In [83]:
```
1 !pip install tensorflow opencv-python matplotlib
```

```
Requirement already satisfied: tensorflow in c:\users\asus\anaconda3\lib\sit
e-packages (2.16.1)
Requirement already satisfied: opencv-python in c:\users\asus\anaconda3\lib
\site-packages (4.10.0.82)
Requirement already satisfied: matplotlib in c:\users\asus\anaconda3\lib\sit
e-packages (3.7.0)
Requirement already satisfied: tensorflow-intel==2.16.1 in c:\users\asus\ana
conda3\lib\site-packages (from tensorflow) (2.16.1)
Requirement already satisfied: requests<3,>=2.21.0 in c:\users\asus\anaconda
3\lib\site-packages (from tensorflow-intel==2.16.1->tensorflow) (2.32.3)
Requirement already satisfied: wrapt>=1.11.0 in c:\users\asus\anaconda3\lib
\site-packages (from tensorflow-intel==2.16.1->tensorflow) (1.14.1)
Requirement already satisfied: ml-dtypes~=0.3.1 in c:\users\asus\anaconda3\l
ib\site-packages (from tensorflow-intel==2.16.1->tensorflow) (0.3.2)
Requirement already satisfied: libclang>=13.0.0 in c:\users\asus\anaconda3\l
ib\site-packages (from tensorflow-intel==2.16.1->tensorflow) (18.1.1)
Requirement already satisfied: protobuf!=4.21.0,!=4.21.1,!=4.21.2,!=4.21.3,!
=4.21.4,!=4.21.5,<5.0.0dev,>=3.20.3 in c:\users\asus\anaconda3\lib\site-pack
ages (from tensorflow-intel==2.16.1->tensorflow) (4.25.3)
Requirement already satisfied: typing-extensions>=3.6.6 in c:\users\asus\ana
conda3\lib\site-packages (from tensorflow-intel==2.16.1->tensorflow) (4.12.
2)
Requirement already satisfied: grpcio<2.0,>=1.24.3 in c:\users\asus\anaconda
3\lib\site-packages (from tensorflow-intel==2.16.1->tensorflow) (1.64.1)
Requirement already satisfied: setuptools in c:\users\asus\anaconda3\lib\sit
e-packages (from tensorflow-intel==2.16.1->tensorflow) (80.9.0)
Requirement already satisfied: opt-einsum>=2.3.2 in c:\users\asus\anaconda3
\lib\site-packages (from tensorflow-intel==2.16.1->tensorflow) (3.3.0)
Requirement already satisfied: tensorflow-io-gcs-filesystem>=0.23.1 in c:\us
ers\asus\anaconda3\lib\site-packages (from tensorflow-intel==2.16.1->tensorf
low) (0.31.0)
Requirement already satisfied: keras>=3.0.0 in c:\users\asus\anaconda3\lib\s
ite-packages (from tensorflow-intel==2.16.1->tensorflow) (3.3.3)
Requirement already satisfied: google-pasta>=0.1.1 in c:\users\asus\anaconda
3\lib\site-packages (from tensorflow-intel==2.16.1->tensorflow) (0.2.0)
Requirement already satisfied: six>=1.12.0 in c:\users\asus\anaconda3\lib\si
te-packages (from tensorflow-intel==2.16.1->tensorflow) (1.16.0)
Requirement already satisfied: termcolor>=1.1.0 in c:\users\asus\anaconda3\l
ib\site-packages (from tensorflow-intel==2.16.1->tensorflow) (2.4.0)
Collecting tensorboard<2.17,>=2.16
  Using cached tensorboard-2.16.2-py3-none-any.whl (5.5 MB)
Requirement already satisfied: flatbuffers>=23.5.26 in c:\users\asus\anacond
a3\lib\site-packages (from tensorflow-intel==2.16.1->tensorflow) (24.3.25)
Requirement already satisfied: h5py>=3.10.0 in c:\users\asus\anaconda3\lib\s
ite-packages (from tensorflow-intel==2.16.1->tensorflow) (3.11.0)
Requirement already satisfied: numpy<2.0.0,>=1.23.5 in c:\users\asus\anacond
a3\lib\site-packages (from tensorflow-intel==2.16.1->tensorflow) (1.26.4)
Requirement already satisfied: astunparse>=1.6.0 in c:\users\asus\anaconda3
\lib\site-packages (from tensorflow-intel==2.16.1->tensorflow) (1.6.3)
Requirement already satisfied: packaging in c:\users\asus\anaconda3\lib\site
-packages (from tensorflow-intel==2.16.1->tensorflow) (22.0)
Requirement already satisfied: gast!=0.5.0,!=0.5.1,!=0.5.2,>=0.2.1 in c:\use
rs\asus\anaconda3\lib\site-packages (from tensorflow-intel==2.16.1->tensorfl
ow) (0.5.4)
Requirement already satisfied: absl-py>=1.0.0 in c:\users\asus\anaconda3\lib
\site-packages (from tensorflow-intel==2.16.1->tensorflow) (2.1.0)
Requirement already satisfied: kiwisolver>=1.0.1 in c:\users\asus\anaconda3
\lib\site-packages (from matplotlib) (1.4.4)
Requirement already satisfied: contourpy>=1.0.1 in c:\users\asus\anaconda3\l
ib\site-packages (from matplotlib) (1.0.5)
Requirement already satisfied: fonttools>=4.22.0 in c:\users\asus\anaconda3
```

```
\lib\site-packages (from matplotlib) (4.25.0)
Requirement already satisfied: python-dateutil>=2.7 in c:\users\asus\anacond
a3\lib\site-packages (from matplotlib) (2.8.2)
Requirement already satisfied: cycler>=0.10 in c:\users\asus\anaconda3\lib\s
ite-packages (from matplotlib) (0.11.0)
Requirement already satisfied: pyparsing>=2.3.1 in c:\users\asus\anaconda3\l
ib\site-packages (from matplotlib) (3.0.9)
Requirement already satisfied: pillow>=6.2.0 in c:\users\asus\anaconda3\lib
\site-packages (from matplotlib) (11.2.1)
Requirement already satisfied: wheel<1.0,>=0.23.0 in c:\users\asus\anaconda3
\lib\site-packages (from astunparse>=1.6.0->tensorflow-intel==2.16.1->tensor
flow) (0.38.4)
Requirement already satisfied: optree in c:\users\asus\anaconda3\lib\site-pa
ckages (from keras>=3.0.0->tensorflow-intel==2.16.1->tensorflow) (0.11.0)
Requirement already satisfied: rich in c:\users\asus\anaconda3\lib\site-pack
ages (from keras>=3.0.0->tensorflow-intel==2.16.1->tensorflow) (13.7.1)
Requirement already satisfied: namex in c:\users\asus\anaconda3\lib\site-pac
kages (from keras>=3.0.0->tensorflow-intel==2.16.1->tensorflow) (0.0.8)
Requirement already satisfied: certifi>=2017.4.17 in c:\users\asus\anaconda3
\lib\site-packages (from requests<3,>=2.21.0->tensorflow-intel==2.16.1->tens
orflow) (2023.5.7)
Requirement already satisfied: charset-normalizer<4,>=2 in c:\users\asus\ana
conda3\lib\site-packages (from requests<3,>=2.21.0->tensorflow-intel==2.16.1
->tensorflow) (2.0.4)
Requirement already satisfied: idna<4,>=2.5 in c:\users\asus\anaconda3\lib\s
ite-packages (from requests<3,>=2.21.0->tensorflow-intel==2.16.1->tensorflo
w) (3.4)
Requirement already satisfied: urllib3<3,>=1.21.1 in c:\users\asus\anaconda3
\lib\site-packages (from requests<3,>=2.21.0->tensorflow-intel==2.16.1->tens
orflow) (1.26.14)
Requirement already satisfied: werkzeug>=1.0.1 in c:\users\asus\anaconda3\li
b\site-packages (from tensorboard<2.17,>=2.16->tensorflow-intel==2.16.1->ten
sorflow) (2.2.2)
Requirement already satisfied: tensorboard-data-server<0.8.0,>=0.7.0 in c:\u
sers\asus\anaconda3\lib\site-packages (from tensorboard<2.17,>=2.16->tensorf
low-intel==2.16.1->tensorflow) (0.7.2)
Requirement already satisfied: markdown>=2.6.8 in c:\users\asus\anaconda3\li
b\site-packages (from tensorboard<2.17,>=2.16->tensorflow-intel==2.16.1->ten
sorflow) (3.4.1)
Requirement already satisfied: MarkupSafe>=2.1.1 in c:\users\asus\anaconda3
\lib\site-packages (from werkzeug>=1.0.1->tensorboard<2.17,>=2.16->tensorflo
w-intel==2.16.1->tensorflow) (2.1.1)
Requirement already satisfied: pygments<3.0.0,>=2.13.0 in c:\users\asus\anac
onda3\lib\site-packages (from rich->keras>=3.0.0->tensorflow-intel==2.16.1->
tensorflow) (2.18.0)
Requirement already satisfied: markdown-it-py>=2.2.0 in c:\users\asus\anacon
da3\lib\site-packages (from rich->keras>=3.0.0->tensorflow-intel==2.16.1->te
nsorflow) (3.0.0)
Requirement already satisfied: mdurl~=0.1 in c:\users\asus\anaconda3\lib\sit
e-packages (from markdown-it-py>=2.2.0->rich->keras>=3.0.0->tensorflow-intel
==2.16.1->tensorflow) (0.1.2)
Installing collected packages: tensorboard
  Attempting uninstall: tensorboard
    Found existing installation: tensorboard 2.19.0
    Uninstalling tensorboard-2.19.0:
      Successfully uninstalled tensorboard-2.19.0
Successfully installed tensorboard-2.16.2
```

```
WARNING: Ignoring invalid distribution -pencv-python (c:\users\asus\anaconda
3\lib\site-packages)
WARNING: Ignoring invalid distribution -pencv-python (c:\users\asus\anaconda
3\lib\site-packages)
WARNING: Ignoring invalid distribution -pencv-python (c:\users\asus\anaconda
3\lib\site-packages)
    WARNING: Ignoring invalid distribution -pencv-python (c:\users\asus\anac
onda3\lib\site-packages)
WARNING: Ignoring invalid distribution -pencv-python (c:\users\asus\anaconda
3\lib\site-packages)
WARNING: Ignoring invalid distribution -pencv-python (c:\users\asus\anaconda
3\lib\site-packages)
WARNING: Ignoring invalid distribution -pencv-python (c:\users\asus\anaconda
3\lib\site-packages)
WARNING: Ignoring invalid distribution -pencv-python (c:\users\asus\anaconda
3\lib\site-packages)
```

In [162]:

```
import os
import numpy as np
import cv2
import tensorflow as tf
from tensorflow.keras.preprocessing.image import img_to_array
from tensorflow.keras.utils import to_categorical
from sklearn.model_selection import train_test_split
import matplotlib.pyplot as plt

def load_and_preprocess_images(folder, label, image_size=(220, 220)):
    images = []
    labels = []
    for filename in os.listdir(folder):
        path = os.path.join(folder, filename)
        img = cv2.imread(path)
        if img is None:
            continue
        img = cv2.resize(img, image_size)
        gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
        enhanced = cv2.equalizeHist(gray)
        enhanced = cv2.cvtColor(enhanced, cv2.COLOR_GRAY2RGB)  # convert
#         print(enhanced)
        images.append(img_to_array(enhanced))
#         print(images)
        labels.append(label)
    return images, labels

elephant_images, elephant_labels = load_and_preprocess_images("E:\Object
print(elephant_images)
print("HELLOOOOOOOO\n")
non_elephant_images, non_elephant_labels = load_and_preprocess_images("E:
print(non_elephant_images)

X = np.array(elephant_images + non_elephant_images, dtype="float32") / 25
y = to_categorical(elephant_labels + non_elephant_labels, num_classes=2)

X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2,
```

```
[array([[[ 23.,  23.,  23.],
        [ 23.,  23.,  23.],
        [ 23.,  23.,  23.],
        ...,
        [ 23.,  23.,  23.],
        [ 23.,  23.,  23.],
        [ 23.,  23.,  23.]],

       [[ 23.,  23.,  23.],
        [ 23.,  23.,  23.],
        [ 23.,  23.,  23.],
        ...,
        [ 23.,  23.,  23.],
        [ 23.,  23.,  23.],
        [ 23.,  23.,  23.]],

       [[ 23.,  23.,  23.],
        [ 23.,  23.,  23.],
        [ 23.,  23.,  23.],
```

In [163]:

```
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import Conv2D, MaxPooling2D, Flatten, Dense,

model = Sequential([
    Conv2D(32, (3, 3), activation='relu', input_shape=(220, 220, 3)),
    MaxPooling2D(pool_size=(2, 2)),

    Conv2D(64, (3, 3), activation='relu'),
    MaxPooling2D(pool_size=(2, 2)),

    Conv2D(128, (3, 3), activation='relu'),
    MaxPooling2D(pool_size=(2, 2)),

    Flatten(),
    Dense(256, activation='relu'),
    Dropout(0.5),
    Dense(2, activation='softmax')  # 2 classes
])

model.compile(optimizer='adam', loss='categorical_crossentropy', metrics=
model.summary()
```

Model: "sequential_17"

Layer (type)	Output Shape	
conv2d_51 (Conv2D)	(None, 218, 218, 32)	
max_pooling2d_51 (MaxPooling2D)	(None, 109, 109, 32)	
conv2d_52 (Conv2D)	(None, 107, 107, 64)	
max_pooling2d_52 (MaxPooling2D)	(None, 53, 53, 64)	
conv2d_53 (Conv2D)	(None, 51, 51, 128)	
max_pooling2d_53 (MaxPooling2D)	(None, 25, 25, 128)	
flatten_17 (Flatten)	(None, 80000)	
dense_34 (Dense)	(None, 256)	2
dropout_17 (Dropout)	(None, 256)	
dense_35 (Dense)	(None, 2)	

Total params: 20,574,018 (78.48 MB)

Trainable params: 20,574,018 (78.48 MB)

Non-trainable params: 0 (0.00 B)

In [164]:
```
1 history = model.fit(X_train, y_train, validation_data=(X_test, y_test), e
```

```
Epoch 1/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 6s 6s/step - accuracy: 0.6897 - loss: 0.6492 - val_
accuracy: 0.7500 - val_loss: 8.9021
Epoch 2/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 2s 2s/step - accuracy: 0.7241 - loss: 11.2123 - val
_accuracy: 0.7500 - val_loss: 0.5617
Epoch 3/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 2s 2s/step - accuracy: 0.7586 - loss: 0.5295 - val_
accuracy: 0.2500 - val_loss: 3.9454
Epoch 4/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 0.3448 - loss: 3.3154 - val_
accuracy: 0.7500 - val_loss: 0.5348
Epoch 5/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 0.6207 - loss: 0.7252 - val_
accuracy: 0.7500 - val_loss: 0.8820
Epoch 6/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 0.7241 - loss: 0.8575 - val_
accuracy: 0.7500 - val_loss: 0.6349
Epoch 7/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 0.7241 - loss: 0.6356 - val_
accuracy: 0.7500 - val_loss: 0.5111
Epoch 8/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 0.7931 - loss: 0.4380 - val_
accuracy: 0.5000 - val_loss: 0.6524
Epoch 9/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 0.8621 - loss: 0.4768 - val_
accuracy: 0.7500 - val_loss: 0.4974
Epoch 10/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 0.9655 - loss: 0.3587 - val_
accuracy: 0.7500 - val_loss: 0.5658
Epoch 11/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 0.7586 - loss: 0.3588 - val_
accuracy: 0.7500 - val_loss: 0.5039
Epoch 12/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 0.9655 - loss: 0.1813 - val_
accuracy: 0.6250 - val_loss: 0.6151
Epoch 13/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 0.9655 - loss: 0.1645 - val_
accuracy: 0.6250 - val_loss: 0.6263
Epoch 14/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 0.9310 - loss: 0.1212 - val_
accuracy: 0.7500 - val_loss: 0.7273
Epoch 15/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 0.9655 - loss: 0.1399 - val_
accuracy: 0.8750 - val_loss: 0.7050
Epoch 16/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 2s 2s/step - accuracy: 0.9310 - loss: 0.1230 - val_
accuracy: 0.6250 - val_loss: 0.7902
Epoch 17/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 0.9655 - loss: 0.0674 - val_
accuracy: 0.6250 - val_loss: 0.8370
Epoch 18/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 1.0000 - loss: 0.0395 - val_
accuracy: 0.7500 - val_loss: 0.8130
Epoch 19/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 1.0000 - loss: 0.0234 - val_
accuracy: 0.8750 - val_loss: 0.9598
Epoch 20/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 1.0000 - loss: 0.0278 - val_
accuracy: 0.8750 - val_loss: 1.1310
Epoch 21/50
```

```
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 1.0000 - loss: 0.0223 - val_
accuracy: 0.8750 - val_loss: 1.1747
Epoch 22/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 2s 2s/step - accuracy: 1.0000 - loss: 0.0088 - val_
accuracy: 0.8750 - val_loss: 1.0989
Epoch 23/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 2s 2s/step - accuracy: 1.0000 - loss: 0.0098 - val_
accuracy: 0.7500 - val_loss: 1.1640
Epoch 24/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 1.0000 - loss: 0.0025 - val_
accuracy: 0.7500 - val_loss: 1.3161
Epoch 25/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 2s 2s/step - accuracy: 1.0000 - loss: 0.0033 - val_
accuracy: 0.7500 - val_loss: 1.4484
Epoch 26/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 1.0000 - loss: 0.0013 - val_
accuracy: 0.7500 - val_loss: 1.5702
Epoch 27/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 1.0000 - loss: 0.0162 - val_
accuracy: 0.8750 - val_loss: 1.8935
Epoch 28/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 2s 2s/step - accuracy: 1.0000 - loss: 0.0043 - val_
accuracy: 0.7500 - val_loss: 2.9434
Epoch 29/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 0.9655 - loss: 0.0661 - val_
accuracy: 0.8750 - val_loss: 1.6588
Epoch 30/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 1.0000 - loss: 0.0147 - val_
accuracy: 0.6250 - val_loss: 1.6821
Epoch 31/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 1.0000 - loss: 0.0029 - val_
accuracy: 0.6250 - val_loss: 2.4480
Epoch 32/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 2s 2s/step - accuracy: 1.0000 - loss: 0.0137 - val_
accuracy: 0.6250 - val_loss: 2.7580
Epoch 33/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 2s 2s/step - accuracy: 1.0000 - loss: 0.0260 - val_
accuracy: 0.6250 - val_loss: 2.8750
Epoch 34/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 0.9655 - loss: 0.0416 - val_
accuracy: 0.6250 - val_loss: 2.9415
Epoch 35/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 2s 2s/step - accuracy: 1.0000 - loss: 0.0366 - val_
accuracy: 0.6250 - val_loss: 2.9996
Epoch 36/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 2s 2s/step - accuracy: 1.0000 - loss: 0.0181 - val_
accuracy: 0.6250 - val_loss: 3.0562
Epoch 37/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 1.0000 - loss: 0.0152 - val_
accuracy: 0.6250 - val_loss: 3.0726
Epoch 38/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 1.0000 - loss: 0.0066 - val_
accuracy: 0.6250 - val_loss: 2.9750
Epoch 39/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 2s 2s/step - accuracy: 1.0000 - loss: 0.0252 - val_
accuracy: 0.6250 - val_loss: 2.6882
Epoch 40/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 2s 2s/step - accuracy: 1.0000 - loss: 0.0066 - val_
accuracy: 0.6250 - val_loss: 2.2438
Epoch 41/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 1.0000 - loss: 0.0034 - val_
```

```
accuracy: 0.7500 - val_loss: 1.7337
Epoch 42/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 1.0000 - loss: 0.0034 - val_
accuracy: 0.8750 - val_loss: 1.7829
Epoch 43/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 1.0000 - loss: 0.0109 - val_
accuracy: 0.8750 - val_loss: 2.0975
Epoch 44/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 1.0000 - loss: 0.0030 - val_
accuracy: 0.8750 - val_loss: 2.1363
Epoch 45/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 2s 2s/step - accuracy: 0.9655 - loss: 0.0695 - val_
accuracy: 0.6250 - val_loss: 3.1530
Epoch 46/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 1.0000 - loss: 0.0020 - val_
accuracy: 0.6250 - val_loss: 4.6077
Epoch 47/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 2s 2s/step - accuracy: 1.0000 - loss: 0.0031 - val_
accuracy: 0.6250 - val_loss: 5.2768
Epoch 48/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 1s 1s/step - accuracy: 1.0000 - loss: 0.0077 - val_
accuracy: 0.6250 - val_loss: 5.6497
Epoch 49/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 2s 2s/step - accuracy: 1.0000 - loss: 0.0149 - val_
accuracy: 0.7500 - val_loss: 5.9190
Epoch 50/50
1/1 ━━━━━━━━━━━━━━━━━━━━ 2s 2s/step - accuracy: 1.0000 - loss: 0.0410 - val_
accuracy: 0.7500 - val_loss: 5.9195
```

In [135]:

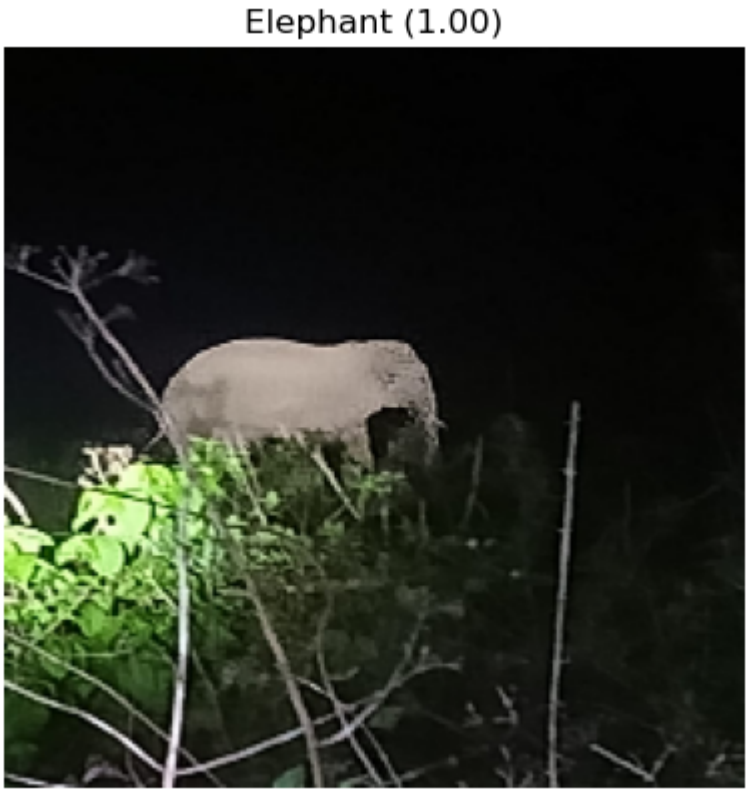
```
# def predict_image(image_path):
#     img = cv2.imread(image_path)
#     img = cv2.resize(img, (220,220))
#     gray = cv2.cvtColor(img, cv2.COLOR_BGR2GRAY)
#     enhanced = cv2.equalizeHist(gray)
#     enhanced = cv2.cvtColor(enhanced, cv2.COLOR_GRAY2RGB)
# #     plt.imshow(enhanced)
#     img_array = img_to_array(enhanced) / 255.0
#     img_array = np.expand_dims(img_array, axis=0)

#     pred = model.predict(img_array)[0]
#     label = "Elephant" if np.argmax(pred) == 1 else "No Elephant"
#     confidence = pred[np.argmax(pred)]

#     plt.imshow(cv2.cvtColor(img, cv2.COLOR_BGR2RGB))
#     plt.title(f"{label} ({confidence:.2f})")
#     plt.axis("off")
#     plt.show()

# predict_image("E:\Object detection Project\Elephant\WhatsApp Image 2025
```

```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 67ms/step
```



In [167]:

```
import cv2
import numpy as np
from tensorflow.keras.preprocessing.image import img_to_array
import matplotlib.pyplot as plt

def predict_from_camera():
    cap = cv2.VideoCapture(0)  # 0 = default webcam

    if not cap.isOpened():
        print("Cannot open camera")
        return

    while True:
        ret, frame = cap.read()
        if not ret:
            print("Can't receive frame. Exiting ...")
            break

        frame_resized = cv2.resize(frame, (220, 220))
        gray = cv2.cvtColor(frame_resized, cv2.COLOR_BGR2GRAY)
        enhanced = cv2.equalizeHist(gray)
        enhanced_rgb = cv2.cvtColor(enhanced, cv2.COLOR_GRAY2RGB)
        img_array = img_to_array(enhanced_rgb) / 255.0
        img_array = np.expand_dims(img_array, axis=0)

        pred = model.predict(img_array)[0]
        label = "Elephant" if np.argmax(pred) == 1 else "No Elephant"
        confidence = pred[np.argmax(pred)]

        # Display prediction
        display_frame = frame.copy()
        cv2.putText(display_frame, f"{label} ({confidence:.2f})", (10,30)
                    cv2.FONT_HERSHEY_SIMPLEX, 1, (0, 255, 0) if label ==

        cv2.imshow("Elephant Detection ",display_frame)

        if cv2.waitKey(1) & 0xFF == ord('q'):
            break

    cap.release()
    cv2.destroyAllWindows()

# Run webcam detection
predict_from_camera()
```

```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 80ms/step
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 73ms/step
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 83ms/step
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 63ms/step
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 68ms/step
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 80ms/step
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 65ms/step
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 63ms/step
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 68ms/step
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 64ms/step
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 63ms/step
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 60ms/step
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 64ms/step
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 75ms/step
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 62ms/step
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 62ms/step
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 62ms/step
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 61ms/step
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 79ms/step
```

In [ ]:
```
1
```

In [ ]:
```
1
```

In [ ]:
```
1
```