In [1]:
```
from tensorflow.keras.preprocessing.image import ImageDataGenerator
from tensorflow.keras.preprocessing import image
import matplotlib.pylab as plt
import tensorflow as tf
import numpy as np
import cv2
import os
```

In [2]:
```
import tensorflow as tf
#tf.__version__
```

In [3]:
```
img=image.load_img(r"C:\Users\DELL\NIT\cnn project\Training\Happy\3.jpg")
```

In [4]:
```
plt.imshow(img)
```

Out[4]:
```
<matplotlib.image.AxesImage at 0x24f921f5d80>
```

In [5]:
```
i1= cv2.imread(r"C:\Users\DELL\NIT\cnn project\Training\Happy\10.jpg")
i1
```

Out[5]:
```
array([[[196, 140, 241],
        [199, 143, 244],
        [201, 145, 246],
        ...,
        [202, 150, 234],
        [213, 162, 242],
        [209, 160, 236]],

       [[193, 137, 238],
        [196, 140, 241],
        [198, 142, 243],
        ...,
        [192, 138, 228],
        [202, 150, 234],
        [198, 147, 227]],

       [[191, 135, 236],
        [192, 136, 237],
        [193, 137, 238],
        ...,
        [186, 127, 225],
        [193, 136, 229],
        [189, 133, 222]],

       ...,

       [[ 89, 173, 231],
        [ 88, 172, 230],
        [ 87, 171, 229],
        ...,
        [112,  85, 205],
        [110,  83, 203],
        [113,  86, 206]],

       [[ 89, 173, 231],
        [ 89, 173, 231],
        [ 90, 174, 232],
        ...,
        [114,  87, 207],
        [111,  84, 204],
        [113,  86, 206]],

       [[ 88, 172, 230],
        [ 90, 174, 232],
        [ 93, 177, 235],
        ...,
        [101,  74, 194],
        [ 98,  71, 191],
        [ 99,  72, 192]]], dtype=uint8)
```

In [6]:
```
i1.shape
```

Out[6]:
```
(408, 612, 3)
```

In [7]:
```
train=ImageDataGenerator(rescale=1/255)
validation=ImageDataGenerator(rescale=1/255)
```

In [8]:
```
train_dataset=train.flow_from_directory(r"C:\Users\DELL\NIT\cnn project\tra
                                        target_size=(200,200),
                                        batch_size=3,
                                        class_mode='binary')
validation_dataset=validation.flow_from_directory(r"C:\Users\DELL\NIT\cnn p
                                                  target_size=(200,200),
                                                  batch_size=3,
                                                  class_mode='binary')
```

```
Found 30 images belonging to 2 classes.
Found 30 images belonging to 2 classes.
```

In [9]:
```
train_dataset.class_indices
```

Out[9]:
```
{'happy': 0, 'sad': 1}
```

In [10]:
```
train_dataset.classes
```

Out[10]:
```
array([0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1,
       1, 1, 1, 1, 1, 1, 1, 1])
```

In [11]:
```
# now we are applying maxpooling

model = tf.keras.models.Sequential([ tf.keras.layers.Conv2D(16,(3,3),activa
                                    tf.keras.layers.MaxPool2D(2,2), #3 filt
                                    #
                                    tf.keras.layers.Conv2D(32,(3,3),activat
                                    tf.keras.layers.MaxPool2D(2,2),
                                    #
                                    tf.keras.layers.Conv2D(64,(3,3),activat
                                    tf.keras.layers.MaxPool2D(2,2),
                                    ##
                                    tf.keras.layers.Flatten(),
                                    ##
                                    tf.keras.layers.Dense(512, activation =
                                    #
                                    tf.keras.layers.Dense(1,activation= 'si
                                    ]
                                    )
```

```
c:\Users\DELL\anaconda3\envs\tensorflow_env\lib\site-packages\keras\src\laye
rs\convolutional\base_conv.py:107: UserWarning: Do not pass an `input_shape
`/`input_dim` argument to a layer. When using Sequential models, prefer usin
g an `Input(shape)` object as the first layer in the model instead.
  super().__init__(activity_regularizer=activity_regularizer, **kwargs)
```

In [12]:
```
model.compile(loss='binary_crossentropy',
              optimizer = tf.keras.optimizers.RMSprop(learning_rate=0.001),
              metrics = ['accuracy']
              )
```

In [13]:
```
model_fit = model.fit(train_dataset,
                      steps_per_epoch = 3,
                      epochs = 10,
                      validation_data = validation_dataset)
```

```
Epoch 1/10
```

```
c:\Users\DELL\anaconda3\envs\tensorflow_env\lib\site-packages\keras\src\trainers\data_adapters\py_dataset_adapter.py:121: UserWarning: Your `PyDataset` class should call `super().__init__(**kwargs)` in its constructor. `**kwargs` can include `workers`, `use_multiprocessing`, `max_queue_size`. Do not pass these arguments to `fit()`, as they will be ignored.
  self._warn_if_super_not_called()
3/3 ━━━━━━━━━━━━━━━━━━━━ 3s 587ms/step - accuracy: 0.2500 - loss: 4.3581 - val_accuracy: 0.6667 - val_loss: 2.3115
Epoch 2/10
3/3 ━━━━━━━━━━━━━━━━━━━━ 1s 394ms/step - accuracy: 0.4306 - loss: 2.7211 - val_accuracy: 0.6667 - val_loss: 0.5853
Epoch 3/10
3/3 ━━━━━━━━━━━━━━━━━━━━ 1s 413ms/step - accuracy: 0.8472 - loss: 0.4907 - val_accuracy: 0.6667 - val_loss: 0.5526
Epoch 4/10
1/3 ━━━━━━━━━━━━━━━━━━━━ 0s 229ms/step - accuracy: 0.6667 - loss: 0.6386
c:\Users\DELL\anaconda3\envs\tensorflow_env\lib\site-packages\keras\src\trainers\epoch_iterator.py:107: UserWarning: Your input ran out of data; interrupting training. Make sure that your dataset or generator can generate at least `steps_per_epoch * epochs` batches. You may need to use the `.repeat()` function when building your dataset.
  self._interrupted_warning()
3/3 ━━━━━━━━━━━━━━━━━━━━ 1s 203ms/step - accuracy: 0.6667 - loss: 0.6386 - val_accuracy: 0.8333 - val_loss: 0.5723
Epoch 5/10
3/3 ━━━━━━━━━━━━━━━━━━━━ 1s 429ms/step - accuracy: 0.7639 - loss: 0.5904 - val_accuracy: 0.8000 - val_loss: 0.5193
Epoch 6/10
3/3 ━━━━━━━━━━━━━━━━━━━━ 1s 424ms/step - accuracy: 0.7222 - loss: 0.5334 - val_accuracy: 0.6667 - val_loss: 0.8518
Epoch 7/10
3/3 ━━━━━━━━━━━━━━━━━━━━ 1s 378ms/step - accuracy: 0.3333 - loss: 1.3635 - val_accuracy: 0.8667 - val_loss: 0.5550
Epoch 8/10
3/3 ━━━━━━━━━━━━━━━━━━━━ 1s 168ms/step - accuracy: 1.0000 - loss: 0.5003 - val_accuracy: 0.7667 - val_loss: 0.4798
Epoch 9/10
3/3 ━━━━━━━━━━━━━━━━━━━━ 1s 448ms/step - accuracy: 0.6944 - loss: 0.5705 - val_accuracy: 0.9667 - val_loss: 0.4711
Epoch 10/10
3/3 ━━━━━━━━━━━━━━━━━━━━ 1s 369ms/step - accuracy: 0.8472 - loss: 0.5425 - val_accuracy: 0.7667 - val_loss: 0.3665
```

In [14]:

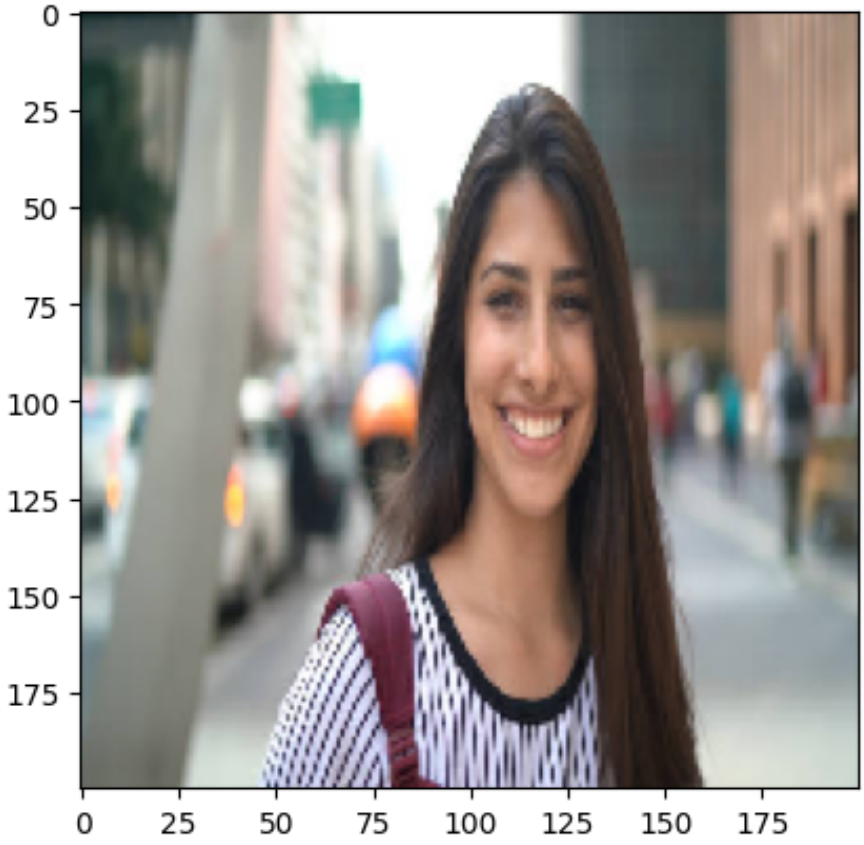
```
dir_path = r"C:\Users\DELL\NIT\cnn project\testing"
for i in os.listdir(dir_path ):
    print(i)
    img = image.load_img(dir_path+ '//'+i, target_size = (200,200))
    #plt.imshow(img)
    #plt.show()
```

```
1.jpg2.jpg
1.jpg4.jpg
10.jpg
11.jpg
19.jpg
2.jpg
5.jpg
6.jpg
7.jpg
9.jpg
a.jpg
d.jpg
e.jpg
g.jpg
h.jpg
j.jpg
```

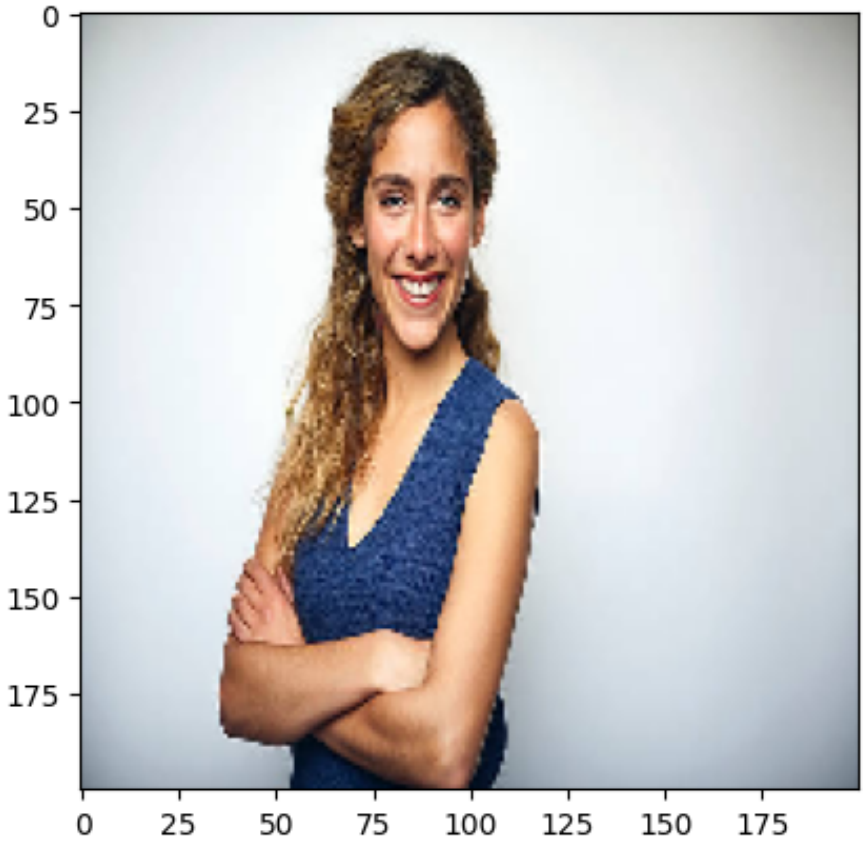
In [15]:
```
dir_path = r"C:\Users\DELL\NIT\cnn project\testing"
for i in os.listdir(dir_path ):
    img = image.load_img(dir_path+ '//'+i, target_size = (200,200))
    plt.imshow(img)
    plt.show()

    x= image.img_to_array(img)
    x=np.expand_dims(x,axis = 0)
    images = np.vstack([x])

    val = model.predict(images)
    if val == 0:
        print( ' i am  happy')
    else:
        print('i am not happy')
```

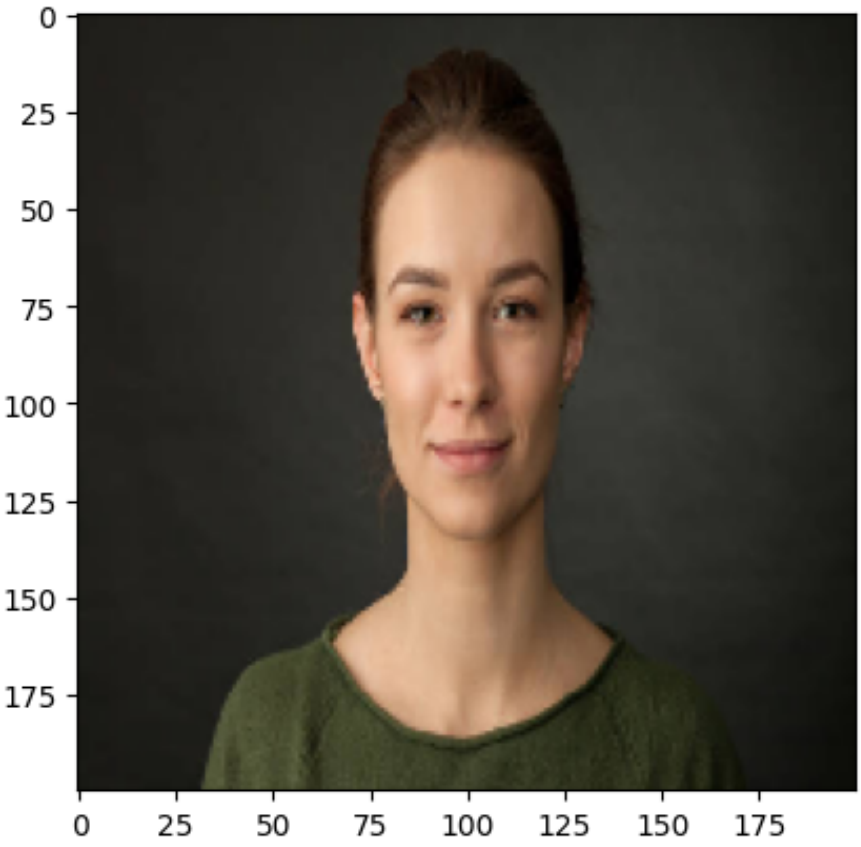


```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 121ms/step
 i am  happy
```



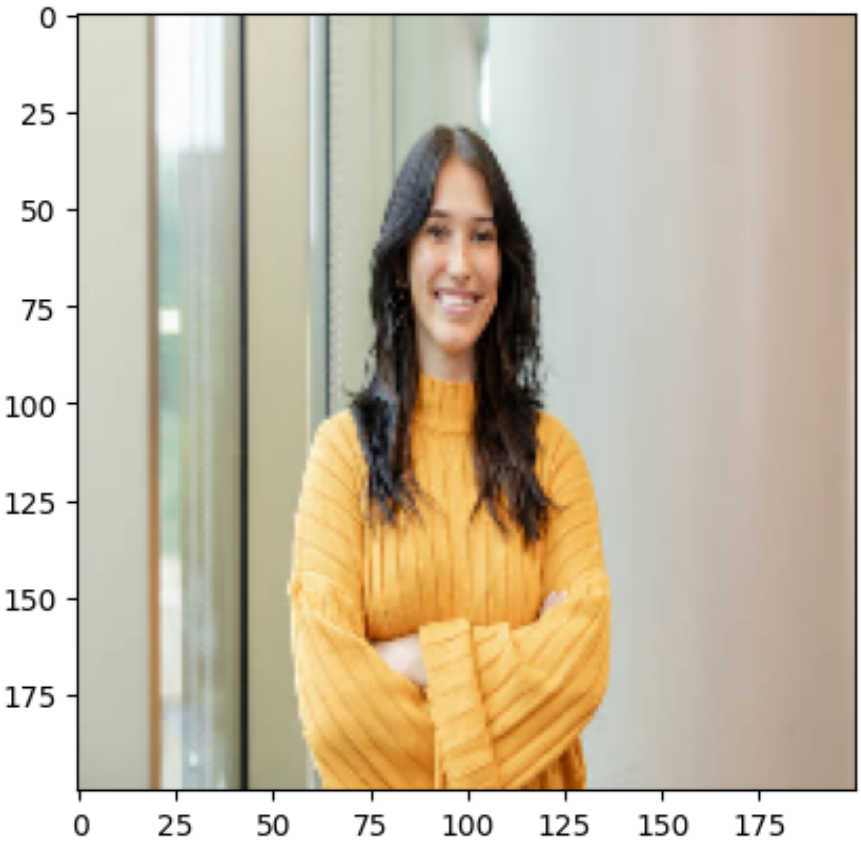

```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 41ms/step
 i am  happy
```


```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 62ms/step
 i am  happy
```

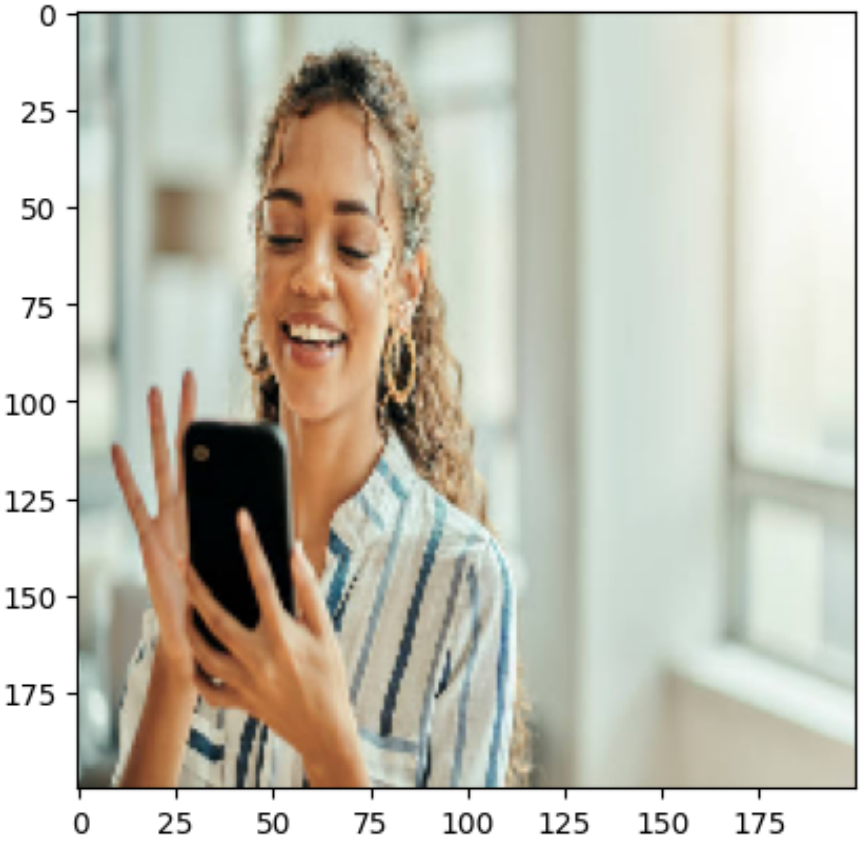



```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 47ms/step
i am  happy
```

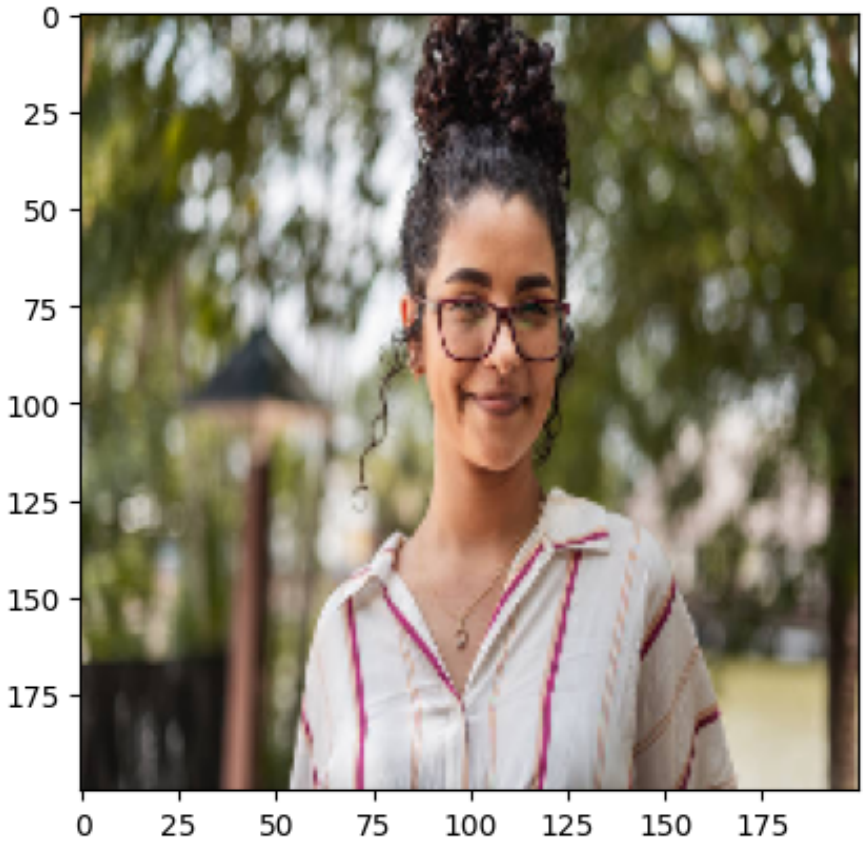

```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 47ms/step
i am  happy
```



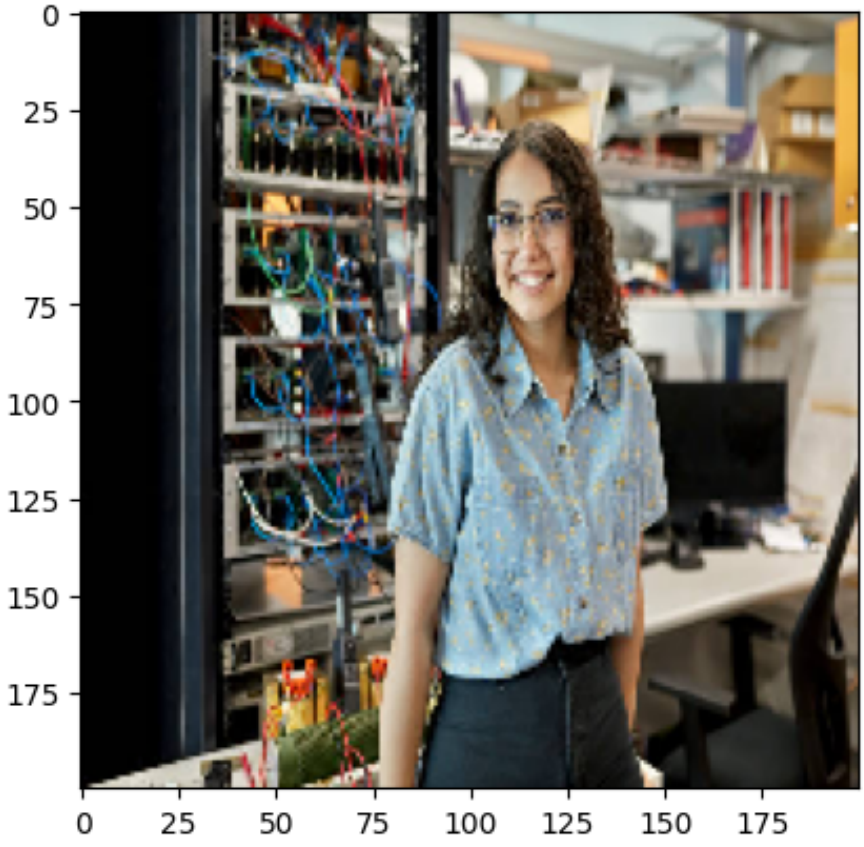

```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 55ms/step
i am  happy
```



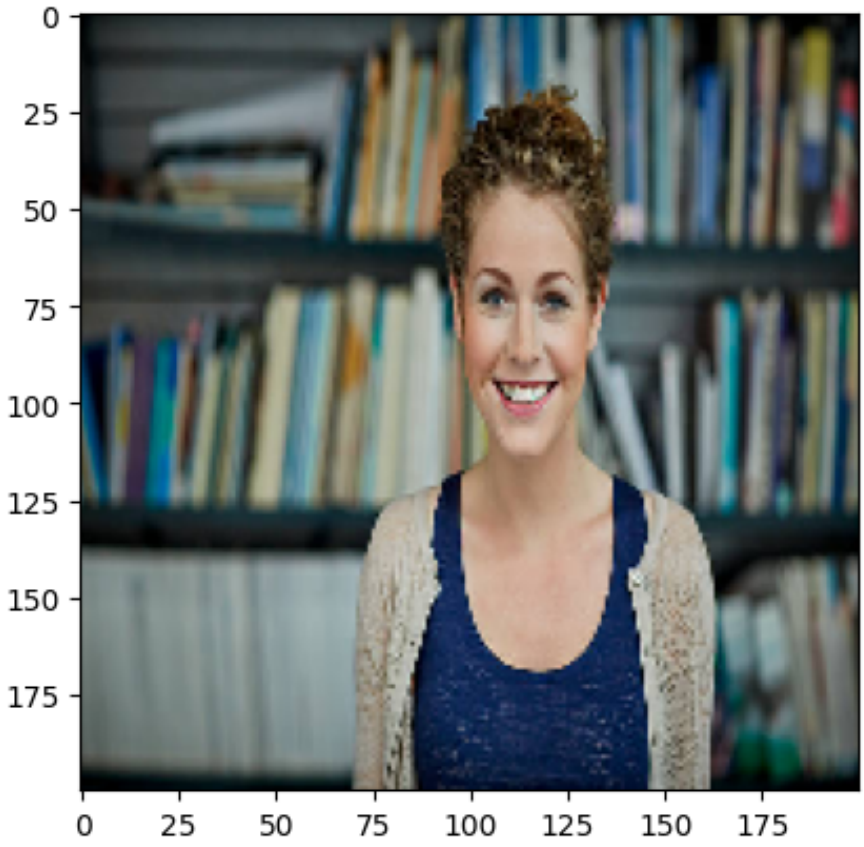

```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 62ms/step
i am  happy
```



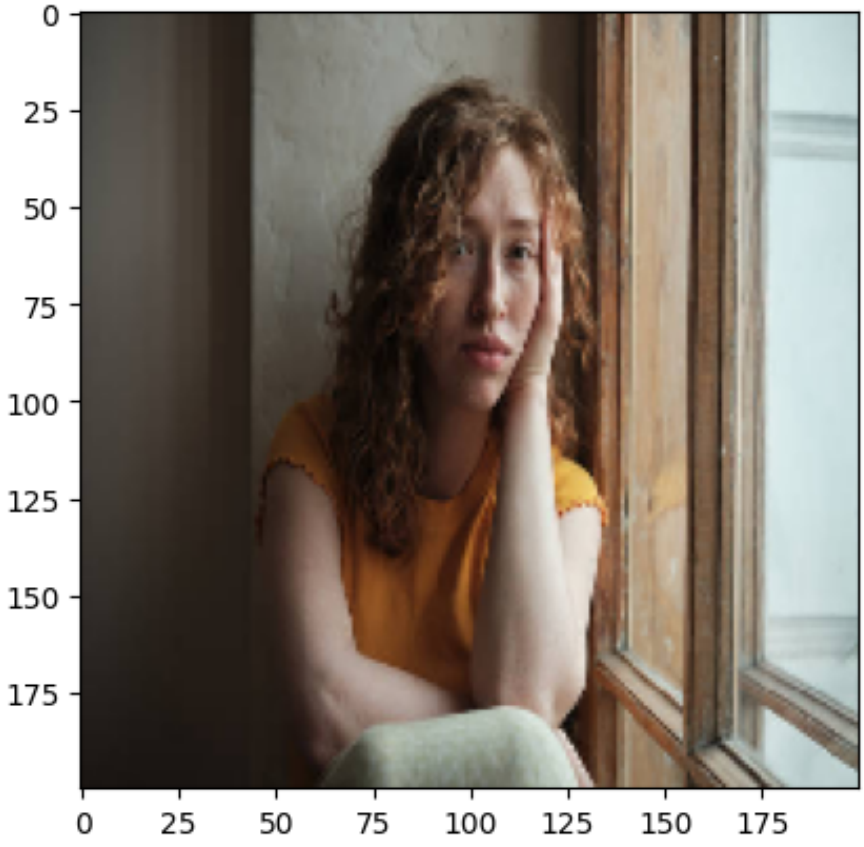

```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 52ms/step
i am  happy
```



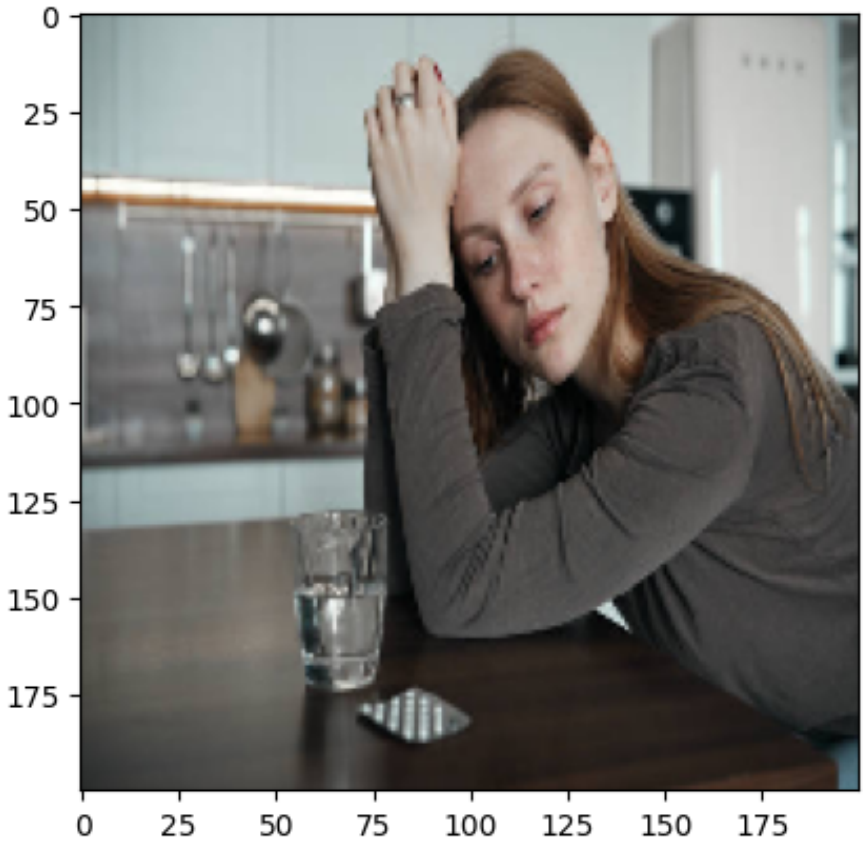

```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 51ms/step
i am  happy
```



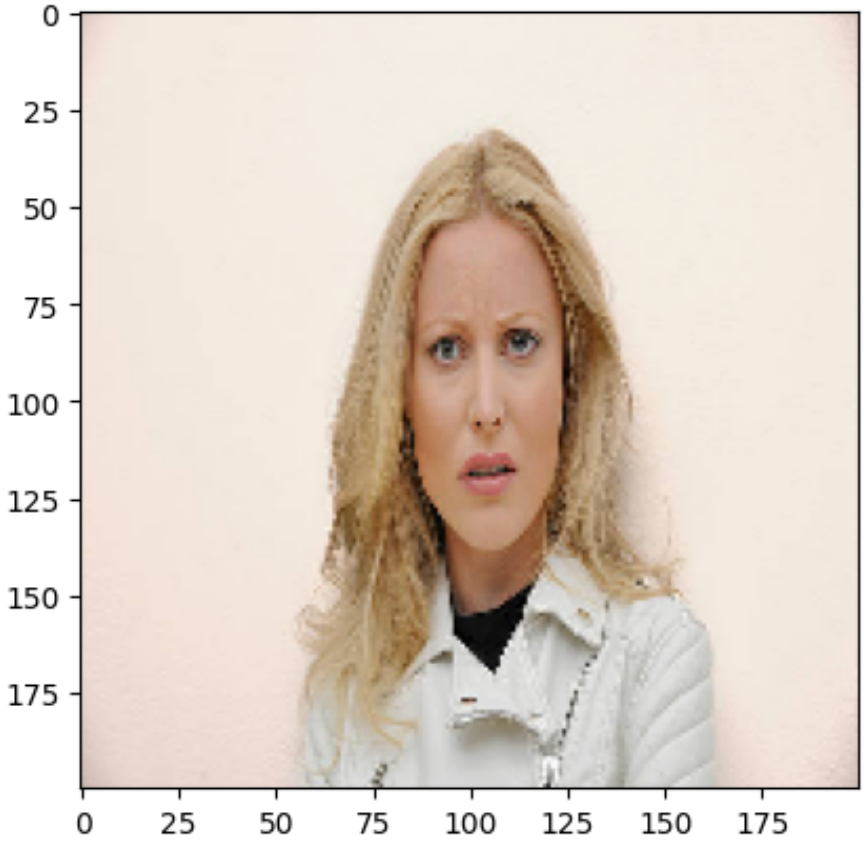

```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 47ms/step
 i am  happy
```



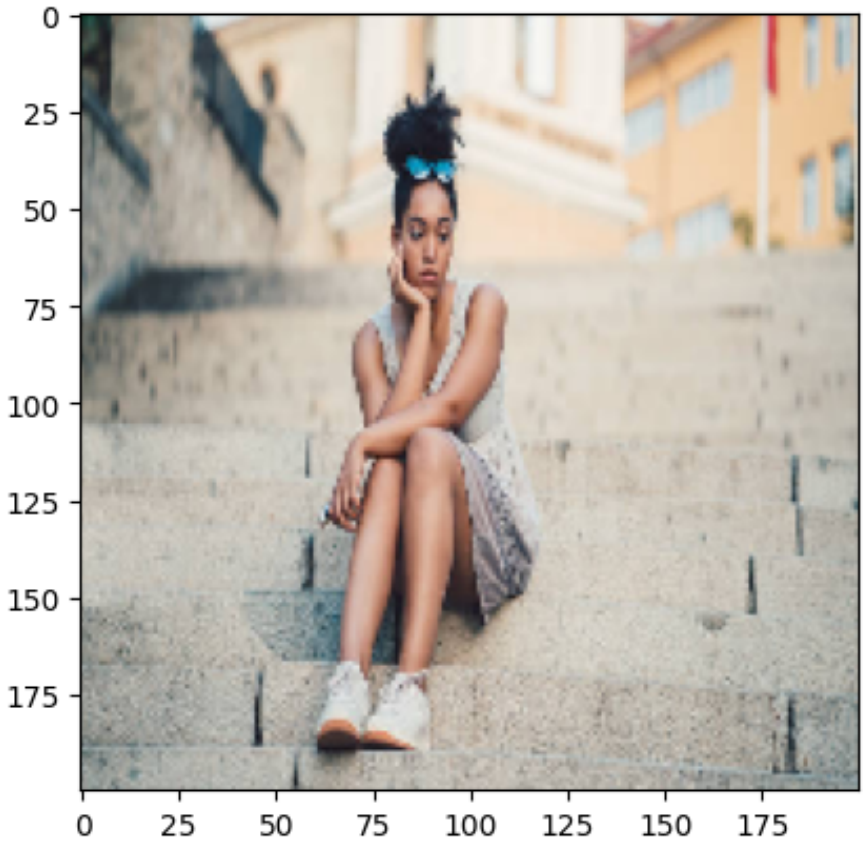

```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 47ms/step
i am not happy
```



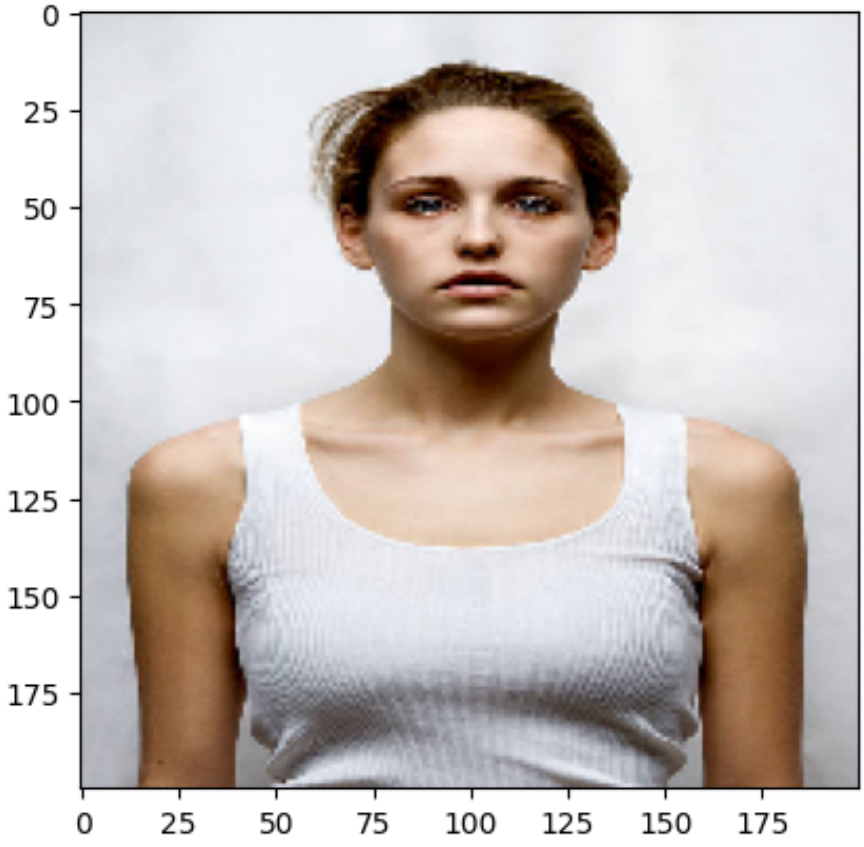

```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 54ms/step
 i am  happy
```



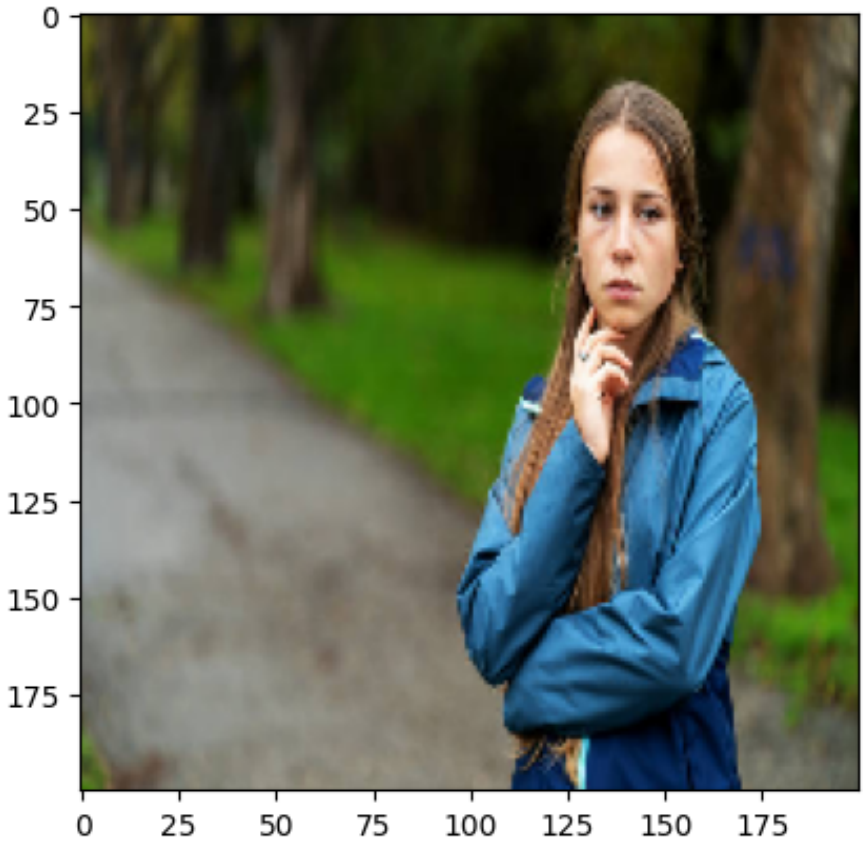

```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 48ms/step
 i am  happy
```




```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 55ms/step
 i am  happy
```




```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 47ms/step
i am not happy
```



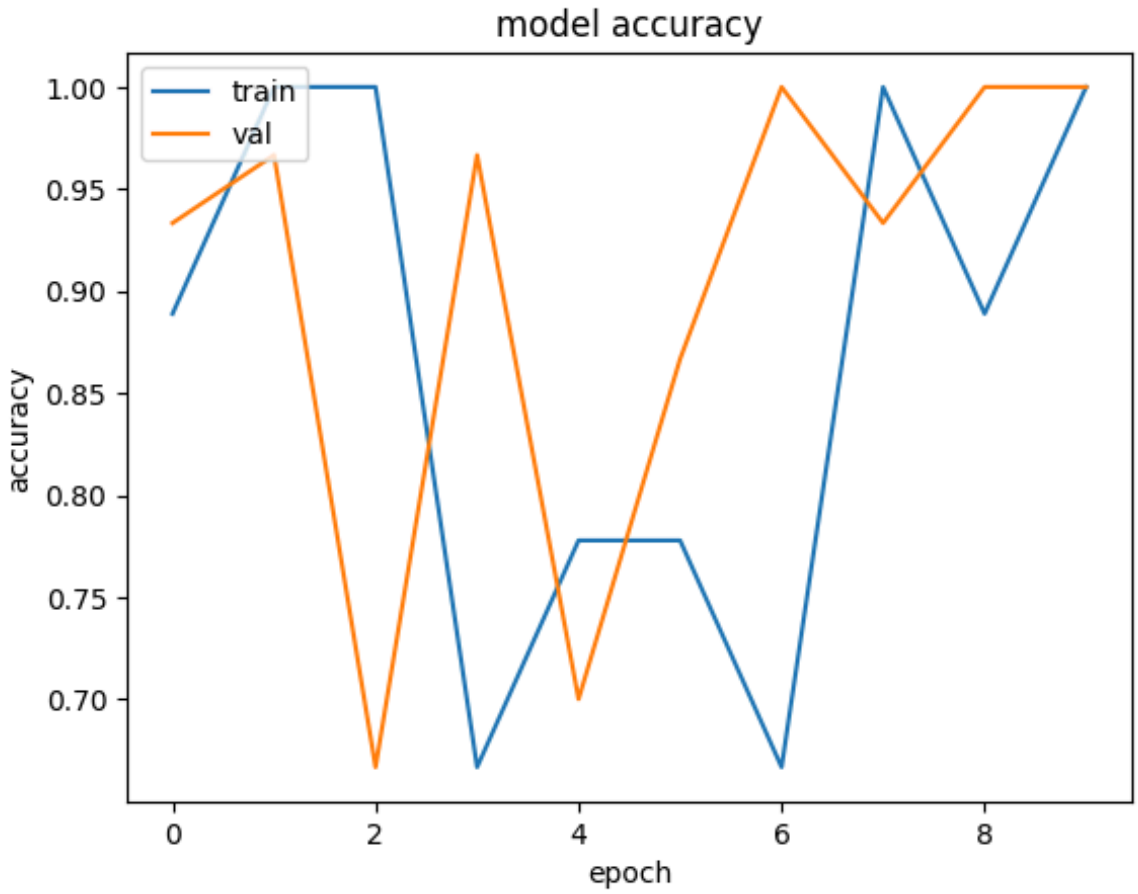

```
1/1 ━━━━━━━━━━━━━━━━━━━━ 0s 130ms/step
i am not happy
```

In [16]:
```
history.history??
```

```
Object `history.history` not found.
```

In [17]:
```
import keras
from matplotlib import pyplot as plt
#history = model1.fit(train_x, train_y,validation_split = 0.1, epochs=50, b
history=model_fit=model.fit(train_dataset,steps_per_epoch=3,epochs=10,valid
plt.plot(history.history['accuracy'])
plt.plot(history.history['val_accuracy'])
plt.title('model accuracy')
plt.ylabel('accuracy')
plt.xlabel('epoch')
plt.legend(['train', 'val'], loc='upper left')
plt.show()
```

```
Epoch 1/10
3/3 ━━━━━━━━━━━━━━━━━━━━ 1s 430ms/step - accuracy: 0.9028 - loss: 0.7201 - v
al_accuracy: 0.9333 - val_loss: 0.4410
Epoch 2/10
3/3 ━━━━━━━━━━━━━━━━━━━━ 1s 403ms/step - accuracy: 1.0000 - loss: 0.4121 - v
al_accuracy: 0.9667 - val_loss: 0.3467
Epoch 3/10
3/3 ━━━━━━━━━━━━━━━━━━━━ 1s 376ms/step - accuracy: 1.0000 - loss: 0.4176 - v
al_accuracy: 0.6667 - val_loss: 0.9856
Epoch 4/10
3/3 ━━━━━━━━━━━━━━━━━━━━ 1s 176ms/step - accuracy: 0.6667 - loss: 0.9170 - v
al_accuracy: 0.9667 - val_loss: 0.2714
Epoch 5/10
3/3 ━━━━━━━━━━━━━━━━━━━━ 1s 408ms/step - accuracy: 0.8889 - loss: 0.3685 - v
al_accuracy: 0.7000 - val_loss: 0.6397
Epoch 6/10
3/3 ━━━━━━━━━━━━━━━━━━━━ 1s 356ms/step - accuracy: 0.6389 - loss: 1.1729 - v
al_accuracy: 0.8667 - val_loss: 0.2972
Epoch 7/10
3/3 ━━━━━━━━━━━━━━━━━━━━ 1s 368ms/step - accuracy: 0.6667 - loss: 0.5064 - v
al_accuracy: 1.0000 - val_loss: 0.2380
Epoch 8/10
3/3 ━━━━━━━━━━━━━━━━━━━━ 1s 156ms/step - accuracy: 1.0000 - loss: 0.3530 - v
al_accuracy: 0.9333 - val_loss: 0.1940
Epoch 9/10
3/3 ━━━━━━━━━━━━━━━━━━━━ 1s 360ms/step - accuracy: 0.9028 - loss: 0.2378 - v
al_accuracy: 1.0000 - val_loss: 0.1511
Epoch 10/10
3/3 ━━━━━━━━━━━━━━━━━━━━ 1s 371ms/step - accuracy: 1.0000 - loss: 0.2128 - v
al_accuracy: 1.0000 - val_loss: 0.0791
```



In [ ]:

In [ ]: