

PNT2022TMID52343

```
{
  "nbformat": 4,
  "nbformat_minor": 0,
  "metadata": {
    "colab": {
      "provenance": [],
      "collapsed_sections": []
    },
    "kernel_spec": {
      "name": "python3",
      "display_name": "Python 3"
    },
    "language_info": {
      "name": "python"
    }
  },
  "cells": [
    {
      "cell_type": "markdown",
      "source": [
        "Team ID:PNT2022TMID09657"
      ],
      "metadata": {
        "id": "A3S5qEZ82XHn"
```

```
}  
},  
{  
  "cell_type": "markdown",  
  "source": [  
    "***Importing The ImageDataGenerator Library***"  
  ],  
  "metadata": {  
    "id": "Yq7MBIMzxa46"  
  }  
},  
{  
  "cell_type": "code",  
  "execution_count": null,  
  "metadata": {  
    "id": "TwbVY9IdxT5E"  
  },  
  "outputs": [],  
  "source": [  
    "import keras \n",  
    "from keras.preprocessing.image import ImageDataGenerator"  
  ]  
},  
{  
  "cell_type": "markdown",  
  "source": [  
    "***Define the parameters/arguments for ImageDataGenerator class***"  
  ],  
  "metadata": {
```

```

        "id": "449Gl96Uxb3j"
    }
},
{
    "cell_type": "code",
    "source": [

"train_datagen=ImageDataGenerator(rescale=1./255,shear_range=0.2,rotation_range=180,zoom_range
=0.2, horizontal_flip=True)\n",

        "test_datagen=ImageDataGenerator(rescale=1./255)"
    ],
    "metadata": {
        "id": "7E0B6ZFCxcAC"
    },
    "execution_count": null,
    "outputs": []
},
{
    "cell_type": "markdown",
    "source": [
        "***Applying ImageDataGenerator functionality to trainset***"
    ],
    "metadata": {
        "id": "Ceh_nXLHxcId"
    }
},
{
    "cell_type": "code",
    "source": [

```

```
"x_train=train_datagen.flow_from_directory(r'/content/drive/MyDrive/Dataset/train_set',target_size=(128,128),batch_size=32, class_mode='binary')"
```

```
],
```

```
"metadata": {
```

```
  "colab": {
```

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

```
  },
```

```
  "id": "C5FSZ_KnxcQW",
```

```
  "outputId": "c28b17a4-def3-4de0-ca2d-711ede6b63a8"
```

```
},
```

```
"execution_count": null,
```

```
"outputs": [
```

```
  {
```

```
    "output_type": "stream",
```

```
    "name": "stdout",
```

```
    "text": [
```

```
      "Found 436 images belonging to 2 classes.\n"
```

```
    ]
```

```
  }
```

```
]
```

```
},
```

```
{
```

```
  "cell_type": "markdown",
```

```
  "source": [
```

```
    "***Applying ImageDataGenerator functionality to testset**"
```

```
  ],
```

```
"metadata": {
```

```
  "id": "dRHL_n10yDdC"
```

```

    }
  },
  {
    "cell_type": "code",
    "source": [

"x_test=test_datagen.flow_from_directory(r'/content/drive/MyDrive/Dataset/test_set',target_size=(12
8,128),batch_size=32, class_mode='binary')"

    ],
    "metadata": {
      "colab": {
        "base_uri": "https://localhost:8080/"
      },
      "id": "D7_3jdlqxzhv",
      "outputId": "fe7c7493-17db-41aa-d1b0-0e918b80fb34"
    },
    "execution_count": null,
    "outputs": [
      {
        "output_type": "stream",
        "name": "stdout",
        "text": [
          "Found 121 images belonging to 2 classes.\n"
        ]
      }
    ]
  },
  {
    "cell_type": "markdown",

```

```

"source": [
    "***Import model building libraries***"
],
"metadata": {
    "id": "6fbxEKhryYhE"
}
},
{
    "cell_type": "code",
    "source": [
        "#To define Linear initialisation import Sequential\n",
        "from keras.models import Sequential\n",
        "#To add layers import Dense\n",
        "from keras.layers import Dense\n",
        "#To create Convolution kernel import Convolution2D \n",
        "from keras.layers import Convolution2D\n",
        "#import Maxpooling layer\n",
        "from keras.layers import MaxPooling2D \n",
        "#import flatten layer\n",
        "from keras.layers import Flatten \n",
        "import warnings \n",
        "warnings.filterwarnings('ignore')
    ],
    "metadata": {
        "id": "6RuPf8_ZyYoc"
    },
    "execution_count": null,
    "outputs": []
},

```

```
{
  "cell_type": "markdown",
  "source": [
    "***Initializing the model***"
  ],
  "metadata": {
    "id": "-v8KAP49ysom"
  }
},
{
  "cell_type": "code",
  "source": [
    "model=Sequential()"
  ],
  "metadata": {
    "id": "DvWAyoLLysza"
  },
  "execution_count": null,
  "outputs": []
},
{
  "cell_type": "markdown",
  "source": [
    "***Add CNN Layer***"
  ],
  "metadata": {
    "id": "luqlqx4zyykT"
  }
},
```

```

{
  "cell_type": "code",
  "source": [
    "model.add(Convolution2D(32,(3,3),input_shape=(128,128,3),activation='relu')) \n",
    "#add maxpooling layer\n",
    "model.add(MaxPooling2D(pool_size=(2,2)))\n",
    "#add flatten layer\n",
    "model.add(Flatten())"
  ],
  "metadata": {
    "id": "XsWT_D1iyyVr"
  },
  "execution_count": null,
  "outputs": []
},
{
  "cell_type": "markdown",
  "source": [
    "***Add Hidden Layer***"
  ],
  "metadata": {
    "id": "wx8nTNR9zTgl"
  }
},
{
  "cell_type": "code",
  "source": [
    " #add hidden layer\n",
    "model.add(Dense(150,activation='relu')) \n",

```



```

"#add output layer \n",
"model.add(Dense(1,activation='sigmoid'))"
],
"metadata": {
  "id": "o3PilaCRzRbx"
},
"execution_count": null,
"outputs": []
},
{
  "cell_type": "markdown",
  "source": [
    "***Configure the learning process***"
  ],
  "metadata": {
    "id": "Q0hbp_tQzY5o"
  }
},
{
  "cell_type": "code",
  "source": [
    "model.compile(loss='binary_crossentropy',optimizer=\"adam\",metrics=[\"accuracy\"])"
  ],
  "metadata": {
    "id": "7QHmgxszZln"
  },
  "execution_count": null,
  "outputs": []
},

```

```

{
  "cell_type": "markdown",
  "source": [
    "***Train the model***"
  ],
  "metadata": {
    "id": "0OPIh_g-zhpc"
  }
},
{
  "cell_type": "code",
  "source": [

"model.fit_generator(x_train,steps_per_epoch=14,epochs=10,validation_data=x_test,validation_steps=
4)"

  ],
  "metadata": {
    "colab": {
      "base_uri": "https://localhost:8080/"
    },
    "id": "dbRjnLDazkxm",
    "outputId": "32b8e981-9d3b-466a-95d3-4d8b9e924365"
  },
  "execution_count": null,
  "outputs": [
    {
      "output_type": "stream",
      "name": "stdout",
      "text": [

```

```
"Epoch 1/10\n",  
  "14/14 [=====] - 205s 15s/step - loss: 2.7344 - accuracy: 0.7454 -  
val_loss: 0.2016 - val_accuracy: 0.9256\n",  
  "Epoch 2/10\n",  
  "14/14 [=====] - 20s 1s/step - loss: 0.3267 - accuracy: 0.8945 -  
val_loss: 0.2290 - val_accuracy: 0.9339\n",  
  "Epoch 3/10\n",  
  "14/14 [=====] - 20s 1s/step - loss: 0.2991 - accuracy: 0.8922 -  
val_loss: 0.0524 - val_accuracy: 0.9835\n",  
  "Epoch 4/10\n",  
  "14/14 [=====] - 20s 1s/step - loss: 0.2418 - accuracy: 0.9174 -  
val_loss: 0.1570 - val_accuracy: 0.9421\n",  
  "Epoch 5/10\n",  
  "14/14 [=====] - 20s 1s/step - loss: 0.1984 - accuracy: 0.9083 -  
val_loss: 0.0767 - val_accuracy: 0.9752\n",  
  "Epoch 6/10\n",  
  "14/14 [=====] - 20s 1s/step - loss: 0.1643 - accuracy: 0.9335 -  
val_loss: 0.0749 - val_accuracy: 0.9752\n",  
  "Epoch 7/10\n",  
  "14/14 [=====] - 20s 1s/step - loss: 0.1538 - accuracy: 0.9312 -  
val_loss: 0.1264 - val_accuracy: 0.9421\n",  
  "Epoch 8/10\n",  
  "14/14 [=====] - 20s 1s/step - loss: 0.1732 - accuracy: 0.9266 -  
val_loss: 0.0652 - val_accuracy: 0.9835\n",  
  "Epoch 9/10\n",  
  "14/14 [=====] - 20s 1s/step - loss: 0.1514 - accuracy: 0.9358 -  
val_loss: 0.0567 - val_accuracy: 0.9835\n",  
  "Epoch 10/10\n",  
  "14/14 [=====] - 20s 1s/step - loss: 0.1445 - accuracy: 0.9404 -  
val_loss: 0.0448 - val_accuracy: 0.9917\n"  
]  
,
```

```
{
  "output_type": "execute_result",
  "data": {
    "text/plain": [
      "<keras.callbacks.History at 0x7f51fdf33610>"
    ]
  },
  "metadata": {},
  "execution_count": 10
}
],
{
  "cell_type": "markdown",
  "source": [
    "***Save The Model***"
  ],
  "metadata": {
    "id": "ExX269AR2OJO"
  }
},
{
  "cell_type": "code",
  "source": [
    "model.save(\"forest1.h5\")"
  ],
  "metadata": {
    "id": "r_HNZErV2NPz"
  },
}
```

```
"execution_count": null,
"outputs": []
},
{
  "cell_type": "markdown",
  "source": [
    "***Predictions***"
  ],
  "metadata": {
    "id": "_KL58pMT2TR2"
  }
},
{
  "cell_type": "code",
  "source": [
    "#import load_model from keras.model\n",
    "from keras.models import load_model\n",
    "#import image class from keras\n",
    "from tensorflow.keras.preprocessing import image #import numpy\n",
    "import numpy as np\n",
    "#import cv2\n",
    "import cv2"
  ],
  "metadata": {
    "id": "ojWbOAng4RRA"
  },
  "execution_count": null,
  "outputs": []
},
```

```

{
  "cell_type": "code",
  "source": [
    "#load the saved model\n",
    "model = load_model(\"forest1.h5\")"
  ],
  "metadata": {
    "id": "ITQgwI0x4coy"
  },
  "execution_count": null,
  "outputs": []
},
{
  "cell_type": "code",
  "source": [
    "img=image.load_img(r'/content/drive/MyDrive/Dataset/test_set/forest/0.48007200_1530881924_final_forest.jpg')\n",
    "x=image.img_to_array(img)\n",
    "res = cv2.resize(x, dsize=(128, 128), interpolation=cv2.INTER_CUBIC)\n",
    "#expand the image shape\n",
    "x=np.expand_dims(res,axis=0)"
  ],
  "metadata": {
    "id": "iD7BChtG2Tad"
  },
  "execution_count": null,
  "outputs": []
},

```

```
{
  "cell_type": "code",
  "source": [
    "pred= model.predict(x)"
  ],
  "metadata": {
    "colab": {
      "base_uri": "https://localhost:8080/"
    },
    "id": "YfvDp7BZ4n41",
    "outputId": "fb723c8a-7bd3-4d05-8980-91a3911c4830"
  },
  "execution_count": null,
  "outputs": [
    {
      "output_type": "stream",
      "name": "stdout",
      "text": [
        "1/1 [=====] - 0s 94ms/step\n"
      ]
    }
  ],
},
{
  "cell_type": "code",
  "source": [
    "pred"
  ],
  "metadata": {
```

```
"colab": {
  "base_uri": "https://localhost:8080/"
},
"id": "rcnCY5ao6hg-",
"outputId": "d56708af-7c8b-4b7c-c624-4442dc2a1a26"
},
"execution_count": null,
"outputs": [
  {
    "output_type": "execute_result",
    "data": {
      "text/plain": [
        "array([[0.]], dtype=float32)"
      ]
    },
    "metadata": {},
    "execution_count": 16
  }
]
}
```