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    "import numpy as np\n",
    "import os\n",
    "import shutil\n",
    "import matplotlib.pyplot as plt"
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      "Copying files: 3660 files [01:27, 41.83 files/s] \n"
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    "#input_folder=\"CT-KIDNEY-DATASET-Normal-Cyst-Tumor-Stone\"\n",
    "#splitfolders.ratio(input_folder,output=\"CT-KIDNEY-DATASET-Normal-
Cyst-Tumor-Stone/train-test-
split\",seed=42,ratio=(0.7,0.2,0.1),group_prefix=None)"
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```
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    "train_path  = r\"C:\\Users\\91995\\Major_project\\CT-KIDNEY-DATASET-
Normal-Cyst-Tumor-Stone\\train-test-split\\train\"\n",
    "valid_path  = r\"C:\\Users\\91995\\Major_project\\CT-KIDNEY-DATASET-
Normal-Cyst-Tumor-Stone\\train-test-split\\val\"\n",
    "test_path   = r\"C:\\Users\\91995\\Major_project\\CT-KIDNEY-DATASET-
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    "from keras.preprocessing.image import ImageDataGenerator\n",
    "from keras.applications.densenet import preprocess_input,
DenseNet121\n",
    "from keras.models import Model\n",
    "from keras.layers import Dense, MaxPool2D, Conv2D\n",
    "import keras"
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    "train_data_gen = ImageDataGenerator(preprocessing_function=
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    "                                    zoom_range= 0.2, \n",
    "                                    horizontal_flip= True, \n",
    "                                    shear_range= 0.2,\n",
    "                                    \n",
    "                                    )\n",
    "\n",
    "train = train_data_gen.flow_from_directory(directory= train_path,
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target_size=(224,224))"
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preprocess_input )\n",
    "\n",
    "test = test_data_gen.flow_from_directory(directory= test_path , \n",
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    "                                         shuffle= False)"
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is represented by 1\n",
    "\n",
    "class_type = {0:'Stone',  1 : 'Tumor'}"
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    "from keras.applications.densenet import DenseNet121\n",
    "from keras.layers import Flatten , Dense, Dropout , MaxPool2D"
```

```
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include_top will "
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\n",
    "  layer.trainable = False"
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    "x = Flatten()(res.output)\n",
    "x = Dense(units=2 , activation='sigmoid', name = 'predictions'
)(x)\n",
    "\n",
    "# creating our model.\n",
    "model = Model(res.input, x)"
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Connected to                     \n",

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[]                               \n",
```

```
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      "
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['zero_padding2d[0][0]']         \n",
      "                                )
\n",
      "
\n",
      " conv1/bn (BatchNormalization)  (None, 112, 112, 64  256
['conv1/conv[0][0]']             \n",
      "                                )
\n",
      "
\n",
      " conv1/relu (Activation)         (None, 112, 112, 64  0
['conv1/bn[0][0]']               \n",
      "                                )
\n",
      "
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\n",
      "
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      "
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\n",
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\n",
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\n",
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```
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```

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      "
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      " te)
'conv3_block3_2_conv[0][0]']    \n",
      "
\n",
```

```
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\n",
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\n",
      "
\n",
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['conv3_block4_1_relu[0][0]']    \n",
      "
\n",
      " conv3_block4_concat (Concatena  (None, 28, 28, 256)  0
['conv3_block3_concat[0][0]',    \n",
      " te)
'conv3_block4_2_conv[0][0]']    \n",
      "
\n",
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\n",
      "
\n",
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['conv3_block5_0_relu[0][0]']    \n",
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      " conv3_block5_1_bn (BatchNormal  (None, 28, 28, 128)  512
['conv3_block5_1_conv[0][0]']    \n",
      " ization)
\n",
```

```
      "
\n",
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\n",
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['pool4_conv[0][0]']             \n",
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\n",
      "
\n",
      " conv5_block1_1_conv (Conv2D)   (None, 7, 7, 128)    65536
['conv5_block1_0_relu[0][0]']    \n",
      "
\n",
      " conv5_block1_1_bn (BatchNormal  (None, 7, 7, 128)   512
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      " ization)
\n",
      "
\n",
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\n",
      "
\n",
      " conv5_block1_2_conv (Conv2D)   (None, 7, 7, 32)     36864
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      "
\n",
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\n",
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      " n)
\n",
      "
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      " conv5_block2_1_conv (Conv2D)   (None, 7, 7, 128)    69632
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      "
\n",
```

```
      " conv5_block2_1_bn (BatchNormal  (None, 7, 7, 128)   512
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      " ization)
\n",
      "
\n",
      " conv5_block2_1_relu (Activatio  (None, 7, 7, 128)   0
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      " n)
\n",
      "
\n",
      " conv5_block2_2_conv (Conv2D)   (None, 7, 7, 32)     36864
['conv5_block2_1_relu[0][0]']    \n",
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\n",
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      " te)
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\n",
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      " ization)
\n",
      "
\n",
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\n",
      "
\n",
      " conv5_block3_2_conv (Conv2D)   (None, 7, 7, 32)     36864
['conv5_block3_1_relu[0][0]']    \n",
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\n",
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      " te)
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```

```
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['conv5_block3_concat[0][0]']    \n",
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      " te)
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\n",
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\n",
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\n",
```

```
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['conv5_block5_0_relu[0][0]']    \n",
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\n",
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      " ization)
\n",
      "
\n",
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      " n)
\n",
      "
\n",
      " conv5_block5_2_conv (Conv2D)   (None, 7, 7, 32)     36864
['conv5_block5_1_relu[0][0]']    \n",
      "
\n",
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['conv5_block4_concat[0][0]',    \n",
      " te)
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      "
\n",
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\n",
      "
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\n",
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\n",
      "
\n",
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      " n)
\n",
      "
\n",
      " conv5_block6_2_conv (Conv2D)   (None, 7, 7, 32)     36864
['conv5_block6_1_relu[0][0]']    \n",
      "
\n",
```

```
      " conv5_block6_concat (Concatena  (None, 7, 7, 704)   0
['conv5_block5_concat[0][0]',    \n",
      " te)
'conv5_block6_2_conv[0][0]']    \n",
      "
\n",
      " conv5_block7_0_bn (BatchNormal  (None, 7, 7, 704)   2816
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      " ization)
\n",
      "
\n",
      " conv5_block7_0_relu (Activatio  (None, 7, 7, 704)   0
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      "
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      " conv5_block7_1_conv (Conv2D)   (None, 7, 7, 128)    90112
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\n",
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\n",
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      " conv5_block7_2_conv (Conv2D)   (None, 7, 7, 32)     36864
['conv5_block7_1_relu[0][0]']    \n",
      "
\n",
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      " te)
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      "
\n",
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\n",
      "
\n",
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\n",
      "
\n",
      " conv5_block8_1_conv (Conv2D)   (None, 7, 7, 128)    94208
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```

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\n",
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['conv5_block9_1_bn[0][0]']      \n",
      " n)
\n",
      "
\n",
```

```
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\n",
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\n",
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      "
\n",
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      " lization)
\n",
      "
\n",
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\n",
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      "
\n",
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\n",
```

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\n",
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      " lization)
\n",
      "
\n",
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\n",
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\n",
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      " conv5_block12_1_conv (Conv2D)  (None, 7, 7, 128)    110592
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\n",
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      " lization)
\n",
      "
\n",
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['conv5_block13_1_conv[0][0]']   \n",
      " lization)
\n",
      "
\n",
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      "
\n",
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\n",
```

```
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\n",
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['conv5_block14_1_conv[0][0]']   \n",
      " lization)
\n",
      "
\n",
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      " on)
\n",
      "
\n",
      " conv5_block14_2_conv (Conv2D)  (None, 7, 7, 32)     36864
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\n",
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\n",
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['conv5_block15_1_conv[0][0]']   \n",
      " lization)
\n",
      "
\n",
      " conv5_block15_1_relu (Activati  (None, 7, 7, 128)   0
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      " on)
\n",
```

```
      "
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      "
\n",
      " conv5_block15_concat (Concaten  (None, 7, 7, 992)   0
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      " ate)
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      " lization)
\n",
      "
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      "
\n",
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\n",
      "
\n",
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      " on)
\n",
      "
\n",
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      "
\n",
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\n",
      " relu (Activation)              (None, 7, 7, 1024)   0
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\n",
```

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      " flatten_2 (Flatten)             (None, 50176)        0
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      " predictions (Dense)             (None, 2)            100354
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    "from keras.callbacks import ModelCheckpoint\n",
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    "es = EarlyStopping(monitor= \"val_accuracy\" , min_delta= 0.01,
patience= 3, verbose=1)\n",
    "mc = ModelCheckpoint(filepath=\"bestmodel.h5\",
monitor=\"val_accuracy\", verbose=1, save_best_only= True)"
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to bestmodel.h5\n",
      "10/10 [==============================] - 109s 10s/step - loss:
6.4259 - accuracy: 0.5531 - val_loss: 4.7980 - val_accuracy: 0.6484\n",
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      "10/10 [==============================] - ETA: 0s - loss: 2.1669 -
accuracy: 0.7656\n",
      "Epoch 2: val_accuracy improved from 0.64844 to 0.77930, saving
model to bestmodel.h5\n",
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2.1669 - accuracy: 0.7656 - val_loss: 2.5202 - val_accuracy: 0.7793\n",
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accuracy: 0.8512\n",
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model to bestmodel.h5\n",
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1.1805 - accuracy: 0.8512 - val_loss: 1.1290 - val_accuracy: 0.8633\n",
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accuracy: 0.8824\n",
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model to bestmodel.h5\n",
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model to bestmodel.h5\n",
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model to bestmodel.h5\n",
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0.1944 - accuracy: 0.9625 - val_loss: 0.1777 - val_accuracy: 0.9473\n",
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```

```
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