In [1]:
```
import warnings
warnings.filterwarnings("ignore")
import os
import cv2
import numpy as np
import matplotlib.pyplot as plt
%matplotlib inline
import seaborn as sns
from tqdm import tqdm
from sklearn.model_selection import train_test_split
from sklearn.metrics import accuracy_score, classification_report, confusion_matrix
import tensorflow as tf
from tensorflow.keras.utils import to_categorical
```

In [3]:
```
# Load class labels from directory
base_dir = 'Fruits'
class_labels = os.listdir(base_dir)
class_labels.sort()
print(class_labels)
```

```
['Lime_Bad', 'Lime_Good']
```

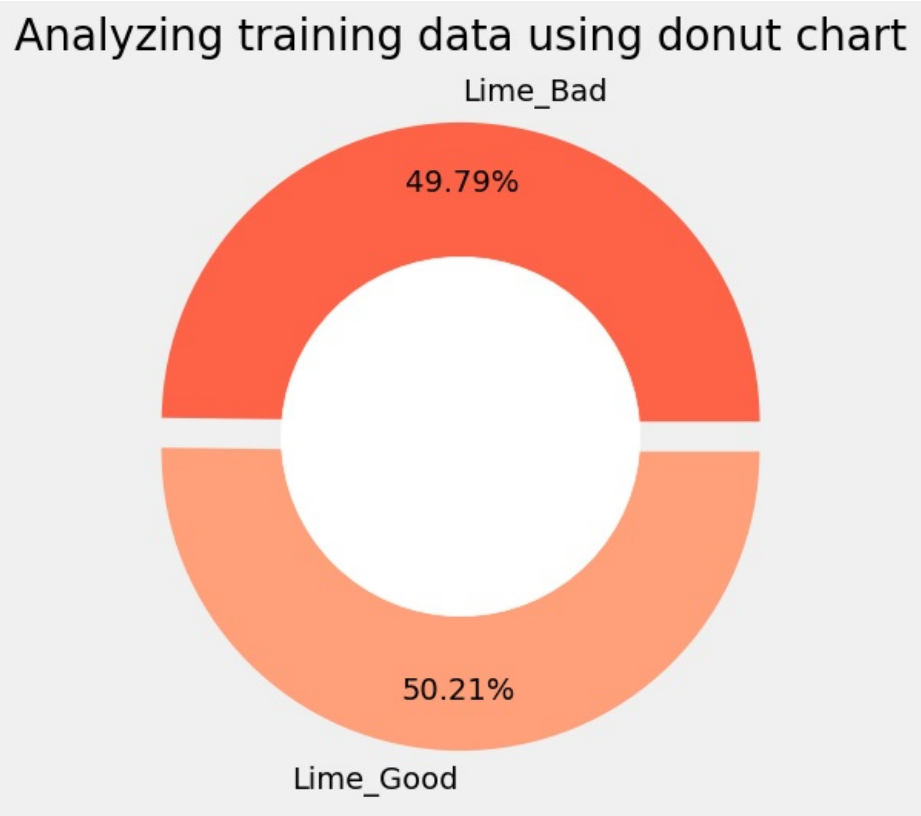
In [4]:
```
# Display the distribution of samples for each class
chart_data = []
for target in class_labels:
    path = os.path.join(base_dir, target)
    size = len(os.listdir(path))
    chart_data.append(size)
    print(f'The target {target} has {size} samples in the dataset')
```

```
The target Lime_Bad has 1085 samples in the dataset
The target Lime_Good has 1094 samples in the dataset
```

In [5]:
```
# Plot the distribution using a pie chart
with plt.style.context(style="fivethirtyeight"):
    plt.figure(figsize=(6, 6))
    plt.pie(chart_data,
            explode=[0.05]*len(class_labels),  # Positional argument
            colors=["tomato", "lightsalmon"],
            labels=class_labels,
            autopct='%.2f%%',  # Keyword argument
            pctdistance=0.80)

    # Create a white center circle
    centre_circle = plt.Circle((0, 0), 0.6, color='white')
    fig = plt.gcf()
    fig.gca().add_artist(centre_circle)

    plt.title("Analyzing training data using donut chart")
    plt.show()
```



In [6]:
```
# Load images and labels
data = []
```

```
labels = []
count = 0
for target in tqdm(class_labels):
    path = os.path.join(base_dir, target)
    image_names = os.listdir(path)
    for image_name in image_names:
        image_path = os.path.join(path, image_name)
        image = cv2.imread(image_path)
        image = cv2.cvtColor(image, cv2.COLOR_BGR2RGB)
        image = cv2.resize(image, (128, 128))  # Adjusted to square images
        image = np.array(image)
        image = image / 255.0
        data.append(image)
        labels.append(count)
    count += 1  # Increment the count after processing all images in the class

data = np.array(data)
labels = np.array(labels)
print(data.shape, labels.shape)
```

```
100%|██████████| 2/2 [00:04<00:00,  2.15s/it]
(2179, 128, 128, 3) (2179,)
```

In [7]:

```
# Function to display images
from random import randint

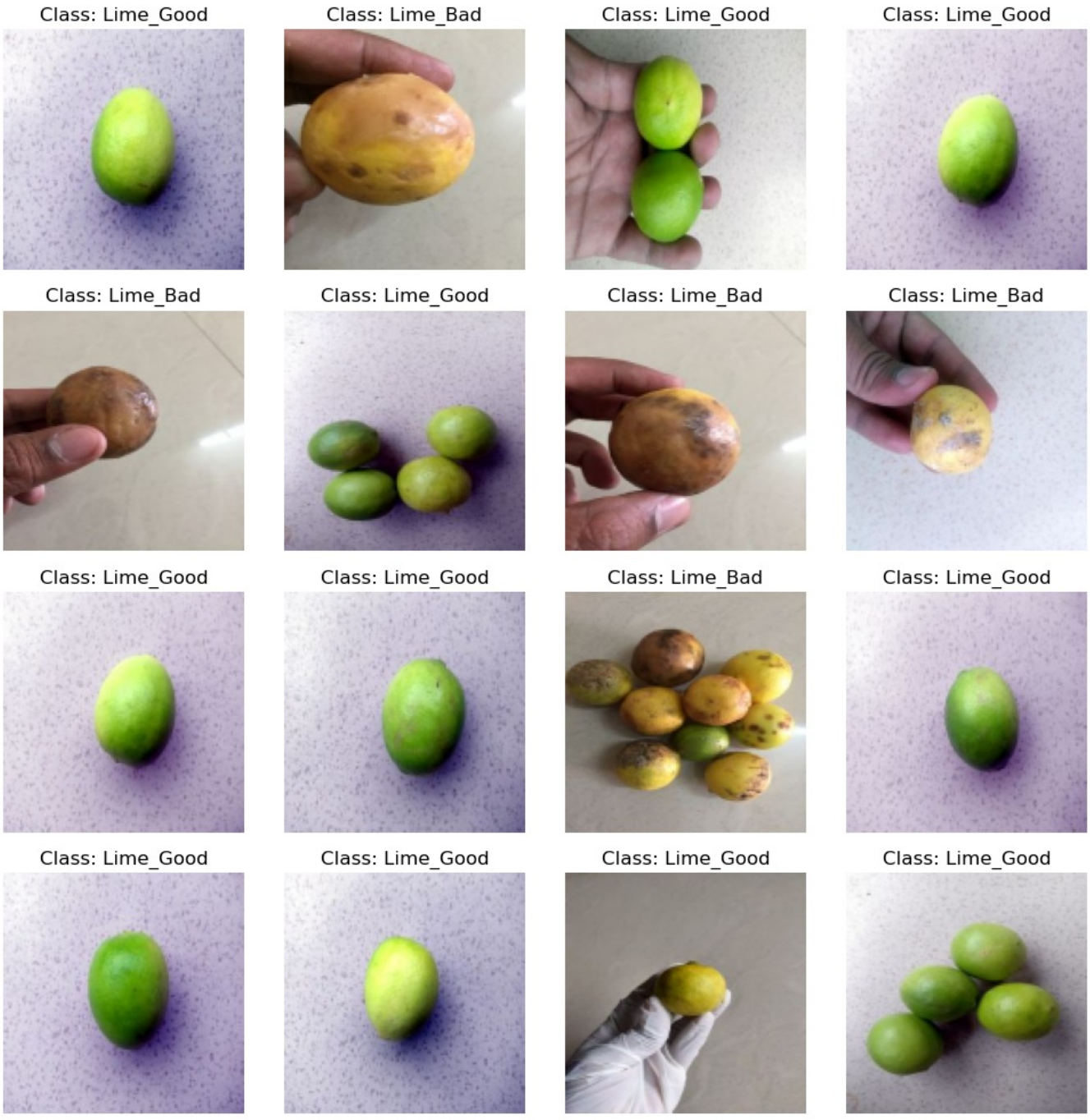
def show_images(X, labels, class_labels):
    plt.figure(figsize=(10, 10))
    for i in range(16):  # Display 16 images in a 4x4 grid
        idx = randint(0, X.shape[0] - 1)  # Generate a random index
        ax = plt.subplot(4, 4, i + 1)  # Subplot position

        # Debugging: Print index and corresponding label
        print(f"Index: {idx}, Label: {labels[idx]}, Class: {class_labels[labels[idx]]}")

        plt.imshow(X[idx])
        plt.axis("off")
        plt.title("Class: {}".format(class_labels[labels[idx]]))  # Display correct class label
    plt.tight_layout()
    plt.show()

# Show images to verify correctness
show_images(data, labels, class_labels)
```

```
Index: 1222, Label: 1, Class: Lime_Good
Index: 620, Label: 0, Class: Lime_Bad
Index: 1788, Label: 1, Class: Lime_Good
Index: 1239, Label: 1, Class: Lime_Good
Index: 528, Label: 0, Class: Lime_Bad
Index: 1983, Label: 1, Class: Lime_Good
Index: 495, Label: 0, Class: Lime_Bad
Index: 319, Label: 0, Class: Lime_Bad
Index: 1247, Label: 1, Class: Lime_Good
Index: 1564, Label: 1, Class: Lime_Good
Index: 739, Label: 0, Class: Lime_Bad
Index: 1536, Label: 1, Class: Lime_Good
Index: 1287, Label: 1, Class: Lime_Good
Index: 1190, Label: 1, Class: Lime_Good
Index: 1175, Label: 1, Class: Lime_Good
Index: 1900, Label: 1, Class: Lime_Good
```



In [10]:
```
y=to_categorical(labels)
X_train,X_test,y_train,y_test=train_test_split(data,y, test_size=0.2, random_state=42, shuffle=True)
print(X_train. shape, X_test.shape,y_train.shape,y_test.shape)
```

```
(1743, 128, 128, 3) (436, 128, 128, 3) (1743, 2) (436, 2)
```

In [12]:
```
densenet_model=tf.keras.applications.DenseNet201(include_top=False,
weights="imagenet", input_tensor=None, input_shape=(128,128,3),pooling="max",classes=1000)
densenet_model.trainable=False
```

```
Downloading data from https://storage.googleapis.com/tensorflow/keras-applications/densenet/densenet201_weights
_tf_dim_ordering_tf_kernels_notop.h5
74836368/74836368 ━━━━━━━━━━━━━━━━━━━━ 9s 0us/step
```

In [15]:
```
inputs=densenet_model.input
m=tf.keras.layers.Dense(512, activation='relu')(densenet_model.output)
outputs=tf.keras.layers.Dense(len(class_labels), activation='softmax')(m)
dense_model=tf.keras.Model(inputs=inputs,outputs=outputs)
```

In [19]:
```
dense_model.compile(optimizer='adam',loss='categorical_crossentropy',metrics=['accuracy'])
```

In [20]:
```
dense_model.summary()
```

Model: "functional"

Layer (type)	Output Shape	Param #	Connected to
input_layer (InputLayer)	(None, 128, 128, 3)	0	-
zero_padding2d (ZeroPadding2D)	(None, 134, 134, 3)	0	input_layer[0][0]
conv1_conv (Conv2D)	(None, 64, 64, 64)	9,408	zero_padding2d[0][0]
conv1_bn (BatchNormalization)	(None, 64, 64, 64)	256	conv1_conv[0][0]
conv1_relu (Activation)	(None, 64, 64, 64)	0	conv1_bn[0][0]
zero_padding2d_1 (ZeroPadding2D)	(None, 66, 66, 64)	0	conv1_relu[0][0]
pool1 (MaxPooling2D)	(None, 32, 32, 64)	0	zero_padding2d_1[0][0]
conv2_block1_0_bn (BatchNormalization)	(None, 32, 32, 64)	256	pool1[0][0]
conv2_block1_0_relu (Activation)	(None, 32, 32, 64)	0	conv2_block1_0_bn[0][0]
conv2_block1_1_conv (Conv2D)	(None, 32, 32, 128)	8,192	conv2_block1_0_relu[0][0
conv2_block1_1_bn (BatchNormalization)	(None, 32, 32, 128)	512	conv2_block1_1_conv[0][0
conv2_block1_1_relu (Activation)	(None, 32, 32, 128)	0	conv2_block1_1_bn[0][0]
conv2_block1_2_conv (Conv2D)	(None, 32, 32, 32)	36,864	conv2_block1_1_relu[0][0
conv2_block1_concat (Concatenate)	(None, 32, 32, 96)	0	pool1[0][0], conv2_block1_2_conv[0][0
conv2_block2_0_bn (BatchNormalization)	(None, 32, 32, 96)	384	conv2_block1_concat[0][0
conv2_block2_0_relu (Activation)	(None, 32, 32, 96)	0	conv2_block2_0_bn[0][0]
conv2_block2_1_conv (Conv2D)	(None, 32, 32, 128)	12,288	conv2_block2_0_relu[0][0
conv2_block2_1_bn (BatchNormalization)	(None, 32, 32, 128)	512	conv2_block2_1_conv[0][0
conv2_block2_1_relu (Activation)	(None, 32, 32, 128)	0	conv2_block2_1_bn[0][0]
conv2_block2_2_conv (Conv2D)	(None, 32, 32, 32)	36,864	conv2_block2_1_relu[0][0
conv2_block2_concat (Concatenate)	(None, 32, 32, 128)	0	conv2_block1_concat[0][0 conv2_block2_2_conv[0][0
conv2_block3_0_bn (BatchNormalization)	(None, 32, 32, 128)	512	conv2_block2_concat[0][0
conv2_block3_0_relu (Activation)	(None, 32, 32, 128)	0	conv2_block3_0_bn[0][0]
conv2_block3_1_conv (Conv2D)	(None, 32, 32, 128)	16,384	conv2_block3_0_relu[0][0

conv2_block3_1_bn (BatchNormalization)	(None, 32, 32, 128)	512	conv2_block3_1_conv[0][0
conv2_block3_1_relu (Activation)	(None, 32, 32, 128)	0	conv2_block3_1_bn[0][0]
conv2_block3_2_conv (Conv2D)	(None, 32, 32, 32)	36,864	conv2_block3_1_relu[0][0
conv2_block3_concat (Concatenate)	(None, 32, 32, 160)	0	conv2_block2_concat[0][0 conv2_block3_2_conv[0][0
conv2_block4_0_bn (BatchNormalization)	(None, 32, 32, 160)	640	conv2_block3_concat[0][0
conv2_block4_0_relu (Activation)	(None, 32, 32, 160)	0	conv2_block4_0_bn[0][0]
conv2_block4_1_conv (Conv2D)	(None, 32, 32, 128)	20,480	conv2_block4_0_relu[0][0
conv2_block4_1_bn (BatchNormalization)	(None, 32, 32, 128)	512	conv2_block4_1_conv[0][0
conv2_block4_1_relu (Activation)	(None, 32, 32, 128)	0	conv2_block4_1_bn[0][0]
conv2_block4_2_conv (Conv2D)	(None, 32, 32, 32)	36,864	conv2_block4_1_relu[0][0
conv2_block4_concat (Concatenate)	(None, 32, 32, 192)	0	conv2_block3_concat[0][0 conv2_block4_2_conv[0][0
conv2_block5_0_bn (BatchNormalization)	(None, 32, 32, 192)	768	conv2_block4_concat[0][0
conv2_block5_0_relu (Activation)	(None, 32, 32, 192)	0	conv2_block5_0_bn[0][0]
conv2_block5_1_conv (Conv2D)	(None, 32, 32, 128)	24,576	conv2_block5_0_relu[0][0
conv2_block5_1_bn (BatchNormalization)	(None, 32, 32, 128)	512	conv2_block5_1_conv[0][0
conv2_block5_1_relu (Activation)	(None, 32, 32, 128)	0	conv2_block5_1_bn[0][0]
conv2_block5_2_conv (Conv2D)	(None, 32, 32, 32)	36,864	conv2_block5_1_relu[0][0
conv2_block5_concat (Concatenate)	(None, 32, 32, 224)	0	conv2_block4_concat[0][0 conv2_block5_2_conv[0][0
conv2_block6_0_bn (BatchNormalization)	(None, 32, 32, 224)	896	conv2_block5_concat[0][0
conv2_block6_0_relu (Activation)	(None, 32, 32, 224)	0	conv2_block6_0_bn[0][0]
conv2_block6_1_conv (Conv2D)	(None, 32, 32, 128)	28,672	conv2_block6_0_relu[0][0
conv2_block6_1_bn (BatchNormalization)	(None, 32, 32, 128)	512	conv2_block6_1_conv[0][0
conv2_block6_1_relu (Activation)	(None, 32, 32, 128)	0	conv2_block6_1_bn[0][0]
conv2_block6_2_conv (Conv2D)	(None, 32, 32, 32)	36,864	conv2_block6_1_relu[0][0
conv2_block6_concat (Concatenate)	(None, 32, 32, 256)	0	conv2_block5_concat[0][0 conv2_block6_2_conv[0][0
pool2_bn (BatchNormalization)	(None, 32, 32, 256)	1,024	conv2_block6_concat[0][0
pool2_relu (Activation)	(None, 32, 32, 256)	0	pool2_bn[0][0]
pool2_conv (Conv2D)	(None, 32, 32, 128)	32,768	pool2_relu[0][0]
pool2_pool (AveragePooling2D)	(None, 16, 16, 128)	0	pool2_conv[0][0]
conv3_block1_0_bn (BatchNormalization)	(None, 16, 16, 128)	512	pool2_pool[0][0]
conv3_block1_0_relu (Activation)	(None, 16, 16, 128)	0	conv3_block1_0_bn[0][0]

conv3_block1_1_conv (Conv2D)	(None, 16, 16, 128)	16,384	conv3_block1_0_relu[0][0
conv3_block1_1_bn (BatchNormalization)	(None, 16, 16, 128)	512	conv3_block1_1_conv[0][0
conv3_block1_1_relu (Activation)	(None, 16, 16, 128)	0	conv3_block1_1_bn[0][0]
conv3_block1_2_conv (Conv2D)	(None, 16, 16, 32)	36,864	conv3_block1_1_relu[0][0
conv3_block1_concat (Concatenate)	(None, 16, 16, 160)	0	pool2_pool[0][0], conv3_block1_2_conv[0][0
conv3_block2_0_bn (BatchNormalization)	(None, 16, 16, 160)	640	conv3_block1_concat[0][0
conv3_block2_0_relu (Activation)	(None, 16, 16, 160)	0	conv3_block2_0_bn[0][0]
conv3_block2_1_conv (Conv2D)	(None, 16, 16, 128)	20,480	conv3_block2_0_relu[0][0
conv3_block2_1_bn (BatchNormalization)	(None, 16, 16, 128)	512	conv3_block2_1_conv[0][0
conv3_block2_1_relu (Activation)	(None, 16, 16, 128)	0	conv3_block2_1_bn[0][0]
conv3_block2_2_conv (Conv2D)	(None, 16, 16, 32)	36,864	conv3_block2_1_relu[0][0
conv3_block2_concat (Concatenate)	(None, 16, 16, 192)	0	conv3_block1_concat[0][0 conv3_block2_2_conv[0][0
conv3_block3_0_bn (BatchNormalization)	(None, 16, 16, 192)	768	conv3_block2_concat[0][0
conv3_block3_0_relu (Activation)	(None, 16, 16, 192)	0	conv3_block3_0_bn[0][0]
conv3_block3_1_conv (Conv2D)	(None, 16, 16, 128)	24,576	conv3_block3_0_relu[0][0
conv3_block3_1_bn (BatchNormalization)	(None, 16, 16, 128)	512	conv3_block3_1_conv[0][0
conv3_block3_1_relu (Activation)	(None, 16, 16, 128)	0	conv3_block3_1_bn[0][0]
conv3_block3_2_conv (Conv2D)	(None, 16, 16, 32)	36,864	conv3_block3_1_relu[0][0
conv3_block3_concat (Concatenate)	(None, 16, 16, 224)	0	conv3_block2_concat[0][0 conv3_block3_2_conv[0][0
conv3_block4_0_bn (BatchNormalization)	(None, 16, 16, 224)	896	conv3_block3_concat[0][0
conv3_block4_0_relu (Activation)	(None, 16, 16, 224)	0	conv3_block4_0_bn[0][0]
conv3_block4_1_conv (Conv2D)	(None, 16, 16, 128)	28,672	conv3_block4_0_relu[0][0
conv3_block4_1_bn (BatchNormalization)	(None, 16, 16, 128)	512	conv3_block4_1_conv[0][0
conv3_block4_1_relu (Activation)	(None, 16, 16, 128)	0	conv3_block4_1_bn[0][0]
conv3_block4_2_conv (Conv2D)	(None, 16, 16, 32)	36,864	conv3_block4_1_relu[0][0
conv3_block4_concat (Concatenate)	(None, 16, 16, 256)	0	conv3_block3_concat[0][0 conv3_block4_2_conv[0][0
conv3_block5_0_bn (BatchNormalization)	(None, 16, 16, 256)	1,024	conv3_block4_concat[0][0
conv3_block5_0_relu (Activation)	(None, 16, 16, 256)	0	conv3_block5_0_bn[0][0]
conv3_block5_1_conv (Conv2D)	(None, 16, 16, 128)	32,768	conv3_block5_0_relu[0][0
conv3_block5_1_bn (BatchNormalization)	(None, 16, 16, 128)	512	conv3_block5_1_conv[0][0
conv3_block5_1_relu (Activation)	(None, 16, 16, 128)	0	conv3_block5_1_bn[0][0]

conv3_block5_2_conv (Conv2D)	(None, 16, 16, 32)	36,864	conv3_block5_1_relu[0][0
conv3_block5_concat (Concatenate)	(None, 16, 16, 288)	0	conv3_block4_concat[0][0 conv3_block5_2_conv[0][0
conv3_block6_0_bn (BatchNormalization)	(None, 16, 16, 288)	1,152	conv3_block5_concat[0][0
conv3_block6_0_relu (Activation)	(None, 16, 16, 288)	0	conv3_block6_0_bn[0][0]
conv3_block6_1_conv (Conv2D)	(None, 16, 16, 128)	36,864	conv3_block6_0_relu[0][0
conv3_block6_1_bn (BatchNormalization)	(None, 16, 16, 128)	512	conv3_block6_1_conv[0][0
conv3_block6_1_relu (Activation)	(None, 16, 16, 128)	0	conv3_block6_1_bn[0][0]
conv3_block6_2_conv (Conv2D)	(None, 16, 16, 32)	36,864	conv3_block6_1_relu[0][0
conv3_block6_concat (Concatenate)	(None, 16, 16, 320)	0	conv3_block5_concat[0][0 conv3_block6_2_conv[0][0
conv3_block7_0_bn (BatchNormalization)	(None, 16, 16, 320)	1,280	conv3_block6_concat[0][0
conv3_block7_0_relu (Activation)	(None, 16, 16, 320)	0	conv3_block7_0_bn[0][0]
conv3_block7_1_conv (Conv2D)	(None, 16, 16, 128)	40,960	conv3_block7_0_relu[0][0
conv3_block7_1_bn (BatchNormalization)	(None, 16, 16, 128)	512	conv3_block7_1_conv[0][0
conv3_block7_1_relu (Activation)	(None, 16, 16, 128)	0	conv3_block7_1_bn[0][0]
conv3_block7_2_conv (Conv2D)	(None, 16, 16, 32)	36,864	conv3_block7_1_relu[0][0
conv3_block7_concat (Concatenate)	(None, 16, 16, 352)	0	conv3_block6_concat[0][0 conv3_block7_2_conv[0][0
conv3_block8_0_bn (BatchNormalization)	(None, 16, 16, 352)	1,408	conv3_block7_concat[0][0
conv3_block8_0_relu (Activation)	(None, 16, 16, 352)	0	conv3_block8_0_bn[0][0]
conv3_block8_1_conv (Conv2D)	(None, 16, 16, 128)	45,056	conv3_block8_0_relu[0][0
conv3_block8_1_bn (BatchNormalization)	(None, 16, 16, 128)	512	conv3_block8_1_conv[0][0
conv3_block8_1_relu (Activation)	(None, 16, 16, 128)	0	conv3_block8_1_bn[0][0]
conv3_block8_2_conv (Conv2D)	(None, 16, 16, 32)	36,864	conv3_block8_1_relu[0][0
conv3_block8_concat (Concatenate)	(None, 16, 16, 384)	0	conv3_block7_concat[0][0 conv3_block8_2_conv[0][0
conv3_block9_0_bn (BatchNormalization)	(None, 16, 16, 384)	1,536	conv3_block8_concat[0][0
conv3_block9_0_relu (Activation)	(None, 16, 16, 384)	0	conv3_block9_0_bn[0][0]
conv3_block9_1_conv (Conv2D)	(None, 16, 16, 128)	49,152	conv3_block9_0_relu[0][0
conv3_block9_1_bn (BatchNormalization)	(None, 16, 16, 128)	512	conv3_block9_1_conv[0][0
conv3_block9_1_relu (Activation)	(None, 16, 16, 128)	0	conv3_block9_1_bn[0][0]
conv3_block9_2_conv (Conv2D)	(None, 16, 16, 32)	36,864	conv3_block9_1_relu[0][0
conv3_block9_concat (Concatenate)	(None, 16, 16, 416)	0	conv3_block8_concat[0][0 conv3_block9_2_conv[0][0
conv3_block10_0_bn	(None, 16, 16, 416)	1,664	conv3_block9_concat[0][0

(BatchNormalization)			
conv3_block10_0_relu (Activation)	(None, 16, 16, 416)	0	conv3_block10_0_bn[0][0]
conv3_block10_1_conv (Conv2D)	(None, 16, 16, 128)	53,248	conv3_block10_0_relu[0][
conv3_block10_1_bn (BatchNormalization)	(None, 16, 16, 128)	512	conv3_block10_1_conv[0][
conv3_block10_1_relu (Activation)	(None, 16, 16, 128)	0	conv3_block10_1_bn[0][0]
conv3_block10_2_conv (Conv2D)	(None, 16, 16, 32)	36,864	conv3_block10_1_relu[0][
conv3_block10_concat (Concatenate)	(None, 16, 16, 448)	0	conv3_block9_concat[0][0 conv3_block10_2_conv[0][
conv3_block11_0_bn (BatchNormalization)	(None, 16, 16, 448)	1,792	conv3_block10_concat[0][
conv3_block11_0_relu (Activation)	(None, 16, 16, 448)	0	conv3_block11_0_bn[0][0]
conv3_block11_1_conv (Conv2D)	(None, 16, 16, 128)	57,344	conv3_block11_0_relu[0][
conv3_block11_1_bn (BatchNormalization)	(None, 16, 16, 128)	512	conv3_block11_1_conv[0][
conv3_block11_1_relu (Activation)	(None, 16, 16, 128)	0	conv3_block11_1_bn[0][0]
conv3_block11_2_conv (Conv2D)	(None, 16, 16, 32)	36,864	conv3_block11_1_relu[0][
conv3_block11_concat (Concatenate)	(None, 16, 16, 480)	0	conv3_block10_concat[0][conv3_block11_2_conv[0][
conv3_block12_0_bn (BatchNormalization)	(None, 16, 16, 480)	1,920	conv3_block11_concat[0][
conv3_block12_0_relu (Activation)	(None, 16, 16, 480)	0	conv3_block12_0_bn[0][0]
conv3_block12_1_conv (Conv2D)	(None, 16, 16, 128)	61,440	conv3_block12_0_relu[0][
conv3_block12_1_bn (BatchNormalization)	(None, 16, 16, 128)	512	conv3_block12_1_conv[0][
conv3_block12_1_relu (Activation)	(None, 16, 16, 128)	0	conv3_block12_1_bn[0][0]
conv3_block12_2_conv (Conv2D)	(None, 16, 16, 32)	36,864	conv3_block12_1_relu[0][
conv3_block12_concat (Concatenate)	(None, 16, 16, 512)	0	conv3_block11_concat[0][conv3_block12_2_conv[0][
pool3_bn (BatchNormalization)	(None, 16, 16, 512)	2,048	conv3_block12_concat[0][
pool3_relu (Activation)	(None, 16, 16, 512)	0	pool3_bn[0][0]
pool3_conv (Conv2D)	(None, 16, 16, 256)	131,072	pool3_relu[0][0]
pool3_pool (AveragePooling2D)	(None, 8, 8, 256)	0	pool3_conv[0][0]
conv4_block1_0_bn (BatchNormalization)	(None, 8, 8, 256)	1,024	pool3_pool[0][0]
conv4_block1_0_relu (Activation)	(None, 8, 8, 256)	0	conv4_block1_0_bn[0][0]
conv4_block1_1_conv (Conv2D)	(None, 8, 8, 128)	32,768	conv4_block1_0_relu[0][0
conv4_block1_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block1_1_conv[0][0
conv4_block1_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block1_1_bn[0][0]
conv4_block1_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block1_1_relu[0][0
conv4_block1_concat (Concatenate)	(None, 8, 8, 288)	0	pool3_pool[0][0], conv4_block1_2_conv[0][0

conv4_block2_0_bn (BatchNormalization)	(None, 8, 8, 288)	1,152	conv4_block1_concat[0][0
conv4_block2_0_relu (Activation)	(None, 8, 8, 288)	0	conv4_block2_0_bn[0][0]
conv4_block2_1_conv (Conv2D)	(None, 8, 8, 128)	36,864	conv4_block2_0_relu[0][0
conv4_block2_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block2_1_conv[0][0
conv4_block2_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block2_1_bn[0][0]
conv4_block2_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block2_1_relu[0][0
conv4_block2_concat (Concatenate)	(None, 8, 8, 320)	0	conv4_block1_concat[0][0 conv4_block2_2_conv[0][0
conv4_block3_0_bn (BatchNormalization)	(None, 8, 8, 320)	1,280	conv4_block2_concat[0][0
conv4_block3_0_relu (Activation)	(None, 8, 8, 320)	0	conv4_block3_0_bn[0][0]
conv4_block3_1_conv (Conv2D)	(None, 8, 8, 128)	40,960	conv4_block3_0_relu[0][0
conv4_block3_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block3_1_conv[0][0
conv4_block3_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block3_1_bn[0][0]
conv4_block3_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block3_1_relu[0][0
conv4_block3_concat (Concatenate)	(None, 8, 8, 352)	0	conv4_block2_concat[0][0 conv4_block3_2_conv[0][0
conv4_block4_0_bn (BatchNormalization)	(None, 8, 8, 352)	1,408	conv4_block3_concat[0][0
conv4_block4_0_relu (Activation)	(None, 8, 8, 352)	0	conv4_block4_0_bn[0][0]
conv4_block4_1_conv (Conv2D)	(None, 8, 8, 128)	45,056	conv4_block4_0_relu[0][0
conv4_block4_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block4_1_conv[0][0
conv4_block4_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block4_1_bn[0][0]
conv4_block4_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block4_1_relu[0][0
conv4_block4_concat (Concatenate)	(None, 8, 8, 384)	0	conv4_block3_concat[0][0 conv4_block4_2_conv[0][0
conv4_block5_0_bn (BatchNormalization)	(None, 8, 8, 384)	1,536	conv4_block4_concat[0][0
conv4_block5_0_relu (Activation)	(None, 8, 8, 384)	0	conv4_block5_0_bn[0][0]
conv4_block5_1_conv (Conv2D)	(None, 8, 8, 128)	49,152	conv4_block5_0_relu[0][0
conv4_block5_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block5_1_conv[0][0
conv4_block5_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block5_1_bn[0][0]
conv4_block5_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block5_1_relu[0][0
conv4_block5_concat (Concatenate)	(None, 8, 8, 416)	0	conv4_block4_concat[0][0 conv4_block5_2_conv[0][0
conv4_block6_0_bn (BatchNormalization)	(None, 8, 8, 416)	1,664	conv4_block5_concat[0][0
conv4_block6_0_relu (Activation)	(None, 8, 8, 416)	0	conv4_block6_0_bn[0][0]
conv4_block6_1_conv (Conv2D)	(None, 8, 8, 128)	53,248	conv4_block6_0_relu[0][0

conv4_block6_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block6_1_conv[0][0
conv4_block6_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block6_1_bn[0][0]
conv4_block6_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block6_1_relu[0][0
conv4_block6_concat (Concatenate)	(None, 8, 8, 448)	0	conv4_block5_concat[0][0 conv4_block6_2_conv[0][0
conv4_block7_0_bn (BatchNormalization)	(None, 8, 8, 448)	1,792	conv4_block6_concat[0][0
conv4_block7_0_relu (Activation)	(None, 8, 8, 448)	0	conv4_block7_0_bn[0][0]
conv4_block7_1_conv (Conv2D)	(None, 8, 8, 128)	57,344	conv4_block7_0_relu[0][0
conv4_block7_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block7_1_conv[0][0
conv4_block7_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block7_1_bn[0][0]
conv4_block7_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block7_1_relu[0][0
conv4_block7_concat (Concatenate)	(None, 8, 8, 480)	0	conv4_block6_concat[0][0 conv4_block7_2_conv[0][0
conv4_block8_0_bn (BatchNormalization)	(None, 8, 8, 480)	1,920	conv4_block7_concat[0][0
conv4_block8_0_relu (Activation)	(None, 8, 8, 480)	0	conv4_block8_0_bn[0][0]
conv4_block8_1_conv (Conv2D)	(None, 8, 8, 128)	61,440	conv4_block8_0_relu[0][0
conv4_block8_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block8_1_conv[0][0
conv4_block8_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block8_1_bn[0][0]
conv4_block8_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block8_1_relu[0][0
conv4_block8_concat (Concatenate)	(None, 8, 8, 512)	0	conv4_block7_concat[0][0 conv4_block8_2_conv[0][0
conv4_block9_0_bn (BatchNormalization)	(None, 8, 8, 512)	2,048	conv4_block8_concat[0][0
conv4_block9_0_relu (Activation)	(None, 8, 8, 512)	0	conv4_block9_0_bn[0][0]
conv4_block9_1_conv (Conv2D)	(None, 8, 8, 128)	65,536	conv4_block9_0_relu[0][0
conv4_block9_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block9_1_conv[0][0
conv4_block9_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block9_1_bn[0][0]
conv4_block9_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block9_1_relu[0][0
conv4_block9_concat (Concatenate)	(None, 8, 8, 544)	0	conv4_block8_concat[0][0 conv4_block9_2_conv[0][0
conv4_block10_0_bn (BatchNormalization)	(None, 8, 8, 544)	2,176	conv4_block9_concat[0][0
conv4_block10_0_relu (Activation)	(None, 8, 8, 544)	0	conv4_block10_0_bn[0][0]
conv4_block10_1_conv (Conv2D)	(None, 8, 8, 128)	69,632	conv4_block10_0_relu[0][
conv4_block10_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block10_1_conv[0][
conv4_block10_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block10_1_bn[0][0]

conv4_block10_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block10_1_relu[0][
conv4_block10_concat (Concatenate)	(None, 8, 8, 576)	0	conv4_block9_concat[0][0 conv4_block10_2_conv[0][
conv4_block11_0_bn (BatchNormalization)	(None, 8, 8, 576)	2,304	conv4_block10_concat[0][
conv4_block11_0_relu (Activation)	(None, 8, 8, 576)	0	conv4_block11_0_bn[0][0]
conv4_block11_1_conv (Conv2D)	(None, 8, 8, 128)	73,728	conv4_block11_0_relu[0][
conv4_block11_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block11_1_conv[0][
conv4_block11_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block11_1_bn[0][0]
conv4_block11_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block11_1_relu[0][
conv4_block11_concat (Concatenate)	(None, 8, 8, 608)	0	conv4_block10_concat[0][conv4_block11_2_conv[0][
conv4_block12_0_bn (BatchNormalization)	(None, 8, 8, 608)	2,432	conv4_block11_concat[0][
conv4_block12_0_relu (Activation)	(None, 8, 8, 608)	0	conv4_block12_0_bn[0][0]
conv4_block12_1_conv (Conv2D)	(None, 8, 8, 128)	77,824	conv4_block12_0_relu[0][
conv4_block12_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block12_1_conv[0][
conv4_block12_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block12_1_bn[0][0]
conv4_block12_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block12_1_relu[0][
conv4_block12_concat (Concatenate)	(None, 8, 8, 640)	0	conv4_block11_concat[0][conv4_block12_2_conv[0][
conv4_block13_0_bn (BatchNormalization)	(None, 8, 8, 640)	2,560	conv4_block12_concat[0][
conv4_block13_0_relu (Activation)	(None, 8, 8, 640)	0	conv4_block13_0_bn[0][0]
conv4_block13_1_conv (Conv2D)	(None, 8, 8, 128)	81,920	conv4_block13_0_relu[0][
conv4_block13_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block13_1_conv[0][
conv4_block13_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block13_1_bn[0][0]
conv4_block13_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block13_1_relu[0][
conv4_block13_concat (Concatenate)	(None, 8, 8, 672)	0	conv4_block12_concat[0][conv4_block13_2_conv[0][
conv4_block14_0_bn (BatchNormalization)	(None, 8, 8, 672)	2,688	conv4_block13_concat[0][
conv4_block14_0_relu (Activation)	(None, 8, 8, 672)	0	conv4_block14_0_bn[0][0]
conv4_block14_1_conv (Conv2D)	(None, 8, 8, 128)	86,016	conv4_block14_0_relu[0][
conv4_block14_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block14_1_conv[0][
conv4_block14_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block14_1_bn[0][0]
conv4_block14_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block14_1_relu[0][
conv4_block14_concat (Concatenate)	(None, 8, 8, 704)	0	conv4_block13_concat[0][conv4_block14_2_conv[0][
conv4_block15_0_bn (BatchNormalization)	(None, 8, 8, 704)	2,816	conv4_block14_concat[0][

conv4_block15_0_relu (Activation)	(None, 8, 8, 704)	0	conv4_block15_0_bn[0][0]
conv4_block15_1_conv (Conv2D)	(None, 8, 8, 128)	90,112	conv4_block15_0_relu[0][
conv4_block15_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block15_1_conv[0][
conv4_block15_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block15_1_bn[0][0]
conv4_block15_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block15_1_relu[0][
conv4_block15_concat (Concatenate)	(None, 8, 8, 736)	0	conv4_block14_concat[0][conv4_block15_2_conv[0][
conv4_block16_0_bn (BatchNormalization)	(None, 8, 8, 736)	2,944	conv4_block15_concat[0][
conv4_block16_0_relu (Activation)	(None, 8, 8, 736)	0	conv4_block16_0_bn[0][0]
conv4_block16_1_conv (Conv2D)	(None, 8, 8, 128)	94,208	conv4_block16_0_relu[0][
conv4_block16_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block16_1_conv[0][
conv4_block16_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block16_1_bn[0][0]
conv4_block16_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block16_1_relu[0][
conv4_block16_concat (Concatenate)	(None, 8, 8, 768)	0	conv4_block15_concat[0][conv4_block16_2_conv[0][
conv4_block17_0_bn (BatchNormalization)	(None, 8, 8, 768)	3,072	conv4_block16_concat[0][
conv4_block17_0_relu (Activation)	(None, 8, 8, 768)	0	conv4_block17_0_bn[0][0]
conv4_block17_1_conv (Conv2D)	(None, 8, 8, 128)	98,304	conv4_block17_0_relu[0][
conv4_block17_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block17_1_conv[0][
conv4_block17_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block17_1_bn[0][0]
conv4_block17_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block17_1_relu[0][
conv4_block17_concat (Concatenate)	(None, 8, 8, 800)	0	conv4_block16_concat[0][conv4_block17_2_conv[0][
conv4_block18_0_bn (BatchNormalization)	(None, 8, 8, 800)	3,200	conv4_block17_concat[0][
conv4_block18_0_relu (Activation)	(None, 8, 8, 800)	0	conv4_block18_0_bn[0][0]
conv4_block18_1_conv (Conv2D)	(None, 8, 8, 128)	102,400	conv4_block18_0_relu[0][
conv4_block18_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block18_1_conv[0][
conv4_block18_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block18_1_bn[0][0]
conv4_block18_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block18_1_relu[0][
conv4_block18_concat (Concatenate)	(None, 8, 8, 832)	0	conv4_block17_concat[0][conv4_block18_2_conv[0][
conv4_block19_0_bn (BatchNormalization)	(None, 8, 8, 832)	3,328	conv4_block18_concat[0][
conv4_block19_0_relu (Activation)	(None, 8, 8, 832)	0	conv4_block19_0_bn[0][0]
conv4_block19_1_conv (Conv2D)	(None, 8, 8, 128)	106,496	conv4_block19_0_relu[0][
conv4_block19_1_bn	(None, 8, 8, 128)	512	conv4_block19_1_conv[0][

(BatchNormalization)			
conv4_block19_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block19_1_bn[0][0]
conv4_block19_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block19_1_relu[0][
conv4_block19_concat (Concatenate)	(None, 8, 8, 864)	0	conv4_block18_concat[0][conv4_block19_2_conv[0][
conv4_block20_0_bn (BatchNormalization)	(None, 8, 8, 864)	3,456	conv4_block19_concat[0][
conv4_block20_0_relu (Activation)	(None, 8, 8, 864)	0	conv4_block20_0_bn[0][0]
conv4_block20_1_conv (Conv2D)	(None, 8, 8, 128)	110,592	conv4_block20_0_relu[0][
conv4_block20_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block20_1_conv[0][
conv4_block20_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block20_1_bn[0][0]
conv4_block20_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block20_1_relu[0][
conv4_block20_concat (Concatenate)	(None, 8, 8, 896)	0	conv4_block19_concat[0][conv4_block20_2_conv[0][
conv4_block21_0_bn (BatchNormalization)	(None, 8, 8, 896)	3,584	conv4_block20_concat[0][
conv4_block21_0_relu (Activation)	(None, 8, 8, 896)	0	conv4_block21_0_bn[0][0]
conv4_block21_1_conv (Conv2D)	(None, 8, 8, 128)	114,688	conv4_block21_0_relu[0][
conv4_block21_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block21_1_conv[0][
conv4_block21_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block21_1_bn[0][0]
conv4_block21_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block21_1_relu[0][
conv4_block21_concat (Concatenate)	(None, 8, 8, 928)	0	conv4_block20_concat[0][conv4_block21_2_conv[0][
conv4_block22_0_bn (BatchNormalization)	(None, 8, 8, 928)	3,712	conv4_block21_concat[0][
conv4_block22_0_relu (Activation)	(None, 8, 8, 928)	0	conv4_block22_0_bn[0][0]
conv4_block22_1_conv (Conv2D)	(None, 8, 8, 128)	118,784	conv4_block22_0_relu[0][
conv4_block22_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block22_1_conv[0][
conv4_block22_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block22_1_bn[0][0]
conv4_block22_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block22_1_relu[0][
conv4_block22_concat (Concatenate)	(None, 8, 8, 960)	0	conv4_block21_concat[0][conv4_block22_2_conv[0][
conv4_block23_0_bn (BatchNormalization)	(None, 8, 8, 960)	3,840	conv4_block22_concat[0][
conv4_block23_0_relu (Activation)	(None, 8, 8, 960)	0	conv4_block23_0_bn[0][0]
conv4_block23_1_conv (Conv2D)	(None, 8, 8, 128)	122,880	conv4_block23_0_relu[0][
conv4_block23_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block23_1_conv[0][
conv4_block23_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block23_1_bn[0][0]
conv4_block23_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block23_1_relu[0][

conv4_block23_concat (Concatenate)	(None, 8, 8, 992)	0	conv4_block22_concat[0][conv4_block23_2_conv[0][
conv4_block24_0_bn (BatchNormalization)	(None, 8, 8, 992)	3,968	conv4_block23_concat[0][
conv4_block24_0_relu (Activation)	(None, 8, 8, 992)	0	conv4_block24_0_bn[0][0]
conv4_block24_1_conv (Conv2D)	(None, 8, 8, 128)	126,976	conv4_block24_0_relu[0][
conv4_block24_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block24_1_conv[0][
conv4_block24_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block24_1_bn[0][0]
conv4_block24_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block24_1_relu[0][
conv4_block24_concat (Concatenate)	(None, 8, 8, 1024)	0	conv4_block23_concat[0][conv4_block24_2_conv[0][
conv4_block25_0_bn (BatchNormalization)	(None, 8, 8, 1024)	4,096	conv4_block24_concat[0][
conv4_block25_0_relu (Activation)	(None, 8, 8, 1024)	0	conv4_block25_0_bn[0][0]
conv4_block25_1_conv (Conv2D)	(None, 8, 8, 128)	131,072	conv4_block25_0_relu[0][
conv4_block25_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block25_1_conv[0][
conv4_block25_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block25_1_bn[0][0]
conv4_block25_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block25_1_relu[0][
conv4_block25_concat (Concatenate)	(None, 8, 8, 1056)	0	conv4_block24_concat[0][conv4_block25_2_conv[0][
conv4_block26_0_bn (BatchNormalization)	(None, 8, 8, 1056)	4,224	conv4_block25_concat[0][
conv4_block26_0_relu (Activation)	(None, 8, 8, 1056)	0	conv4_block26_0_bn[0][0]
conv4_block26_1_conv (Conv2D)	(None, 8, 8, 128)	135,168	conv4_block26_0_relu[0][
conv4_block26_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block26_1_conv[0][
conv4_block26_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block26_1_bn[0][0]
conv4_block26_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block26_1_relu[0][
conv4_block26_concat (Concatenate)	(None, 8, 8, 1088)	0	conv4_block25_concat[0][conv4_block26_2_conv[0][
conv4_block27_0_bn (BatchNormalization)	(None, 8, 8, 1088)	4,352	conv4_block26_concat[0][
conv4_block27_0_relu (Activation)	(None, 8, 8, 1088)	0	conv4_block27_0_bn[0][0]
conv4_block27_1_conv (Conv2D)	(None, 8, 8, 128)	139,264	conv4_block27_0_relu[0][
conv4_block27_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block27_1_conv[0][
conv4_block27_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block27_1_bn[0][0]
conv4_block27_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block27_1_relu[0][
conv4_block27_concat (Concatenate)	(None, 8, 8, 1120)	0	conv4_block26_concat[0][conv4_block27_2_conv[0][
conv4_block28_0_bn (BatchNormalization)	(None, 8, 8, 1120)	4,480	conv4_block27_concat[0][
conv4_block28_0_relu	(None, 8, 8, 1120)	0	conv4_block28_0_bn[0][0]

(Activation)			
conv4_block28_1_conv (Conv2D)	(None, 8, 8, 128)	143,360	conv4_block28_0_relu[0][
conv4_block28_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block28_1_conv[0][
conv4_block28_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block28_1_bn[0][0]
conv4_block28_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block28_1_relu[0][
conv4_block28_concat (Concatenate)	(None, 8, 8, 1152)	0	conv4_block27_concat[0][conv4_block28_2_conv[0][
conv4_block29_0_bn (BatchNormalization)	(None, 8, 8, 1152)	4,608	conv4_block28_concat[0][
conv4_block29_0_relu (Activation)	(None, 8, 8, 1152)	0	conv4_block29_0_bn[0][0]
conv4_block29_1_conv (Conv2D)	(None, 8, 8, 128)	147,456	conv4_block29_0_relu[0][
conv4_block29_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block29_1_conv[0][
conv4_block29_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block29_1_bn[0][0]
conv4_block29_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block29_1_relu[0][
conv4_block29_concat (Concatenate)	(None, 8, 8, 1184)	0	conv4_block28_concat[0][conv4_block29_2_conv[0][
conv4_block30_0_bn (BatchNormalization)	(None, 8, 8, 1184)	4,736	conv4_block29_concat[0][
conv4_block30_0_relu (Activation)	(None, 8, 8, 1184)	0	conv4_block30_0_bn[0][0]
conv4_block30_1_conv (Conv2D)	(None, 8, 8, 128)	151,552	conv4_block30_0_relu[0][
conv4_block30_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block30_1_conv[0][
conv4_block30_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block30_1_bn[0][0]
conv4_block30_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block30_1_relu[0][
conv4_block30_concat (Concatenate)	(None, 8, 8, 1216)	0	conv4_block29_concat[0][conv4_block30_2_conv[0][
conv4_block31_0_bn (BatchNormalization)	(None, 8, 8, 1216)	4,864	conv4_block30_concat[0][
conv4_block31_0_relu (Activation)	(None, 8, 8, 1216)	0	conv4_block31_0_bn[0][0]
conv4_block31_1_conv (Conv2D)	(None, 8, 8, 128)	155,648	conv4_block31_0_relu[0][
conv4_block31_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block31_1_conv[0][
conv4_block31_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block31_1_bn[0][0]
conv4_block31_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block31_1_relu[0][
conv4_block31_concat (Concatenate)	(None, 8, 8, 1248)	0	conv4_block30_concat[0][conv4_block31_2_conv[0][
conv4_block32_0_bn (BatchNormalization)	(None, 8, 8, 1248)	4,992	conv4_block31_concat[0][
conv4_block32_0_relu (Activation)	(None, 8, 8, 1248)	0	conv4_block32_0_bn[0][0]
conv4_block32_1_conv (Conv2D)	(None, 8, 8, 128)	159,744	conv4_block32_0_relu[0][
conv4_block32_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block32_1_conv[0][

conv4_block32_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block32_1_bn[0][0]
conv4_block32_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block32_1_relu[0][
conv4_block32_concat (Concatenate)	(None, 8, 8, 1280)	0	conv4_block31_concat[0][conv4_block32_2_conv[0][
conv4_block33_0_bn (BatchNormalization)	(None, 8, 8, 1280)	5,120	conv4_block32_concat[0][
conv4_block33_0_relu (Activation)	(None, 8, 8, 1280)	0	conv4_block33_0_bn[0][0]
conv4_block33_1_conv (Conv2D)	(None, 8, 8, 128)	163,840	conv4_block33_0_relu[0][
conv4_block33_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block33_1_conv[0][
conv4_block33_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block33_1_bn[0][0]
conv4_block33_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block33_1_relu[0][
conv4_block33_concat (Concatenate)	(None, 8, 8, 1312)	0	conv4_block32_concat[0][conv4_block33_2_conv[0][
conv4_block34_0_bn (BatchNormalization)	(None, 8, 8, 1312)	5,248	conv4_block33_concat[0][
conv4_block34_0_relu (Activation)	(None, 8, 8, 1312)	0	conv4_block34_0_bn[0][0]
conv4_block34_1_conv (Conv2D)	(None, 8, 8, 128)	167,936	conv4_block34_0_relu[0][
conv4_block34_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block34_1_conv[0][
conv4_block34_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block34_1_bn[0][0]
conv4_block34_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block34_1_relu[0][
conv4_block34_concat (Concatenate)	(None, 8, 8, 1344)	0	conv4_block33_concat[0][conv4_block34_2_conv[0][
conv4_block35_0_bn (BatchNormalization)	(None, 8, 8, 1344)	5,376	conv4_block34_concat[0][
conv4_block35_0_relu (Activation)	(None, 8, 8, 1344)	0	conv4_block35_0_bn[0][0]
conv4_block35_1_conv (Conv2D)	(None, 8, 8, 128)	172,032	conv4_block35_0_relu[0][
conv4_block35_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block35_1_conv[0][
conv4_block35_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block35_1_bn[0][0]
conv4_block35_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block35_1_relu[0][
conv4_block35_concat (Concatenate)	(None, 8, 8, 1376)	0	conv4_block34_concat[0][conv4_block35_2_conv[0][
conv4_block36_0_bn (BatchNormalization)	(None, 8, 8, 1376)	5,504	conv4_block35_concat[0][
conv4_block36_0_relu (Activation)	(None, 8, 8, 1376)	0	conv4_block36_0_bn[0][0]
conv4_block36_1_conv (Conv2D)	(None, 8, 8, 128)	176,128	conv4_block36_0_relu[0][
conv4_block36_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block36_1_conv[0][
conv4_block36_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block36_1_bn[0][0]
conv4_block36_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block36_1_relu[0][
conv4_block36_concat (Concatenate)	(None, 8, 8, 1408)	0	conv4_block35_concat[0][conv4_block36_2_conv[0][

conv4_block37_0_bn (BatchNormalization)	(None, 8, 8, 1408)	5,632	conv4_block36_concat[0][
conv4_block37_0_relu (Activation)	(None, 8, 8, 1408)	0	conv4_block37_0_bn[0][0]
conv4_block37_1_conv (Conv2D)	(None, 8, 8, 128)	180,224	conv4_block37_0_relu[0][
conv4_block37_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block37_1_conv[0][
conv4_block37_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block37_1_bn[0][0]
conv4_block37_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block37_1_relu[0][
conv4_block37_concat (Concatenate)	(None, 8, 8, 1440)	0	conv4_block36_concat[0][conv4_block37_2_conv[0][
conv4_block38_0_bn (BatchNormalization)	(None, 8, 8, 1440)	5,760	conv4_block37_concat[0][
conv4_block38_0_relu (Activation)	(None, 8, 8, 1440)	0	conv4_block38_0_bn[0][0]
conv4_block38_1_conv (Conv2D)	(None, 8, 8, 128)	184,320	conv4_block38_0_relu[0][
conv4_block38_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block38_1_conv[0][
conv4_block38_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block38_1_bn[0][0]
conv4_block38_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block38_1_relu[0][
conv4_block38_concat (Concatenate)	(None, 8, 8, 1472)	0	conv4_block37_concat[0][conv4_block38_2_conv[0][
conv4_block39_0_bn (BatchNormalization)	(None, 8, 8, 1472)	5,888	conv4_block38_concat[0][
conv4_block39_0_relu (Activation)	(None, 8, 8, 1472)	0	conv4_block39_0_bn[0][0]
conv4_block39_1_conv (Conv2D)	(None, 8, 8, 128)	188,416	conv4_block39_0_relu[0][
conv4_block39_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block39_1_conv[0][
conv4_block39_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block39_1_bn[0][0]
conv4_block39_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block39_1_relu[0][
conv4_block39_concat (Concatenate)	(None, 8, 8, 1504)	0	conv4_block38_concat[0][conv4_block39_2_conv[0][
conv4_block40_0_bn (BatchNormalization)	(None, 8, 8, 1504)	6,016	conv4_block39_concat[0][
conv4_block40_0_relu (Activation)	(None, 8, 8, 1504)	0	conv4_block40_0_bn[0][0]
conv4_block40_1_conv (Conv2D)	(None, 8, 8, 128)	192,512	conv4_block40_0_relu[0][
conv4_block40_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block40_1_conv[0][
conv4_block40_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block40_1_bn[0][0]
conv4_block40_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block40_1_relu[0][
conv4_block40_concat (Concatenate)	(None, 8, 8, 1536)	0	conv4_block39_concat[0][conv4_block40_2_conv[0][
conv4_block41_0_bn (BatchNormalization)	(None, 8, 8, 1536)	6,144	conv4_block40_concat[0][
conv4_block41_0_relu (Activation)	(None, 8, 8, 1536)	0	conv4_block41_0_bn[0][0]

conv4_block41_1_conv (Conv2D)	(None, 8, 8, 128)	196,608	conv4_block41_0_relu[0][
conv4_block41_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block41_1_conv[0][
conv4_block41_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block41_1_bn[0][0]
conv4_block41_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block41_1_relu[0][
conv4_block41_concat (Concatenate)	(None, 8, 8, 1568)	0	conv4_block40_concat[0][conv4_block41_2_conv[0][
conv4_block42_0_bn (BatchNormalization)	(None, 8, 8, 1568)	6,272	conv4_block41_concat[0][
conv4_block42_0_relu (Activation)	(None, 8, 8, 1568)	0	conv4_block42_0_bn[0][0]
conv4_block42_1_conv (Conv2D)	(None, 8, 8, 128)	200,704	conv4_block42_0_relu[0][
conv4_block42_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block42_1_conv[0][
conv4_block42_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block42_1_bn[0][0]
conv4_block42_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block42_1_relu[0][
conv4_block42_concat (Concatenate)	(None, 8, 8, 1600)	0	conv4_block41_concat[0][conv4_block42_2_conv[0][
conv4_block43_0_bn (BatchNormalization)	(None, 8, 8, 1600)	6,400	conv4_block42_concat[0][
conv4_block43_0_relu (Activation)	(None, 8, 8, 1600)	0	conv4_block43_0_bn[0][0]
conv4_block43_1_conv (Conv2D)	(None, 8, 8, 128)	204,800	conv4_block43_0_relu[0][
conv4_block43_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block43_1_conv[0][
conv4_block43_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block43_1_bn[0][0]
conv4_block43_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block43_1_relu[0][
conv4_block43_concat (Concatenate)	(None, 8, 8, 1632)	0	conv4_block42_concat[0][conv4_block43_2_conv[0][
conv4_block44_0_bn (BatchNormalization)	(None, 8, 8, 1632)	6,528	conv4_block43_concat[0][
conv4_block44_0_relu (Activation)	(None, 8, 8, 1632)	0	conv4_block44_0_bn[0][0]
conv4_block44_1_conv (Conv2D)	(None, 8, 8, 128)	208,896	conv4_block44_0_relu[0][
conv4_block44_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block44_1_conv[0][
conv4_block44_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block44_1_bn[0][0]
conv4_block44_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block44_1_relu[0][
conv4_block44_concat (Concatenate)	(None, 8, 8, 1664)	0	conv4_block43_concat[0][conv4_block44_2_conv[0][
conv4_block45_0_bn (BatchNormalization)	(None, 8, 8, 1664)	6,656	conv4_block44_concat[0][
conv4_block45_0_relu (Activation)	(None, 8, 8, 1664)	0	conv4_block45_0_bn[0][0]
conv4_block45_1_conv (Conv2D)	(None, 8, 8, 128)	212,992	conv4_block45_0_relu[0][
conv4_block45_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block45_1_conv[0][
conv4_block45_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block45_1_bn[0][0]

conv4_block45_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block45_1_relu[0][
conv4_block45_concat (Concatenate)	(None, 8, 8, 1696)	0	conv4_block44_concat[0][conv4_block45_2_conv[0][
conv4_block46_0_bn (BatchNormalization)	(None, 8, 8, 1696)	6,784	conv4_block45_concat[0][
conv4_block46_0_relu (Activation)	(None, 8, 8, 1696)	0	conv4_block46_0_bn[0][0]
conv4_block46_1_conv (Conv2D)	(None, 8, 8, 128)	217,088	conv4_block46_0_relu[0][
conv4_block46_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block46_1_conv[0][
conv4_block46_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block46_1_bn[0][0]
conv4_block46_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block46_1_relu[0][
conv4_block46_concat (Concatenate)	(None, 8, 8, 1728)	0	conv4_block45_concat[0][conv4_block46_2_conv[0][
conv4_block47_0_bn (BatchNormalization)	(None, 8, 8, 1728)	6,912	conv4_block46_concat[0][
conv4_block47_0_relu (Activation)	(None, 8, 8, 1728)	0	conv4_block47_0_bn[0][0]
conv4_block47_1_conv (Conv2D)	(None, 8, 8, 128)	221,184	conv4_block47_0_relu[0][
conv4_block47_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block47_1_conv[0][
conv4_block47_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block47_1_bn[0][0]
conv4_block47_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block47_1_relu[0][
conv4_block47_concat (Concatenate)	(None, 8, 8, 1760)	0	conv4_block46_concat[0][conv4_block47_2_conv[0][
conv4_block48_0_bn (BatchNormalization)	(None, 8, 8, 1760)	7,040	conv4_block47_concat[0][
conv4_block48_0_relu (Activation)	(None, 8, 8, 1760)	0	conv4_block48_0_bn[0][0]
conv4_block48_1_conv (Conv2D)	(None, 8, 8, 128)	225,280	conv4_block48_0_relu[0][
conv4_block48_1_bn (BatchNormalization)	(None, 8, 8, 128)	512	conv4_block48_1_conv[0][
conv4_block48_1_relu (Activation)	(None, 8, 8, 128)	0	conv4_block48_1_bn[0][0]
conv4_block48_2_conv (Conv2D)	(None, 8, 8, 32)	36,864	conv4_block48_1_relu[0][
conv4_block48_concat (Concatenate)	(None, 8, 8, 1792)	0	conv4_block47_concat[0][conv4_block48_2_conv[0][
pool4_bn (BatchNormalization)	(None, 8, 8, 1792)	7,168	conv4_block48_concat[0][
pool4_relu (Activation)	(None, 8, 8, 1792)	0	pool4_bn[0][0]
pool4_conv (Conv2D)	(None, 8, 8, 896)	1,605,632	pool4_relu[0][0]
pool4_pool (AveragePooling2D)	(None, 4, 4, 896)	0	pool4_conv[0][0]
conv5_block1_0_bn (BatchNormalization)	(None, 4, 4, 896)	3,584	pool4_pool[0][0]
conv5_block1_0_relu (Activation)	(None, 4, 4, 896)	0	conv5_block1_0_bn[0][0]
conv5_block1_1_conv (Conv2D)	(None, 4, 4, 128)	114,688	conv5_block1_0_relu[0][0
conv5_block1_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block1_1_conv[0][0
conv5_block1_1_relu	(None, 4, 4, 128)	0	conv5_block1_1_bn[0][0]

(Activation)			
conv5_block1_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block1_1_relu[0][0
conv5_block1_concat (Concatenate)	(None, 4, 4, 928)	0	pool4_pool[0][0], conv5_block1_2_conv[0][0
conv5_block2_0_bn (BatchNormalization)	(None, 4, 4, 928)	3,712	conv5_block1_concat[0][0
conv5_block2_0_relu (Activation)	(None, 4, 4, 928)	0	conv5_block2_0_bn[0][0]
conv5_block2_1_conv (Conv2D)	(None, 4, 4, 128)	118,784	conv5_block2_0_relu[0][0
conv5_block2_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block2_1_conv[0][0
conv5_block2_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block2_1_bn[0][0]
conv5_block2_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block2_1_relu[0][0
conv5_block2_concat (Concatenate)	(None, 4, 4, 960)	0	conv5_block1_concat[0][0 conv5_block2_2_conv[0][0
conv5_block3_0_bn (BatchNormalization)	(None, 4, 4, 960)	3,840	conv5_block2_concat[0][0
conv5_block3_0_relu (Activation)	(None, 4, 4, 960)	0	conv5_block3_0_bn[0][0]
conv5_block3_1_conv (Conv2D)	(None, 4, 4, 128)	122,880	conv5_block3_0_relu[0][0
conv5_block3_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block3_1_conv[0][0
conv5_block3_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block3_1_bn[0][0]
conv5_block3_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block3_1_relu[0][0
conv5_block3_concat (Concatenate)	(None, 4, 4, 992)	0	conv5_block2_concat[0][0 conv5_block3_2_conv[0][0
conv5_block4_0_bn (BatchNormalization)	(None, 4, 4, 992)	3,968	conv5_block3_concat[0][0
conv5_block4_0_relu (Activation)	(None, 4, 4, 992)	0	conv5_block4_0_bn[0][0]
conv5_block4_1_conv (Conv2D)	(None, 4, 4, 128)	126,976	conv5_block4_0_relu[0][0
conv5_block4_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block4_1_conv[0][0
conv5_block4_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block4_1_bn[0][0]
conv5_block4_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block4_1_relu[0][0
conv5_block4_concat (Concatenate)	(None, 4, 4, 1024)	0	conv5_block3_concat[0][0 conv5_block4_2_conv[0][0
conv5_block5_0_bn (BatchNormalization)	(None, 4, 4, 1024)	4,096	conv5_block4_concat[0][0
conv5_block5_0_relu (Activation)	(None, 4, 4, 1024)	0	conv5_block5_0_bn[0][0]
conv5_block5_1_conv (Conv2D)	(None, 4, 4, 128)	131,072	conv5_block5_0_relu[0][0
conv5_block5_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block5_1_conv[0][0
conv5_block5_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block5_1_bn[0][0]
conv5_block5_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block5_1_relu[0][0
conv5_block5_concat (Concatenate)	(None, 4, 4, 1056)	0	conv5_block4_concat[0][0 conv5_block5_2_conv[0][0

conv5_block6_0_bn (BatchNormalization)	(None, 4, 4, 1056)	4,224	conv5_block5_concat[0][0
conv5_block6_0_relu (Activation)	(None, 4, 4, 1056)	0	conv5_block6_0_bn[0][0]
conv5_block6_1_conv (Conv2D)	(None, 4, 4, 128)	135,168	conv5_block6_0_relu[0][0
conv5_block6_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block6_1_conv[0][0
conv5_block6_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block6_1_bn[0][0]
conv5_block6_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block6_1_relu[0][0
conv5_block6_concat (Concatenate)	(None, 4, 4, 1088)	0	conv5_block5_concat[0][0 conv5_block6_2_conv[0][0
conv5_block7_0_bn (BatchNormalization)	(None, 4, 4, 1088)	4,352	conv5_block6_concat[0][0
conv5_block7_0_relu (Activation)	(None, 4, 4, 1088)	0	conv5_block7_0_bn[0][0]
conv5_block7_1_conv (Conv2D)	(None, 4, 4, 128)	139,264	conv5_block7_0_relu[0][0
conv5_block7_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block7_1_conv[0][0
conv5_block7_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block7_1_bn[0][0]
conv5_block7_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block7_1_relu[0][0
conv5_block7_concat (Concatenate)	(None, 4, 4, 1120)	0	conv5_block6_concat[0][0 conv5_block7_2_conv[0][0
conv5_block8_0_bn (BatchNormalization)	(None, 4, 4, 1120)	4,480	conv5_block7_concat[0][0
conv5_block8_0_relu (Activation)	(None, 4, 4, 1120)	0	conv5_block8_0_bn[0][0]
conv5_block8_1_conv (Conv2D)	(None, 4, 4, 128)	143,360	conv5_block8_0_relu[0][0
conv5_block8_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block8_1_conv[0][0
conv5_block8_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block8_1_bn[0][0]
conv5_block8_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block8_1_relu[0][0
conv5_block8_concat (Concatenate)	(None, 4, 4, 1152)	0	conv5_block7_concat[0][0 conv5_block8_2_conv[0][0
conv5_block9_0_bn (BatchNormalization)	(None, 4, 4, 1152)	4,608	conv5_block8_concat[0][0
conv5_block9_0_relu (Activation)	(None, 4, 4, 1152)	0	conv5_block9_0_bn[0][0]
conv5_block9_1_conv (Conv2D)	(None, 4, 4, 128)	147,456	conv5_block9_0_relu[0][0
conv5_block9_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block9_1_conv[0][0
conv5_block9_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block9_1_bn[0][0]
conv5_block9_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block9_1_relu[0][0
conv5_block9_concat (Concatenate)	(None, 4, 4, 1184)	0	conv5_block8_concat[0][0 conv5_block9_2_conv[0][0
conv5_block10_0_bn (BatchNormalization)	(None, 4, 4, 1184)	4,736	conv5_block9_concat[0][0
conv5_block10_0_relu (Activation)	(None, 4, 4, 1184)	0	conv5_block10_0_bn[0][0]
conv5_block10_1_conv (Conv2D)	(None, 4, 4, 128)	151,552	conv5_block10_0_relu[0][

conv5_block10_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block10_1_conv[0][
conv5_block10_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block10_1_bn[0][0]
conv5_block10_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block10_1_relu[0][
conv5_block10_concat (Concatenate)	(None, 4, 4, 1216)	0	conv5_block9_concat[0][0] conv5_block10_2_conv[0][
conv5_block11_0_bn (BatchNormalization)	(None, 4, 4, 1216)	4,864	conv5_block10_concat[0][
conv5_block11_0_relu (Activation)	(None, 4, 4, 1216)	0	conv5_block11_0_bn[0][0]
conv5_block11_1_conv (Conv2D)	(None, 4, 4, 128)	155,648	conv5_block11_0_relu[0][
conv5_block11_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block11_1_conv[0][
conv5_block11_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block11_1_bn[0][0]
conv5_block11_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block11_1_relu[0][
conv5_block11_concat (Concatenate)	(None, 4, 4, 1248)	0	conv5_block10_concat[0][conv5_block11_2_conv[0][
conv5_block12_0_bn (BatchNormalization)	(None, 4, 4, 1248)	4,992	conv5_block11_concat[0][
conv5_block12_0_relu (Activation)	(None, 4, 4, 1248)	0	conv5_block12_0_bn[0][0]
conv5_block12_1_conv (Conv2D)	(None, 4, 4, 128)	159,744	conv5_block12_0_relu[0][
conv5_block12_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block12_1_conv[0][
conv5_block12_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block12_1_bn[0][0]
conv5_block12_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block12_1_relu[0][
conv5_block12_concat (Concatenate)	(None, 4, 4, 1280)	0	conv5_block11_concat[0][conv5_block12_2_conv[0][
conv5_block13_0_bn (BatchNormalization)	(None, 4, 4, 1280)	5,120	conv5_block12_concat[0][
conv5_block13_0_relu (Activation)	(None, 4, 4, 1280)	0	conv5_block13_0_bn[0][0]
conv5_block13_1_conv (Conv2D)	(None, 4, 4, 128)	163,840	conv5_block13_0_relu[0][
conv5_block13_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block13_1_conv[0][
conv5_block13_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block13_1_bn[0][0]
conv5_block13_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block13_1_relu[0][
conv5_block13_concat (Concatenate)	(None, 4, 4, 1312)	0	conv5_block12_concat[0][conv5_block13_2_conv[0][
conv5_block14_0_bn (BatchNormalization)	(None, 4, 4, 1312)	5,248	conv5_block13_concat[0][
conv5_block14_0_relu (Activation)	(None, 4, 4, 1312)	0	conv5_block14_0_bn[0][0]
conv5_block14_1_conv (Conv2D)	(None, 4, 4, 128)	167,936	conv5_block14_0_relu[0][
conv5_block14_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block14_1_conv[0][
conv5_block14_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block14_1_bn[0][0]

conv5_block14_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block14_1_relu[0][
conv5_block14_concat (Concatenate)	(None, 4, 4, 1344)	0	conv5_block13_concat[0][conv5_block14_2_conv[0][
conv5_block15_0_bn (BatchNormalization)	(None, 4, 4, 1344)	5,376	conv5_block14_concat[0][
conv5_block15_0_relu (Activation)	(None, 4, 4, 1344)	0	conv5_block15_0_bn[0][0]
conv5_block15_1_conv (Conv2D)	(None, 4, 4, 128)	172,032	conv5_block15_0_relu[0][
conv5_block15_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block15_1_conv[0][
conv5_block15_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block15_1_bn[0][0]
conv5_block15_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block15_1_relu[0][
conv5_block15_concat (Concatenate)	(None, 4, 4, 1376)	0	conv5_block14_concat[0][conv5_block15_2_conv[0][
conv5_block16_0_bn (BatchNormalization)	(None, 4, 4, 1376)	5,504	conv5_block15_concat[0][
conv5_block16_0_relu (Activation)	(None, 4, 4, 1376)	0	conv5_block16_0_bn[0][0]
conv5_block16_1_conv (Conv2D)	(None, 4, 4, 128)	176,128	conv5_block16_0_relu[0][
conv5_block16_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block16_1_conv[0][
conv5_block16_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block16_1_bn[0][0]
conv5_block16_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block16_1_relu[0][
conv5_block16_concat (Concatenate)	(None, 4, 4, 1408)	0	conv5_block15_concat[0][conv5_block16_2_conv[0][
conv5_block17_0_bn (BatchNormalization)	(None, 4, 4, 1408)	5,632	conv5_block16_concat[0][
conv5_block17_0_relu (Activation)	(None, 4, 4, 1408)	0	conv5_block17_0_bn[0][0]
conv5_block17_1_conv (Conv2D)	(None, 4, 4, 128)	180,224	conv5_block17_0_relu[0][
conv5_block17_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block17_1_conv[0][
conv5_block17_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block17_1_bn[0][0]
conv5_block17_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block17_1_relu[0][
conv5_block17_concat (Concatenate)	(None, 4, 4, 1440)	0	conv5_block16_concat[0][conv5_block17_2_conv[0][
conv5_block18_0_bn (BatchNormalization)	(None, 4, 4, 1440)	5,760	conv5_block17_concat[0][
conv5_block18_0_relu (Activation)	(None, 4, 4, 1440)	0	conv5_block18_0_bn[0][0]
conv5_block18_1_conv (Conv2D)	(None, 4, 4, 128)	184,320	conv5_block18_0_relu[0][
conv5_block18_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block18_1_conv[0][
conv5_block18_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block18_1_bn[0][0]
conv5_block18_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block18_1_relu[0][
conv5_block18_concat (Concatenate)	(None, 4, 4, 1472)	0	conv5_block17_concat[0][conv5_block18_2_conv[0][
conv5_block19_0_bn (BatchNormalization)	(None, 4, 4, 1472)	5,888	conv5_block18_concat[0][

conv5_block19_0_relu (Activation)	(None, 4, 4, 1472)	0	conv5_block19_0_bn[0][0]
conv5_block19_1_conv (Conv2D)	(None, 4, 4, 128)	188,416	conv5_block19_0_relu[0][
conv5_block19_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block19_1_conv[0][
conv5_block19_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block19_1_bn[0][0]
conv5_block19_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block19_1_relu[0][
conv5_block19_concat (Concatenate)	(None, 4, 4, 1504)	0	conv5_block18_concat[0][conv5_block19_2_conv[0][
conv5_block20_0_bn (BatchNormalization)	(None, 4, 4, 1504)	6,016	conv5_block19_concat[0][
conv5_block20_0_relu (Activation)	(None, 4, 4, 1504)	0	conv5_block20_0_bn[0][0]
conv5_block20_1_conv (Conv2D)	(None, 4, 4, 128)	192,512	conv5_block20_0_relu[0][
conv5_block20_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block20_1_conv[0][
conv5_block20_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block20_1_bn[0][0]
conv5_block20_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block20_1_relu[0][
conv5_block20_concat (Concatenate)	(None, 4, 4, 1536)	0	conv5_block19_concat[0][conv5_block20_2_conv[0][
conv5_block21_0_bn (BatchNormalization)	(None, 4, 4, 1536)	6,144	conv5_block20_concat[0][
conv5_block21_0_relu (Activation)	(None, 4, 4, 1536)	0	conv5_block21_0_bn[0][0]
conv5_block21_1_conv (Conv2D)	(None, 4, 4, 128)	196,608	conv5_block21_0_relu[0][
conv5_block21_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block21_1_conv[0][
conv5_block21_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block21_1_bn[0][0]
conv5_block21_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block21_1_relu[0][
conv5_block21_concat (Concatenate)	(None, 4, 4, 1568)	0	conv5_block20_concat[0][conv5_block21_2_conv[0][
conv5_block22_0_bn (BatchNormalization)	(None, 4, 4, 1568)	6,272	conv5_block21_concat[0][
conv5_block22_0_relu (Activation)	(None, 4, 4, 1568)	0	conv5_block22_0_bn[0][0]
conv5_block22_1_conv (Conv2D)	(None, 4, 4, 128)	200,704	conv5_block22_0_relu[0][
conv5_block22_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block22_1_conv[0][
conv5_block22_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block22_1_bn[0][0]
conv5_block22_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block22_1_relu[0][
conv5_block22_concat (Concatenate)	(None, 4, 4, 1600)	0	conv5_block21_concat[0][conv5_block22_2_conv[0][
conv5_block23_0_bn (BatchNormalization)	(None, 4, 4, 1600)	6,400	conv5_block22_concat[0][
conv5_block23_0_relu (Activation)	(None, 4, 4, 1600)	0	conv5_block23_0_bn[0][0]
conv5_block23_1_conv (Conv2D)	(None, 4, 4, 128)	204,800	conv5_block23_0_relu[0][
conv5_block23_1_bn	(None, 4, 4, 128)	512	conv5_block23_1_conv[0][

(BatchNormalization)			
conv5_block23_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block23_1_bn[0][0]
conv5_block23_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block23_1_relu[0][
conv5_block23_concat (Concatenate)	(None, 4, 4, 1632)	0	conv5_block22_concat[0][conv5_block23_2_conv[0][
conv5_block24_0_bn (BatchNormalization)	(None, 4, 4, 1632)	6,528	conv5_block23_concat[0][
conv5_block24_0_relu (Activation)	(None, 4, 4, 1632)	0	conv5_block24_0_bn[0][0]
conv5_block24_1_conv (Conv2D)	(None, 4, 4, 128)	208,896	conv5_block24_0_relu[0][
conv5_block24_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block24_1_conv[0][
conv5_block24_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block24_1_bn[0][0]
conv5_block24_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block24_1_relu[0][
conv5_block24_concat (Concatenate)	(None, 4, 4, 1664)	0	conv5_block23_concat[0][conv5_block24_2_conv[0][
conv5_block25_0_bn (BatchNormalization)	(None, 4, 4, 1664)	6,656	conv5_block24_concat[0][
conv5_block25_0_relu (Activation)	(None, 4, 4, 1664)	0	conv5_block25_0_bn[0][0]
conv5_block25_1_conv (Conv2D)	(None, 4, 4, 128)	212,992	conv5_block25_0_relu[0][
conv5_block25_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block25_1_conv[0][
conv5_block25_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block25_1_bn[0][0]
conv5_block25_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block25_1_relu[0][
conv5_block25_concat (Concatenate)	(None, 4, 4, 1696)	0	conv5_block24_concat[0][conv5_block25_2_conv[0][
conv5_block26_0_bn (BatchNormalization)	(None, 4, 4, 1696)	6,784	conv5_block25_concat[0][
conv5_block26_0_relu (Activation)	(None, 4, 4, 1696)	0	conv5_block26_0_bn[0][0]
conv5_block26_1_conv (Conv2D)	(None, 4, 4, 128)	217,088	conv5_block26_0_relu[0][
conv5_block26_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block26_1_conv[0][
conv5_block26_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block26_1_bn[0][0]
conv5_block26_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block26_1_relu[0][
conv5_block26_concat (Concatenate)	(None, 4, 4, 1728)	0	conv5_block25_concat[0][conv5_block26_2_conv[0][
conv5_block27_0_bn (BatchNormalization)	(None, 4, 4, 1728)	6,912	conv5_block26_concat[0][
conv5_block27_0_relu (Activation)	(None, 4, 4, 1728)	0	conv5_block27_0_bn[0][0]
conv5_block27_1_conv (Conv2D)	(None, 4, 4, 128)	221,184	conv5_block27_0_relu[0][
conv5_block27_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block27_1_conv[0][
conv5_block27_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block27_1_bn[0][0]
conv5_block27_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block27_1_relu[0][

conv5_block27_concat (Concatenate)	(None, 4, 4, 1760)	0	conv5_block26_concat[0][conv5_block27_2_conv[0][
conv5_block28_0_bn (BatchNormalization)	(None, 4, 4, 1760)	7,040	conv5_block27_concat[0][
conv5_block28_0_relu (Activation)	(None, 4, 4, 1760)	0	conv5_block28_0_bn[0][0]
conv5_block28_1_conv (Conv2D)	(None, 4, 4, 128)	225,280	conv5_block28_0_relu[0][
conv5_block28_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block28_1_conv[0][
conv5_block28_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block28_1_bn[0][0]
conv5_block28_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block28_1_relu[0][
conv5_block28_concat (Concatenate)	(None, 4, 4, 1792)	0	conv5_block27_concat[0][conv5_block28_2_conv[0][
conv5_block29_0_bn (BatchNormalization)	(None, 4, 4, 1792)	7,168	conv5_block28_concat[0][
conv5_block29_0_relu (Activation)	(None, 4, 4, 1792)	0	conv5_block29_0_bn[0][0]
conv5_block29_1_conv (Conv2D)	(None, 4, 4, 128)	229,376	conv5_block29_0_relu[0][
conv5_block29_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block29_1_conv[0][
conv5_block29_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block29_1_bn[0][0]
conv5_block29_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block29_1_relu[0][
conv5_block29_concat (Concatenate)	(None, 4, 4, 1824)	0	conv5_block28_concat[0][conv5_block29_2_conv[0][
conv5_block30_0_bn (BatchNormalization)	(None, 4, 4, 1824)	7,296	conv5_block29_concat[0][
conv5_block30_0_relu (Activation)	(None, 4, 4, 1824)	0	conv5_block30_0_bn[0][0]
conv5_block30_1_conv (Conv2D)	(None, 4, 4, 128)	233,472	conv5_block30_0_relu[0][
conv5_block30_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block30_1_conv[0][
conv5_block30_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block30_1_bn[0][0]
conv5_block30_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block30_1_relu[0][
conv5_block30_concat (Concatenate)	(None, 4, 4, 1856)	0	conv5_block29_concat[0][conv5_block30_2_conv[0][
conv5_block31_0_bn (BatchNormalization)	(None, 4, 4, 1856)	7,424	conv5_block30_concat[0][
conv5_block31_0_relu (Activation)	(None, 4, 4, 1856)	0	conv5_block31_0_bn[0][0]
conv5_block31_1_conv (Conv2D)	(None, 4, 4, 128)	237,568	conv5_block31_0_relu[0][
conv5_block31_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block31_1_conv[0][
conv5_block31_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block31_1_bn[0][0]
conv5_block31_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block31_1_relu[0][
conv5_block31_concat (Concatenate)	(None, 4, 4, 1888)	0	conv5_block30_concat[0][conv5_block31_2_conv[0][
conv5_block32_0_bn (BatchNormalization)	(None, 4, 4, 1888)	7,552	conv5_block31_concat[0][
conv5_block32_0_relu	(None, 4, 4, 1888)	0	conv5_block32_0_bn[0][0]

(Activation)			
conv5_block32_1_conv (Conv2D)	(None, 4, 4, 128)	241,664	conv5_block32_0_relu[0][
conv5_block32_1_bn (BatchNormalization)	(None, 4, 4, 128)	512	conv5_block32_1_conv[0][
conv5_block32_1_relu (Activation)	(None, 4, 4, 128)	0	conv5_block32_1_bn[0][0]
conv5_block32_2_conv (Conv2D)	(None, 4, 4, 32)	36,864	conv5_block32_1_relu[0][
conv5_block32_concat (Concatenate)	(None, 4, 4, 1920)	0	conv5_block31_concat[0][conv5_block32_2_conv[0][
bn (BatchNormalization)	(None, 4, 4, 1920)	7,680	conv5_block32_concat[0][
relu (Activation)	(None, 4, 4, 1920)	0	bn[0][0]
max_pool (GlobalMaxPooling2D)	(None, 1920)	0	relu[0][0]
dense (Dense)	(None, 512)	983,552	max_pool[0][0]
dense_1 (Dense)	(None, 2)	1,026	dense[0][0]

Total params: 19,306,562 (73.65 MB)

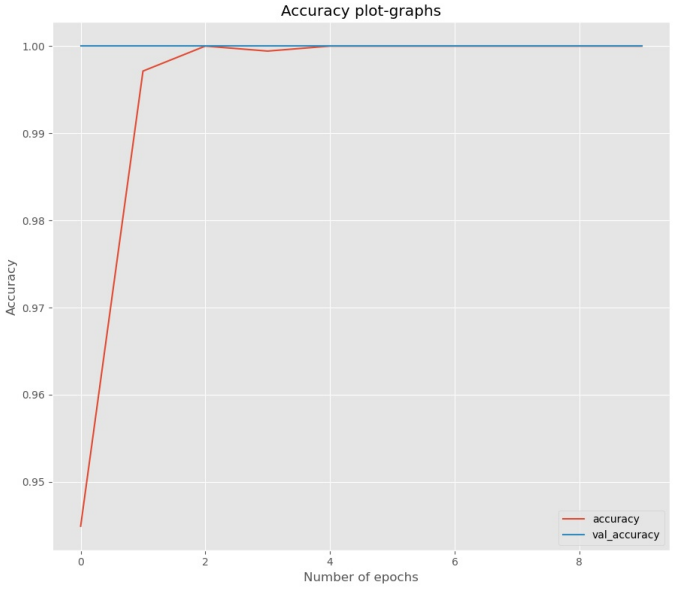
Trainable params: 984,578 (3.76 MB)

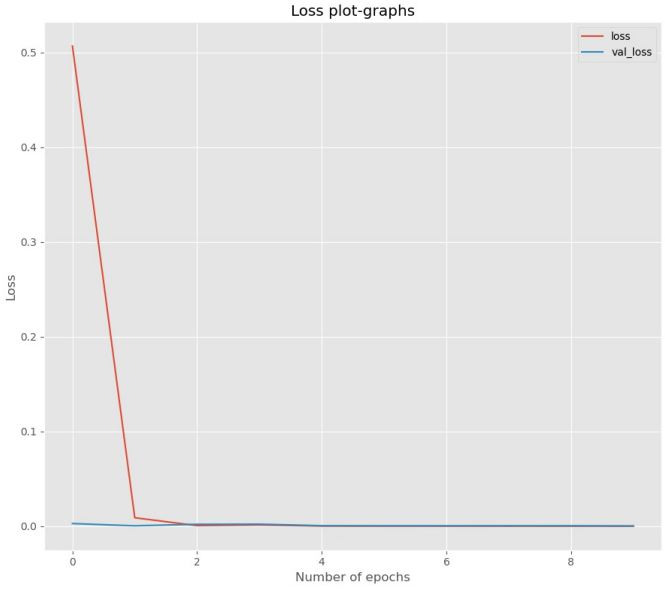
Non-trainable params: 18,321,984 (69.89 MB)

In [21]:
```
history = dense_model.fit(X_train,y_train,batch_size=16,validation_data=(X_test,y_test),epochs=10)
```

```
Epoch 1/10
109/109 ━━━━━━━━━━━━━━━━━━━━ 274s 1s/step - accuracy: 0.8482 - loss: 1.6236 - val_accuracy: 1.0000 - val_loss:
0.0028
Epoch 2/10
109/109 ━━━━━━━━━━━━━━━━━━━━ 131s 1s/step - accuracy: 0.9974 - loss: 0.0064 - val_accuracy: 1.0000 - val_loss:
4.5431e-04
Epoch 3/10
109/109 ━━━━━━━━━━━━━━━━━━━━ 129s 1s/step - accuracy: 1.0000 - loss: 0.0012 - val_accuracy: 1.0000 - val_loss:
0.0021
Epoch 4/10
109/109 ━━━━━━━━━━━━━━━━━━━━ 130s 1s/step - accuracy: 0.9976 - loss: 0.0041 - val_accuracy: 1.0000 - val_loss:
0.0022
Epoch 5/10
109/109 ━━━━━━━━━━━━━━━━━━━━ 130s 1s/step - accuracy: 1.0000 - loss: 9.4150e-05 - val_accuracy: 1.0000 - val_lo
ss: 5.8055e-04
Epoch 6/10
109/109 ━━━━━━━━━━━━━━━━━━━━ 127s 1s/step - accuracy: 1.0000 - loss: 9.5118e-05 - val_accuracy: 1.0000 - val_lo
ss: 4.9078e-04
Epoch 7/10
109/109 ━━━━━━━━━━━━━━━━━━━━ 132s 1s/step - accuracy: 1.0000 - loss: 4.6267e-05 - val_accuracy: 1.0000 - val_lo
ss: 4.5905e-04
Epoch 8/10
109/109 ━━━━━━━━━━━━━━━━━━━━ 129s 1s/step - accuracy: 1.0000 - loss: 3.6670e-05 - val_accuracy: 1.0000 - val_lo
ss: 4.9868e-04
Epoch 9/10
109/109 ━━━━━━━━━━━━━━━━━━━━ 130s 1s/step - accuracy: 1.0000 - loss: 4.5027e-05 - val_accuracy: 1.0000 - val_lo
ss: 4.9205e-04
Epoch 10/10
109/109 ━━━━━━━━━━━━━━━━━━━━ 130s 1s/step - accuracy: 1.0000 - loss: 4.1266e-05 - val_accuracy: 1.0000 - val_lo
ss: 3.0644e-04
```

In [26]:
```
with plt.style.context (style='ggplot'):
    fig, axes=plt.subplots(nrows=1, ncols=2, figsize=(18,8))
    axes[0].plot(history.history["accuracy"],label="accuracy")
    axes[0].plot(history.history["val_accuracy"],label="val_accuracy")
    axes[0].set_title(label='Accuracy plot-graphs')
    axes[0].set_xlabel(xlabel='Number of epochs')
    axes[0].set_ylabel(ylabel='Accuracy')
    axes[0].legend()
    axes[1].plot(history.history["loss"], label="loss")
    axes[1].plot(history.history["val_loss"], label="val_loss")
    axes[1].set_title(label='Loss plot-graphs')
    axes[1].set_xlabel(xlabel='Number of epochs')
    axes[1].set_ylabel(ylabel='Loss')
    axes[1].legend()
    fig.tight_layout()
    plt.show()
```





In [30]:
```
dense_model_prediction=dense_model.predict(X_test,batch_size=32,verbose=1)
```

14/14 ━━━━━━━━━━━━━━━━━━━━ **24s** 2s/step

In [31]:
```
print(dense_model_prediction)
```

```
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 [1.00000000e+00 1.15180088e-08]
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```

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[6.56714549e-09 1.00000000e+00]
[1.34675901e-07 9.99999881e-01]
[3.42427562e-08 1.00000000e+00]
[2.30092399e-12 1.00000000e+00]
[1.00000000e+00 6.85848378e-10]
[9.99854445e-01 1.45497223e-04]
[3.35371091e-08 1.00000000e+00]
[9.99999404e-01 6.09976439e-07]
[6.19478840e-07 9.99999404e-01]
[1.53888791e-09 1.00000000e+00]
[4.74277395e-10 1.00000000e+00]
[4.26037677e-12 1.00000000e+00]
[1.00000000e+00 8.63941622e-13]
[1.00000000e+00 2.84148555e-11]
[3.35929817e-09 1.00000000e+00]
[1.00000000e+00 4.04672207e-08]
[3.59372844e-11 1.00000000e+00]
[1.00000000e+00 9.64229530e-11]
[1.03185767e-11 1.00000000e+00]
[2.92883510e-06 9.99997020e-01]
[5.33500044e-09 1.00000000e+00]
[6.57183466e-12 1.00000000e+00]
[1.00000000e+00 2.14610090e-08]
[1.79927961e-09 1.00000000e+00]
[1.00000000e+00 3.91650357e-09]
[1.00000000e+00 1.37634706e-12]
[2.15123421e-07 9.99999762e-01]
[1.00000000e+00 2.55799167e-11]
[1.00000000e+00 1.37165520e-13]
[3.86812937e-09 1.00000000e+00]
[4.19607266e-11 1.00000000e+00]
[1.65328758e-11 1.00000000e+00]
[1.00000000e+00 1.00288481e-14]
[1.00000000e+00 2.27741867e-10]
[9.99418974e-01 5.81101340e-04]
[1.04673267e-11 1.00000000e+00]
[1.00000000e+00 7.01031855e-09]
[1.00000000e+00 1.01498857e-15]
[1.00000000e+00 1.09552303e-16]
[1.00000000e+00 4.09445766e-14]
[1.45182590e-11 1.00000000e+00]
[3.68018327e-09 1.00000000e+00]
[1.00000000e+00 4.80283673e-14]
[4.23881463e-09 1.00000000e+00]
[8.41313186e-10 1.00000000e+00]
[7.84686816e-10 1.00000000e+00]
[7.40162185e-12 1.00000000e+00]
[1.00000000e+00 2.24156496e-16]
```

```
[9.99976397e-01 2.36319502e-05]
[1.00000000e+00 2.20152621e-14]
[8.59547433e-11 1.00000000e+00]
[5.79133141e-09 1.00000000e+00]
[9.99999642e-01 3.21682279e-07]
[1.00000000e+00 1.15458082e-16]
[2.21551666e-09 1.00000000e+00]
[1.00000000e+00 5.91186058e-11]
[3.62158983e-11 1.00000000e+00]
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[1.00000000e+00 4.76199705e-11]
[1.00000000e+00 2.85108790e-08]
[1.00000000e+00 2.22156165e-11]
[4.27063407e-09 1.00000000e+00]
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[1.00000000e+00 2.50984520e-12]
[1.97548775e-06 9.99997973e-01]
[3.39743423e-07 9.99999642e-01]
[1.00000000e+00 2.22765773e-12]
[8.76692866e-07 9.99999166e-01]
[1.00000000e+00 2.78574869e-16]
[1.00000000e+00 1.95561456e-10]
[9.99999881e-01 1.67406085e-07]
[3.92686491e-12 1.00000000e+00]
[2.08300005e-14 1.00000000e+00]
[1.01821040e-09 1.00000000e+00]
[3.83713825e-11 1.00000000e+00]
[9.99949574e-01 5.03798292e-05]
[2.01972085e-11 1.00000000e+00]
[6.09303830e-10 1.00000000e+00]
[2.37876332e-08 1.00000000e+00]
[1.80382231e-09 1.00000000e+00]
[2.36594315e-06 9.99997616e-01]
[1.00000000e+00 6.62674532e-14]
[1.00000000e+00 1.02575595e-13]
[8.03472899e-10 1.00000000e+00]
[2.22419985e-10 1.00000000e+00]
[6.57767574e-09 1.00000000e+00]
[1.23981918e-08 1.00000000e+00]
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[1.00000000e+00 3.95231903e-10]
[1.00000000e+00 7.04534020e-14]
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[1.00000000e+00 2.29857734e-12]
[1.00000000e+00 5.58844915e-10]
[1.00000000e+00 6.01426244e-12]
[3.11768722e-10 1.00000000e+00]
[1.51868518e-11 1.00000000e+00]
[4.98036778e-10 1.00000000e+00]
[9.99990463e-01 9.53979543e-06]
[1.02964590e-11 1.00000000e+00]
[9.88156668e-10 1.00000000e+00]
[1.00000000e+00 2.55663459e-12]
[2.48366683e-09 1.00000000e+00]
[1.00000000e+00 5.44209677e-11]
[1.00000000e+00 2.30420696e-10]
[1.63088298e-09 1.00000000e+00]
[1.00000000e+00 1.79202885e-13]
[1.00000000e+00 1.45757461e-15]
[2.62309313e-10 1.00000000e+00]
[9.97823238e-01 2.17682333e-03]
[1.00000000e+00 4.28412479e-11]
[1.00000000e+00 2.34888842e-09]
[7.98672595e-09 1.00000000e+00]
[1.00000000e+00 5.53305668e-09]
[2.54307634e-11 1.00000000e+00]
[1.00000000e+00 6.56801014e-09]
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[2.28873066e-11 1.00000000e+00]
[3.31883166e-06 9.99996662e-01]
[9.99998569e-01 1.37345546e-06]
[3.50520973e-10 1.00000000e+00]
[1.00000000e+00 2.99601940e-11]
[1.00000000e+00 8.12182988e-10]
[9.99999404e-01 5.54568373e-07]
[1.00000000e+00 2.60349034e-13]
[1.00000000e+00 1.27003882e-16]
[1.00000000e+00 4.91250596e-10]
[1.00000000e+00 9.27794520e-19]
[1.16394616e-10 1.00000000e+00]
[6.03384495e-11 1.00000000e+00]
[1.00000000e+00 2.32904690e-15]
[1.00000000e+00 1.45718437e-09]
[9.99999642e-01 3.88207496e-07]
[1.16261212e-07 9.99999881e-01]
[1.00000000e+00 3.08095482e-09]
[1.00000000e+00 2.62673164e-11]
[1.00000000e+00 8.01922678e-12]
[9.99996305e-01 3.74308092e-06]
```

```
[1.00000000e+00 1.91390370e-08]
[2.48953369e-09 1.00000000e+00]
[9.99993801e-01 6.24609902e-06]
[1.00000000e+00 1.22461312e-08]
[9.99993682e-01 6.26913379e-06]
[1.65346105e-11 1.00000000e+00]
[1.00000000e+00 1.71400492e-17]
[9.99999881e-01 9.92253959e-08]
[9.97193158e-01 2.80692149e-03]
[3.40903150e-09 1.00000000e+00]
[7.28367783e-11 1.00000000e+00]
[6.34378244e-11 1.00000000e+00]
[2.67554424e-06 9.99997377e-01]
[5.25607162e-11 1.00000000e+00]
[5.31722721e-11 1.00000000e+00]
[4.55539739e-09 1.00000000e+00]
[1.61677424e-04 9.99838352e-01]
[1.00000000e+00 3.43882284e-10]
[4.39479703e-11 1.00000000e+00]
[1.73215597e-06 9.99998212e-01]
[1.00000000e+00 3.26567061e-13]
[1.00000000e+00 6.05335471e-09]]
```

In [32]:
```
dense_model_pred=[]
for i in range(len(dense_model_prediction)):
    dense_model_pred.append(np.argmax(dense_model_prediction[i]))
```

In [33]:
```
print(dense_model_pred)
```

```
[0, 0, 1, 1, 0, 0, 0, 1, 1, 1, 1, 0, 0, 1, 0, 1, 0, 0, 1, 0, 1, 0, 0, 0, 0, 0, 1, 0, 0, 1, 0, 0, 0, 0, 0, 1, 0,
0, 1, 1, 1, 0, 1, 0, 0, 0, 0, 1, 1, 1, 1, 0, 1, 0, 0, 1, 1, 1, 1, 1, 0, 0, 0, 0, 0, 1, 0, 0, 1, 1, 1, 1, 1, 1,
0, 1, 0, 0, 0, 1, 0, 1, 1, 1, 1, 1, 0, 0, 0, 0, 0, 1, 1, 1, 1, 1, 0, 1, 0, 0, 0, 0, 1, 1, 1, 1, 0, 1, 0, 0, 0,
0, 0, 0, 1, 1, 1, 1, 1, 1, 0, 1, 0, 0, 1, 1, 1, 0, 0, 1, 1, 0, 0, 1, 0, 0, 1, 0, 1, 1, 0, 1, 1, 1, 0, 0, 0, 1,
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1, 0, 1, 1, 0, 1, 1, 1, 0, 1, 0, 0, 0, 1, 0, 0, 0, 1, 1, 1, 1, 1, 1, 0, 1, 0, 0, 1, 1, 1, 1, 1, 0, 0, 1, 0, 1,
1, 0, 0, 1, 1, 0, 1, 0, 1, 0, 0, 1, 1, 1, 1, 0, 0, 0, 1, 1, 0, 0, 1, 0, 0, 1, 0, 0, 0, 0, 1, 0, 0, 1, 0, 0, 1,
0, 0, 1, 1, 0, 0, 0, 1, 0, 1, 0, 0, 0, 1, 0, 1, 1, 1, 1, 1, 1, 1, 0, 0, 1, 0, 1, 1, 1, 1, 0, 0, 1, 0, 1, 0, 1,
1, 1, 1, 0, 1, 0, 0, 1, 0, 0, 1, 1, 1, 0, 0, 0, 1, 0, 0, 0, 0, 1, 1, 0, 1, 1, 1, 1, 0, 0, 0, 1, 1, 0, 0, 1, 0,
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0, 1, 1, 1, 0, 1, 1, 0, 1, 0, 0, 1, 0, 0, 1, 0, 0, 0, 1, 0, 1, 0, 1, 1, 1, 0, 1, 0, 0, 0, 0, 0, 0, 1, 1, 0,
0, 0, 1, 0, 0, 0, 0, 0, 1, 0, 0, 0, 1, 0, 0, 0, 1, 1, 1, 1, 1, 1, 1, 1, 0, 1, 1, 0, 0]
```

In [35]:
```
true_labels=[]
for i in range(len(y_test)):
    true_labels.append(np.argmax(y_test[i]))
```

In [36]:
```
print(true_labels)
```

```
[0, 0, 1, 1, 0, 0, 0, 1, 1, 1, 1, 0, 0, 1, 0, 1, 0, 0, 1, 0, 1, 0, 0, 0, 0, 0, 1, 0, 0, 1, 0, 0, 0, 0, 0, 1, 0,
0, 1, 1, 1, 0, 1, 0, 0, 0, 0, 1, 1, 1, 1, 0, 1, 0, 0, 1, 1, 1, 1, 1, 0, 0, 0, 0, 0, 1, 0, 0, 1, 1, 1, 1, 1, 1,
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0, 0, 0, 1, 1, 1, 1, 1, 1, 0, 1, 0, 0, 1, 1, 1, 0, 0, 1, 1, 0, 0, 1, 0, 0, 1, 0, 1, 1, 0, 1, 1, 1, 0, 0, 0, 1,
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0, 1, 1, 1, 0, 1, 1, 0, 1, 0, 0, 1, 0, 0, 1, 0, 0, 0, 1, 0, 1, 0, 1, 1, 1, 0, 1, 0, 0, 0, 0, 0, 0, 1, 1, 0,
0, 0, 1, 0, 0, 0, 0, 0, 1, 0, 0, 0, 1, 0, 0, 0, 1, 1, 1, 1, 1, 1, 1, 1, 0, 1, 1, 0, 0]
```

Result Analysis

In [38]:
```
#Accuracy score
densemodel_accuracy=accuracy_score(y_true=true_labels,y_pred=dense_model_pred)
print(f"Validation accuracy of DenseNet201 model accuracy is {densemodel_accuracy*100.0:.2f}%")
```

```
Validation accuracy of DenseNet201 model accuracy is 100.00%
```

Classification Report

In [40]:
```
from IPython.core.display import display, HTML
display (HTML("<h1>DenseNet201 model classification report"))
print(classification_report(y_true=true_labels,y_pred=dense_model_pred, target_names=class_labels))
```

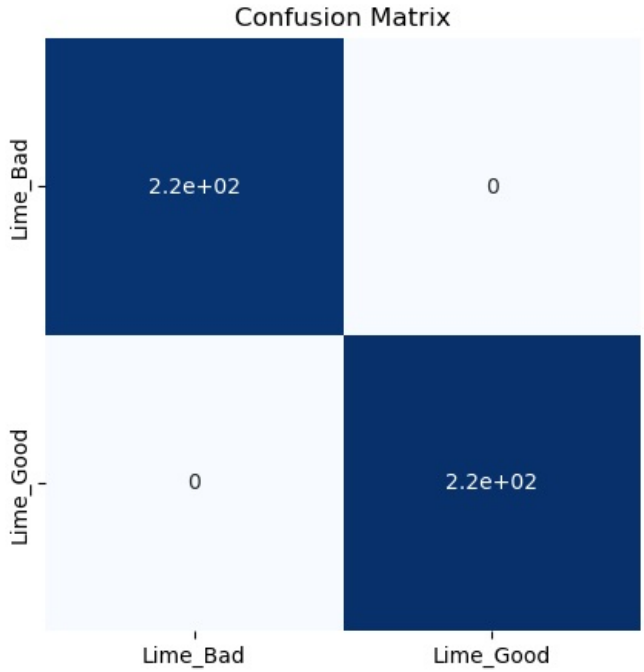
DenseNet201 model classification report

```
              precision    recall  f1-score   support

    Lime_Bad       1.00      1.00      1.00       216
   Lime_Good       1.00      1.00      1.00       220

    accuracy                           1.00       436
   macro avg       1.00      1.00      1.00       436
weighted avg       1.00      1.00      1.00       436
```

In [48]:
```
plt.figure(figsize=(5,5))
sns.heatmap(data=confusion_matrix(y_true=true_labels,y_pred=dense_model_pred),
annot=True,
#fmt='d'
cbar=False,
cmap=plt.cm.Blues,
xticklabels=class_labels,
yticklabels=class_labels)
plt.title(label='Confusion Matrix')
plt.show()
```



In [58]:
```
#it measns value is 220 =2.2*10^^2 , e represents 10
dense_model.save("Fruits_DenseNet201_model.keras")
```

In [32]:
```
from IPython.display import Image,display
#import tensorflow as tf
from tensorflow.keras.models import load_model
```

In [43]:
```
model=load_model(filepath='Fruits_DenseNet201_model.keras',compile=False)
model.compile(optimizer='adam', loss='categorical_crossentropy', metrics=['accuracy'])
```

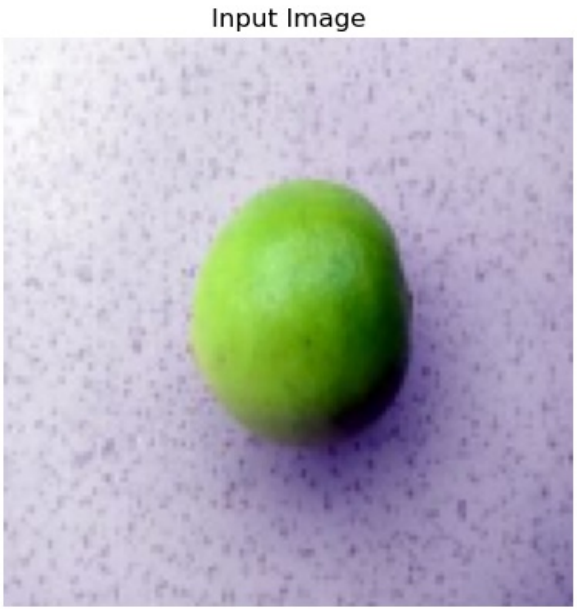
In [44]:
```
class_labels=['Lime_Bad','Lime_Good']
```

In [49]:
```
image_path='Fruits/Lime_Good/imgnew.jpg'
print(image_path)
```

```
Fruits/Lime_Good/imgnew.jpg
```

In [50]:
```
image=cv2.imread(image_path)

image=cv2.cvtColor(image,cv2.COLOR_BGR2RGB)
image=cv2.resize(image,(128,128))
plt.imshow(image)
plt.title(label='Input Image')
plt.axis('off')
plt.show()
```



In [51]:
```
image=np.array(image)
image=image/255.0
image=np.expand_dims(image,axis=0)
print(image.shape)
```

```
(1, 128, 128, 3)
```

In [52]:
```
model_prediction=model.predict(image)
model_class=np.argmax(model_prediction[0])
model_label=class_labels[model_class]
fruit_name=model_label.split("_")[0]
fruit_quality=model_label.split("_")[1]
print(f"Fruit classified as -> {fruit_name}")
print(f"Quality assessed as -> {fruit_quality}")
```

```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 215ms/step
Fruit classified as -> Lime
Quality assessed as -> Good
```

In [ ]: