

```
{
```

```
    "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,\\n",  
                "test_datagen=ImageDataGenerator(rescale=1)\\n"  
            ]  
        },  
        {  
            "cell_type": "code",  
            "source": [  
                "x_train=train_datagen.flow_from_directory(r'/content/drive/MyDrive/DataSet/Data",  
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/Data",  
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": "rzY0is19sHl0"
    },
    "execution_count": 8,
    "outputs": []
},

```

```

{
  "cell_type": "code",
  "source": [
    "model.add(Dense(units=150,kernel_initializer='uniform',activation='relu'))"
  ],
  "metadata": {
    "id": "0ilxaf50sI_7"
  },
  "execution_count": 9,
  "outputs": []
},
{
  "cell_type": "code",
  "source": [
    "model.add(Dense(units=75,kernel_initializer='uniform',activation='relu'))"
  ],
  "metadata": {
    "id": "umQ5x5pps0SD"
  },
  "execution_count": 10,
  "outputs": []
},
{
  "cell_type": "code",
  "source": [
    "model.add(Dense(units=9,kernel_initializer='uniform',activation='softmax'))"
  ],
  "metadata": {
    "id": "RWDSMiy_sSkj"
  },
  "execution_count": 11,
  "outputs": []
},
{
  "cell_type": "code",
  "source": [
    "model.compile(loss='categorical_crossentropy',optimizer=\"adam\",metrics=[\"a"
  ],
  "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=89)",
  ],
  "metadata": {
    "colab": {
      "base_uri": "https://localhost:8080/"
    },
    "id": "BWOC9xsSsam6",
    "outputId": "6fccc1fb-2a67-485d-e9bb-d3670d07bee8"
  },
  "execution_count": 13,
  "outputs": [
    {
      "output_type": "stream",
      "name": "stdout",
      "text": [
        "Epoch 1/20\n",
        "89/89 [=====] - 66s 735ms/step - loss: 2.1991 - a",
        "Epoch 2/20\n",
        "89/89 [=====] - 52s 586ms/step - loss: 2.1355 - a",
        "Epoch 3/20\n",
        "89/89 [=====] - 52s 579ms/step - loss: 2.1752 - a",
        "Epoch 4/20\n",
        "89/89 [=====] - 48s 535ms/step - loss: 2.1048 - a",
        "Epoch 5/20\n",
        "89/89 [=====] - 48s 540ms/step - loss: 2.1155 - a",
        "Epoch 6/20\n",
        "89/89 [=====] - 49s 547ms/step - loss: 2.0742 - a",
        "Epoch 7/20\n",
        "89/89 [=====] - 47s 521ms/step - loss: 1.8939 - a",
        "Epoch 8/20\n",
        "89/89 [=====] - 44s 499ms/step - loss: 1.9078 - a",
        "Epoch 9/20\n",
        "89/89 [=====] - 43s 481ms/step - loss: 1.8248 - a",
        "Epoch 10/20\n",
        "89/89 [=====] - 42s 474ms/step - loss: 1.8874 - a",
        "Epoch 11/20\n",
        "89/89 [=====] - 42s 475ms/step - loss: 1.7656 - a"
      ]
    }
  ]
}

```

```

        "Epoch 12/20\n",
        "89/89 [=====] - 42s 474ms/step - loss: 1.7070 - a",
        "Epoch 13/20\n",
        "89/89 [=====] - 39s 436ms/step - loss: 1.9401 - a",
        "Epoch 14/20\n",
        "89/89 [=====] - 41s 469ms/step - loss: 1.8265 - a",
        "Epoch 15/20\n",
        "89/89 [=====] - 40s 441ms/step - loss: 1.6787 - a",
        "Epoch 16/20\n",
        "89/89 [=====] - 38s 431ms/step - loss: 1.7424 - a",
        "Epoch 17/20\n",
        "89/89 [=====] - 36s 408ms/step - loss: 1.7309 - a",
        "Epoch 18/20\n",
        "89/89 [=====] - 37s 421ms/step - loss: 1.6828 - a",
        "Epoch 19/20\n",
        "89/89 [=====] - 38s 423ms/step - loss: 1.5997 - a",
        "Epoch 20/20\n",
        "89/89 [=====] - 38s 423ms/step - loss: 1.6695 - a",
    ]
},
{
    "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",

```

```
    "
    ]
  }
]
}
```