Multi-Cancer Classification

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Your data preparation process

1. Resizing images.
2. Convert from RGB to gray scale .

Description of the models and techniques :

1. Brain Scan Breast Scan model : We use Bag Of Words , test and Train by SVM
2. Brain model : We use HOG To Extarct Features , test and train it by SVM Then save and load Model using pickle .
3. Breast model : : We use HOG To Extarct Features , test and train it by SVM Then save and load Model using pickle .

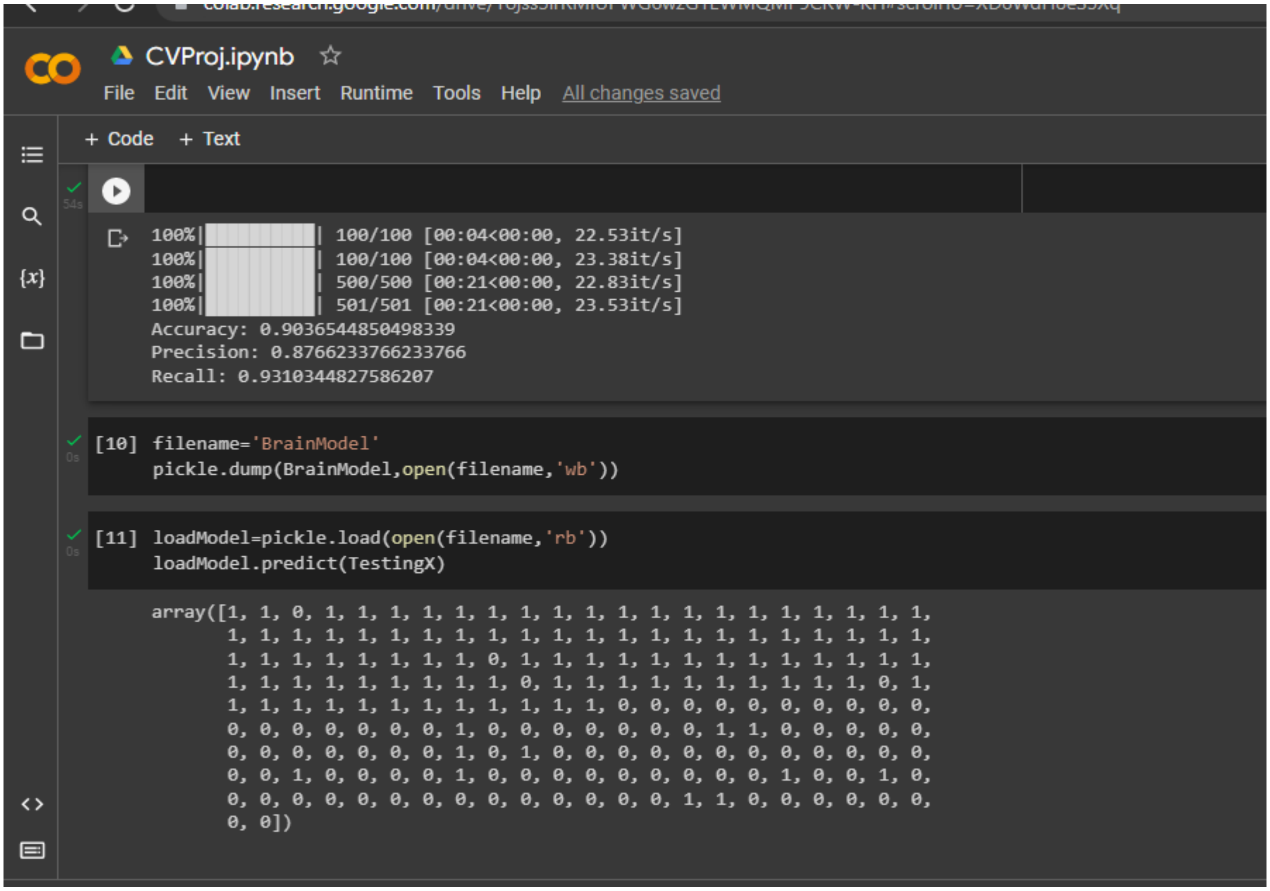
Training and Testing times for each model :

Models	Training	Testing
Brain Scan Breast Scan		
Brain	1 min : 40s	8s
Breast	1 min : 58s	5s

Image Classification training and testing accuracy:

Models	Training accuracy	Testing accuracy
Brain Scan Breast Scan		
Brain	100%	90.3%
Breast	100%	72.2%

The test sets classification with visualization



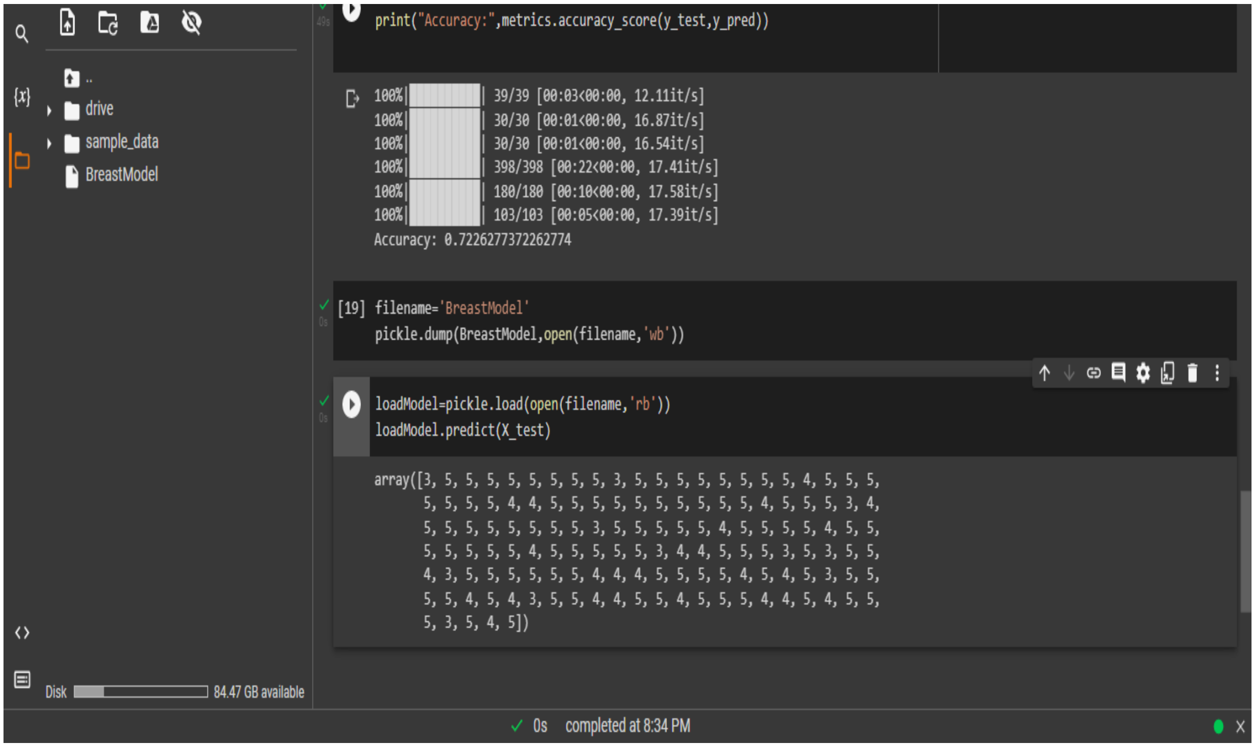
colab.research.google.com/drive/1ojss5IrKMIOFWG0wzGTLWMQMPJCRW-Kr#scrollTo=XDuwdrl0e5Jxq
CO
CVProj.ipynb ☆
File Edit View Insert Runtime Tools Help All changes saved
+ Code + Text
54s
0s
0s

```
100%|██████████| 100/100 [00:04<00:00, 22.53it/s]
100%|██████████| 100/100 [00:04<00:00, 23.38it/s]
100%|██████████| 500/500 [00:21<00:00, 22.83it/s]
100%|██████████| 501/501 [00:21<00:00, 23.53it/s]
Accuracy: 0.9036544850498339
Precision: 0.8766233766233766
Recall: 0.9310344827586207
```

```
[10] filename='BrainModel'
     pickle.dump(BrainModel,open(filename,'wb'))
```

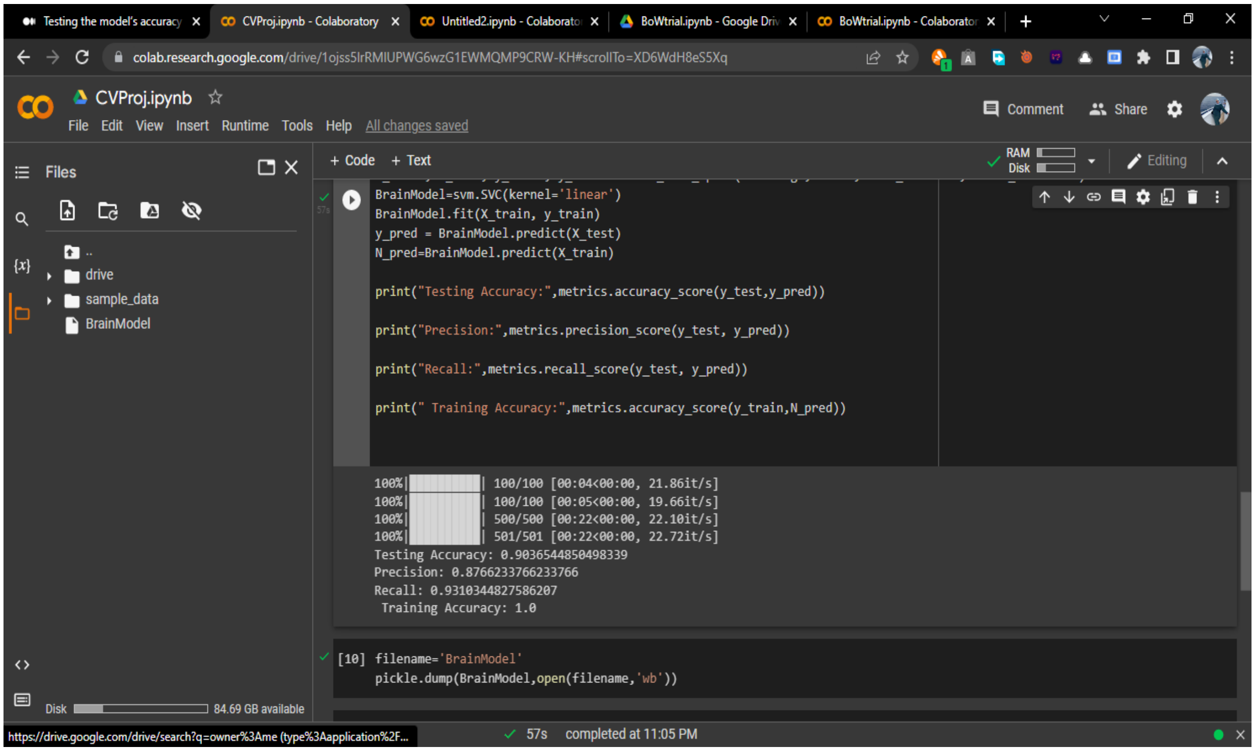
```
[11] loadModel=pickle.load(open(filename,'rb'))
     loadModel.predict(TestingX)
```

```
array([1, 1, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
       1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
       1, 1, 1, 1, 1, 1, 1, 1, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,
       1, 1, 1, 1, 1, 1, 1, 1, 1, 0, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 0, 1,
       1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 0, 1, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
       0, 0, 1, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 1, 0,
       0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 1, 0, 0, 0, 0, 0, 0,
       0, 0])
```



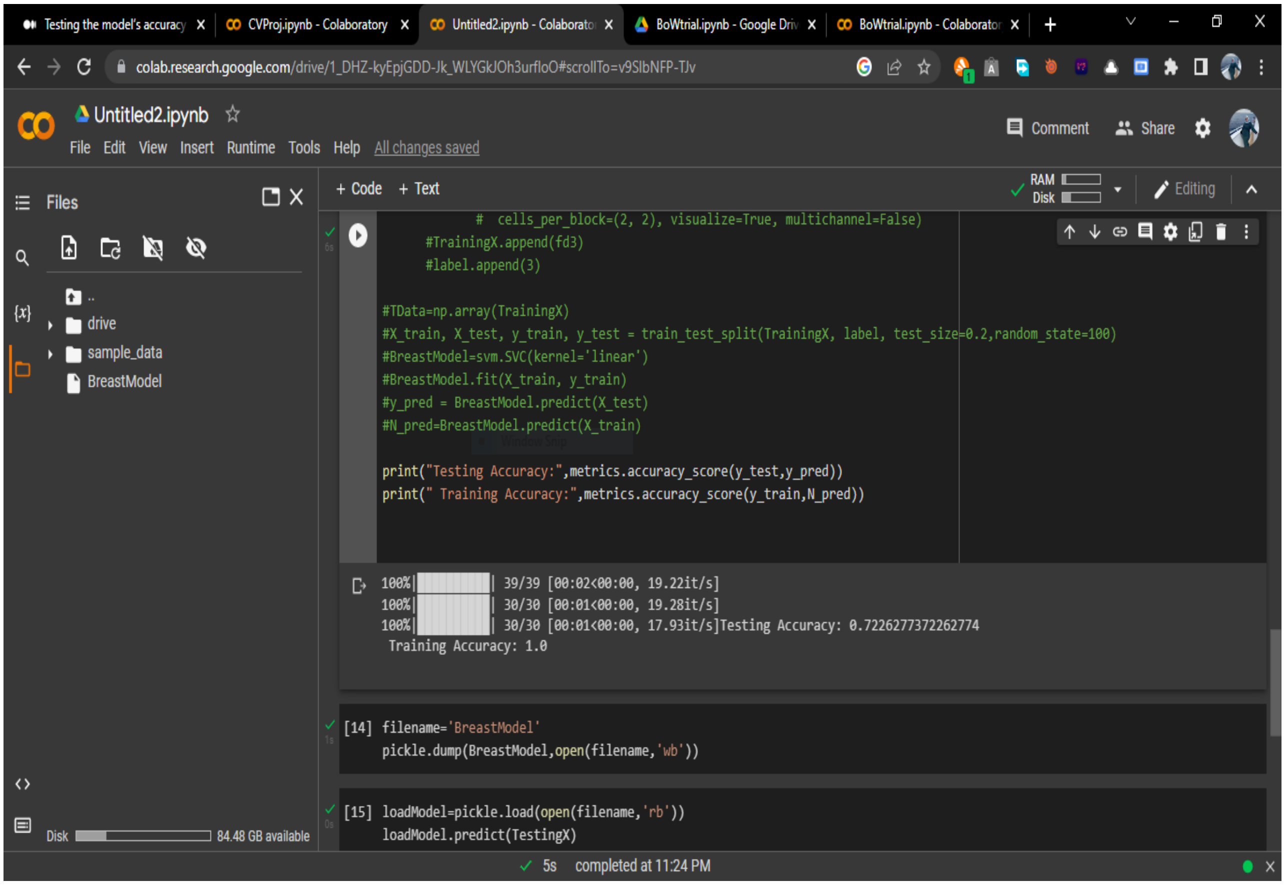
```
print("Accuracy:",metrics.accuracy_score(y_test,y_pred))

100%|██████████| 39/39 [00:03<00:00, 12.11it/s]
100%|██████████| 30/30 [00:01<00:00, 16.87it/s]
100%|██████████| 30/30 [00:01<00:00, 16.54it/s]
100%|██████████| 398/398 [00:22<00:00, 17.41it/s]
100%|██████████| 180/180 [00:10<00:00, 17.58it/s]
100%|██████████| 103/103 [00:05<00:00, 17.39it/s]
Accuracy: 0.7226277372262774

[19] filename='BreastModel'
     pickle.dump(BreastModel,open(filename,'wb'))

loadModel=pickle.load(open(filename,'rb'))
loadModel.predict(X_test)

array([3, 5, 5, 5, 5, 5, 5, 5, 5, 3, 5, 5, 5, 5, 5, 5, 5, 5, 4, 5, 5, 5,
       5, 5, 5, 5, 4, 4, 5, 5, 5, 5, 5, 5, 5, 5, 5, 5, 4, 5, 5, 5, 3, 4,
       5, 5, 5, 5, 5, 5, 5, 5, 3, 5, 5, 5, 5, 5, 4, 5, 5, 5, 5, 4, 5, 5,
       5, 5, 5, 5, 5, 4, 5, 5, 5, 5, 5, 3, 4, 4, 5, 5, 5, 3, 5, 3, 5, 5,
       4, 3, 5, 5, 5, 5, 5, 5, 4, 4, 4, 5, 5, 5, 5, 4, 5, 4, 5, 3, 5, 5,
       5, 5, 4, 5, 4, 3, 5, 5, 4, 4, 5, 5, 4, 5, 5, 5, 4, 4, 5, 4, 5, 5,
       5, 3, 5, 4, 5])
```

Brain Model Accuracy and Testing Time:


Testing the model's accuracy
CVProj.ipynb - Colaboratory
Untitled2.ipynb - Colaborato
BoWtrial.ipynb - Google Driv
BoWtrial.ipynb - Colaborator
colab.research.google.com/drive/1ojss5lrRMIUPWG6wzG1EWMQMP9CRW-KH#scrollTo=XD6WdH8eS5Xq
CVProj.ipynb
File Edit View Insert Runtime Tools Help All changes saved
Comment
Share
+ Code + Text
RAM
Disk
Editing
Files
drive
sample_data
BrainModel
Disk 84.69 GB available
https://drive.google.com/drive/search?q=owner%3Ame (type%3Aapplication%2F...
57s completed at 11:05 PM

```
BrainModel=svm.SVC(kernel='linear')
BrainModel.fit(X_train, y_train)
y_pred = BrainModel.predict(X_test)
N_pred=BrainModel.predict(X_train)

print("Testing Accuracy:",metrics.accuracy_score(y_test,y_pred))

print("Precision:",metrics.precision_score(y_test, y_pred))

print("Recall:",metrics.recall_score(y_test, y_pred))

print(" Training Accuracy:",metrics.accuracy_score(y_train,N_pred))

100%|██████████| 100/100 [00:04<00:00, 21.86it/s]
100%|██████████| 100/100 [00:05<00:00, 19.66it/s]
100%|██████████| 500/500 [00:22<00:00, 22.10it/s]
100%|██████████| 501/501 [00:22<00:00, 22.72it/s]
Testing Accuracy: 0.9036544850498339
Precision: 0.8766233766233766
Recall: 0.9310344827586207
 Training Accuracy: 1.0

[10] filename='BrainModel'
     pickle.dump(BrainModel,open(filename,'wb'))
```

Breast Model and Testing Time:


Testing the model's accuracy
CVProj.ipynb - Colaboratory
Untitled2.ipynb - Colaborato
BoWtrial.ipynb - Google Driv
BoWtrial.ipynb - Colaborator
colab.research.google.com/drive/1_DHZ-kyEpjGDD-Jk_WLYGkJOh3urfloO#scrollTo=v9SIbNFP-TJv
Untitled2.ipynb
File
Edit
View
Insert
Runtime
Tools
Help
All changes saved
Comment
Share
Files
+ Code
+ Text
RAM
Disk
Editing
..
drive
sample_data
BreastModel
Disk
84.48 GB available

```
            #  cells_per_block=(2, 2), visualize=True, multichannel=False)
      #TrainingX.append(fd3)
      #label.append(3)

#TData=np.array(TrainingX)
#X_train, X_test, y_train, y_test = train_test_split(TrainingX, label, test_size=0.2,random_state=100)
#BreastModel=svm.SVC(kernel='linear')
#BreastModel.fit(X_train, y_train)
#y_pred = BreastModel.predict(X_test)
#N_pred=BreastModel.predict(X_train)

print("Testing Accuracy:",metrics.accuracy_score(y_test,y_pred))
print(" Training Accuracy:",metrics.accuracy_score(y_train,N_pred))
```

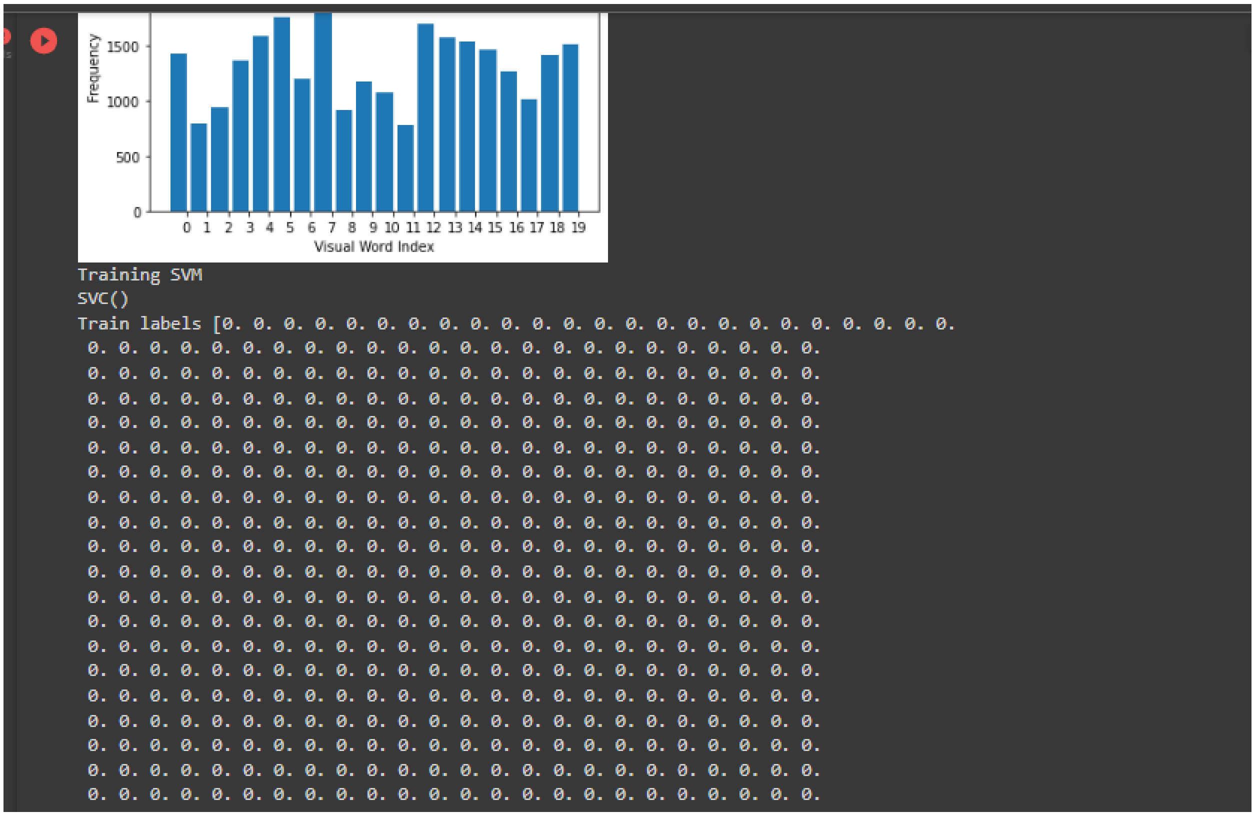
```
100%|██████████| 39/39 [00:02<00:00, 19.22it/s]
100%|██████████| 30/30 [00:01<00:00, 19.28it/s]
100%|██████████| 30/30 [00:01<00:00, 17.93it/s]Testing Accuracy: 0.7226277372262774
 Training Accuracy: 1.0
```

```
[14] filename='BreastModel'
     pickle.dump(BreastModel,open(filename,'wb'))
```

```
[15] loadModel=pickle.load(open(filename,'rb'))
     loadModel.predict(TestingX)
```

✓ 5s completed at 11:24 PM

BOW Histogram From Brain and Breast Scan Model :



```
Training SVM
SVC()
Train labels [0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.
 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0. 0.
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```