUglgi  
tVhE9iO4RKc0WiQBBRQBEQCnFnECgGNIyOHbKbKtSmgSIHnt67lNiYny+cJYc9m2jIAIAYRARlgrRI5CIM  
PPF229lZgJcLE8W88aHxnd9URQikQnMTxqtsrPnV3b3j4au2L96DAiQABG2bt+wGTGyQsTh2oCRAZkToI  
IYlZqL3We2X7ZiOiTPjprFGJTeUBQCgBBloklauZCjJmbW+tdWk7Wp8985SoyDKdZ1AkVaa1FBAC01mf  
Pnu26DgCYWWullGraRVmWi1k9m5147wEAFTGzQkKFHCG0LCDD8Yixt86REgrm+PD4BS88p4iZoYle20  
IDYulgiCKolCuGBpn2d24OR9ZanuRZNe+QNFKEAEaQgEgsAPmodAPHkDpps9LWi04p0IWpU2fQZc5pQ  
wAiCAB8PJspDZosInjfnRzP27YFOICESRAUnL5WKZWipMASZXN7tWpqjpJE2uizXDfzOvVYd8vMmkRML  
DoGns4qArlmpYCIncQssOWpFktPANZGI6Em6pqoSQAfypNBk0CKtdx7T0RIYp1Z9l1KYJ1aH6/MIkddW  
2eS1XWdlwUpJTbGSG1/Mp8vQZRwlIAECUSILUgxCKCiAl8Xpk0TbOoO0RtrUqgU0TlZPT8YCXbGexv5i  
bXK+dm+Bwe0QESqkIAIGape97aP2KLY5CD4DeR0OoNJAVQB0EylIRUKzOkYjQkxUbnATujVGjZ2iyyMEj  
mbKzbo4OjIh+wxLwgYTWbLSQBACaiKmBmpVRqURKIREEUgqzlo++V0QopASIFDoHQxeSVVWVZKqsV  
4nK2qOdeMyCWZlXBlnHhYEGklJK1NqQowojEwtoaSCJ9JA35UKGxfDXq0uXjYZblANJUdT4cdtE7TSwx9  
h5EA1Ns+xijdfkrA4AwkgkTrNCBBCIGSAXkCliBcjlzyc9AgClpNDL3fedeeabs+3t7ZSS95333lrd1HWMofc  
BySGiQhQGARZETikBAAGlNaeECohIKRLNinVf9aLg/EgdE62d3RRESTllrxTGGEejSVPVilgmj31XzQ8h6Wr  
RkmlAICJmFgEaIDQSGViAANTzbGFCETHGMDMAg8hkRdcVdU20OZR50Uq0gMySFVlkbJYLJAecABCfPy  
KxCAACKjrJJoOoUDRorcthaQowgpiUx3B43A2nl8psWQ5D6JkTkSoGZVVVoDD5vp4vmiooRCJKKYGcFI  
BBBEQNKaEAKvqfDY+IliliwAJAd98zfvyROSvliF1mo5bQiXUahGLyAlorjcwAp25NggllClgSBQVBhFmMUa  
KRtBJBgYzqb2Aw52p1PTnjLI85SNvRWGWMITRN3YGQ733usmCCV4ACRMDp1MGAYkFfIOA0TgQJT1E  
CEJ6/PUDy/NJXnHn0wQPkKAIrFB0hc6MXlZdWeiNzXJzyqiGIDxDD0AlIkarJCwiBEGawZDKtDL69E9KKa  
LTDwQAq13rl1uTff53rUczHBTWnkagUqoNPsbIDIV18+Oj4D2C4iinNmZ+PmylgJkRkbThmJBFBGKKL3/  
NxmNfmzfHPRCivHAsgWQ5EEQLe4YkWOYasVQKgPuESEmYFloIMkoiWxrKES1AYqNs0/WImGWWDBI  
pAlImczrNq/Se3/zw7rOXP/jx9y6Xi6vXni0H9rte+8bXv+b7xB91HorJ+O0//RYDajGfxwblIBASqOfLEWJK

SUQkJmUNKgqL/s6XbT/58JGyHbMhjAyCEXIH1kGTKAoPJuv4OLCIQRookYQRJQoAEEFC0EaxJH7+fGRm  
ZYiILFLGWOMtfbXf+UDt91yR5br/RtXlstljHE8Hucq3Ni5luCtW08gibksB0qpZcU//L98V55nbduhpr/yh  
u9/x9v/zmAww6Pv+//n3v/WR330/WFRapS66QZYP5WSnJ0OnbpckGhVadEUeOaUQjeULd97ShxADO4R4  
Z5iheJAlIEAErUBpjEMTTaqQZksqeN5jNHKHeXL/IP/2HT0L0bUjHhzdHo7Julhvr2113dPNg5+DgoCgKkTg  
ebWRZ1nVelHrvv/u/fv9Tn3jlq1772//uAybPEyRJLDEhaB86EXnFq1+csDLk+q5G1sHz/8hmgAjowOYZKI  
ohnL9lzWaOERAF7YrGSL7zEBBIEJFRtFUAEH1ChcJISsgpbRUADcpRn6qPfvCBzfUzbdv2fV/VM02GOVpr  
VN701c59SLRGFMWE4H4zLOP11W/srrxqm97vSZMUe3sXj46vI7KFeVEq8xqg8bVzeKvvenVcQGUMad  
kNGRO69zMDzslwEoAlc2tsfSC29a0ybvqFQNihoigkGLLgglAoBBAAAEegICIRLicjFan53/+537h077tdSEF  
JTHliqqtZrNZ3SszathaRIErr8I2ISJQW59zs8GpdN8oOsnxwx6V7nC6qptnZvdK088XJzGWEqFMUa1fqGO  
550Z1/8qeP/tTffxsprTX5LipkRcZLoESgxFhQhoqiOHfuFtLqeH4YYqdaWMbQpuUphQFEJBFTm/PAAQg  
RlaY+Vvuufe13/4dFpFejmcLgTTIH1HmSYDY5fedrYTNgXBfV9r5Xq64Ok29WJ84T33n3XfNHsHe1436  
VUpdRrQ8YqTZS01PXBxtrgyuWbd9/1EmOIUAuL0qx+A+RgRCRRy4hBAGbW5tdr6BdfotOMammPSWifx  
AATAICAAIlgCpw4hBYyACj71wlcfefDHLI68OBkPyKEWY6xSPLi5J+yTxO2z6zdv3tTaKhKtGFLtdE9c5uPxd  
Nx77vKMqnoBKLnL+r7XhLmzTVX5Pg6ybm24vXfSXn7usbBgOOqnsE1AxigRSSmRUhC5Wfjr13ereS8RG  
KEca4qL5JcBETkmBAQBAAUAEEkYlw+TidrXWgMZPfe+7K8SE8/+WWSWBSFUSoYpQwRekmL9bWBc  
85mxlpbZkiqKVdoUqZLT33rdLLKoVmdyMXzW3fcfnFQZivrk8hiskE5Gr7wrleev+1lq9PJZGhAAJUWJKsFF  
CRhQQBCQSBjSGFbpdgBodYWy3KMeFpr4HI7g8DzbyAAAkBQmbbWtSf11ct7V557rhwOVqbrMfnBoF  
wsFsE3J4vdsiwtLwGam0c3Mzd0WccMSpmMFsIL8doNVppKsumE6FxKqRxxj3z960U2HQwGZzc3O88x  
5ZzwpOoe+uqD//ifv0MkMQQAYgZ9+GUZgMLM3vvARASl1M3HA8R3GmaCgAAi8TT5yBqgQRCAIAA  
Yq353fd/dDJZuXjx1vL84X0/GmdIdnGy3y33rGuLfKxtyFS6und5dTLN0apiFud/TjTp++cGQIF3z1z6uWXcP  
jzanwyERXVJTSaTvku+l2Xtj44qV6x991tf6bSJrfdV41mSgNUGEQFIRGKMGRGQsx+jLsiTrCBE5MSJKOr39K  
V2RU+IOAMqgLZ3vww/84Pevra3s7OxUVVWwS6vvehwopCDYSFoBLBgGZbW0Mx/myaz9DaVYM0GW  
PToonPD/UmtuPll882N8bjcfz+eNllaTjZrnX1Yfed4Ram2LRHYwHo8wNh5MpWo2IkCSUQkoppRBCD8C  
IkiloZWKMKSNUcAp1lQIEgSRAE+bDgCNgIAuGxfTz/3xH3WL42axv6z7LB+ezE5SpOmkeFTO6kyBCoeC  
yzxfv2X7luOrX5e48eDnHr7/O49d4hVl23a7ldkjz5x56cpoE+v+2tZWrpU+ONjFwaZWrvd+saz+0c/9k+sH  
1zUwKO1jX65O4XjRL4Mdud7XmbitjbOBx+4GAUoRQUg7jlynsY4aldWxD9ADKhaBUlgKUKtbtS995IMfl  
zYNpsPULx9/7Ct9OtraujMfrCL0gqzRk55tn/sBt9I0R8313ebg4Q+uDz9xcFS9+FY/Gh8/d/X2zRdOBtP/db  
/RWTLjM5+T9PovPviiM5t3D8otBFf36ROf/G8BURn3xBNP/tcH/shmKvhWKX28P+cAwsFktO1sctnNtkM  
vXdMPVx0qwlNuiAio8HncBhQRzFAilChNXdNr3vCG1//qO3/NWutTjL3/2jc+3feXy9GZzTNnHSqg/clwoj  
X38wcP+2/d3rh/r38ofP1vImSL3K4O563f/vTn/Jt/9nsH6IVntXzo639u8kuD6eDKc/t7NxdR6y/cOHu+zNe  
UNgCUkuwc3Pgbb3sjOsHW1F0PluljMaQAbmLX1tzRwdJkTjmDYBBZhOF56JXnWwpQoBwJIRohUGWZ  
/8nHv2TzjJPmeO1na9cufoFinbWbm7kpT42wKuTawA/3k/vf+7GQ7Pf+4fJPTPO8q1zfvfqr5U3POGD4  
STEdP1nYNPP/rQn1l3/sX33rcyvcu4DWVLEjsYU5LgZdIVN/Z2f+jH3miS8tHHGCWxRJYEpKEYK4uqY3a5R  
TfNJICvOyQQAQIQJEmMCsiQoBRjYzKmU+//zPT1ZU8z5k5So9ofFfdvP7ZK1e+q12HXhQevPCiofBIN9s/  
Wv/s2dtvZg++9dkD/7If+jPfdDN7BrWnoJ+89uVzWy+6evkPCgWD1YGkNW0nNp+AOAETvDRdLyLVsf/r  
7/ulT3z09ziKIEROSEol9k2gATiFpii6pkdQBMwICEYkAZ42rvG8FJSTwlor2NSVR7Kf/d1P59k4YhqW11vmf  
btM3Cglqdu7vvuFoU63Xnl7u7cc+XPT6XRYRh1vmOEfCkInd9lXpKTqtEhHH3Vqm6kKUCo1JJkIQCZoI2J  
eh+7po+os6z89te9fFkvBXpFJkYGTJDICtohh6hiwNgnBAIAUBmh1nHp4TSrtYopjdcG5EC7um/R6OFsd4  
FDzEH1bXjPr/6a0pCXQ42qrW6g6r77DW8+XvaO6t3DucOciDY+aM/SPIldpks1r5FqseeePTfGBx7tTlan  
BuvntVmTKpAsKiGSDnDUMSmJL5ffuB9v/GVx5798sOfU05rQyleQ4Y5cs3KsFWaCBg0EWlQgAqZWSqP  
BCjAAJISiCyqZqBs32ulVlw9OoFAycmlOy8yw+xkJgdHzoJztsjgcAHDoiQ9Op+t7u1cPbjye0W4HuCycmY5  
XGezv3j6l4t82tTkrPa+mR/toOuVGTgAkBaVlyjiElPiJqhX3f/63/rwW5VVCJwCi4hPUQFinkTM0VGQikAii  
OhT6FJKhRiFAQROkwEVYKLIiToFJBKBMJwW9bIFVo6sK9yYssVir5rtVxGKixfKbISohFjpcn27HKy8M6Ud  
P39uefxUU//+/PiV+eRvVUefNPmmF4od91FB1ypimxlbNKNIZDwLMINWtIpl2IQStdYoJkBFRKTCamyMb  
FkklAQTi6fQkI7QYT0c0AgopMSOdcIQBAO6FDHIQIAALW7esS129/U1vqPyCiji9Vdq5ZLPb3vz2f+j06JRc  
xRhD8DH0iBJ9zQxt2zb1PIQUkvfeh75LEICddiOTTa0rjHEHBE7gLP3kz/zEc9efZeYYowRfTsp6UXMURZpA  
dbOeUDNHREqCkHSAaIiShEFROSyVUov53KD67fe87957XsbcaAyAOBKqqpN8tBGW1/cPHnr4C18Myc  
+Xs2G2UreHL3zR677z+398NBp576P3LDGIEGNEiXUzy4sVfTM21XxRxcR9186Xxs7ey6bjCfrSiInblg+pfC

TP/N2ysR777seE/su6ex0tklXmgopA+yZW0AChOK0bxcKSErcygCAiqI42rv5uvtf/+5f/T/7fIFVC2eltO3aFF  
NniZpu2Syvbm4MPvXxD42HxbUbex//6Oc/9pk/Xlbd5tkXEEGKqK3d39+frlycge7kAI0DGtVd19aLqgmB/  
fHNwx9+69tect/dl+6824D+3Bcf2N/flccDZRUAOK264AFEQX9yEEkbZiZmVqIMZU6388BBENwpZSOyO  
ChKZgZUVttXfctf+sd//+8lkb7tnHOCofFMMsyozAbKwjT8fjK7rNf+i8f5tnOPa/7vjvuemnVtCJyclTXLtu2  
6utm1ix7YKahMbpD2bjwsvvur3pu6vbw8NC37Tv+3o/MopeO+ibqzE6mU5+SCCstzmkgil2zrKLENINQL  
0EUqYyNBavt8jBIEnQjF/oeAhin+y6iAXJGAZI1H/yN3ywGY6UzpRShGKO01igMAAK90iWLFZEQ2hj6YdZ  
MVoZtE3yoqkXb1k1TLWKblgMrTFCT0kf7V7TQH37uiTf96PfpOPo/3v1Pp+fHh+3ym1+rOt+CaBFkjmVZ  
GqRsK646G3bp6fq4cE4ptdhvdE6i0BisbsZTtQbRAhBgRE5icvuy+17+d/+3n7q5v2+L/L6XvHqXPyLURIQK  
CusEoLYSUYKKCLpq+Xh2AEJI4mwxLOPqauhamc+OfRv7et53HMGjEu/jM089cuHChcl0qzm8+cCfP/Hx//  
rAG+/7C83V+f5yfrWIT1/tJTW6WB7bXBLdvx3/upYIVnvW+X+0ceyhx+7jILcChiYruTzZSs9oZLTETfaMfk  
6gcAr/+Krf+od/wAwAoBzbjqliRmD8hKKURGSTG0KYk1XpVY+2xZNSlCvMZWZVr7UdkpOLp5sOyrpu3  
7FJZRRKtVfAPQ+IRaN1UmZnZ87sK39Z7f8hM/eH5j6+knbilpGvntjc0F7m1Nz33HC9zO/CDQ2le/ctNlg4  
e+sWdWcPNivqLzxx9dZEYWJ1FIJMBa58q3kaxiTm/90R9h6WKIAMAc89wqVFluAZjFzx603SLPcyIhNXry  
8T8+e8t91mCAHpMxDpTKEkAG7r9ZbUQfyxaC0cfGQAG+bhjylpJlg2UGj795NPXrt+cH8DJOS71mFlaab  
u3O8sdXA03dtX0x14va4Odq7frN793AQipz659vd3RDQN4D+iAFJrljnqktNYMKCL/9l/93/OTvTKbuMxo  
rQf2BijtVYamqOjw+qo6fWN++qqs4NRoWtrJ5M13U9P1aolRoKvMWRrJLL3/i9II0ASNIqX2n69tbzL7e  
ukFRUnpUtqzplCnUbCM27f+N9jz72RGa7QrsT34M4U8pwlj6EvDBHM5GUn443u3kDFSJYFBIserJlqq  
h5hBFABFefNe3/PiPvG00HMYyq2oxna5aq8fjcQj97ORwd/c5Tle+a9fO3M0lhGaSNy+4eJtlub/7tNaGU  
7M6Hpf5tavPfiWhFcxMOY3LZjTOi9EzIDnrIBNBQlQ073WIEiNrW5ws4z95579sjhbFRgGkkjptCImZUUH  
wLQCKlBlzLEiiYKITiORBRDBfLdpFoxSlxBDoP/zHD1249UJKqa6rg8Nd7zuXmZTiyCnx4uR6SgvuK+PsML+  
NTTMcj6sbltSmkWWUoVQ5fK1kZNNrj8zyM/6sO1GG3Z4qyvXKKjYPxQxKWVEnEAeoxHWfYgMRd91B  
8f1+z/44YPmcFktkkdSnCQosjGysnQK7THGeMiEJFYEBRJgAoQcjAZmSB7Wzo7a1v/sP/j5qmq2zmxqQy  
n1IJKkb5uFhjIRi+iR276pjQ6clgRpMhp11c5w4CcFEcxvfmZeHeT6bBUY1ZixylcXlBv7cHZ4biuL/jkHy5og5  
cwaxlQgSVS1rJvOrm+fe8vb34RgFCsQMTZjCELlgZuqlToBIFsBlhQQFvSCbgygdN/Es5eGfZ8W19hOchr4  
IX/9a199+KGtra08s6Shb70z/aBgij2mxveNcRFpcWYy2lx9wZMPfpgj1LN94PzatXTfX+4G0y0xmbVOeAh  
u6AbrdRyNvr53OFqbHfxhXQUBZcxYWKeoSLuUcFEdn8zj7zzXZjHEPqBnh4fzCagsIABsGC8CSmoUqcYF  
YFEYADdV1CuAxlofVWOxnR7oJj9xq/+vyUO7rrz7hh9TO3R0cGffvkl45H1PTjDVPkyy4ZFTcjaLrh/8i/85V  
d+5D3/5WAGqGyK2Te+vLa+vZdW7zADVv3e+VuyiKMoGMKsmcOtt93/jUf/UJusC54UkXLLuhGwiwbqp  
gvSZ2QAql/LfD3jGvq5J0FJHdKQKVScuaw77vF0B0DlIBxXzuaiVF/D2vTc4498s695MOKu9cYiiBqPV+6//z  
tTXLTvVjH1ulCu32ur2kr2W//qP//w2y++9+27/+xd9qGvqdDFYhD+9Evzetnf8YpDS5Nej24cRYY/L8stNI/  
OatnyzSerDmdEiqR/OAw1W0ffHs8b4zgWpE1lqJ0TMA+2tKaAKpKcwYEYE5KafbhVKxXFqY7Faojylem7  
oLqtAdWJnv/v+dbllPp1NjFRFrQyCRVE+w5HCTpPPd9Xp5HMIJsktkPvfdT3/GdZ9qb63bwnE+1CDhdJP  
He33v+vpilWG3MapjhgnYG4rDx37yu++5mv/tHaWqy92dnXVX0MYo22yubWZh7tImf+6m3KaVPBQ6L  
5tUx++tSCcwYRgLuxishzCoAK9NaF7XDuZDnvMsh2r/QKBBQfnNw8M5i0XS2gWYLYgQszJqVUKxRMKso  
wcb02Pj8qxj/9LvMHH3n8wl1P3fj6Wifp/J3doFixefuxD9D5F49hML19vBLU+HDhgczRwle+9IXxUD95Zff  
kJAPm2tdKlcYNBqokSQL66GhhnOXlp7oypfD54O+KYNlKCLXwU5R8QgQBRnry4cPFsa7nWB+LM5oSKC  
X/+z/76btft9gOHZ2GBP1XaiadnbSLZdpuZR5s0gh2zhzp8rPffPpazdu4lu/7a4X3PuRx57qX/99b9y/sart  
pRde+oHX/uCkiW48WqNyKx9u3Xr+petnbnfutjL3ypQuv3W6uplNyKgxqigTpsRUN7FNTMPk4ucVWM  
TeEl/KDJRFRAUOYYgkgklgIjPMOtzrEQBNAuR8xXZL/JVffvfyxUKZTJHZZCgcEVXHyZuGpTMD4ydBvExHo  
w310Uhpt57+NGf/tuorr/yNa9av+0e7oaT9d2q09oUSg0iZlqPfKcy14wGG20ElxmW1iQijKAgJmAElqggC  
6H5/+VuAAHood+nRJdORT0h94ZMTIEAE+issMywmMXCaXRQ5LqreTI9e3Tzglzt27qPXeJ+Miqnqy84nl  
11NM20UhoAYkiZ0qt9XyGo5fKBRXP39poer6zP2rOFI9ATVxiyjnEAKU+KJ6NScOWDS9dok/plk2lwO6kV  
+5TgZF5leSm+et/vvCelhEinDAKEIKV+azRt9d7x/LoSxQLoAyyAEfns5Skq70rVhSj5mDoUWe/Nlv/jrHk  
Gc6Rq+UGpbZ9RvPXrj1ou+OtYo21xwWWnFdHxtDRiflJdNPrxjZ/doZbJq9MI8doUI83wVzLbTq6lsmRG  
zZtEpyXI5a0OzcZAnwKpuE+PJsirywS/+m38hMGcOp2snSillzKTWZv0oQMM4JSWOnVJIOT6oWsw3TLsl  
pJUCEojMsro5QkuXlrziTd/7Q0bhZDRGIN29HUjx4m2XUHUQF0idNgKpD7FRSpVI2VfH2sn5W+5JHLzvf  
F+19dyZDHWZlbewENJA6TwEipH7EH0M3/09rzl/8dZxvPzVK6OVB7/6Z1/+k88P18qUAqlighggcZAYAJA  
4l+33lqDTcK8U4OOWGZ6EZkmMdmjFR2RB0oESWWOHYpwOTUxN+c53/QIKJd97XxxZ9J6XvCjFFtHH

uG8MiwhLr7Uui0l1sgPY3XHHX2Lm3ne+X4Jo51ZB68iEqliKKBoC1n3fMaTAOztX3/GOt0w2aLkMiVElJT  
HMz+8fhJCYGRITgQarQs8gbZ9eIQPdB8XKGn0jVogWjCXuOTHoXLNymQ56nOUhHB20NMz8vBMEY+l  
H3qAJQAwct/3B85EbbFpOpdNRqNRaPazcnBm65KISOg637VeoxTW2q6vQDnfY4zew/OLdF3TB05v/u  
G/6nJ2OqqFmdlIRpMAKlrRozAFZOZRF7Ywe+XmbV+cX9ZkLpf9Yj9FH8cTWw60NoXhPrnc9RBZONPp/F  
FKx3Vj1aVBeTm0KKA0MHNZFsvlMnFKCQUHITuaLSgCtERDOzAxJuYmKcJroFwp6D10Te+9MDdZXgAa  
BEhJmFkrUzf9vS+678pTXwka9heVLg0yWGuBGVIFH4PG1y6Lk745b9w3n3lqaHjVDc4s7IE0LcBt3WAw  
VxqQWbNHIS8QmUopyvxMNGez0Yyb/a5PGfZdAgZSNmKaN01GxKxQFzqliGt7ZX0wehQFBJTvY4wQ2  
QAgEQtoHzqXl/NlozWxaABgwL7t2r7Zm93srPstFBqaZcA6ROU37xjN9rqNoG+dJZ/B1l3n/VFYu+1S1R2  
2TabUHTjY46rpAoJQaFOuXWlCyYzOiFkOM7VZrvM2O5gvU4jWZCDgRnnVt/OTypGJKTGcKvMggqRA2  
GitAdK1G/tJVOC5xFQ1bdv5LkRts2pxswsiynvftm2MsfYppfTcEO+bzAkpHGItAQWEebl3YiidaHpqIF/r5q  
2pbmg80/Ez/qRNYQnRF0VkjqlvudPZwLZ9n4+KlHp0GL0chva38fJdiBtMmqCe1VYr8XF+dGht0cdWBDk  
mC6ENpMIYpZX2iE5rrZQ9mVe+jwkkRvZ9IK2cc4rEOOnOy7FIKlsl+dG3/vv/vN3VB3MW+7gdTF2rBmAB  
ws9eLOjSbUbSd1/ERhL92bv2R69dfgsMD1Tex7dv+lnz9bLF6pdmhPvhiYFD3UbhrAUhi8i/2UG+uPQDd  
TMM9zn17Pr0UaXlwooQTAZHO8zz0MbRHPrVqshTJg6imC41PdQgPPvLw0fE8xNR07fHxyU+89Y0xw  
W/+1rtj9BFwUS2X85PE/WNPf3n93FrdB6l5ca0NnAlCrbirOhYPrMaBPQj3nslB0X88OnxW4hOuPUQfCO  
ciD8adP1g8vksRx2eLrvPCsjFI5Ne1+lx4rfSZxE/fu3b20YPbeL0xgUGlKl3m3b8w2TxzvHt9kBfatmvrK598  
7+9+z9/6213nfR+QbNu288XRZz/zyW8++N82zt/zipf+xc/+yef4w/VqB7PmWKCBGYwfu1f+Z4//NTHrSl  
StzRF6mtOyLZXy6ZEYV4CMA3J3r+gO5T7gKv2c8JFIK1jH6Kltir2yeUqAGG2aohNlASEqe/+ep+7iBeGa3u  
2eqztHoLmjKtZ6Lzh2FKYRHyO1D9/34dC2/yinn//Z1b1ZG9o3feJj0sfG03K5jH3c33/uA7/zb49uLorR8Nxx  
70DNKd6koEY5a7KuVAjVydyVRflp+Ma3cXWzCCe8zRaacMjdmaJAA43Th0fzFUeXNY1iyifZQOx9y+yP0  
myWonM2oohPOJ7aZRcBhJ0Cz2/t3BjLjWL1qWr3G9Tup1AqOmMKE2Wp4+2xWlKKB4PPxxv3xdF2Pq  
0lfrM6nLzlb77qtd917erTv/xL78oy1TetNYpzBT2GtgcBtAqRR5NhkpiS9K0viwytygjL43mWcVPBy2m4kl4  
RvjXlEzu8itW1FJ8Z+WoRVsej79XTtaUOqXvUzz/LFa6Uvu2ctjhYy+uq00SYBCdZ2YafrMs2+RzUcySPQ+9  
ElcbZBA+q+T3eDKxZEHQJLm6d295d/H666bV9VgVvMMtzkxnvvYTIzEQUYyQtxLo77vVljSbDfDxeLpel6  
8cEAJmyhCrTaw1kq3B0vdNFTsvuPjO+XZUNz49jfe7i7fnKphk+3OzergbXuP0MLTWSCKhMSSu4ub2y9C  
F1fR8CsSSGtZVsG4qnqC5mXpPa8jIQBQCdkqFo6xCsUJRfGG42vnqkPzjScjB2SbiZL7XWZL7EZApl2rtiK  
MoVopjlh1jFABrKXYsApKACC6M8smS82l+s1rudqlf14Ni+NevpyXB9VBHUhtqqEke4cWRpFAikOXoY8+  
oEAD+O4B7M7QnleWwAAAAAEIFTkSuQmCC\n"

},

"metadata": {},

"execution\_count": 32

}

]

},

{

"cell\_type": "code",

"source": [

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

],

"metadata": {

"id": "d3AL9SaGWU2N"

```

},
"execution_count": null,
"outputs": []
},
{
"cell_type": "code",
"source": [
"x"
],
"metadata": {
"colab": {
"base_uri": "https://localhost:8080/"
},
"id": "yihZyOxDYyte",
"outputId": "14949ad9-1a03-4d1b-86ff-3f6715d253db"
},
"execution_count": null,
"outputs": [
{
"output_type": "execute_result",
"data": {
"text/plain": [
"array([[14., 22., 7.],\n",
"       [11., 22., 6.],\n",
"       [ 8., 19., 3.],\n",
"       ..., \n",
"       [32., 47., 24.],\n",
"       [30., 48., 22.],\n",
"       [33., 49., 23.]])\n",
"\n",
"       [[13., 20., 12.],\n",

```

" [11., 21., 10.],\n",  
" [11., 22., 8.],\n",  
" ..., \n",  
" [37., 51., 26.],\n",  
" [35., 49., 26.],\n",  
" [25., 45., 20.]],\n",  
"\n",  
" [[19., 30., 16.],\n",  
" [19., 31., 17.],\n",  
" [16., 29., 12.],\n",  
" ..., \n",  
" [31., 47., 20.],\n",  
" [28., 49., 18.],\n",  
" [27., 43., 17.]],\n",  
"\n",  
" ..., \n",  
"\n",  
" [[15., 17., 6.],\n",  
" [ 2., 9., 2.],\n",  
" [ 2., 9., 1.],\n",  
" ..., \n",  
" [ 8., 21., 11.],\n",  
" [ 2., 12., 3.],\n",  
" [ 9., 16., 9.]],\n",  
"\n",  
" [[12., 20., 9.],\n",  
" [ 1., 8., 1.],\n",  
" [ 5., 10., 3.],\n",  
" ..., \n",  
" [ 3., 8., 2.],\n",  
" [ 6., 16., 5.],\n",



```

    "    [ 5., 7., 4.]],\n",
    "\n",
    "    [[24., 27., 18.],\n",
    "    [11., 21., 13.],\n",
    "    [ 8., 13., 6.],\n",
    "    ..., \n",
    "    [ 1., 6., 0.],\n",
    "    [ 2., 9., 1.],\n",
    "    [ 2., 9., 1.]]], dtype=float32)"
]
},
"metadata": {},
"execution_count": 49
}
]
},
{
  "cell_type": "code",
  "source": [
    "x.ndim"
  ],
  "metadata": {
    "colab": {
      "base_uri": "https://localhost:8080/"
    },
    "id": "p4pRB7AMZoX4",
    "outputId": "74bfef14-8fb3-4cd6-89dc-cfe963f3626d"
  },
  "execution_count": null,
  "outputs": [
    {

```

```
"output_type": "execute_result",
"data": {
  "text/plain": [
    "3"
  ]
},
"metadata": {},
"execution_count": 50
}
]
},
{
  "cell_type": "code",
  "source": [
    "x = np.expand_dims(x,axis = 0)"
  ],
  "metadata": {
    "id": "mAUK7tH7aFq4"
  },
  "execution_count": null,
  "outputs": []
},
{
  "cell_type": "code",
  "source": [
    "x.ndim"
  ],
  "metadata": {
    "colab": {
      "base_uri": "https://localhost:8080/"
    }
  },
}
```

```
"id": "D-MSkf0taJmw",
"outputId": "1c27fced-2208-4995-c574-91d117b9e372"
},
"execution_count": null,
"outputs": [
  {
    "output_type": "execute_result",
    "data": {
      "text/plain": [
        "4"
      ]
    },
    "metadata": {},
    "execution_count": 52
  }
],
},
{
  "cell_type": "code",
  "source": [
    "pred = model.predict(x)"
  ],
  "metadata": {
    "id": "t5DQqIIIVaK1x"
  },
  "execution_count": null,
  "outputs": []
},
{
  "cell_type": "code",
  "source": [
```

```
"pred"
],
"metadata": {
  "colab": {
    "base_uri": "https://localhost:8080/"
  },
  "id": "aP7rI4BXaNYL",
  "outputId": "e1046fae-9f8d-43fe-b0fd-5912eb8f2bf6"
},
"execution_count": null,
"outputs": [
  {
    "output_type": "execute_result",
    "data": {
      "text/plain": [
        "array([[1., 0., 0., 0., 0.]], dtype=float32)"
      ]
    },
    "metadata": {},
    "execution_count": 54
  }
],
},
{
  "cell_type": "code",
  "source": [
    "labels=[\"Daisy\\\", \"Dandelion\\\", \"Rose\\\", \"Sunflower\\\", \"Tulip\\\"]"
  ],
  "metadata": {
    "id": "LWlqmHlIdaQDs"
  },
}
```

```
"execution_count": 20,
"outputs": []
},
{
  "cell_type": "code",
  "source": [
    "np.argmax(pred)"
  ],
  "metadata": {
    "colab": {
      "base_uri": "https://localhost:8080/"
    },
    "id": "THFchlaLbEhE",
    "outputId": "65839c90-60a9-4c71-d250-9ac5c3a154b3"
  },
  "execution_count": null,
  "outputs": [
    {
      "output_type": "execute_result",
      "data": {
        "text/plain": [
          "0"
        ]
      },
      "metadata": {},
      "execution_count": 56
    }
  ],
},
{
  "cell_type": "code",
```

```
"source": [
  "labels[np.argmax(pred)]"
],
"metadata": {
  "colab": {
    "base_uri": "https://localhost:8080/",
    "height": 36
  },
  "id": "i56HhEIgbG0o",
  "outputId": "cfec579d-d110-44a0-f5a8-cee6980ab465"
},
"execution_count": null,
"outputs": [
  {
    "output_type": "execute_result",
    "data": {
      "text/plain": [
        "'Daisy'"
      ],
      "application/vnd.google.colaboratory.intrinsic+json": {
        "type": "string"
      }
    },
    "metadata": {},
    "execution_count": 57
  }
],
{
  "cell_type": "code",
  "source": [],
```

```
"metadata": {  
  "id": "SyoEw6NmbKHt"  
},  
"execution_count": 20,  
"outputs": []  
}  
]  
}
```