In [2]:

```
import tensorflow as tf
from tensorflow import keras
from tensorflow.keras.preprocessing.image import ImageDataGenerator
```

In [3]:

```
from tensorflow.keras.optimizers import RMSprop
from matplotlib import pyplot as plt
```

In [4]:

```
train_dir = '/Users/varun/Documents/kaggle_dogs_vs_cats/train'
```

In [5]:

```
train_datagen = ImageDataGenerator(rescale = 1./255,validation_spli
validation_datagen = ImageDataGenerator(rescale = 1./255)
```

In [6]:

```
train_generator = train_datagen.flow_from_directory(
                    train_dir,
                    target_size = (150,150),
                    batch_size = 50,
                    class_mode = 'binary',
                    subset = 'training')

validation_generator = train_datagen.flow_from_directory(
                        train_dir,
                        target_size = (150,150),
                        batch_size = 50,
                        class_mode = 'binary',
                        subset = 'validation')
```

```
Found 20000 images belonging to 2 classes.
Found 5000 images belonging to 2 classes.
```

In [7]:

```
model = tf.keras.Sequential([
                            tf.keras.layers.Conv2D(16,(3,3),activat
                            tf.keras.layers.MaxPooling2D(2,2),
                            tf.keras.layers.Conv2D(32,(3,3),activat
                            tf.keras.layers.MaxPooling2D(2,2),
                            tf.keras.layers.Conv2D(64,(3,3),activat
                            tf.keras.layers.MaxPooling2D(2,2),
                            tf.keras.layers.Flatten(),
                            tf.keras.layers.Dense(512,activation =
                            tf.keras.layers.Dense(1,activation = 's
```

In [8]:

```
model.summary()
```

```
Model: "sequential"
_________________________________________________________________
Layer (type)                 Output Shape              Param #   
=================================================================
conv2d (Conv2D)              (None, 148, 148, 16)      448       
_________________________________________________________________
max_pooling2d (MaxPooling2D) (None, 74, 74, 16)        0         
_________________________________________________________________
conv2d_1 (Conv2D)            (None, 72, 72, 32)        4640      
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 36, 36, 32)        0         
_________________________________________________________________
conv2d_2 (Conv2D)            (None, 34, 34, 64)        18496     
_________________________________________________________________
max_pooling2d_2 (MaxPooling2 (None, 17, 17, 64)        0         
_________________________________________________________________
flatten (Flatten)            (None, 18496)             0         
_________________________________________________________________
dense (Dense)                (None, 512)               9470464   
_________________________________________________________________
dense_1 (Dense)              (None, 1)                 513       
=================================================================
Total params: 9,494,561
Trainable params: 9,494,561
Non-trainable params: 0
_________________________________________________________________
```

In [9]:

```
model.compile(optimizer = RMSprop(lr = 0.001),
                loss = 'binary_crossentropy',
                metrics = ['accuracy'])
```

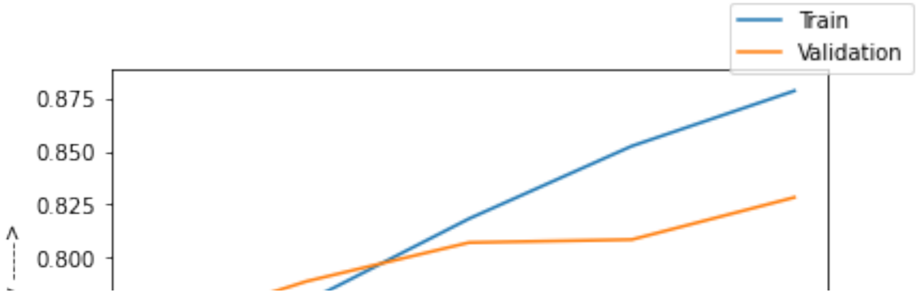
In [10]:

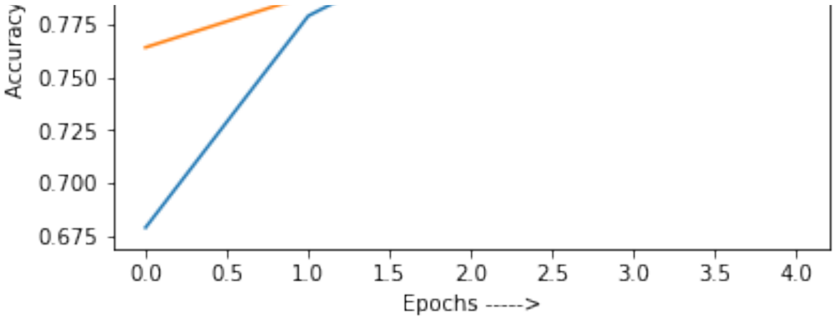
```
history = model.fit_generator(train_generator,
                              validation_data=validation_generator,
                              steps_per_epoch=train_generator.sampl
                              epochs=5,
                              validation_steps=validation_generator
                              verbose=1)
```

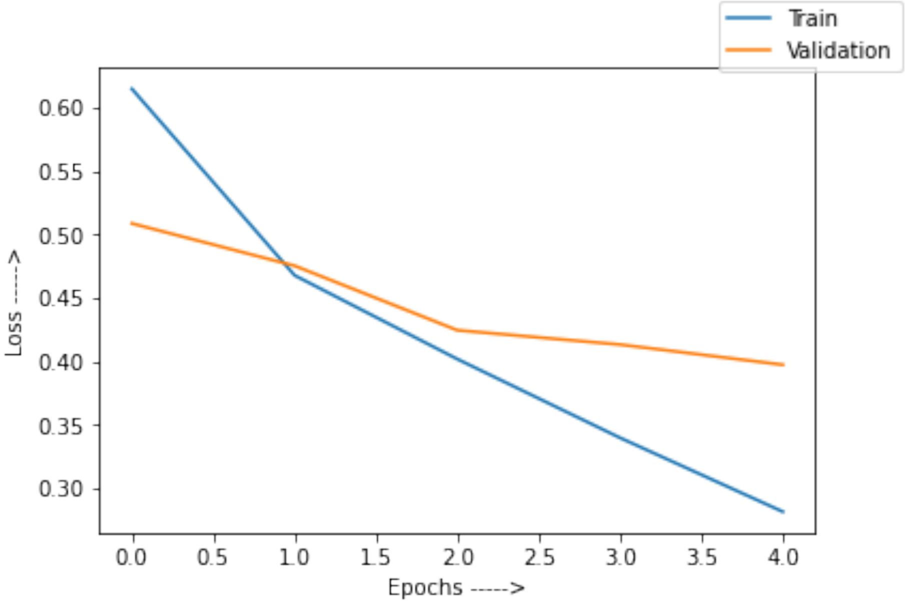
```
Epoch 1/5
400/400 [==============================] - 549s 1s/step - loss: 0.
6148 - accuracy: 0.6787 - val_loss: 0.5088 - val_accuracy: 0.7640
Epoch 2/5
400/400 [==============================] - 707s 2s/step - loss: 0.
4679 - accuracy: 0.7789 - val_loss: 0.4754 - val_accuracy: 0.7886
Epoch 3/5
400/400 [==============================] - 787s 2s/step - loss: 0.
4019 - accuracy: 0.8183 - val_loss: 0.4246 - val_accuracy: 0.8070
Epoch 4/5
400/400 [==============================] - 792s 2s/step - loss: 0.
3399 - accuracy: 0.8527 - val_loss: 0.4133 - val_accuracy: 0.8084
Epoch 5/5
400/400 [==============================] - 801s 2s/step - loss: 0.
2817 - accuracy: 0.8789 - val_loss: 0.3974 - val_accuracy: 0.8284
```

In [11]:

```
acc = history.history['accuracy']
val_acc = history.history['val_accuracy']
loss = history.history['loss']
val_loss = history.history['val_loss']


ax1 = plt.figure(0)
plt.plot(acc,label = 'Train')
plt.plot(val_acc, label = 'Validation')
plt.xlabel('Epochs ----->')
plt.ylabel('Accuracy ----->')
leg = ax1.legend()


ax2 = plt.figure(1)
plt.plot(loss,label = 'Train')
plt.plot(val_loss,label = 'Validation')
plt.xlabel('Epochs ----->')
plt.ylabel('Loss ----->')
leg = ax2.legend()
```







In [12]:

```
import cv2

def predict_model_from_image(i):
    if(model.predict(i)<0.5):
        print("Predicted Image is Cat")
    else:
        print("Predicted Image is Dog")
```

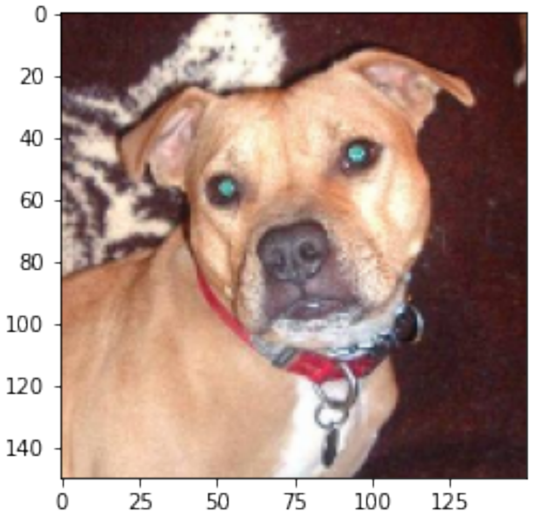
In [13]:

```
import numpy as np
```

In [15]:

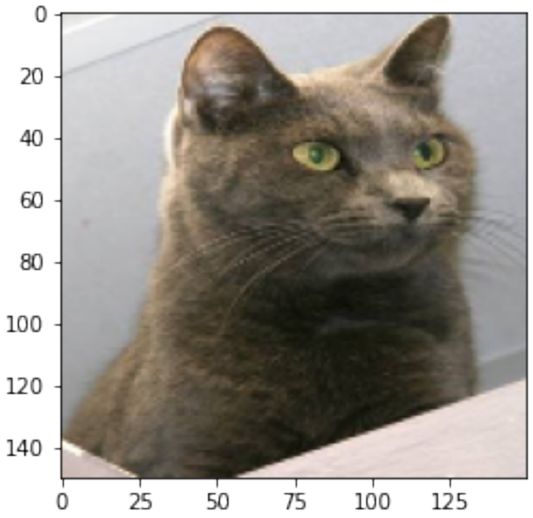
```
#Test Image out of training and Validation Set

I1 = cv2.resize(cv2.imread('/Users/varun/Documents/kaggle_dogs_vs_c

I2 = tf.cast(I1, tf.float32)

I1 = cv2.cvtColor(I1,cv2.COLOR_BGR2RGB)

plt.imshow(I1)

x = np.expand_dims(I2,axis = 0)

print("I1 shape:" + str(I1.shape))
print("x shape:" + str(x.shape))

predict_model_from_image(x)
```

```
I1 shape:(150, 150, 3)
x shape:(1, 150, 150, 3)
Predicted Image is Dog
```



In [16]:
```
IC = cv2.resize(cv2.imread('/Users/varun/Documents/kaggle_dogs_vs_c

ICCONV = cv2.cvtColor(IC,cv2.COLOR_BGR2RGB)

plt.imshow(ICCONV)

I2 = tf.cast(IC, tf.float32)


x1 = np.expand_dims(I2,axis = 0)

print("IC shape:" + str(I1.shape))
print("x1 shape:" + str(x1.shape))

predict_model_from_image(x1)
```

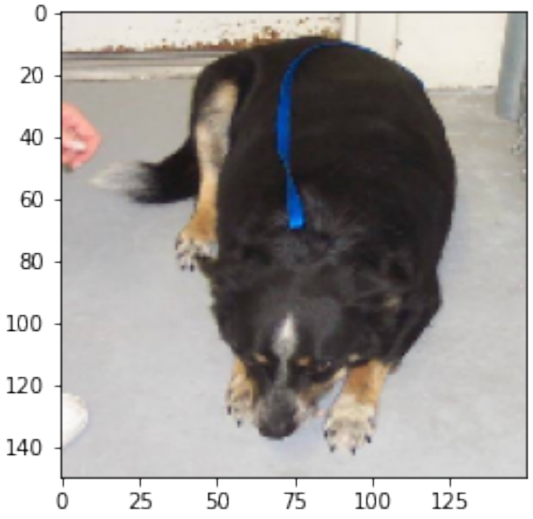
```
IC shape:(150, 150, 3)
x1 shape:(1, 150, 150, 3)
Predicted Image is Cat
```



In [18]:

```
I1 = cv2.resize(cv2.imread('/Users/varun/Documents/kaggle_dogs_vs_c

I2 = tf.cast(I1, tf.float32)

I1 = cv2.cvtColor(I1,cv2.COLOR_BGR2RGB)

plt.imshow(I1)

x = np.expand_dims(I2,axis = 0)

print("I1 shape:" + str(I1.shape))
print("x shape:" + str(x.shape))

predict_model_from_image(x)
```

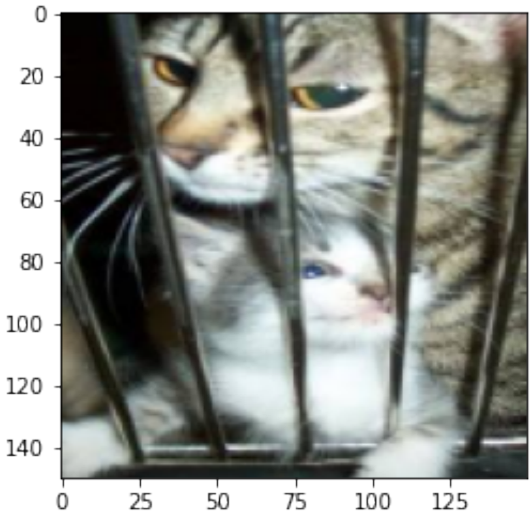
```
I1 shape:(150, 150, 3)
x shape:(1, 150, 150, 3)
Predicted Image is Dog
```



In [19]:

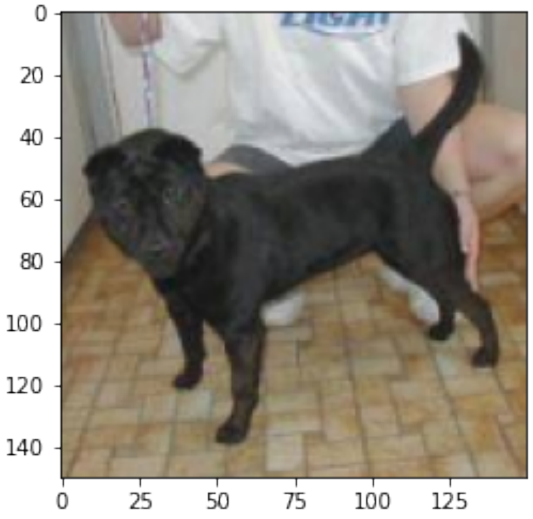
```
#failed

I1 = cv2.resize(cv2.imread('/Users/varun/Documents/kaggle_dogs_vs_c

I2 = tf.cast(I1, tf.float32)

I1 = cv2.cvtColor(I1,cv2.COLOR_BGR2RGB)

plt.imshow(I1)

x = np.expand_dims(I2,axis = 0)

print("I1 shape:" + str(I1.shape))
print("x shape:" + str(x.shape))

predict_model_from_image(x)
```

```
I1 shape:(150, 150, 3)
x shape:(1, 150, 150, 3)
Predicted Image is Dog
```



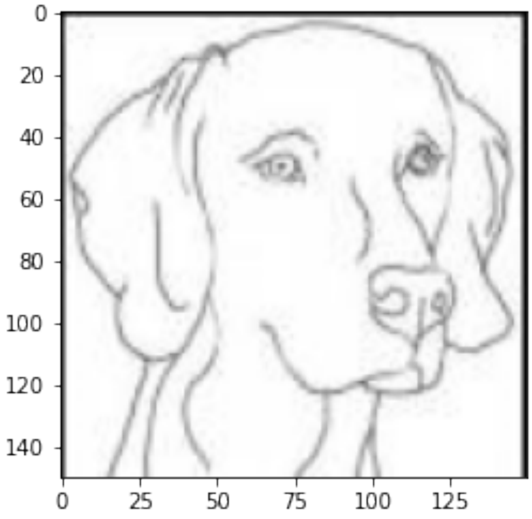
```
In [22]: I1 = cv2.resize(cv2.imread('/Users/varun/Documents/kaggle_dogs_vs_c

         I2 = tf.cast(I1, tf.float32)

         I1 = cv2.cvtColor(I1,cv2.COLOR_BGR2RGB)

         plt.imshow(I1)

         x = np.expand_dims(I2,axis = 0)

         print("I1 shape:" + str(I1.shape))
         print("x shape:" + str(x.shape))

         predict_model_from_image(x)
```

```
I1 shape:(150, 150, 3)
x shape:(1, 150, 150, 3)
Predicted Image is Dog
```



```
In [23]: I1 = cv2.resize(cv2.imread('/Users/varun/Documents/kaggle_dogs_vs_c

         I2 = tf.cast(I1, tf.float32)

         I1 = cv2.cvtColor(I1,cv2.COLOR_BGR2RGB)

         plt.imshow(I1)

         x = np.expand_dims(I2,axis = 0)

         print("I1 shape:" + str(I1.shape))
         print("x shape:" + str(x.shape))

         predict_model_from_image(x)
```

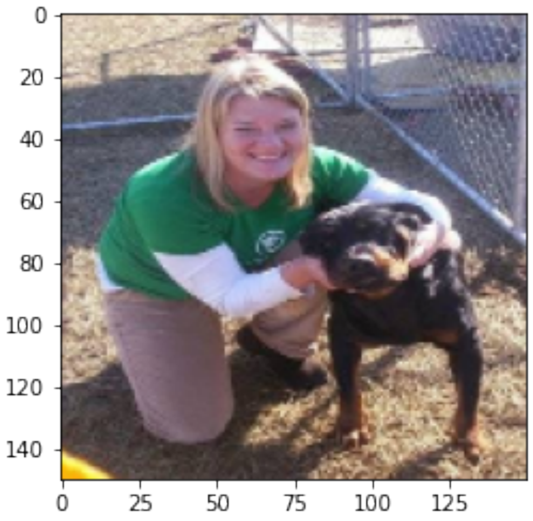
```
I1 shape:(150, 150, 3)
x shape:(1, 150, 150, 3)
Predicted Image is Dog
```



In [24]:

```
I1 = cv2.resize(cv2.imread('/Users/varun/Documents/kaggle_dogs_vs_c

I2 = tf.cast(I1, tf.float32)

I1 = cv2.cvtColor(I1,cv2.COLOR_BGR2RGB)

plt.imshow(I1)

x = np.expand_dims(I2,axis = 0)

print("I1 shape:" + str(I1.shape))
print("x shape:" + str(x.shape))

predict_model_from_image(x)
```

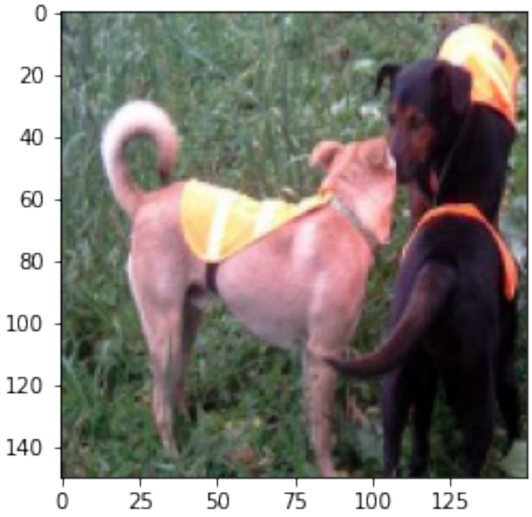
```
I1 shape:(150, 150, 3)
x shape:(1, 150, 150, 3)
Predicted Image is Dog
```



In [25]:

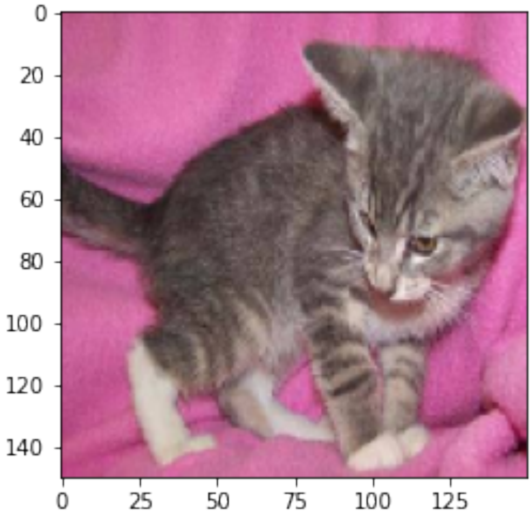
```
I1 = cv2.resize(cv2.imread('/Users/varun/Documents/kaggle_dogs_vs_c

I2 = tf.cast(I1, tf.float32)

I1 = cv2.cvtColor(I1,cv2.COLOR_BGR2RGB)

plt.imshow(I1)

x = np.expand_dims(I2,axis = 0)

print("I1 shape:" + str(I1.shape))
print("x shape:" + str(x.shape))

predict_model_from_image(x)
```

```
I1 shape:(150, 150, 3)
x shape:(1, 150, 150, 3)
Predicted Image is Dog
```



```
In [26]: I1 = cv2.resize(cv2.imread('/Users/varun/Documents/kaggle_dogs_vs_c

         I2 = tf.cast(I1, tf.float32)

         I1 = cv2.cvtColor(I1,cv2.COLOR_BGR2RGB)

         plt.imshow(I1)

         x = np.expand_dims(I2,axis = 0)

         print("I1 shape:" + str(I1.shape))
         print("x shape:" + str(x.shape))

         predict_model_from_image(x)
```

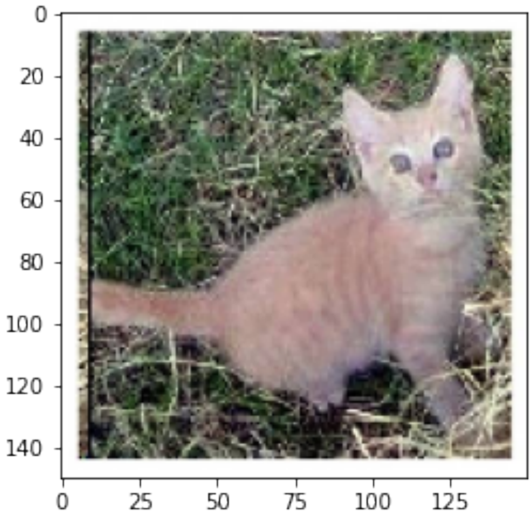
```
I1 shape:(150, 150, 3)
x shape:(1, 150, 150, 3)
Predicted Image is Cat
```



In [27]:

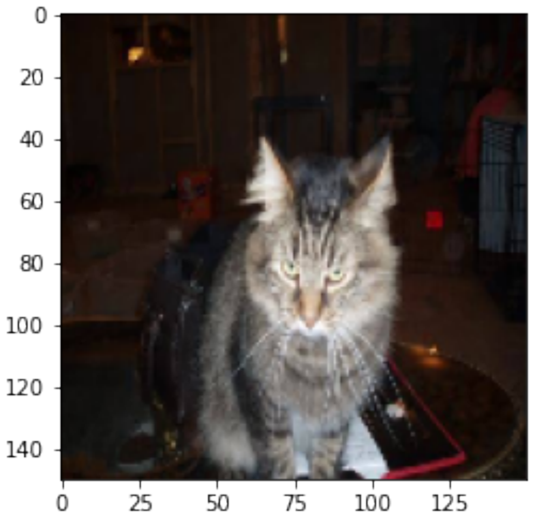
```
#failed

I1 = cv2.resize(cv2.imread('/Users/varun/Documents/kaggle_dogs_vs_c

I2 = tf.cast(I1, tf.float32)

I1 = cv2.cvtColor(I1,cv2.COLOR_BGR2RGB)

plt.imshow(I1)

x = np.expand_dims(I2,axis = 0)

print("I1 shape:" + str(I1.shape))
print("x shape:" + str(x.shape))

predict_model_from_image(x)
```

```
I1 shape:(150, 150, 3)
x shape:(1, 150, 150, 3)
Predicted Image is Dog
```



In [28]:
```
I1 = cv2.resize(cv2.imread('/Users/varun/Documents/kaggle_dogs_vs_c

I2 = tf.cast(I1, tf.float32)

I1 = cv2.cvtColor(I1,cv2.COLOR_BGR2RGB)

plt.imshow(I1)

x = np.expand_dims(I2,axis = 0)

print("I1 shape:" + str(I1.shape))
print("x shape:" + str(x.shape))

predict_model_from_image(x)
```

```
I1 shape:(150, 150, 3)
x shape:(1, 150, 150, 3)
Predicted Image is Cat
```



In [ ]: