```
 32/765 [>.............................] - ETA: 1s
384/765 [==============>...............] - ETA: 0s
736/765 [===========================>..] - ETA: 0s
765/765 [==============================] - 0s 243us/step
The accuracy of this model is 0.9803921568627451%
```

CNN when the train and test on the same nest

```
_________________________________________________________________
Layer (type)                 Output Shape              Param #
=================================================================
conv2d_1 (Conv2D)            (None, 76, 102, 32)       896
_________________________________________________________________
activation_1 (Activation)    (None, 76, 102, 32)       0
_________________________________________________________________
max_pooling2d_1 (MaxPooling2 (None, 38, 51, 32)        0
_________________________________________________________________
dropout_1 (Dropout)          (None, 38, 51, 32)        0
_________________________________________________________________
conv2d_2 (Conv2D)            (None, 38, 51, 64)        18496
_________________________________________________________________
activation_2 (Activation)    (None, 38, 51, 64)        0
_________________________________________________________________
max_pooling2d_2 (MaxPooling2 (None, 19, 25, 64)        0
_________________________________________________________________
dropout_2 (Dropout)          (None, 19, 25, 64)        0
_________________________________________________________________
flatten_1 (Flatten)          (None, 30400)             0
_________________________________________________________________
dense_1 (Dense)              (None, 512)               15565312
_________________________________________________________________
activation_3 (Activation)    (None, 512)               0
_________________________________________________________________
dropout_3 (Dropout)          (None, 512)               0
_________________________________________________________________
dense_2 (Dense)              (None, 2)                 1026
_________________________________________________________________
activation_4 (Activation)    (None, 2)                 0
=================================================================
Total params: 15,585,730
Trainable params: 15,585,730
Non-trainable params: 0
```

Structure of the CNN.

```
 32/765 [>.............................] - ETA: 1s
384/765 [==============>...............] - ETA: 0s
736/765 [===========================>..] - ETA: 0s
765/765 [==============================] - 0s 234us/step
The accuracy of this model is 0.5986928103796018%
```

```
 32/765 [>.............................] - ETA: 1s
384/765 [==============>...............] - ETA: 0s
736/765 [===========================>..] - ETA: 0s
765/765 [==============================] - 0s 239us/step
The accuracy of this model is 0.40653594693327264%
The total running time is 51.005769014358521
```

Another possible result, since the dataset is not balanced. We can assume this is not converge.

```
 32/765 [>.............................] - ETA: 1s
416/765 [===============>..............] - ETA: 0s
765/765 [==============================] - 0s 227us/step
The accuracy of this model is 0.9908496732026144%

Process finished with exit code 0
```

The result can be even better.

CNN will read the colored image, svm and knn only read greyscale image.

```
 32/1934 [..............................] - ETA: 3s
384/1934 [====>.........................] - ETA: 0s
736/1934 [==========>...................] - ETA: 0s
1088/1934 [===============>..............] - ETA: 0s
1472/1934 [====================>.........] - ETA: 0s
1856/1934 [===========================>..] - ETA: 0s
1934/1934 [==============================] - 0s 176us/step
The accuracy of this model is 0.7383660806618407%
```

CNN when the the test dataset has some never seen nest.

```
 32/1934 [..............................] - ETA: 3s
384/1934 [====>.........................] - ETA: 0s
704/1934 [=========>....................] - ETA: 0s
1056/1934 [==============>...............] - ETA: 0s
1408/1934 [===================>..........] - ETA: 0s
1760/1934 [=========================>....] - ETA: 0s
1934/1934 [==============================] - 0s 185us/step
The accuracy of this model is 0.6096173733195 45%
```

Result when model not converge

Svm:

```
The accuracy of svm is  0.9908496732026144%
              precision    recall  f1-score   support

         0.0       0.99      0.99      0.99       293
         1.0       0.99      0.99      0.99       472

   micro avg       0.99      0.99      0.99       765
   macro avg       0.99      0.99      0.99       765
weighted avg       0.99      0.99      0.99       765

The total running time is 11.647185802459717
```

```
The accuracy of svm is  0.6825232678386763%
              precision    recall  f1-score   support

         0.0       0.58      0.69      0.63       755
         1.0       0.77      0.68      0.72      1179

   micro avg       0.68      0.68      0.68      1934
   macro avg       0.68      0.68      0.68      1934
weighted avg       0.70      0.68      0.69      1934

The total running time is 15.924508810043335
```

Knn:

```
Using TensorFlow backend.
The accuracy of knn is 0.9660130718954248%
              precision    recall  f1-score   support

         0.0       0.93      0.99      0.96       301
         1.0       0.99      0.95      0.97       464

   micro avg       0.97      0.97      0.97       765
   macro avg       0.96      0.97      0.96       765
weighted avg       0.97      0.97      0.97       765

The total running time is 15.58170771598816
```

```
Using TensorFlow backend.
The accuracy of knn is 0.6473629782833505%
              precision    recall  f1-score   support

         0.0       0.55      0.55      0.55       755
         1.0       0.71      0.71      0.71      1179

   micro avg       0.65      0.65      0.65      1934
   macro avg       0.63      0.63      0.63      1934
weighted avg       0.65      0.65      0.65      1934

The total running time is 68.0224916934967
```