```json
{
  "nbformat": 4,
  "nbformat_minor": 0,
  "metadata": {
    "colab": {
      "provenance": []
    },
    "kernelspec": {
      "name": "python3",
      "display_name": "Python 3"
    },
    "language_info": {
      "name": "python"
    }
  },
  "cells": [
    {
      "cell_type": "code",
      "execution_count": 16,
      "metadata": {
        "id": "Kmn87h7Qqva8"
      },
      "outputs": [],
      "source": [
        "from keras.preprocessing.image import ImageDataGenerator\n",
        "train_datagen=ImageDataGenerator(rescale=1./255,shear_range=0.2,zoom_range=0.2,horizontal_flip=True)\n",
        "test_datagen=ImageDataGenerator(rescale=1)"
      ]
    },
    {
```

    "cell_type": "code",

    "source": [

      "x_train=train_datagen.flow_from_directory(r'/content/drive/MyDrive/DataSet/Dataset Plant Disease/Veg-dataset/Veg-

dataset/test_set',target_size=(128,128),batch_size=2,class_mode='categorical')\n",

      "x_test=test_datagen.flow_from_directory(r'/content/drive/MyDrive/DataSet/Dataset Plant Disease/Veg-dataset/Veg-

dataset/train_set',target_size=(128,128),batch_size=2,class_mode='categorical')"

    ],

    "metadata": {

     "colab": {

       "base_uri": "https://localhost:8080/"

     },

     "id": "KwwIP59PrMHD",

     "outputId": "fe4f27e9-ed03-4155-9647-e55184674fd1"

    },

    "execution_count": 17,

    "outputs": [

     {

       "output_type": "stream",

       "name": "stdout",

       "text": [

        "Found 3416 images belonging to 9 classes.\n",

        "Found 11386 images belonging to 9 classes.\n"

       ]

     }

    ]

   },

   {

    "cell_type": "code",

    "source": [

      "from keras.models import Sequential\n",

```
    "from keras.layers import Dense\n",
    "from keras.layers import Convolution2D\n",
    "from keras.layers import MaxPooling2D\n",
    "from keras.layers import Flatten"
  ],
  "metadata": {
   "id": "-83sTKQ2rtqU"
  },
  "execution_count": 18,
  "outputs": []
 },
 {
  "cell_type": "code",
  "source": [
   "model=Sequential()"
  ],
  "metadata": {
   "id": "c6Gn5yy-rxi9"
  },
  "execution_count": 4,
  "outputs": []
 },
 {
  "cell_type": "code",
  "source": [
   "model.add(Convolution2D(32,(3,3),input_shape=(128,128,3),activation='relu'))"
  ],
  "metadata": {
   "id": "Llp2PuTTr2IS"
  },
  "execution_count": 5,
```

```
    "outputs": []
  },
  {
    "cell_type": "code",
    "source": [
      "model.add(MaxPooling2D(pool_size=(2,2)))"
    ],
    "metadata": {
      "id": "1HH4kT-Vr8gz"
    },
    "execution_count": 6,
    "outputs": []
  },
  {
    "cell_type": "code",
    "source": [
      "model.add(Flatten())"
    ],
    "metadata": {
      "id": "RiF3j7y7sDlT"
    },
    "execution_count": 7,
    "outputs": []
  },
  {
    "cell_type": "code",
    "source": [
      "model.add(Dense(units=300,kernel_initializer='uniform',activation='relu'))"
    ],
    "metadata": {
      "id": "rzYOisl9sHl0"
```

```json
  },
  "execution_count": 8,
  "outputs": []
},
{
  "cell_type": "code",
  "source": [
   "model.add(Dense(units=150,kernel_initializer='uniform',activation='relu'))"
  ],
  "metadata": {
   "id": "0ilxaf50sl_7"
  },
  "execution_count": 9,
  "outputs": []
},
{
  "cell_type": "code",
  "source": [
   "model.add(Dense(units=75,kernel_initializer='uniform',activation='relu'))"
  ],
  "metadata": {
   "id": "umQ5x5ppsOSD"
  },
  "execution_count": 10,
  "outputs": []
},
{
  "cell_type": "code",
  "source": [
   "model.add(Dense(units=9,kernel_initializer='uniform',activation='softmax'))"
  ],
```

```json
    "metadata": {
     "id": "RWDSMiy_sSkj"
    },
    "execution_count": 11,
    "outputs": []
   },
   {
    "cell_type": "code",
    "source": [
     "model.compile(loss='categorical_crossentropy',optimizer=\"adam\",metrics=[\"accuracy\"])"
    ],
    "metadata": {
     "id": "M38faTM6sWyy"
    },
    "execution_count": 12,
    "outputs": []
   },
   {
    "cell_type": "code",
    "source": [

"model.fit(x_train,steps_per_epoch=89,epochs=20,validation_data=x_test,validation_steps=27)"
    ],
    "metadata": {
     "colab": {
      "base_uri": "https://localhost:8080/"
     },
     "id": "BWOC9xsSsam6",
     "outputId": "6fccc1fb-2a67-485d-e9bb-d3670d07bee8"
    },
    "execution_count": 13,
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    "outputs": [

     {

       "output_type": "stream",

       "name": "stdout",

       "text": [

        "Epoch 1/20\n",

        "89/89 [==============================] - 66s 735ms/step - loss: 2.1991 - accuracy: 0.1685 - val_loss: 34.9906 - val_accuracy: 0.1667\n",

        "Epoch 2/20\n",

        "89/89 [==============================] - 52s 586ms/step - loss: 2.1355 - accuracy: 0.2191 - val_loss: 126.3206 - val_accuracy: 0.1481\n",

        "Epoch 3/20\n",

        "89/89 [==============================] - 52s 579ms/step - loss: 2.1752 - accuracy: 0.1629 - val_loss: 51.6178 - val_accuracy: 0.1667\n",

        "Epoch 4/20\n",

        "89/89 [==============================] - 48s 535ms/step - loss: 2.1048 - accuracy: 0.2079 - val_loss: 69.3990 - val_accuracy: 0.1852\n",

        "Epoch 5/20\n",

        "89/89 [==============================] - 48s 540ms/step - loss: 2.1155 - accuracy: 0.1910 - val_loss: 93.5892 - val_accuracy: 0.1852\n",

        "Epoch 6/20\n",

        "89/89 [==============================] - 49s 547ms/step - loss: 2.0742 - accuracy: 0.2191 - val_loss: 124.8375 - val_accuracy: 0.1852\n",

        "Epoch 7/20\n",

        "89/89 [==============================] - 47s 521ms/step - loss: 1.8939 - accuracy: 0.2809 - val_loss: 220.7767 - val_accuracy: 0.2407\n",

        "Epoch 8/20\n",

        "89/89 [==============================] - 44s 499ms/step - loss: 1.9078 - accuracy: 0.2978 - val_loss: 259.1734 - val_accuracy: 0.2222\n",

        "Epoch 9/20\n",

        "89/89 [==============================] - 43s 481ms/step - loss: 1.8248 - accuracy: 0.3202 - val_loss: 106.8574 - val_accuracy: 0.3333\n",

        "Epoch 10/20\n",

      "89/89 [==============================] - 42s 474ms/step - loss: 1.8874 - accuracy: 0.3146 - val_loss: 94.2278 - val_accuracy: 0.4630\n",

      "Epoch 11/20\n",

      "89/89 [==============================] - 42s 475ms/step - loss: 1.7656 - accuracy: 0.3427 - val_loss: 324.2667 - val_accuracy: 0.2963\n",

      "Epoch 12/20\n",

      "89/89 [==============================] - 42s 474ms/step - loss: 1.7070 - accuracy: 0.3146 - val_loss: 188.0005 - val_accuracy: 0.2407\n",

      "Epoch 13/20\n",

      "89/89 [==============================] - 39s 436ms/step - loss: 1.9401 - accuracy: 0.2753 - val_loss: 130.1401 - val_accuracy: 0.2593\n",

      "Epoch 14/20\n",

      "89/89 [==============================] - 41s 469ms/step - loss: 1.8265 - accuracy: 0.2978 - val_loss: 113.8954 - val_accuracy: 0.3333\n",

      "Epoch 15/20\n",

      "89/89 [==============================] - 40s 441ms/step - loss: 1.6787 - accuracy: 0.3202 - val_loss: 122.3567 - val_accuracy: 0.3519\n",

      "Epoch 16/20\n",

      "89/89 [==============================] - 38s 431ms/step - loss: 1.7424 - accuracy: 0.3090 - val_loss: 94.6337 - val_accuracy: 0.3704\n",

      "Epoch 17/20\n",

      "89/89 [==============================] - 36s 408ms/step - loss: 1.7309 - accuracy: 0.2865 - val_loss: 127.5731 - val_accuracy: 0.3148\n",

      "Epoch 18/20\n",

      "89/89 [==============================] - 37s 421ms/step - loss: 1.6828 - accuracy: 0.3764 - val_loss: 124.5040 - val_accuracy: 0.3704\n",

      "Epoch 19/20\n",

      "89/89 [==============================] - 38s 423ms/step - loss: 1.5997 - accuracy: 0.4045 - val_loss: 108.5413 - val_accuracy: 0.4259\n",

      "Epoch 20/20\n",

      "89/89 [==============================] - 38s 423ms/step - loss: 1.6695 - accuracy: 0.3652 - val_loss: 79.3885 - val_accuracy: 0.3519\n"

    ]
  },
  {

```json
      "output_type": "execute_result",
      "data": {
       "text/plain": [
        "<keras.callbacks.History at 0x7f12002bba10>"
       ]
      },
      "metadata": {},
      "execution_count": 13
     }
    ]
   },
   {
    "cell_type": "code",
    "source": [
     "model.save('vegetable.h5')   "
    ],
    "metadata": {
     "id": "Gq1cVMV5x11C"
    },
    "execution_count": 19,
    "outputs": []
   },
   {
    "cell_type": "code",
    "source": [
     "model.summary()"
    ],
    "metadata": {
     "colab": {
      "base_uri": "https://localhost:8080/"
     },
```

```
  "id": "M8fo2vjByGJ6",
  "outputId": "6fe426b9-a6bf-43bd-e425-14ebaa56eb95"
},
"execution_count": 15,
"outputs": [
 {
   "output_type": "stream",
   "name": "stdout",
   "text": [
    "Model: \"sequential\"\n",
    "_____\n",
    " Layer (type)            Output Shape          Param #  \n",
    "=================================================================\n",
    " conv2d (Conv2D)         (None, 126, 126, 32)    896     \n",
    "                                               \n",
    " max_pooling2d (MaxPooling2D  (None, 63, 63, 32)     0      \n",
    " )                                             \n",
    "                                               \n",
    " flatten (Flatten)       (None, 127008)         0      \n",
    "                                               \n",
    " dense (Dense)           (None, 300)          38102700 \n",
    "                                               \n",
    " dense_1 (Dense)         (None, 150)            45150    \n",
    "                                               \n",
    " dense_2 (Dense)         (None, 75)            11325    \n",
    "                                               \n",
    " dense_3 (Dense)         (None, 9)             684     \n",
    "                                               \n",
    "=================================================================\n",
    "Total params: 38,160,755\n",
    "Trainable params: 38,160,755\n",
```

```
                "Non-trainable params: 0\n",
                "_____\n"
              ]
            }
          ]
        }
      ]
    }
```