

```
In [4]: from sklearn.tree import DecisionTreeClassifier
from sklearn.model_selection import train_test_split
import matplotlib.pyplot as plt
from sklearn.metrics import accuracy_score
from sklearn.metrics import classification_report, confusion_matrix
from sklearn import metrics
import numpy as np
import pandas as pd
import os
import cv2
```

```
In [5]: path = os.listdir('brain_tumor/train') # Path of the dataset
classes = {'glioma_tumor':0, 'meningioma_tumor':1, 'no_tumor':2, 'pituitary_tumor':3} # Class labels
```

```
In [6]: X = []
Y = []
for cls in classes:
    pth = 'brain_tumor/train/' + cls
    for j in os.listdir(pth):
        img = cv2.imread(pth+'/'+j, 0) # 0 means gray color
        img = cv2.resize(img, (200,200)) # resize the image
        X.append(img)
        Y.append(classes[cls])
```

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In [7]: np.unique(Y)
```

```
Out[7]: array([0, 1, 2, 3])
```

```
In [8]: X = np.array(X)
Y = np.array(Y)
```

```
In [9]: pd.Series(Y).value_counts() # Show each class label instances
```

```
Out[9]: 3      827
0       826
1       822
2       395
dtype: int64
```

```
In [10]: X.shape # Show the total number of images and the Dimensions
```

```
Out[10]: (2870, 200, 200)
```

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In [11]: X_updated = X.reshape(len(X), -1)
X_updated.shape
```

```
Out[11]: (2870, 40000)
```

```
In [12]: xtrain, xtest, ytrain, ytest = train_test_split(X_updated, Y, random_state=10, test_size =.20)
```

```
In [13]: xtrain.shape, xtest.shape
```

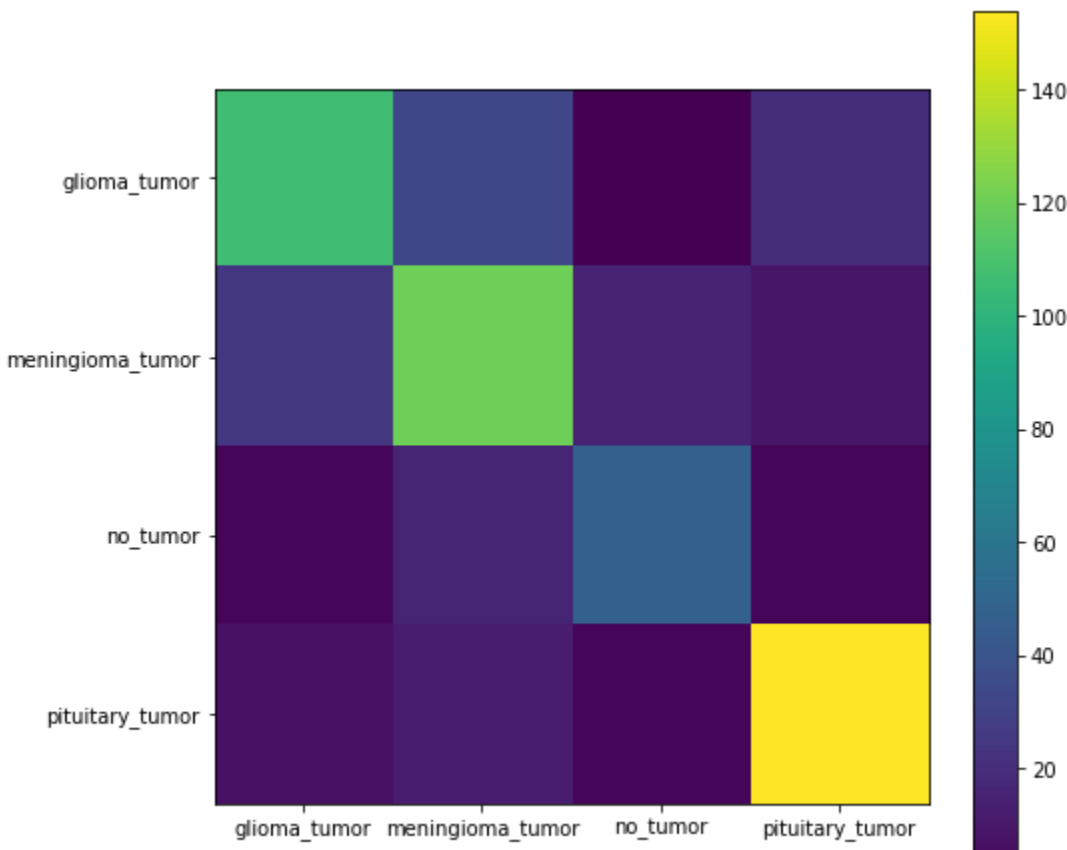
```
Out[13]: ((2296, 40000), (574, 40000))
```

```
In [14]: print(xtrain.max(), xtrain.min())
print(xtest.max(), xtest.min())
xtrain = xtrain/255
xtest = xtest/255
print(xtrain.max(), xtrain.min())
print(xtest.max(), xtest.min())
```

```
255 0
255 0
1.0 0.0
1.0 0.0
```

```
In [15]: clf = DecisionTreeClassifier()
model = clf.fit(xtrain, ytrain)
```

```
In [16]: ypred = model.predict(xtest)
cm = confusion_matrix(ytest, ypred)
plt.figure(figsize= (8,8))
plt.imshow(confusion_matrix(ytest, ypred))
plt.xticks(np.arange(4), classes)
plt.yticks(np.arange(4), classes)
plt.colorbar()
plt.show()
print(cm)
```



```
[[107  33   0  20]
 [ 25 120  15   9]
 [   3  16  47   3]
 [   7  12   3 154]]
```

```
In [17]: report = classification_report(ytest, ypred)
print(report)
```

	precision	recall	f1-score	support
0	0.75	0.67	0.71	160
1	0.66	0.71	0.69	169
2	0.72	0.68	0.70	69
3	0.83	0.88	0.85	176
accuracy			0.75	574
macro avg	0.74	0.73	0.74	574
weighted avg	0.75	0.75	0.74	574

```
In [18]: from sklearn.metrics import mean_squared_error
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```
MSE = mean_squared_error(ytest, ypred)
print ("MSE:{0}".format(MSE))
```

```
MSE:0.7560975609756098
```

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In [ ]:
```