Computer Vision with CNN

Importing CatsDogs class

In [ ]:
```
from cats_vs_dogs import CatsDogs
```

Calling CatsDogs class and loading the dataset

In [ ]:
```
cats_vs_dogs = CatsDogs()
```

```
cats_vs_dogs\train\cat exists!
cats_vs_dogs\train\dog exists!
cats_vs_dogs\validation\cat exists!
cats_vs_dogs\validation\dog exists!
cats_vs_dogs\test\cat exists!
cats_vs_dogs\test\dog exists!
Found 2000 files belonging to 2 classes.
Found 1000 files belonging to 2 classes.
Found 2000 files belonging to 2 classes.
```

In [ ]:
```
history = cats_vs_dogs.train()
```

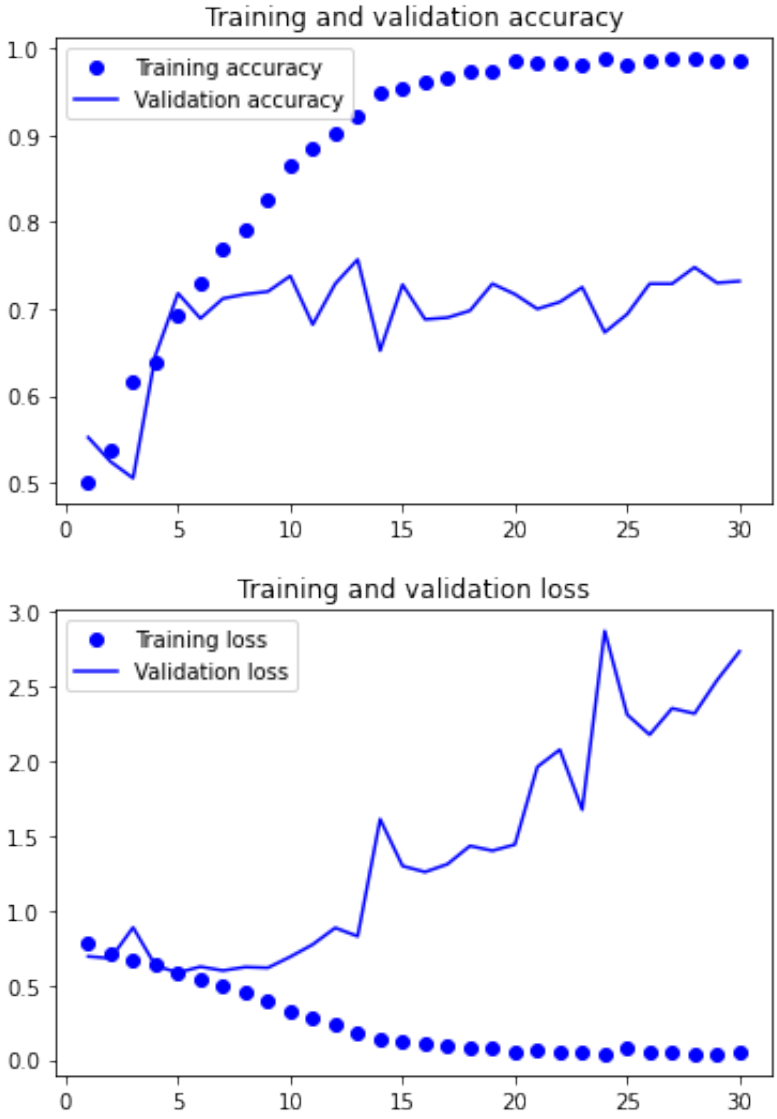
```
Epoch 1/30
63/63 [==============================] - 16s 82ms/step - loss: 0.7856 -
accuracy: 0.5005 - val_loss: 0.6923 - val_accuracy: 0.5520
Epoch 2/30
63/63 [==============================] - 3s 52ms/step - loss: 0.7086 - a
ccuracy: 0.5375 - val_loss: 0.6792 - val_accuracy: 0.5240
Epoch 3/30
63/63 [==============================] - 3s 49ms/step - loss: 0.6695 - a
ccuracy: 0.6150 - val_loss: 0.8862 - val_accuracy: 0.5050
Epoch 4/30
63/63 [==============================] - 3s 49ms/step - loss: 0.6401 - a
ccuracy: 0.6385 - val_loss: 0.6298 - val_accuracy: 0.6470
Epoch 5/30
63/63 [==============================] - 3s 49ms/step - loss: 0.5760 - a
ccuracy: 0.6920 - val_loss: 0.5836 - val_accuracy: 0.7180
Epoch 6/30
63/63 [==============================] - 3s 48ms/step - loss: 0.5375 - a
ccuracy: 0.7285 - val_loss: 0.6234 - val_accuracy: 0.6890
Epoch 7/30
63/63 [==============================] - 3s 48ms/step - loss: 0.5005 - a
ccuracy: 0.7700 - val_loss: 0.5974 - val_accuracy: 0.7120
Epoch 8/30
63/63 [==============================] - 3s 50ms/step - loss: 0.4458 - a
ccuracy: 0.7905 - val_loss: 0.6211 - val_accuracy: 0.7170
Epoch 9/30
63/63 [==============================] - 3s 51ms/step - loss: 0.3964 - a
ccuracy: 0.8265 - val_loss: 0.6161 - val_accuracy: 0.7200
Epoch 10/30
63/63 [==============================] - 3s 48ms/step - loss: 0.3274 - a
ccuracy: 0.8645 - val_loss: 0.6898 - val_accuracy: 0.7380
Epoch 11/30
63/63 [==============================] - 3s 49ms/step - loss: 0.2797 - a
```

```
ccuracy: 0.8840 - val_loss: 0.7721 - val_accuracy: 0.6820
Epoch 12/30
63/63 [==============================] - 3s 48ms/step - loss: 0.2390 - a
ccuracy: 0.9020 - val_loss: 0.8836 - val_accuracy: 0.7290
Epoch 13/30
63/63 [==============================] - 3s 48ms/step - loss: 0.1854 - a
ccuracy: 0.9220 - val_loss: 0.8271 - val_accuracy: 0.7570
Epoch 14/30
63/63 [==============================] - 3s 48ms/step - loss: 0.1415 - a
ccuracy: 0.9485 - val_loss: 1.6113 - val_accuracy: 0.6520
Epoch 15/30
63/63 [==============================] - 3s 48ms/step - loss: 0.1187 - a
ccuracy: 0.9550 - val_loss: 1.2976 - val_accuracy: 0.7280
Epoch 16/30
63/63 [==============================] - 3s 47ms/step - loss: 0.1133 - a
ccuracy: 0.9610 - val_loss: 1.2575 - val_accuracy: 0.6880
Epoch 17/30
63/63 [==============================] - 3s 47ms/step - loss: 0.0965 - a
ccuracy: 0.9655 - val_loss: 1.3103 - val_accuracy: 0.6900
Epoch 18/30
63/63 [==============================] - 3s 48ms/step - loss: 0.0817 - a
ccuracy: 0.9750 - val_loss: 1.4324 - val_accuracy: 0.6980
Epoch 19/30
63/63 [==============================] - 3s 48ms/step - loss: 0.0815 - a
ccuracy: 0.9735 - val_loss: 1.4000 - val_accuracy: 0.7290
Epoch 20/30
63/63 [==============================] - 3s 48ms/step - loss: 0.0558 - a
ccuracy: 0.9860 - val_loss: 1.4412 - val_accuracy: 0.7170
Epoch 21/30
63/63 [==============================] - 3s 47ms/step - loss: 0.0609 - a
ccuracy: 0.9825 - val_loss: 1.9616 - val_accuracy: 0.7000
Epoch 22/30
63/63 [==============================] - 3s 48ms/step - loss: 0.0481 - a
ccuracy: 0.9845 - val_loss: 2.0768 - val_accuracy: 0.7080
Epoch 23/30
63/63 [==============================] - 3s 49ms/step - loss: 0.0502 - a
ccuracy: 0.9815 - val_loss: 1.6747 - val_accuracy: 0.7250
Epoch 24/30
63/63 [==============================] - 3s 48ms/step - loss: 0.0402 - a
ccuracy: 0.9880 - val_loss: 2.8713 - val_accuracy: 0.6730
Epoch 25/30
63/63 [==============================] - 3s 49ms/step - loss: 0.0733 - a
ccuracy: 0.9805 - val_loss: 2.3112 - val_accuracy: 0.6940
Epoch 26/30
63/63 [==============================] - 3s 48ms/step - loss: 0.0546 - a
ccuracy: 0.9860 - val_loss: 2.1770 - val_accuracy: 0.7290
Epoch 27/30
63/63 [==============================] - 3s 48ms/step - loss: 0.0472 - a
ccuracy: 0.9875 - val_loss: 2.3535 - val_accuracy: 0.7290
Epoch 28/30
63/63 [==============================] - 3s 47ms/step - loss: 0.0385 - a
ccuracy: 0.9880 - val_loss: 2.3184 - val_accuracy: 0.7480
Epoch 29/30
63/63 [==============================] - 3s 48ms/step - loss: 0.0384 - a
ccuracy: 0.9865 - val_loss: 2.5413 - val_accuracy: 0.7300
Epoch 30/30
63/63 [==============================] - 3s 49ms/step - loss: 0.0462 - a
```

```
ccuracy: 0.9865 - val_loss: 2.7342 - val_accuracy: 0.7320
```

Plotting the accuracy and loss

In [ ]:
```
cats_vs_dogs.plot()
```



Prediction using test dataset

In [ ]:
```
cats_vs_dogs.predict()
```

```
[[1.        ]
 [1.        ]
 [1.        ]
 ...
 [1.        ]
 [0.9999999 ]
 [0.01072513]]
```

Cats_vs_Dogs Pre class with VGG16 for feature extraction

In [ ]:
```
from cats_vs_dogs_pre import CatsDogsPre
```

Calling the CatsDogsPre class

In [ ]:
```
cats_vs_dogs_pre = CatsDogsPre()
```

```
Found 2000 files belonging to 2 classes.
Found 1000 files belonging to 2 classes.
Found 2000 files belonging to 2 classes.
```

Training the model with VGG16

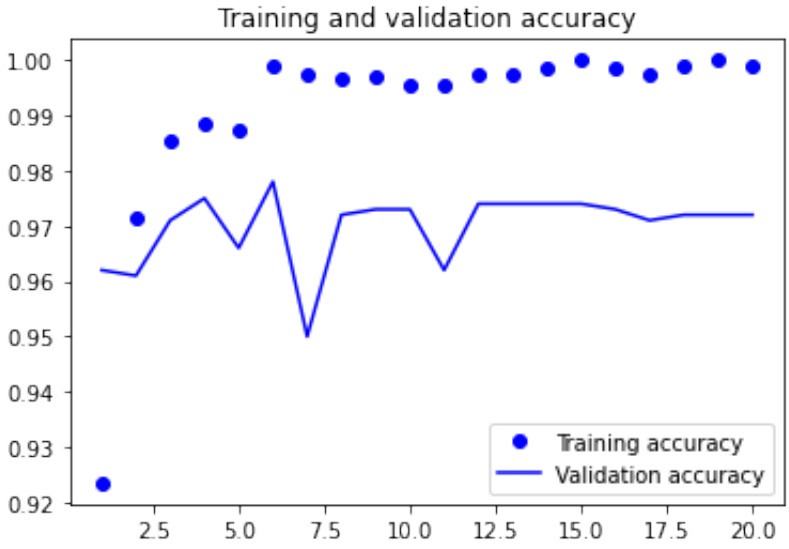
In [ ]:
```
history_1 = cats_vs_dogs_pre.train()
```

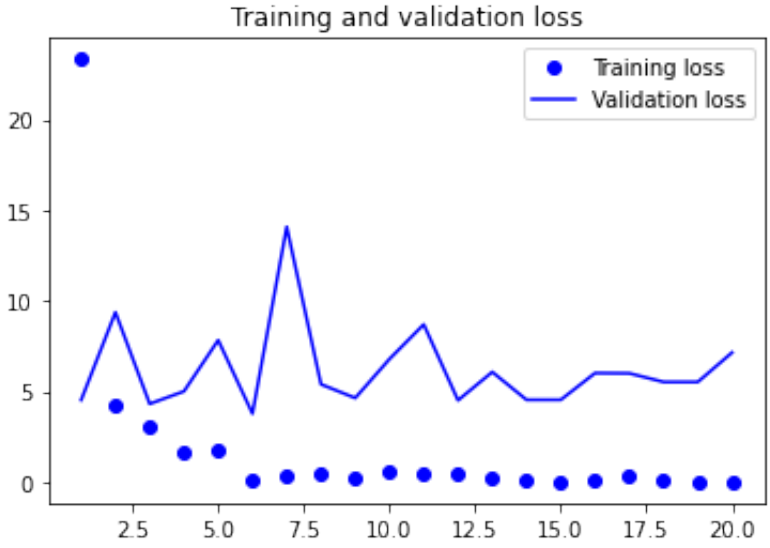
```
Epoch 1/20
63/63 [==============================] - 1s 9ms/step - loss: 23.3553 - a
ccuracy: 0.9235 - val_loss: 4.5292 - val_accuracy: 0.9620
Epoch 2/20
63/63 [==============================] - 0s 6ms/step - loss: 4.2958 - ac
curacy: 0.9715 - val_loss: 9.3712 - val_accuracy: 0.9610
Epoch 3/20
63/63 [==============================] - 0s 6ms/step - loss: 3.0131 - ac
curacy: 0.9855 - val_loss: 4.3167 - val_accuracy: 0.9710
Epoch 4/20
63/63 [==============================] - 0s 6ms/step - loss: 1.5981 - ac
curacy: 0.9885 - val_loss: 5.0079 - val_accuracy: 0.9750
Epoch 5/20
63/63 [==============================] - 0s 6ms/step - loss: 1.8001 - ac
curacy: 0.9875 - val_loss: 7.8346 - val_accuracy: 0.9660
Epoch 6/20
63/63 [==============================] - 0s 6ms/step - loss: 0.1030 - ac
curacy: 0.9990 - val_loss: 3.7780 - val_accuracy: 0.9780
Epoch 7/20
63/63 [==============================] - 0s 6ms/step - loss: 0.3167 - ac
curacy: 0.9975 - val_loss: 14.0876 - val_accuracy: 0.9500
Epoch 8/20
63/63 [==============================] - 0s 6ms/step - loss: 0.4799 - ac
curacy: 0.9965 - val_loss: 5.3974 - val_accuracy: 0.9720
Epoch 9/20
63/63 [==============================] - 0s 7ms/step - loss: 0.1894 - ac
curacy: 0.9970 - val_loss: 4.6394 - val_accuracy: 0.9730
Epoch 10/20
63/63 [==============================] - 0s 7ms/step - loss: 0.5341 - ac
curacy: 0.9955 - val_loss: 6.7917 - val_accuracy: 0.9730
Epoch 11/20
63/63 [==============================] - 1s 8ms/step - loss: 0.4805 - ac
curacy: 0.9955 - val_loss: 8.7012 - val_accuracy: 0.9620
Epoch 12/20
63/63 [==============================] - 0s 7ms/step - loss: 0.4177 - ac
curacy: 0.9975 - val_loss: 4.5128 - val_accuracy: 0.9740
Epoch 13/20
63/63 [==============================] - 0s 8ms/step - loss: 0.1757 - ac
curacy: 0.9975 - val_loss: 6.0763 - val_accuracy: 0.9740
Epoch 14/20
63/63 [==============================] - 0s 7ms/step - loss: 0.0522 - ac
curacy: 0.9985 - val_loss: 4.5404 - val_accuracy: 0.9740
Epoch 15/20
63/63 [==============================] - 0s 7ms/step - loss: 3.5321e-30
- accuracy: 1.0000 - val_loss: 4.5404 - val_accuracy: 0.9740
Epoch 16/20
63/63 [==============================] - 0s 7ms/step - loss: 0.1463 - ac
```

```
curacy: 0.9985 - val_loss: 6.0164 - val_accuracy: 0.9730
Epoch 17/20
63/63 [==============================] - 0s 7ms/step - loss: 0.3467 - ac
curacy: 0.9975 - val_loss: 6.0039 - val_accuracy: 0.9710
Epoch 18/20
63/63 [==============================] - 0s 6ms/step - loss: 0.0556 - ac
curacy: 0.9990 - val_loss: 5.5250 - val_accuracy: 0.9720
Epoch 19/20
63/63 [==============================] - 0s 6ms/step - loss: 1.6106e-25
- accuracy: 1.0000 - val_loss: 5.5250 - val_accuracy: 0.9720
Epoch 20/20
63/63 [==============================] - 0s 6ms/step - loss: 0.0376 - ac
curacy: 0.9990 - val_loss: 7.1506 - val_accuracy: 0.9720
```

Plotting the accuracy and loss

In [ ]:
```
cats_vs_dogs_pre.plot()
```





Prediction of image using test features

In [ ]:
```
cats_vs_dogs_pre.predict()
```

```
[[0.]
 [1.]
 [0.]
 ...
 [0.]
 [1.]
 [0.]]
```