**Naren Suri**

**For clear images please see the word document – weka pdf image resolution is bad**

**Results :**

**Bagging :**

**The code I have written has given the following results:**

1. **Done with classification, now you may calculate the accuracy**

**Number of <mark>Esemble Trees / Bags larned : 10</mark>**

**<mark>depth trained in each tree is  : 3</mark>**

**Tota tested records are : 2125**

**1593True Positive**

**0  True Neg**

**531  False Positive**

**0  Fal  Neg**

**Accuracy for the Bagging Model is :0.75**

**So the accuracy is : 75.0%**

|       |     | True | False |    |
|-------|-----|------|-------|----|
| True  | TP  | 1593 | 0     | FN |
|       |     |      |       |    |
| False | FP  | 531  | 0     | TN |
|       |     |      |       |    |

**2<mark>.  Bagging</mark>**

**Done with classification, now you may calculate the accuracy**

**Number of <mark>Esemble Trees / Bags larned : 10</mark>**

**<mark>depth trained in each tree is  : 5</mark>**

**Tota tested records are : 2125**

**1593  True Positive**

**0  True Neg**

**531  False Positive**

**0  Fal  Neg**

**Accuracy for the Bagging Model is :0.75**

**So the accuracy is : 75.0%**

|  |  | True | False |  |
|---|---|---|---|---|
| **True** | **TP** | **1593** | **0** | **FN** |
|  |  |  |  |  |
| **False** | **FP** | **531** | **0** | **TN** |
|  |  |  |  |  |

**We are creating these many weak classifiers : 10**

**3780Sampled data size**

**3780Sampled data size**

**3780Sampled data size**

**3780Sampled data size**

**3780Sampled data size**

**3780Sampled data size**

**3780Sampled data size**

**3780Sampled data size**

**3780Sampled data size**

**3780Sampled data size**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* - 0 - \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**OnColumn - [99]: Check For - [0] - Meets condtion ?**

 **\*\*If True ---> OnColumn - [92]: Check For - [0] - Meets condtion ?**

 **\*\*\*\*\*\*If True ---> Class Type : [1] is : [115] In number!!**

 **\*\*\*\*\*\*If False ---> Class Type : [0] is : [1518] In number!!**

 **\*\*If False ---> OnColumn - [36]: Check For - [0] - Meets condtion ?**

**\*\*\*\*\*\*If True ---> OnColumn - [27]: Check For - [0] - Meets condtion ?**

**\*\*\*\*\*\*\*\*\*If True ---> OnColumn - [50]: Check For - [0] - Meets condtion ?**

**\*\*\*\*\*\*\*\*\*\*\*\*If True ---> Class Type : [1] is : [64] In number!!**

**\*\*\*\*\*\*\*\*\*\*\*\*If False ---> OnColumn - [48]: Check For - [0] - Meets condtion ?**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*If True ---> Class Type : [0] is : [190] In number!!**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*If False ---> Class Type : [1] is : [5] In number!!**

**\*\*\*\*\*\*\*\*\*If False ---> Class Type : [1] is : [170] In number!!**

**\*\*\*\*\*\*If False ---> Class Type : [1] is : [1718] In number!!**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* - 1 - \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

==Skipping all 10 trees in displaying;== ==showing only a few==

**Going to check the classification accuracy after ensembling**

**\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$ - classified on Moddel 0- \$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$**

**\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$ - classified on Moddel 1- \$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$**

**\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$ - classified on Moddel 2- \$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$**

**\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$ - classified on Moddel 3- \$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$**

**\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$ - classified on Moddel 4- \$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$**

**\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$ - classified on Moddel 5- \$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$**

**\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$ - classified on Moddel 6- \$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$**

**\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$ - classified on Moddel 7- \$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$**

**\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$ - classified on Moddel 8- \$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$**

**\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$ - classified on Moddel 9- \$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$\$**

**Done with classification, now you may calculate the accuracy**

**Number of Esemble Trees / Bags larned : 10**

**depth trained in each tree is  : 5**

**Tota tested records are : 2125**

**1593  True Positive**

**0  True Neg**

**531  False Positive**

**0  Fal  Neg**

**Accuracy for the Bagging Model is :0.75**

**So the accuracy is : 75.0%**

| | | True | False | |
|---|---|---|---|---|
| **True** | **TP** | **1593** | **0** | **FN** |
| | | | | |
| **False** | **FP** | **531** | **0** | **TN** |
| | | | | |

**Bagging depth -3 ensembless 5**

**We are creating these any weak classifiers : 5**

**3780Sampled data size**

**3780Sampled data size**

**3780Sampled data size**

**3780Sampled data size**

**3780Sampled data size**

**********************- 0 -*********************************

**OnColumn - [99]: Check For - [0] - Meets condtion ?**

 **\*\*If True ---> OnColumn - [92]: Check For - [0] - Meets condtion ?**

 **\*\*\*\*\*\*If True ---> Class Type : [1] is : [128] In number!!**

 **\*\*\*\*\*\*If False ---> Class Type : [0] is : [1476] In number!!**

**If False ---> OnColumn - [22]: Check For - [0] - Meets condtion ?

*****If True ---> OnColumn - [55]: Check For - [0] - Meets condtion ?

*********If True ---> Class Type : [1] is : [1822] In number!!

*********If False ---> Class Type : [0] is : [61] In number!!
Class Type : [1] is : [156] In number!!

*****If False ---> Class Type : [0] is : [137] In number!!
*********************** - 1 - *********************************
OnColumn - [99]: Check For - [0] - Meets condtion ?

**If True ---> OnColumn - [92]: Check For - [0] - Meets condtion ?

*****If True ---> Class Type : [1] is : [138] In number!!

*****If False ---> Class Type : [0] is : [1489] In number!!

**If False ---> OnColumn - [22]: Check For - [0] - Meets condtion ?

*****If True ---> OnColumn - [55]: Check For - [0] - Meets condtion ?

*********If True ---> Class Type : [1] is : [1834] In number!!

*********If False ---> Class Type : [0] is : [57] In number!!
Class Type : [1] is : [147] In number!!

*****If False ---> Class Type : [0] is : [115] In number!!

*********************** - 2 - **********************************

**OnColumn - [99]: Check For - [0] - Meets condtion ?**

**\*\*If True ---> OnColumn - [92]: Check For - [0] - Meets condtion ?**

**\*\*\*\*\*\*If True ---> Class Type : [1] is : [119] In number!!**

**\*\*\*\*\*\*If False ---> Class Type : [0] is : [1496] In number!!**

**\*\*If False ---> OnColumn - [22]: Check For - [0] - Meets condtion ?**

**\*\*\*\*\*\*If True ---> OnColumn - [55]: Check For - [0] - Meets condtion ?**

**\*\*\*\*\*\*\*\*\*If True ---> Class Type : [1] is : [1825] In number!!**

**\*\*\*\*\*\*\*\*\*If False ---> Class Type : [0] is : [50] In number!!**
**Class Type : [1] is : [160] In number!!**

**\*\*\*\*\*\*If False ---> Class Type : [0] is : [130] In number!!**
*********************** - 3 - **********************************
**OnColumn - [99]: Check For - [0] - Meets condtion ?**

**\*\*If True ---> OnColumn - [92]: Check For - [0] - Meets condtion ?**

**\*\*\*\*\*\*If True ---> Class Type : [1] is : [136] In number!!**

**\*\*\*\*\*\*If False ---> Class Type : [0] is : [1462] In number!!**

**\*\*If False ---> OnColumn - [36]: Check For - [0] - Meets condtion ?**

******If True ---> OnColumn - [27]: Check For - [0] - Meets condtion ?

*********If True ---> Class Type : [0] is : [178] In number!!
Class Type : [1] is : [64] In number!!

*********If False ---> Class Type : [1] is : [166] In number!!

******If False ---> Class Type : [1] is : [1774] In number!!
*********************** - 4 - ***********************************
OnColumn - [99]: Check For - [0] - Meets condtion ?

**If True ---> OnColumn - [92]: Check For - [0] - Meets condtion ?

******If True ---> Class Type : [1] is : [129] In number!!

******If False ---> Class Type : [0] is : [1513] In number!!

**If False ---> OnColumn - [22]: Check For - [0] - Meets condtion ?

******If True ---> OnColumn - [121]: Check For - [0] - Meets condtion ?

*********If True ---> Class Type : [1] is : [1796] In number!!

*********If False ---> Class Type : [0] is : [60] In number!!
Class Type : [1] is : [161] In number!!

******If False ---> Class Type : [0] is : [121] In number!!
Going to check the classification accuracy after ensembling
$$$$$$$$$$$$$$$$$$$$$ - classified on Moddel 0- $$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$
$$$$$$$$$$$$$$$$$$$$$ - classified on Moddel 1- $$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$

$$$$$$$$$$$$$$$$$$$$ - classified on Moddel 2- $$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$

$$$$$$$$$$$$$$$$$$$$ - classified on Moddel 3- $$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$

$$$$$$$$$$$$$$$$$$$$ - classified on Moddel 4- $$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$$

Done with classification, now you may calculate the accuracy

Number of Esemble Trees / Bags larned : 5

depth trained in each tree is  : 3

Tota tested records are : 2125

1593  True Positive

0  True Neg

531  False Positive

0  Fal  Neg

Accuracy for the Bagging Model is :0.75

So the accuracy is : 75.0%

|  |  | True | False |  |
|---|---|---|---|---|
| True | TP | 1593 | 0 | FN |
|  |  |  |  |  |
| False | FP | 531 | 0 | TN |
|  |  |  |  |  |

Bagging :

******************* From Bagging *************************

Number of Esemble Trees / Bags larned : 5

depth trained in each tree is  : 5

Tota tested records are : 2125

1593  True Positive

0  True Neg

531  False Positive

0  Fal  Neg

Accuracy for the Bagging Model is :0.75

**So the accuracy is : 75.0%**

| | | True | False | |
|---|---|---|---|---|
| True | TP | 1593 | 0 | FN |
| | | | | |
| False | FP | 531 | 0 | TN |
| | | | | |

**Bagging**

**Bagging :**

**Pre-Processing:**

**Using General way of training set :**

**On Test Data : Bagging**

| Preprocess | Classify | Cluster | Associate | Select attributes | Visualize |

**Classifier**

Choose | **Bagging** -P 100 -S 1 -num-slots 1 -I 10 -W weka.classifiers.trees.REPTree -- -M 2 -V 0.001 -N 3 -S 1 -L -1 -I 0.0

**Test options**

○ Use training set
⊙ Supplied test set       Set...
○ Cross-validation   Folds   10
○ Percentage split      %    66

More options...

(Nom) bruises?-bruises_binarized   ▼

Start | Stop

**Result list (right-click for options)**

00:15:14 - meta.Bagging
00:18:22 - meta.Bagging
00:28:55 - meta.Bagging

**Classifier output**

```
Scheme:        weka.classifiers.meta.Bagging -P 100 -S 1 -num-slots 1 -I 10 -W weka.classifiers.tre
Relation:      agaricuslepiotatest1-weka.filters.unsupervised.attribute.Remove-R22-weka.filters.uns
Instances:     2125
Attributes:    126
               [list of attributes omitted]
Test mode:     user supplied test set:  size unknown (reading incrementally)

=== Classifier model (full training set) ===

Bagging with 10 iterations and base learner

weka.classifiers.trees.REPTree -M 2 -V 0.001 -N 3 -S 1 -L -1 -I 0.0

Time taken to build model: 0.43 seconds

=== Evaluation on test set ===

Time taken to test model on supplied test set: 0.1 seconds

=== Summary ===

Correctly Classified Instances        2124                99.9529 %
Incorrectly Classified Instances         1                 0.0471 %
Kappa statistic                          0.9844
Mean absolute error                      0.0006
Root mean squared error                  0.015
Relative absolute error                  1.8502 %
Root relative squared error             12.2916 %
Total Number of Instances             2125

=== Detailed Accuracy By Class ===

                 TP Rate  FP Rate  Precision  Recall  F-Measure  MCC    ROC Area  PRC Area  Cla
                 1.000    0.000    1.000      1.000   1.000      0.984  1.000     1.000     0
                 1.000    0.000    0.970      1.000   0.985      0.984  1.000     1.000     1
Weighted Avg.    1.000    0.000    1.000      1.000   1.000      0.984  1.000     1.000

=== Confusion Matrix ===

    a    b   <-- classified as
 2092    1 |   a = 0
    0   32 |   b = 1
```

**Classifier output**

```
Relation:      agaricuslepiotatrain1-weka.filters.unsupervised.attribute.NominalToBinary-Rfirst-last-weka.filters.unsupervised.att
Instances:     6000
Attributes:    126
               [list of attributes omitted]
Test mode:     user supplied test set:  size unknown (reading incrementally)

=== Classifier model (full training set) ===

RandomForest

Bagging with 100 iterations and base learner

weka.classifiers.trees.RandomTree -K 0 -M 1.0 -V 0.001 -S 1 -do-not-check-capabilities

Time taken to build model: 1.45 seconds

=== Evaluation on test set ===

Time taken to test model on supplied test set: 0.18 seconds

=== Summary ===

Correctly Classified Instances        1744               82.0706 %
Incorrectly Classified Instances       381               17.9294 %
Kappa statistic                          0.1192
Mean absolute error                      0.199
Root mean squared error                  0.3352
Relative absolute error                 35.8268 %
Root relative squared error             60.3062 %
Total Number of Instances             2125

=== Detailed Accuracy By Class ===

                 TP Rate  FP Rate  Precision  Recall   F-Measure  MCC      ROC Area  PRC Area  Class
                 0.818    0.000    1.000      0.818    0.900      0.252    0.996     1.000     0
                 1.000    0.182    0.077      1.000    0.144      0.252    0.996     0.861     1
Weighted Avg.    0.821    0.003    0.986      0.821    0.888      0.252    0.996     0.998

=== Confusion Matrix ===

    a    b   <-- classified as
 1712  381 |   a = 0
    0   32 |   b = 1
```

**Boosting :**  (shown tree only to one type, to avoid too much cluttering. You may run code
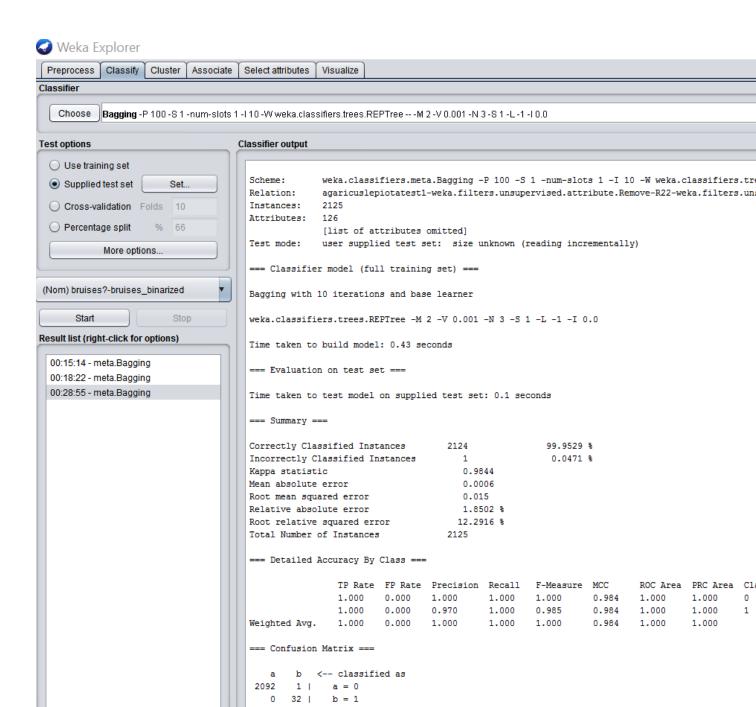and see the trees)

**My ada-boost code is performing well on the data. You may check on different data sets please.**

<mark>**Depth 5 ensemble 5**</mark>

**you should give only path like :**

**C:/Users/Naren Suri/Documents/Python Scripts/DecisionTree/mushrooms/**

**there should be a / in the end, and file names are internally taken care as long as you are giving the same file names as given csv in class**

**boost  arg1**

**5  arg2**

**5  arg3**

**C:/Users/Naren Suri/Documents/Python Scripts/DecisionTree/  arg4**

**C:\Users\Naren Suri\Documents\Python Scripts\DecisionTree**

**AdaBoosting.pyc**

**i got the path you gave, you need not to give the file names.**

**file names are iternally taken care**

**if you want to give different names please change the code in AdaBoosting and nsuriBagging.py**

**C:/Users/Naren Suri/Documents/Python Scripts/DecisionTree/**

**OnColumn - [99]: Check For - [0] - Meets condtion ?**


**  \*\*If True ---> OnColumn - [92]: Check For - [0] - Meets condtion ?**


**  \*\*\*\*\*\*If True ---> Class Type : [1] is : [192] In number!!**


**  \*\*\*\*\*\*If False ---> Class Type : [0] is : [2368] In number!!**


**  \*\*If False ---> OnColumn - [22]: Check For - [0] - Meets condtion ?**


**  \*\*\*\*\*\*If True ---> OnColumn - [55]: Check For - [0] - Meets condtion ?**


**  \*\*\*\*\*\*\*\*\*If True ---> Class Type : [1] is : [2896] In number!!**

**********If False ---> OnColumn - [6]: Check For - [0] - Meets condtion ?

*************If True ---> Class Type : [1] is : [256] In number!!

*************If False ---> Class Type : [0] is : [96] In number!!

******If False ---> Class Type : [0] is : [192] In number!!

###########################################################################

OnColumn - [99]: Check For - [0] - Meets condtion ?

**If True ---> OnColumn - [92]: Check For - [0] - Meets condtion ?

******If True ---> Class Type : [1] is : [192] In number!!

******If False ---> Class Type : [0] is : [2368] In number!!

**If False ---> OnColumn - [22]: Check For - [0] - Meets condtion ?

******If True ---> OnColumn - [55]: Check For - [0] - Meets condtion ?

**********If True ---> Class Type : [1] is : [2896] In number!!

**********If False ---> OnColumn - [6]: Check For - [0] - Meets condtion ?

*************If True ---> Class Type : [1] is : [256] In number!!

*************If False ---> Class Type : [0] is : [96] In number!!

******If False ---> Class Type : [0] is : [192] In number!!

##############################################################################

OnColumn - [99]: Check For - [0] - Meets condtion ?

**If True ---> OnColumn - [92]: Check For - [0] - Meets condtion ?

******If True ---> Class Type : [1] is : [192] In number!!

******If False ---> Class Type : [0] is : [2368] In number!!

**If False ---> OnColumn - [22]: Check For - [0] - Meets condtion ?

******If True ---> OnColumn - [55]: Check For - [0] - Meets condtion ?

**********If True ---> Class Type : [1] is : [2896] In number!!

**********If False ---> OnColumn - [6]: Check For - [0] - Meets condtion ?

**************If True ---> Class Type : [1] is : [256] In number!!

**************If False ---> Class Type : [0] is : [96] In number!!

******If False ---> Class Type : [0] is : [192] In number!!

##############################################################################

OnColumn - [99]: Check For - [0] - Meets condtion ?

**If True ---> OnColumn - [92]: Check For - [0] - Meets condtion ?

**\*\*\*\*\*\*If True ---> Class Type : [1] is : [192] In number!!**

**\*\*\*\*\*\*If False ---> Class Type : [0] is : [2368] In number!!**

**\*\*If False ---> OnColumn - [22]: Check For - [0] - Meets condtion ?**

**\*\*\*\*\*\*If True ---> OnColumn - [55]: Check For - [0] - Meets condtion ?**

**\*\*\*\*\*\*\*\*\*If True ---> Class Type : [1] is : [2896] In number!!**

**\*\*\*\*\*\*\*\*\*If False ---> OnColumn - [6]: Check For - [0] - Meets condtion ?**

**\*\*\*\*\*\*\*\*\*\*\*\*If True ---> Class Type : [1] is : [256] In number!!**

**\*\*\*\*\*\*\*\*\*\*\*\*If False ---> Class Type : [0] is : [96] In number!!**

**\*\*\*\*\*\*If False ---> Class Type : [0] is : [192] In number!!**

**######################################################################**

**OnColumn - [99]: Check For - [0] - Meets condtion ?**

**\*\*If True ---> OnColumn - [92]: Check For - [0] - Meets condtion ?**

**\*\*\*\*\*\*If True ---> Class Type : [1] is : [192] In number!!**

**\*\*\*\*\*\*If False ---> Class Type : [0] is : [2368] In number!!**

**\*\*If False ---> OnColumn - [22]: Check For - [0] - Meets condtion ?**

**\*\*\*\*\*\*If True ---> OnColumn - [55]: Check For - [0] - Meets condtion ?**

**\*\*\*\*\*\*\*\*\*\*If True ---> Class Type : [1] is : [2896] In number!!**

**\*\*\*\*\*\*\*\*\*\*If False ---> OnColumn - [6]: Check For - [0] - Meets condtion ?**

**\*\*\*\*\*\*\*\*\*\*\*\*\*If True ---> Class Type : [1] is : [256] In number!!**

**\*\*\*\*\*\*\*\*\*\*\*\*\*If False ---> Class Type : [0] is : [96] In number!!**

**\*\*\*\*\*\*If False ---> Class Type : [0] is : [192] In number!!**

**###############################################################**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* FROM ADABoost \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**Toatla Ensembles Of trees : 5**

**Depth of each tree of Each Ensemble : 5**

**Tota tested records are : 2125**

**2125  True Positive**

**0  True Neg**

**0  False Positive**

**0  Fal  Neg**

**Accuracy for the Bagging Model is :1.0**

**So the accuracy is : 100.0%**

| | | True | False | |
|---|---|---|---|---|
| **True** | **TP** | **2125** | **0** | **FN** |
| | | | | |
| **False** | **FP** | **0** | **0** | **TN** |
| | | | | |

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* FROM ADABoost \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**Toatla Ensembles Of trees : 5**

**Depth of each tree of Each Ensemble : 3**

**Tota tested records are : 2125**

**2125  True Positive**

**0  True Neg**

**0  False Positive**

**0  Fal  Neg**

**Accuracy for the Bagging Model is :1.0**

**So the accuracy is : 100.0%**

**==Depth 3 ensemble 5==**

**boost  arg1**

**3  arg2**

**5  arg3**

**C:/Users/Naren Suri/Documents/Python Scripts/DecisionTree/  arg4**

**C:\Users\Naren Suri\Documents\Python Scripts\DecisionTree**

**AdaBoosting.pyc**

**i got the path you gave, you need not to give the file names.**

**file names are iternally taken care**

**if you want to give different names please change the code in AdaBoosting and nsuriBagging.py**

**C:/Users/Naren Suri/Documents/Python Scripts/DecisionTree/**

**OnColumn - [99]: Check For - [0] - Meets condtion ?**


**\*\*If True ---> OnColumn - [92]: Check For - [0] - Meets condtion ?**


**\*\*\*\*\*\*If True ---> Class Type : [1] is : [192] In number!!**

**\*\*\*\*\*\*If False ---> Class Type : [0] is : [2368] In number!!**

**\*\*If False ---> OnColumn - [22]: Check For - [0] - Meets condtion ?**

**\*\*\*\*\*\*If True ---> OnColumn - [55]: Check For - [0] - Meets condtion ?**

**\*\*\*\*\*\*\*\*\*\*If True ---> Class Type : [1] is : [2896] In number!!**

**\*\*\*\*\*\*\*\*\*\*If False ---> Class Type : [0] is : [96] In number!!**

**Class Type : [1] is : [256] In number!!**

**\*\*\*\*\*\*If False ---> Class Type : [0] is : [192] In number!!**

################################################################

**Manually Skipped some trees for result documentation purpose – to reduce clumsyness**

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**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* FROM ADABoost \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**Toatla Ensembles Of trees : 5**

**Depth of each tree of Each Ensemble : 3**

**Tota tested records are : 2125**

**2125  True Positive**

**0  True Neg**

**0  False Positive**

**0  Fal  Neg**

**Accuracy for the Bagging Model is :1.0**

**So the accuracy is : 100.0%**

|       |    | True | False |    |
|-------|----|------|-------|----|
| True  | TP | 2125 | 0     | FN |
|       |    |      |       |    |
| False | FP | 0    | 0     | TN |
|       |    |      |       |    |

###########################################################################

**OnColumn - [55]: Check For - [0] - Meets condtion ?**

 **\*\*If True ---> OnColumn - [99]: Check For - [0] - Meets condtion ?**

 **\*\*\*\*\*\*If True ---> OnColumn - [92]: Check For - [0] - Meets condtion ?**

 **\*\*\*\*\*\*\*\*\*If True ---> Class Type : [1] is : [192] In number!!**

 **\*\*\*\*\*\*\*\*\*If False ---> Class Type : [0] is : [1600] In number!!**

 **\*\*\*\*\*\*If False ---> OnColumn - [22]: Check For - [0] - Meets condtion ?**

 **\*\*\*\*\*\*\*\*\*If True ---> Class Type : [1] is : [2896] In number!!**

 **\*\*\*\*\*\*\*\*\*If False ---> Class Type : [0] is : [192] In number!!**

 **\*\*If False ---> OnColumn - [26]: Check For - [0] - Meets condtion ?**

 **\*\*\*\*\*\*If True ---> Class Type : [1] is : [256] In number!!**

 **\*\*\*\*\*\*If False ---> Class Type : [0] is : [864] In number!!**

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 **\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* FROM ADABoost \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***

**Toatla Ensembles Of trees : 10**

**Depth of each tree of Each Ensemble : 3**

**Tota tested records are : 2125**

**2125  True Positive**

**0  True Neg**

**0  False Positive**

**0  Fal  Neg**

**Accuracy for the Bagging Model is :1.0**

**So the accuracy is : 100.0%**

**############################################################################**

**Skipped some trees for result documentation purpose – to reduce clumsyness**

**############################################################################**

|  |  | True | False |  |
|---|---|---|---|---|
| True | TP | 2125 | 0 | FN |
|  |  |  |  |  |
| False | FP | 0 | 0 | TN |
|  |  |  |  |  |

**Depth 5 ensemble 10**

**OnColumn - [99]: Check For - [0] - Meets condtion ?**

**\*\*If True ---> OnColumn - [92]: Check For - [0] - Meets condtion ?**

**\*\*\*\*\*\*If True ---> Class Type : [1] is : [192] In number!!**

**\*\*\*\*\*\*If False ---> Class Type : [0] is : [2368] In number!!**

**\*\*If False ---> OnColumn - [22]: Check For - [0] - Meets condtion ?**

**\*\*\*\*\*\*If True ---> OnColumn - [55]: Check For - [0] - Meets condtion ?**

**\*\*\*\*\*\*\*\*\*\*If True ---> Class Type : [1] is : [2896] In number!!**

**\*\*\*\*\*\*\*\*\*\*If False ---> OnColumn - [6]: Check For - [0] - Meets condtion ?**

**\*\*\*\*\*\*\*\*\*\*\*\*\*If True ---> Class Type : [1] is : [256] In number!!**

**\*\*\*\*\*\*\*\*\*\*\*\*\*If False ---> Class Type : [0] is : [96] In number!!**

**\*\*\*\*\*\*If False ---> Class Type : [0] is : [192] In number!!**

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**###########################################################################**
**Skipped some trees for result documentation purpose – to reduce clumsyness**
**###########################################################################**

**\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* FROM ADABoost \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\***
**Toatla Ensembles Of trees : 10**

**Depth of each tree of Each Ensemble : 5**

**Tota tested records are : 2125**

**2125  True Positive**

**0  True Neg**

**0  False Positive**

**0  Fal  Neg**

**Accuracy for the Bagging Model is :1.0**

**So the accuracy is : 100.0%**

| | | True | False | |
|---|---|---|---|---|
| True | TP | 2125 | 0 | FN |
| | | | | |
| False | FP | 0 | 0 | TN |
| | | | | |

**Boosting:**

**C:/Users/Naren Suri/Documents/Python Scripts/DecisionTree/AdaBoosting.py**

**OnColumn - [99]: Check For - [0] - Meets condtion ?**

 **\*\*If True ---> Class Type : [0] is : [2368] In number!!**

**Class Type : [1] is : [192] In number!!**

 **\*\*If False ---> Class Type : [0] is : [288] In number!!**

**Class Type : [1] is : [3152] In number!!**

 **######################################################################**

**OnColumn - [36]: Check For - [0] - Meets condtion ?**

 **\*\*If True ---> Class Type : [0] is : [592] In number!!**

**Class Type : [1] is : [360] In number!!**

 **\*\*If False ---> Class Type : [0] is : [2064] In number!!**

**Class Type : [1] is : [2984] In number!!**

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**OnColumn - [92]: Check For - [0] - Meets condtion ?**

**\*\*If True ---> Class Type : [1] is : [264] In number!!**

**\*\*If False ---> Class Type : [0] is : [2656] In number!!**
**Class Type : [1] is : [3080] In number!!**

#####################################################################

**OnColumn - [92]: Check For - [0] - Meets condtion ?**

**\*\*If True ---> Class Type : [1] is : [264] In number!!**

**\*\*If False ---> Class Type : [0] is : [2656] In number!!**
**Class Type : [1] is : [3080] In number!!**

#####################################################################

**OnColumn - [92]: Check For - [0] - Meets condtion ?**

**\*\*If True ---> Class Type : [1] is : [264] In number!!**

**\*\*If False ---> Class Type : [0] is : [2656] In number!!**
**Class Type : [1] is : [3080] In number!!**

#####################################################################

**Tota tested records are : 2125**

**2124  True Positive**

**0  True Neg**

**1  False Positive**

**0  Fal  Neg**

**Accuracy for the Bagging Model is :0.999529411765**

**So the accuracy is : 99.9529411765%**

|  |  | True | False |  |
|---|---|---|---|---|
| **True** | **TP** | **2124** | **0** | **FN** |
|  |  |  |  |  |
| **False** | **FP** | **1** | **0** | **TN** |
|  |  |  |  |  |

**Boosting : Weka**

Choose **AdaBoostM1** -P 100 -S 1 -I 10 -W weka.classifiers.trees.DecisionStump

**Test options**

- ⦿ Use training set
- ○ Supplied test set    Set...
- ○ Cross-validation  Folds  10
- ○ Percentage split  %  66

More options...

(Nom) bruises?-bruises_binarized ▾

Start    Stop

Result list (right-click for options)

19:04:05 - meta.AdaBoostM1

**Classifier output**

```
0.8614166348952604       0.13858336510473948
ring-type-pendant_binarized != 0
0    1
0.43997470472348754      0.5600252952765125
ring-type-pendant_binarized is missing
0    1
0.6144860294037353       0.38551397059626474


Weight: 0.78

Number of performed Iterations: 10


Time taken to build model: 0.66 seconds

=== Evaluation on training set ===

Time taken to test model on training data: 0.09 seconds

=== Summary ===

Correctly Classified Instances        5808              96.8   %
Incorrectly Classified Instances       192               3.2   %
Kappa statistic                          0.9347
Mean absolute error                      0.0422
Root mean squared error                  0.1415
Relative absolute error                  8.5544 %
Root relative squared error             28.4948 %
Total Number of Instances             6000

=== Detailed Accuracy By Class ===

              TP Rate  FP Rate  Precision  Recall  F-Measure  MCC    ROC Area  PRC Area  Class
              0.928    0.000    1.000      0.928   0.963      0.937  0.999     0.998     0
              1.000    0.072    0.946      1.000   0.972      0.937  0.999     0.999     1
Weighted Avg. 0.968    0.040    0.970      0.968   0.968      0.937  0.999     0.999

=== Confusion Matrix ===

   a    b   <-- classified as
 2464  192 |   a = 0
    0 3344 |   b = 1
```

**Boosting-Kfold:**



Weka Explorer

Preprocess | Classify | Cluster | Associate | Select attributes | Visualize

**Classifier**

Choose | AdaBoostM1 -P 100 -S 1 -I 10 -W weka.classifiers.trees.DecisionStump

**Test options**

- Use training set
- Supplied test set    Set...
- Cross-validation   Folds   10
- Percentage split    %   66

More options...

(Nom) bruises?-bruises_binarized

Start       Stop

**Result list (right-click for options)**

19:04:05 - meta.AdaBoostM1
19:12:25 - meta.AdaBoostM1

**Classifier output**

```
ring-type-pendant_binarized = 0
0       1
0.8614166348952604       0.13858336510473948
ring-type-pendant_binarized != 0
0       1
0.43997470472348754     0.5600252952765125
ring-type-pendant_binarized is missing
0       1
0.6144860294037353      0.38551397059626474


Weight: 0.78

Number of performed Iterations: 10


Time taken to build model: 0.66 seconds

=== Stratified cross-validation ===
=== Summary ===

Correctly Classified Instances       5813           96.8833 %
Incorrectly Classified Instances      187            3.1167 %
Kappa statistic                      0.9364
Mean absolute error                  0.0421
Root mean squared error              0.1379
Relative absolute error              8.53   %
Root relative squared error         27.7697 %
Total Number of Instances            6000

=== Detailed Accuracy By Class ===

              TP Rate  FP Rate  Precision  Recall  F-Measure  MCC    ROC Area  PRC Area  Class
              0.930    0.000    1.000      0.930   0.964      0.938  0.999     0.999     0
              1.000    0.070    0.947      1.000   0.973      0.938  0.999     0.999     1
Weighted Avg. 0.969    0.039    0.970      0.969   0.969      0.938  0.999     0.999

=== Confusion Matrix ===

    a    b    <-- classified as
 2469  187 |   a = 0
    0 3344 |   b = 1
```

**Tested Adabaoost on Test Set:**



**Some Other results:**

| Name | Type | Size | Value |
|---|---|---|---|
| AlpahEachTreeWeight | dict | 5 | {0: 1.2211735176846021, 1: 0.19441289455209976 |
| DtAndDtPlus | list | 6000 | [[7.836698...22035e-05, 7.836698...22035e-05], |
| FileName1 | str | 1 | agaricuslepiotatrain1.csv |
| FileName2 | str | 1 | agaricuslepiotatest1.csv |
| ResultsClassificationTest | list | 2125 | [[-1, 1, 1, 1, 1, -1, -0.68124092772010048], [ |
| cwd | str | 1 | C:\Users\Naren Suri\Documents\Python Scripts\D |
| depthToBeTrained | int | 1 | 1 |

Object inspector    Variable explorer    File explorer

IPython console

Console 1/A

```
**If True ---> Class Type : [1] is : [264] In number!!

**If False ---> Class Type : [0] is : [2656] In number!!
Class Type : [1] is : [3080] In number!!

##############################################################

OnColumn - [92]: Check For - [0] - Meets condtion ?

**If True ---> Class Type : [1] is : [264] In number!!

**If False ---> Class Type : [0] is : [2656] In number!!
Class Type : [1] is : [3080] In number!!

##############################################################

Tota tested records are : 2125
2124  True Positive
0   True Neg
1   False Positive
0   Fal  Neg
Accuracy for the Bagging Model is :0.999529411765
So the accuracy is : 99.9529411765%

In [89]:
```

Console    IPython console    History log

Permissions: RW    End-of-lines: CRLF    Encoding: ASCII    Line 167    Column: 27    Mem

---

Left panel code (partially visible):

```
n
onTest[row]) - 2):
ight[eachCol] * ResultsClassificationTest[row][eachCol

ificationTest[row]) - 1] = resultvalue
the results

#######################

isionTree/mushrooms/"

#######################

isionTree/mushrooms/"

#######################

#######################

#######################

sForAdaDVec(my_data,my_Test_data) #(my_data,my_Test_da
NumberOfEnsembleTrees,depthToBeTrained,my_train_data,D
eight,TrainedModelTrees,my_Test_data_array,nNumberOfEn

,DtAndDtPlus)
Plus)
```

```python
        # predictor values to be kept in the last column
        for eachCol in range(0, len(ResultsClassificationTest[row]) - 2):
            resultvalue = resultvalue + AlphahEachTreeWeight[eachCol] * ResultsClassificationTest[row][eachCol]

        ResultsClassificationTest[row][len(ResultsClassificationTest[row]) - 1] = resultvalue
        ## finished the final prediction and stored in the results
    return ResultsClassificationTest

# path1 = "C:/Users/Naren Suri/Documents/Python Scripts/DecisionTree/mushrooms/"
import os
print os.getcwd()
print __file__
cwd = os.getcwd()

nNumberOfEnsembleTrees = 5
depthToBeTrained = 1

# path1 = "C:/Users/Naren Suri/Documents/Python Scripts/DecisionTree/mushrooms/"
path1 = os.getcwd() + "/"
FileName1 = 'agaricuslepiotatrain1.csv'
# FileName2 = ...
FileName2 = 'agaricuslepiotatest11.csv'

my_data = filproces.FileProcessing(path1, FileName1)
# split my_data here
my_Test_data = filproces.FileProcessing(path1, FileName2)
# split my_Test_data here

(my_train_data,my_Test_data_array,DtAndDtPlus) = processColsForAdaBVec(my_data,my_Test_data)
(AlphahEachTreeWeight,TrainedModelTrees) = AdaBoostprocess(nNumberOfEnsembleTrees,depthToBeTrained,my_train_data,D
ResultsClassificationTest = TestDataAdaBoost(AlphahEachTreeWeight,TrainedModelTrees,my_Test_data_array,nNumberOfEn
# Now lets calculate the accuracy
acc.AdacalculateAccuracy(ResultsClassificationTest)

# testtree.DecisionTreeCreation(my_train_data,depthToBeTrained,DtAndDtPlus)
# testtree.testingfunc(my_train_data,depthToBeTrained,DtAndDtPlus)
```

**Variable explorer**

| Name | Type | Size | Value |
|---|---|---|---|
| AlphahEachTreeWeight | dict | 5 | {0: 1.22117917844631, 1: 0.19441289495289978... |
| DtAndDtPlus | list | 6150 | [[7.036690...22035e-05, 7.036690...22035e-05]... |
| FileName1 | str | 1 | agaricuslepiotatrain1.csv |
| FileName2 | str | 1 | agaricuslepiotatest1.csv |
| ResultsClassificationTest | list | 2125 | [[-1, 1, 1, 1, 1, -1, -0.60124092772030401, 1... |
| cwd | str | 1 | C:\Users\Naren Suri\Documents\Python Scripts\De... |
| depthToBeTrained | int | 1 | 1 |

**Python console**

```
**If True ---> Class Type : [1] is : [264] In number!!

**If False ---> Class Type : [0] is : [2656] In number!!
Class Type : [1] is : [3080] In number!!

############################################

OnColumn - [92]: Check For - [0] - Meets condition ?

**If True ---> Class Type : [1] is : [264] In number!!

**If False ---> Class Type : [0] is : [2656] In number!!
Class Type : [1] is : [3080] In number!!

############################################

Tota tested records are : 2125
2124  True Positive
0  True Neg
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0  Fal  Neg
Accuracy for the Bagging Model is :0.999529411765
So the accuracy is : 99.9529411765%

In [89]:
```