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Class: Msc CS Part I **Roll no:**11

Subject: Business Intelligence and Big Data Analytics

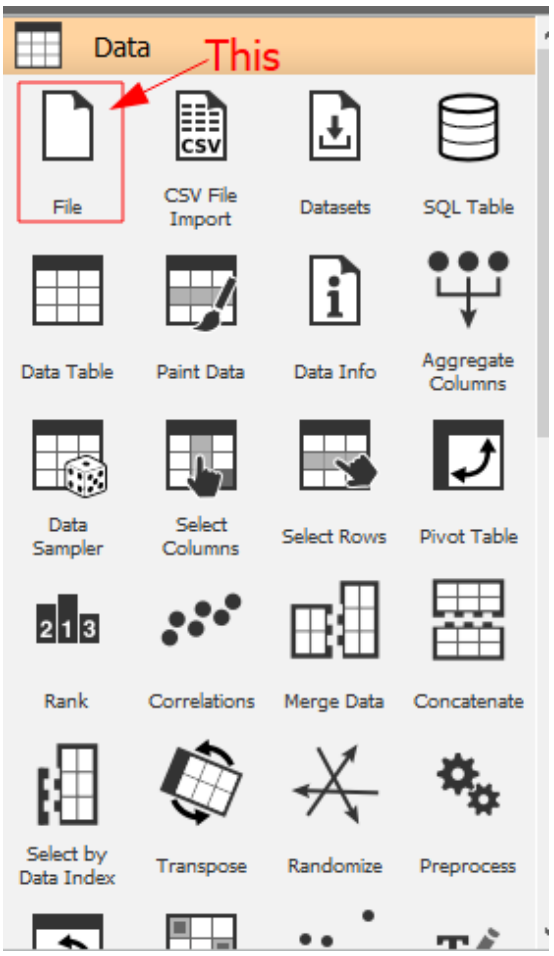
Index

Practical 1

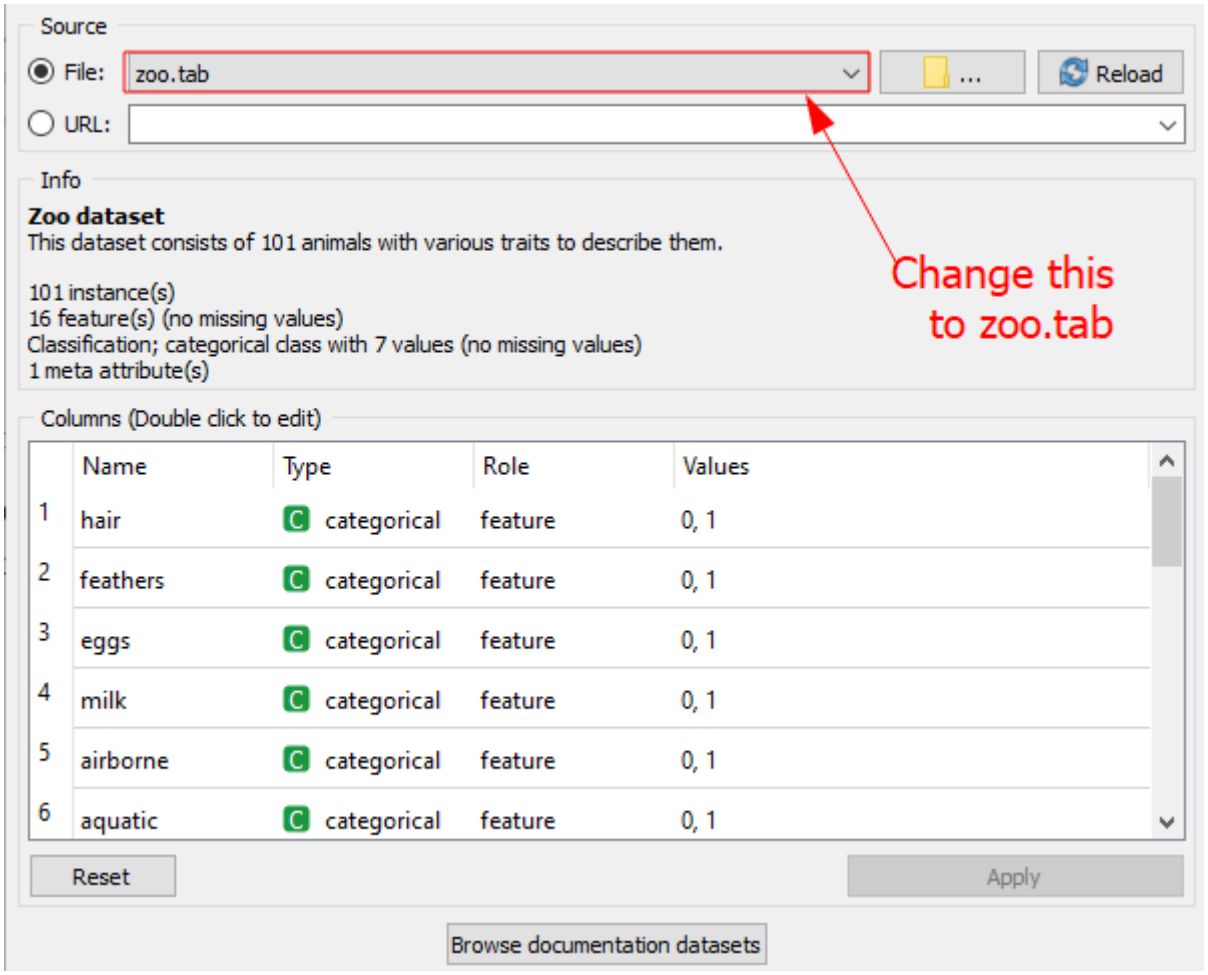
Aim: Classification using orange.

Steps:

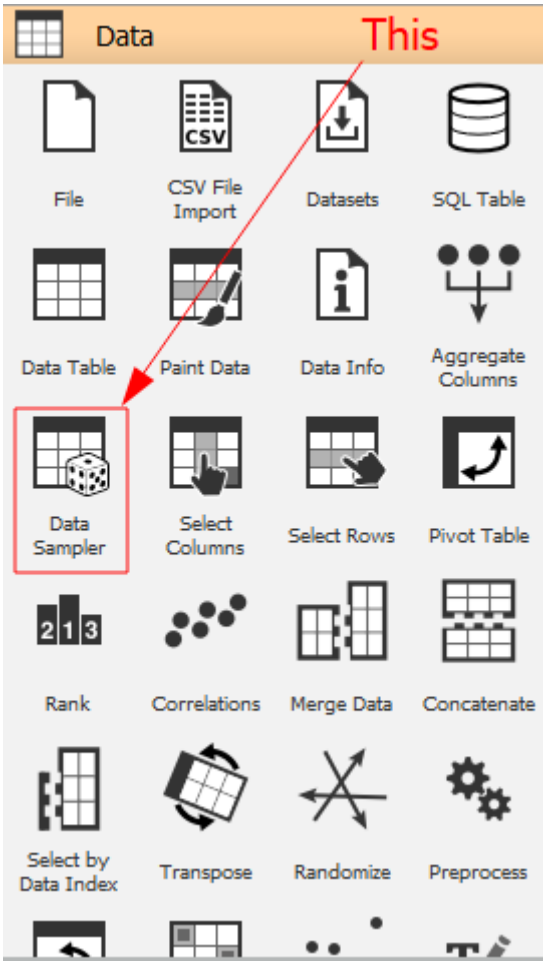
➢ Drag and drop a Filewidget from the Datasection found in the left panel to the workspace.



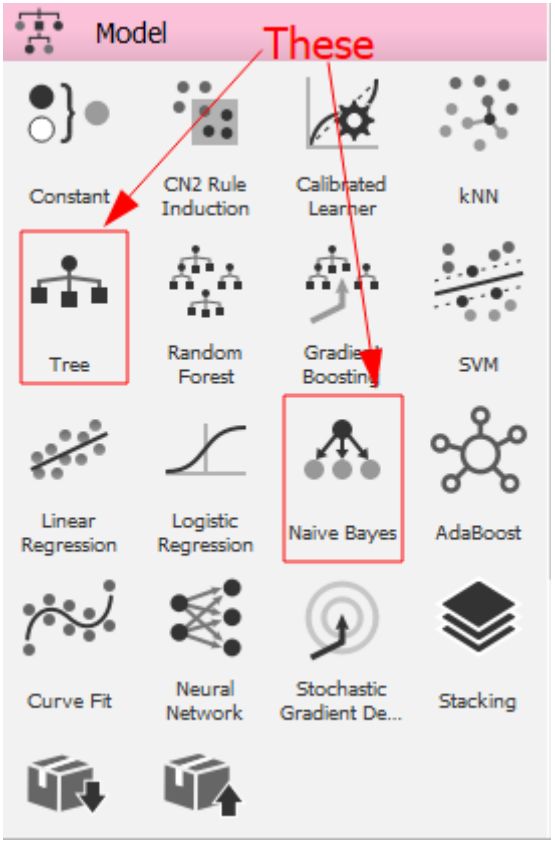
➢ Double click the Filewidget and choose the zoo.tabdataset.

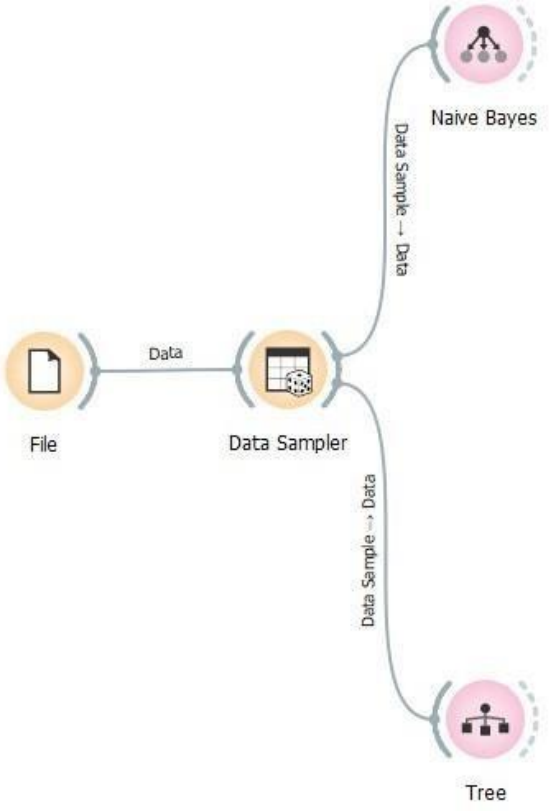


➢ Drag and drop a Data Samplerwidget onto the workspace and connect it to the File widget. This widget is found in the Data section.

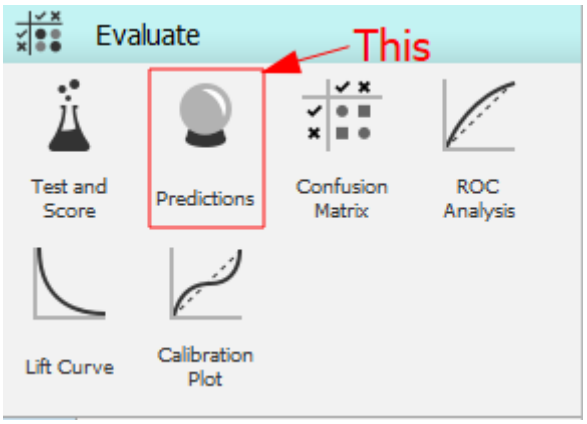


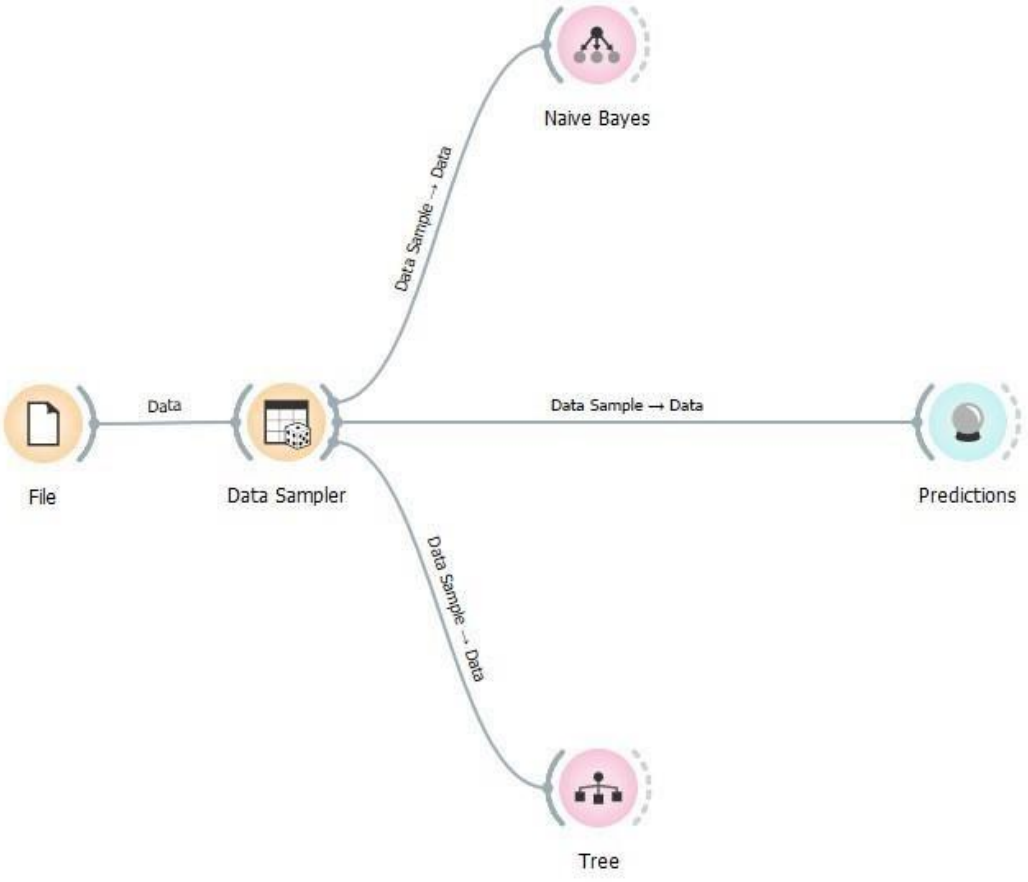
➢ We choose the Naive Bayes' and Classification Tree models to classify our data. Drag and drop these widgets to the workspace. They are found under the Modelssection.


Model
These
Constant
CN2 Rule Induction
Calibrated Learner
kNN
Tree
Random Forest
Gradient Boosting
SVM
Linear Regression
Logistic Regression
Naive Bayes
AdaBoost
Curve Fit
Neural Network
Stochastic Gradient De...
Stacking

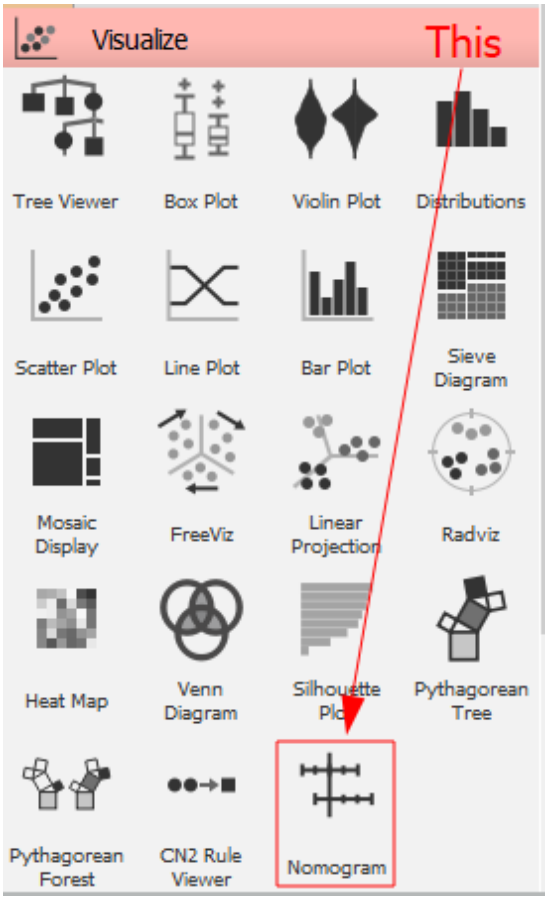

Naive Bayes
Data Sample → Data
Data
File
Data Sampler
Data Sample → Data
Tree

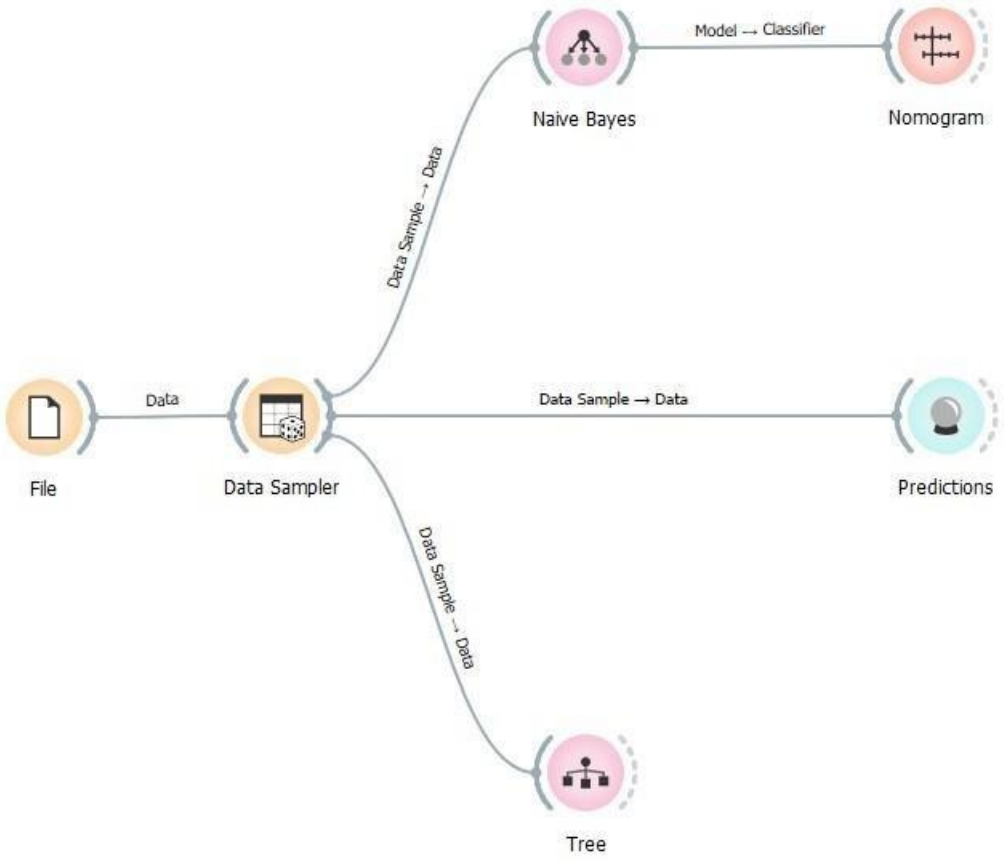
➢ To perform predictions on the data, we drag and drop the Predictions widget onto the workspace.This widget is found in the Evaluate section.



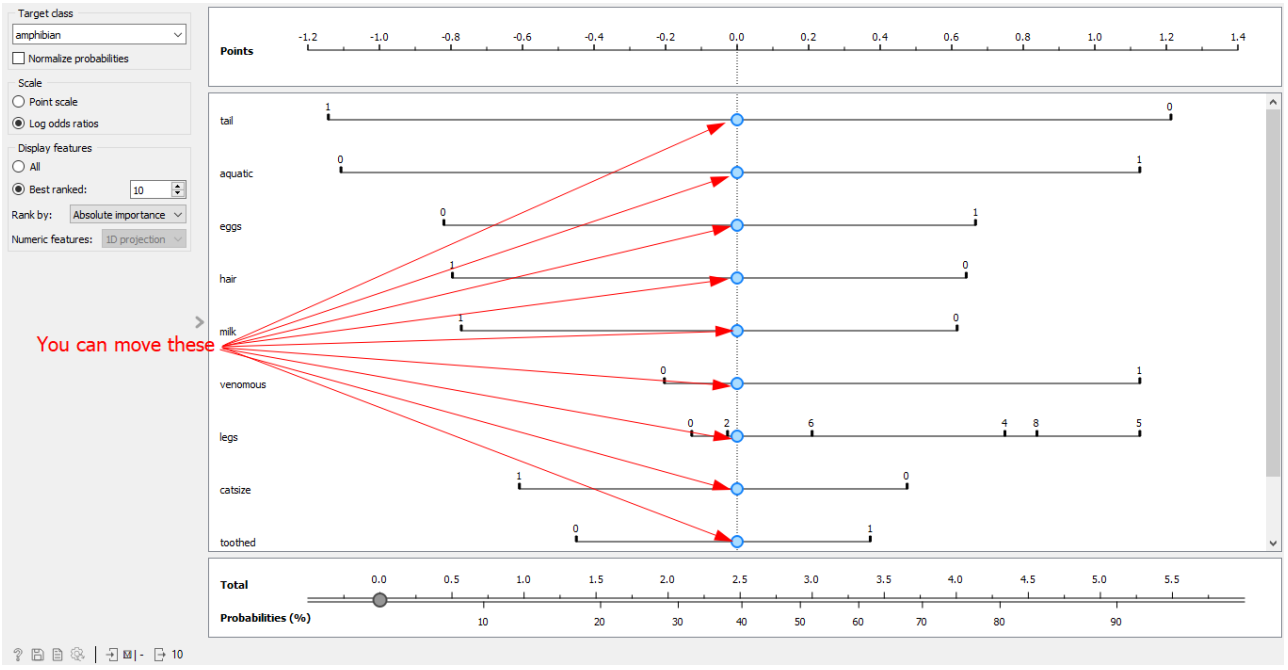


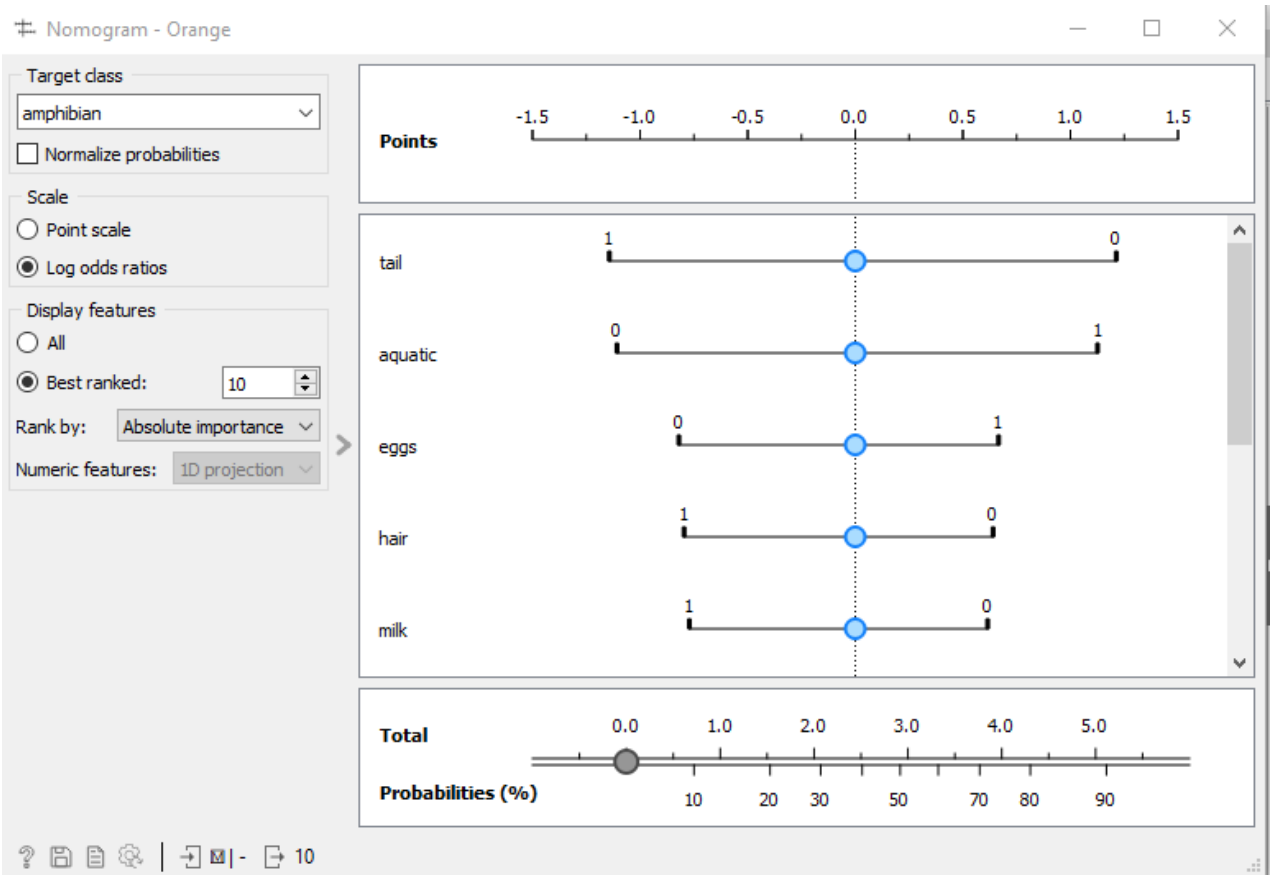
➢ A Nomogram is useful to view data from a Naive Bayes' model. Drag and drop this widget onto the workspace. It can be found in the Visualise section.

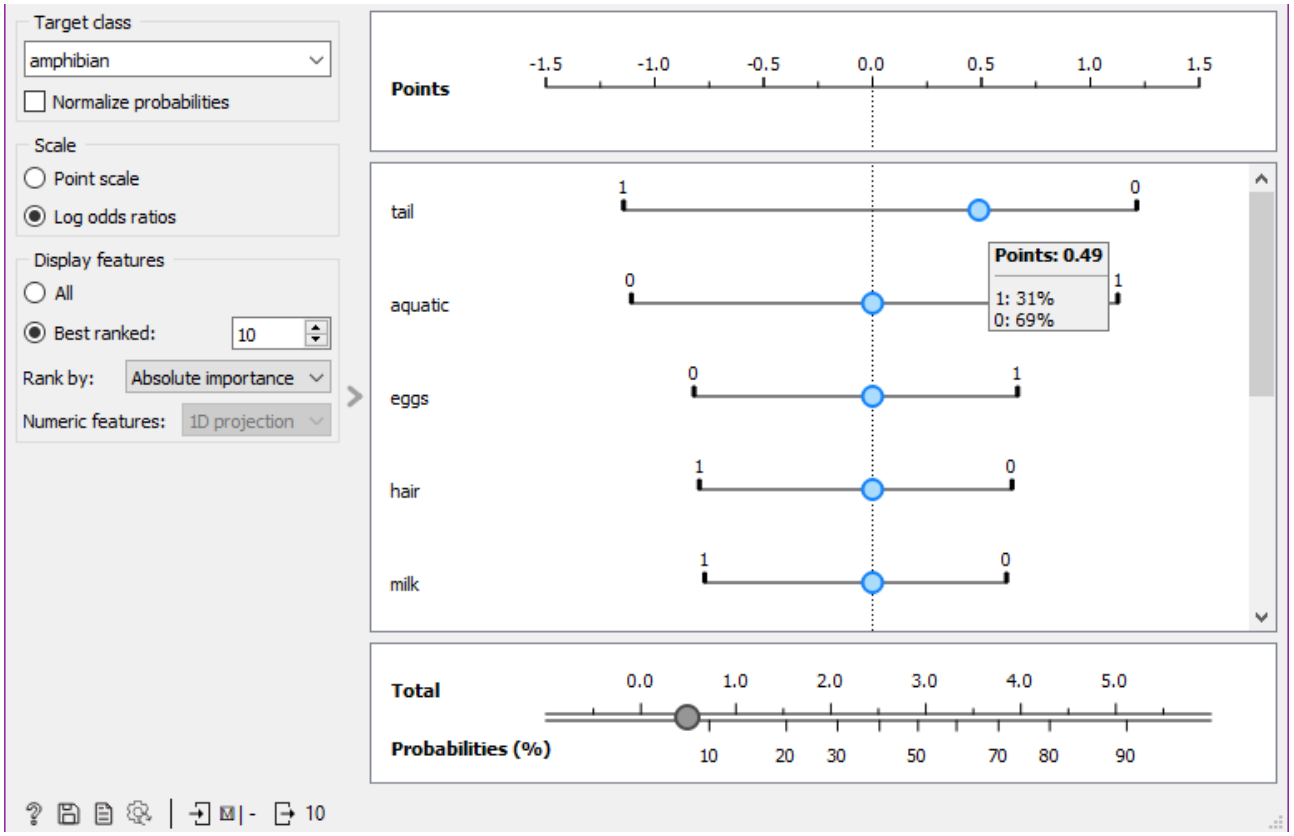

Visualize
This
Tree Viewer
Box Plot
Violin Plot
Distributions
Scatter Plot
Line Plot
Bar Plot
Sieve Diagram
Mosaic Display
FreeViz
Linear Projection
Radviz
Heat Map
Venn Diagram
Silhouette Plo
Pythagorean Tree
Pythagorean Forest
CN2 Rule Viewer
Nomogram



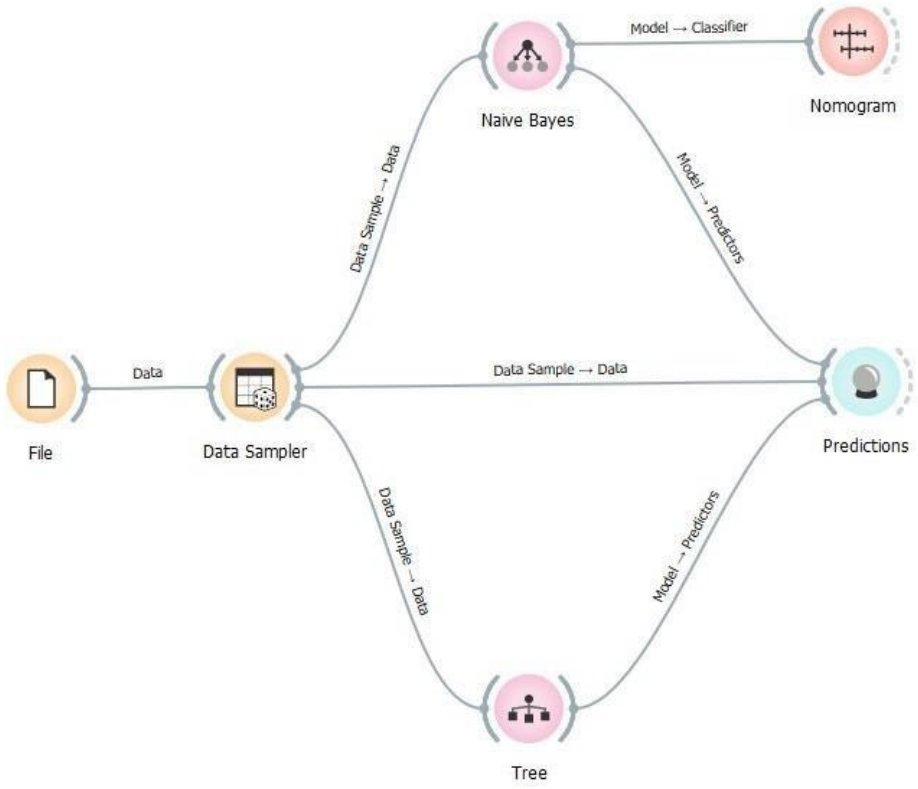
➢ You can move the points in the Nomogram to see the probabilities of a particular class. Here 1 indicates favourable probability while 0 indicates unfavourable probability.


Target class
amphibian
Normalize probabilities
Scale
Point scale
Log odds ratios
Display features
All
Best ranked: 10
Rank by: Absolute importance
Numeric features: 1D projection
You can move these
Points
tail
aquatic
eggs
hair
milk
venomous
legs
catsize
toothed
Total
Probabilities (%)

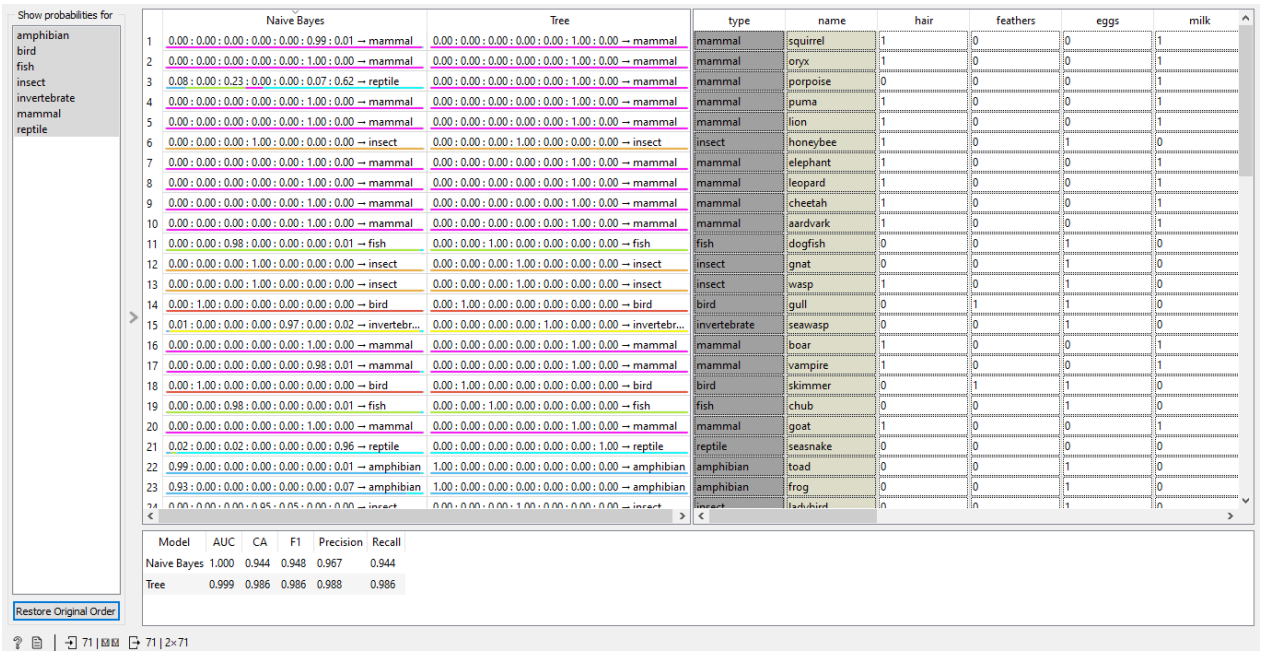

Nomogram - Orange
Target class
amphibian
Normalize probabilities
Scale
Point scale
Log odds ratios
Display features
All
Best ranked: 10
Rank by: Absolute importance
Numeric features: 1D projection
Points
tail
aquatic
eggs
hair
milk
Total
Probabilities (%)



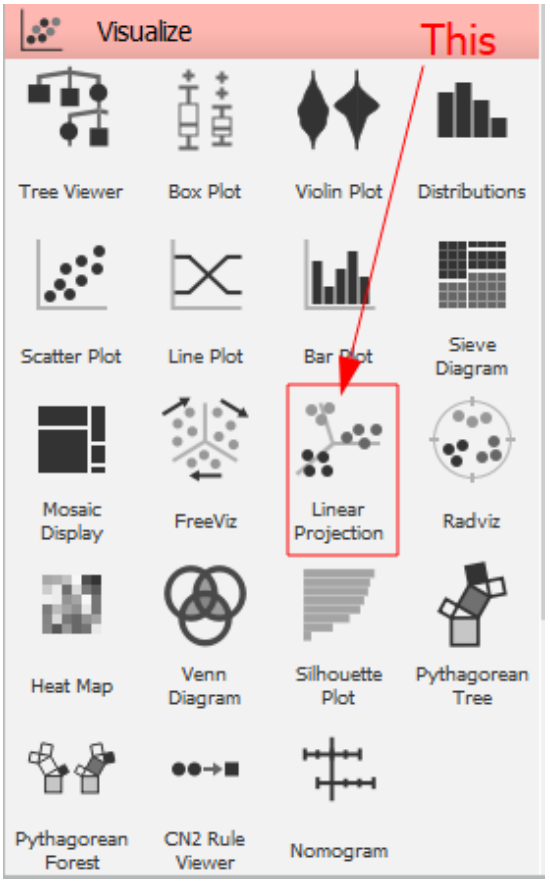
➢ Connect the Naive Bayes widget and Tree widget to the Predictions widget to perform predictions.

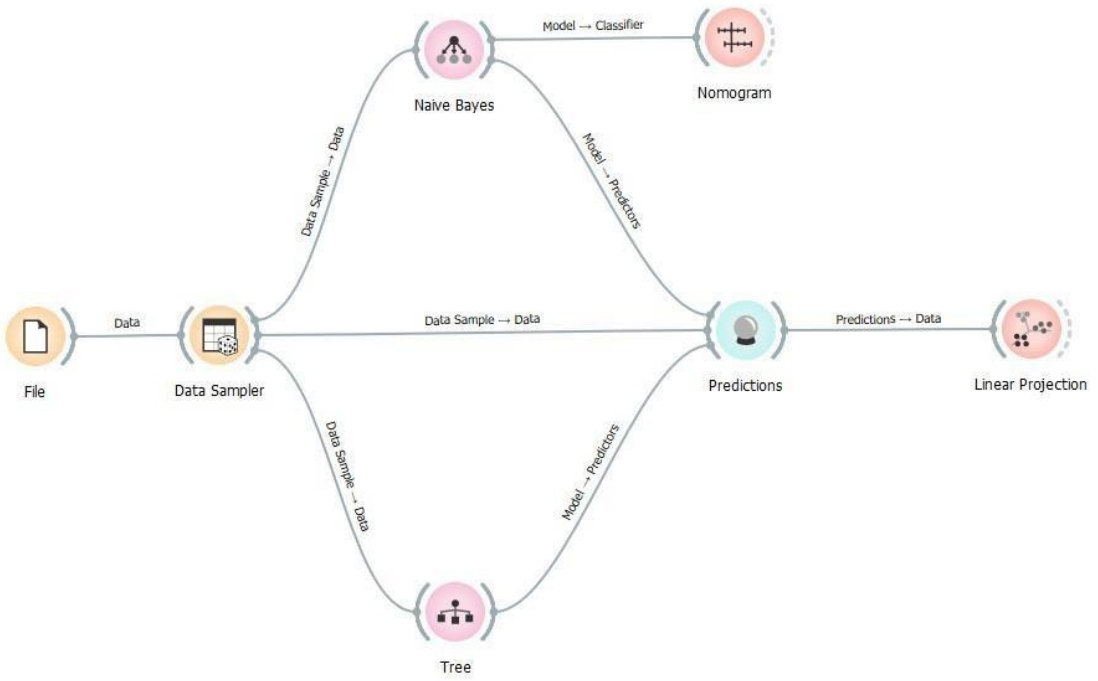


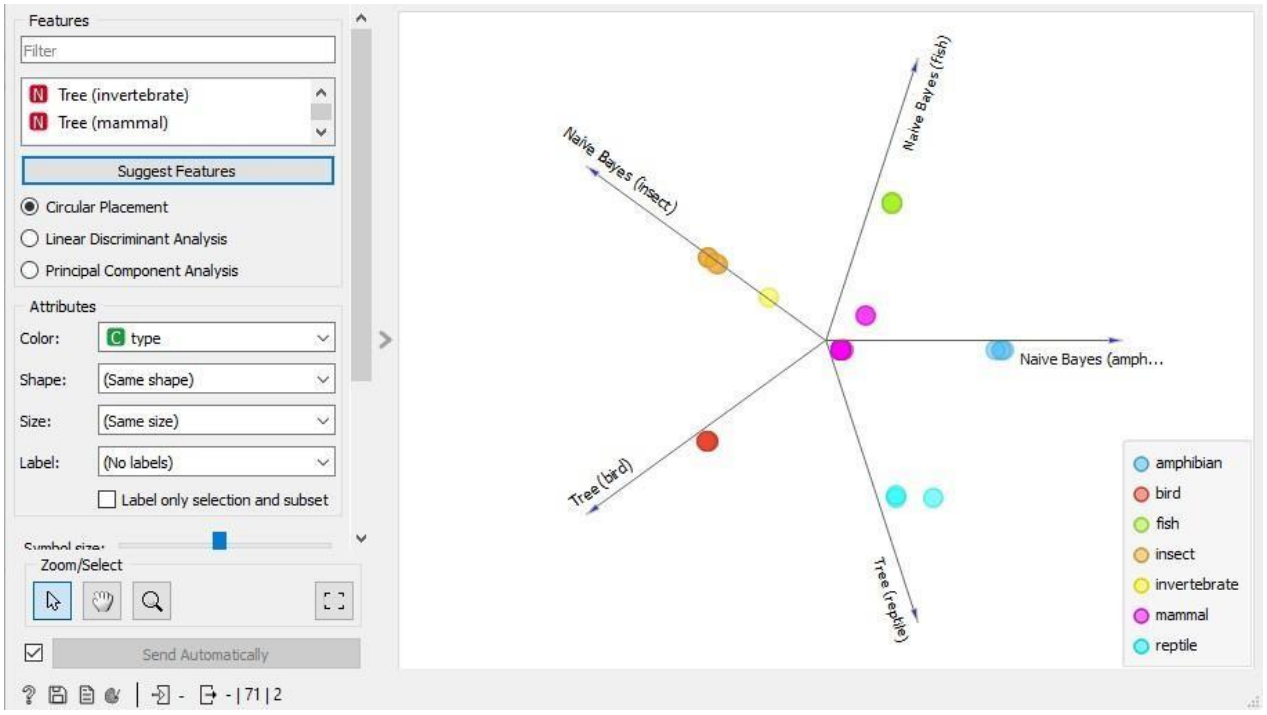
➢ Double click the Predictions widget to see the predictions.



➢ We will use the Linear Projection widget to visualize the data. Drag and drop this widget from the Visualize section.




Model → Classifier
Naive Bayes
Nomogram
Data Sample → Data
Model → Predictions
Data
Data Sample → Data
Predictions → Data
File
Data Sampler
Predictions
Linear Projection
Data Sample → Data
Model → Predictions
Tree

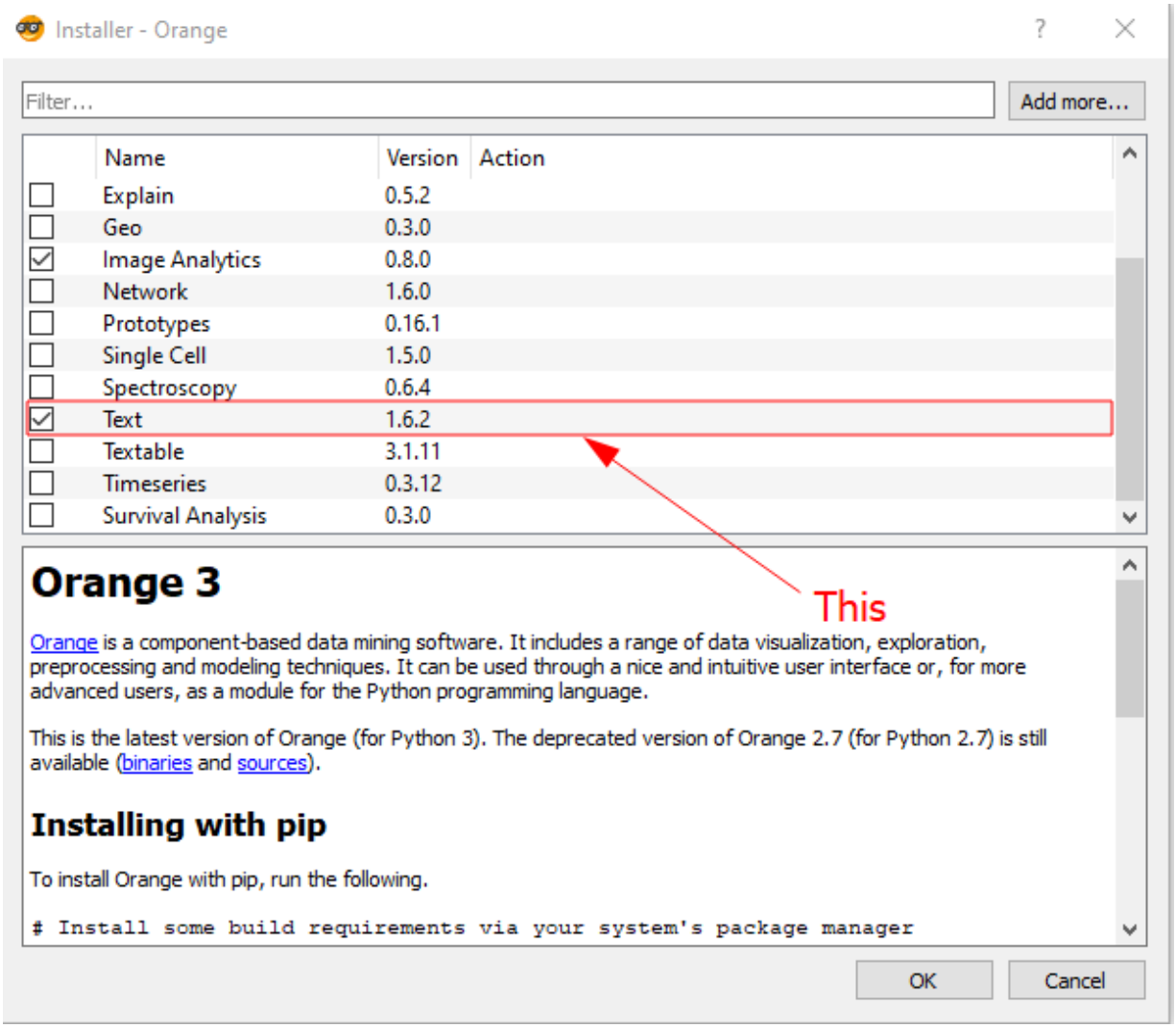

Features
Filter
Tree (invertebrate)
Tree (mammal)
Suggest Features
Circular Placement
Linear Discriminant Analysis
Principal Component Analysis
Attributes
Color: type
Shape: (Same shape)
Size: (Same size)
Label: (No labels)
Label only selection and subset
Zoom/Select
Send Automatically
Naive Bayes (fish)
Naive Bayes (insect)
Naive Bayes (amph...
Tree (bird)
Tree (reptile)
amphibian
bird
fish
insect
invertebrate
mammal
reptile

Practical 2

Aim: Text classification using Orange.

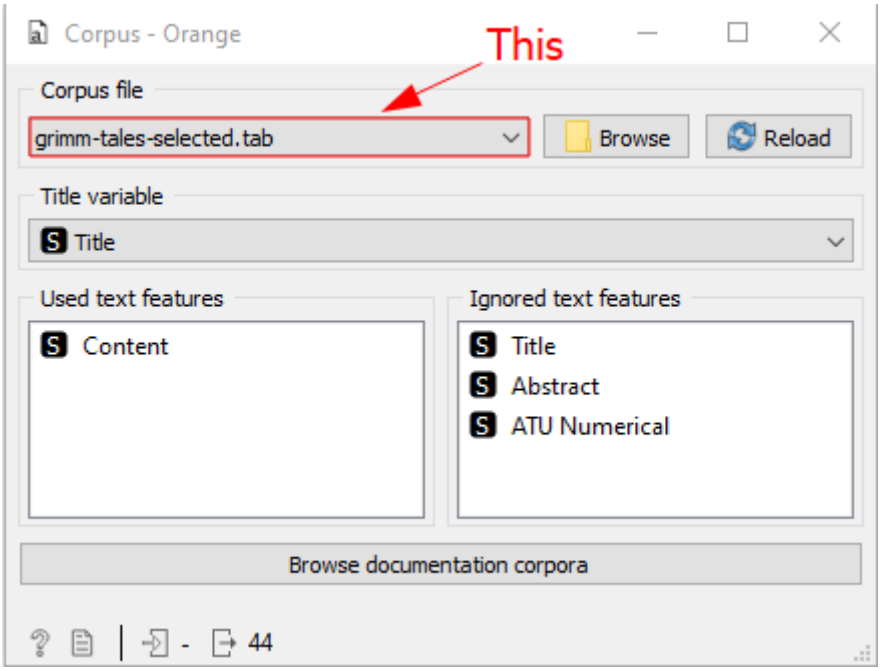
Steps:

➢ Before starting, we need to install the `Text` add-on. Install it by navigating to Options > Add ons…. You will be prompted to restart Orange after the installation completes. If it is already installed, skip this step.



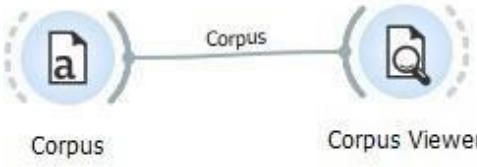
➢ Drag and drop a Corpus widget to the workspace. It can be found in the newly added Text Mining section.

➢ Double click the Corpus widget and select the grimm-tales-selected.tab corpus file.

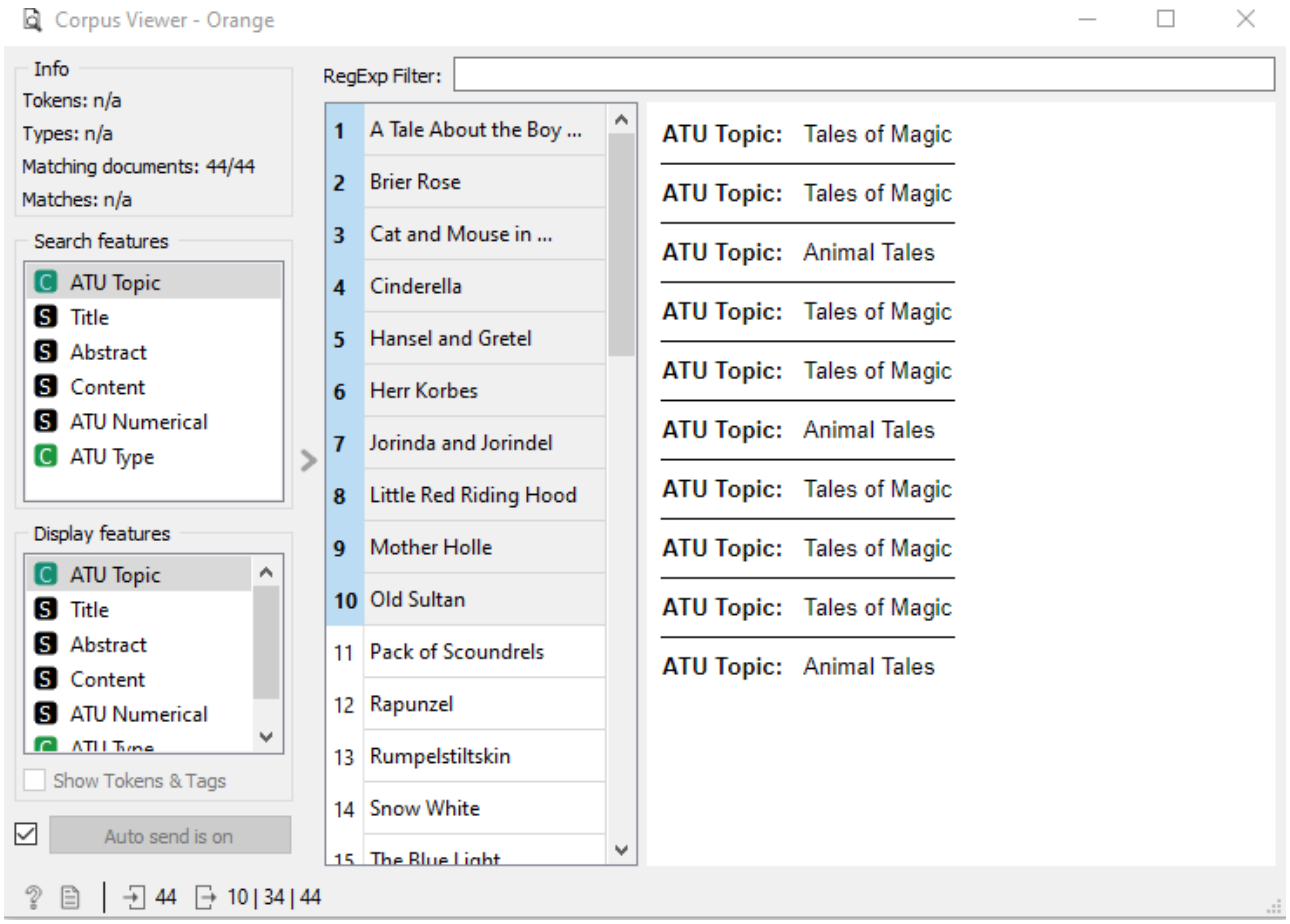


➢ Drag and drop a Corpus Viewer widget and connect it to the Corpus widget. The Corpus Viewer widget can be found in the Text Mining section.


Pubmed
Twitter
Preprocess Text
Corpus to Network
Bag of Words
Document Embedding
Similarity Hashing
Sentiment Analysis
Tweet Profiler
Topic Modelling
LDAvis
Corpus Viewer
Score Documents
Word Cloud
Concordance
Document Map
Word Enrichment
Duplicate Detection
Word List
Extract Keywords
Semantic Viewer
Statistics
This

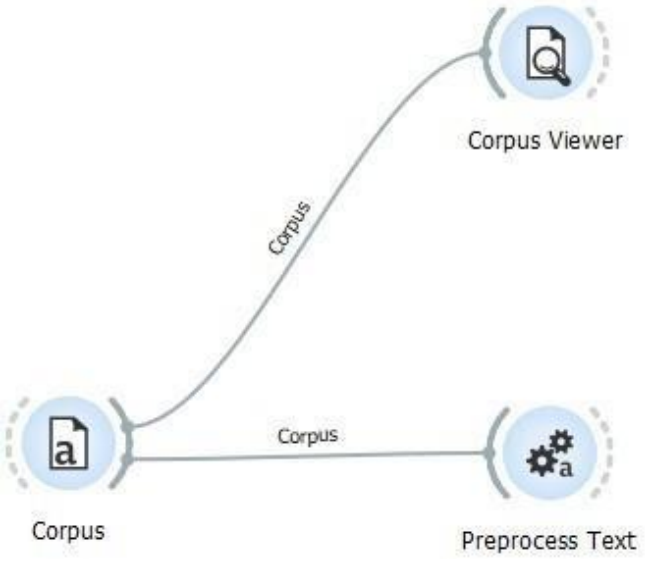

Corpus
Corpus
Corpus Viewer

➢ Double click the Corpus Viewer widget to visualize the corpus in a tabular format. Select the first 10 entries to use as training set.

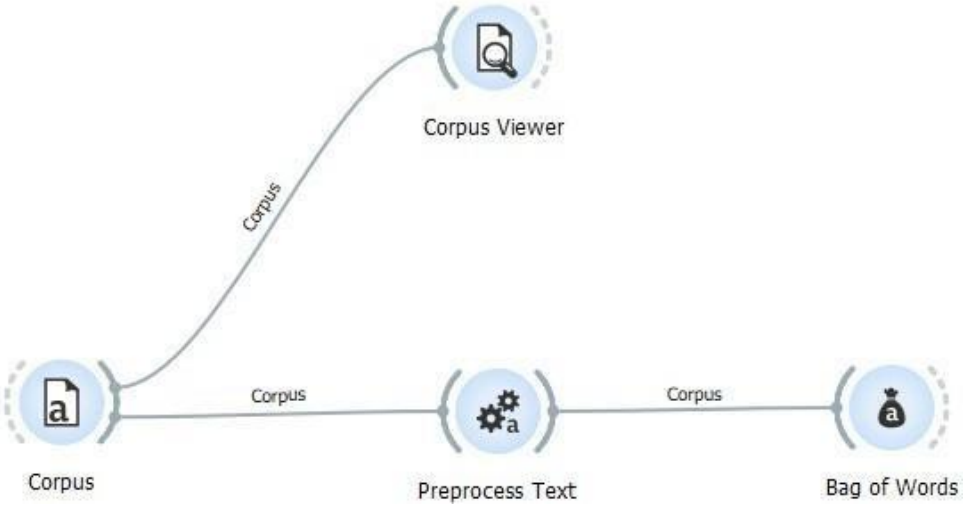


➢ Add a Preprocess Text widget to the workspace. This widget can also be found in the Text Miningsection.

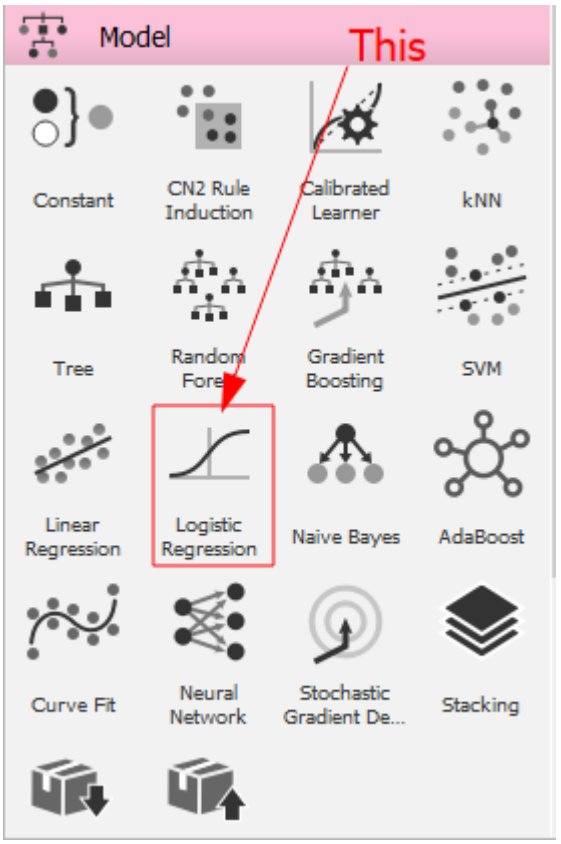

Text Mining
This
Corpus
Import Documents
The Guardian
NY Times
Pubmed
Twitter
Preprocess Text
Corpus to Network
Bag of Words
Document Embedding
Similarity Hashing
Sentiment Analysis
Tweet Profiler
Topic Modelling
LDAvis
Corpus Viewer

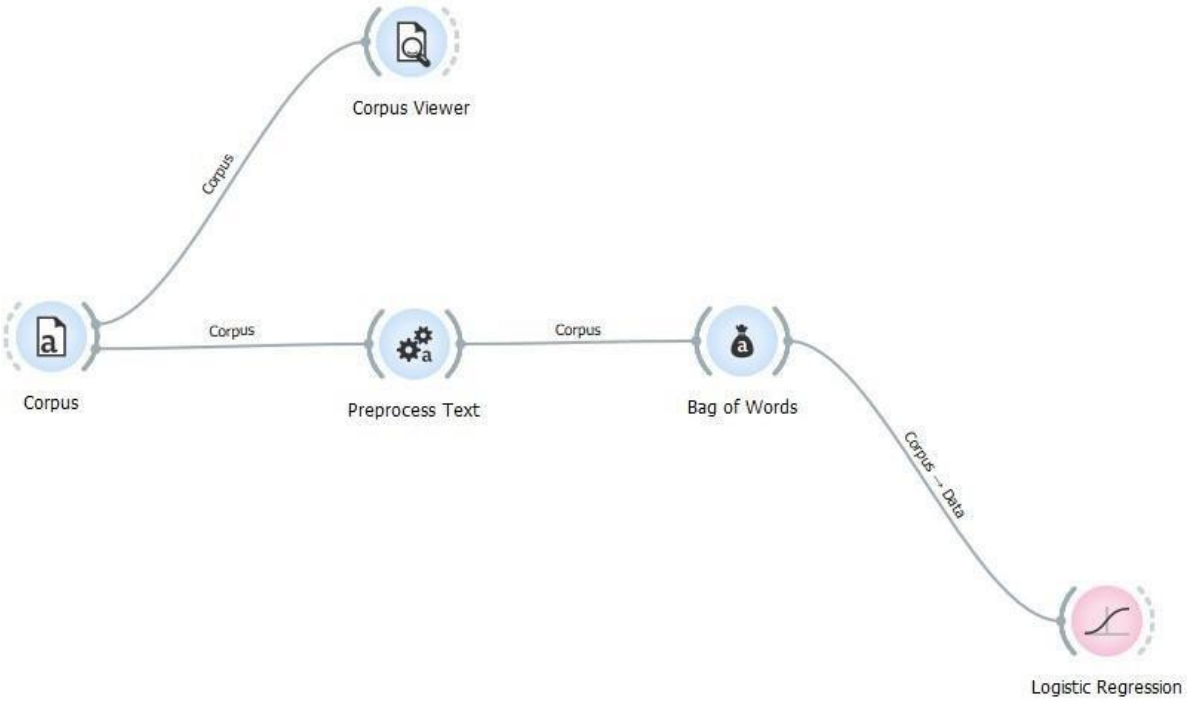

Corpus Viewer
Corpus
Corpus
Corpus
Preprocess Text

➢ Add a Bag Of Words widget to the workspace and connect it to the Preprocess Text widget. This widget is also found in the Text Miningsection.

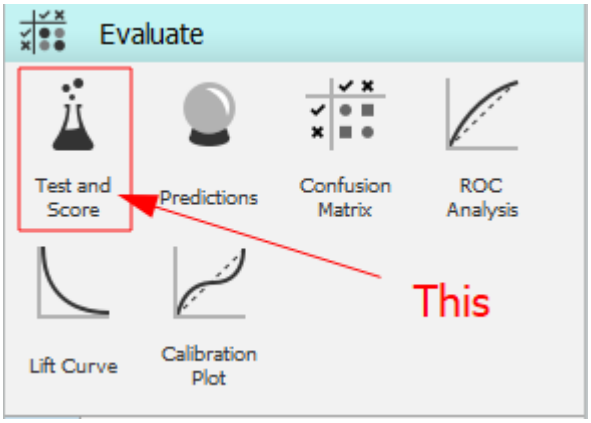


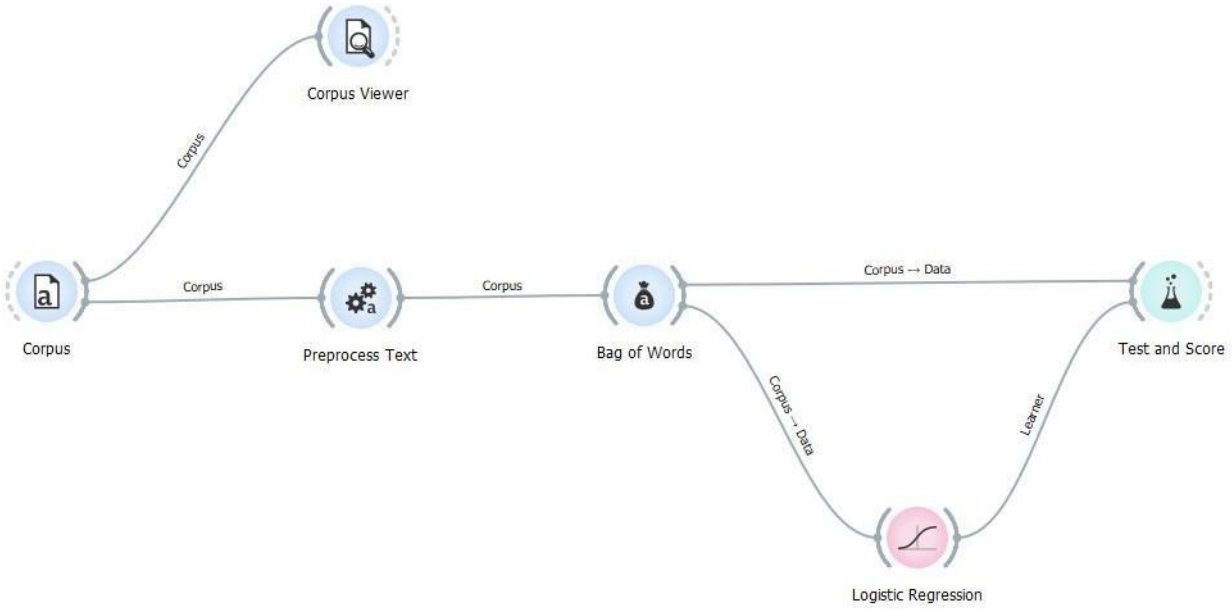
➢ We will use Logistic Regression to model our data. Drag and drop this widget from the Model section onto the workspace.



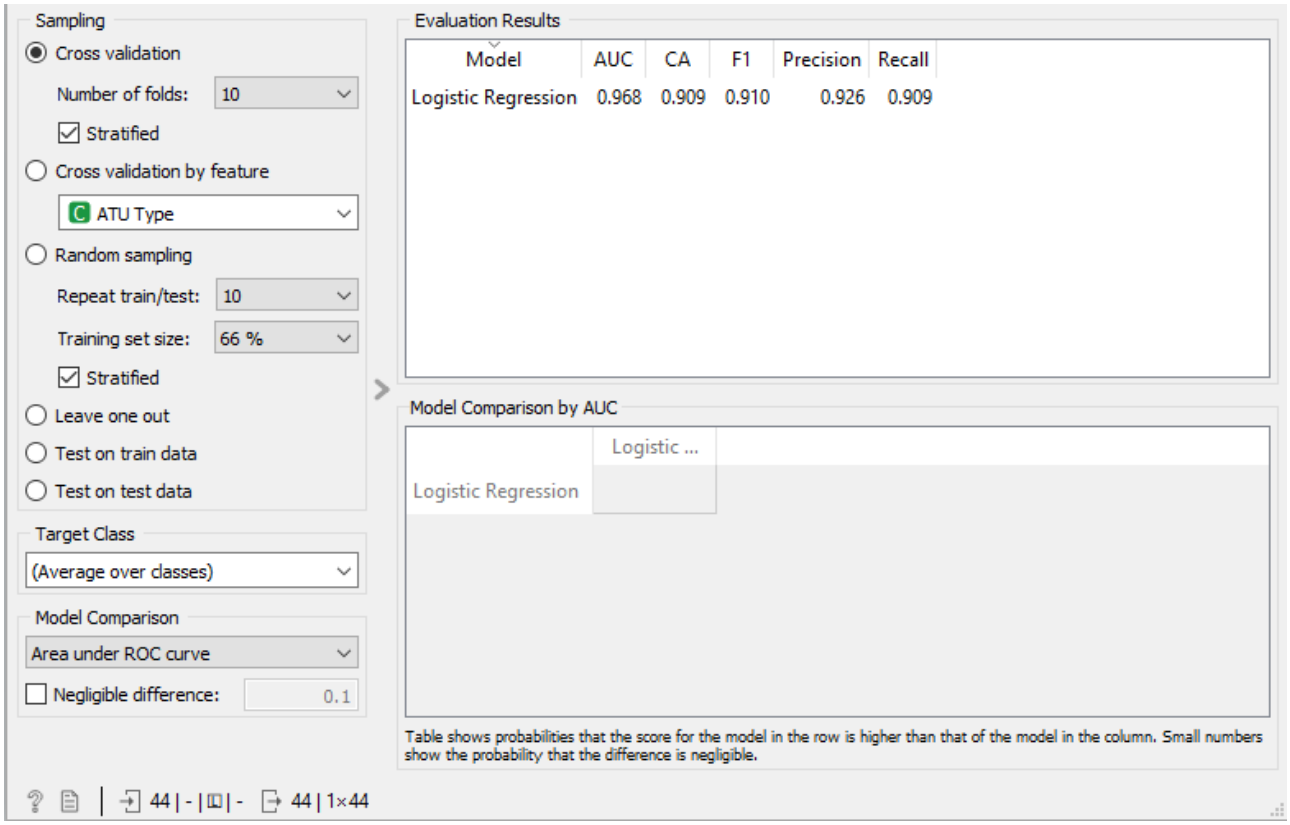


➢ We will use the Test and Score widget to check our model. Drag and drop this widget from the Evaluatesection onto the workspace and connect it to the Logistic Regression model and Bag of Words widget.

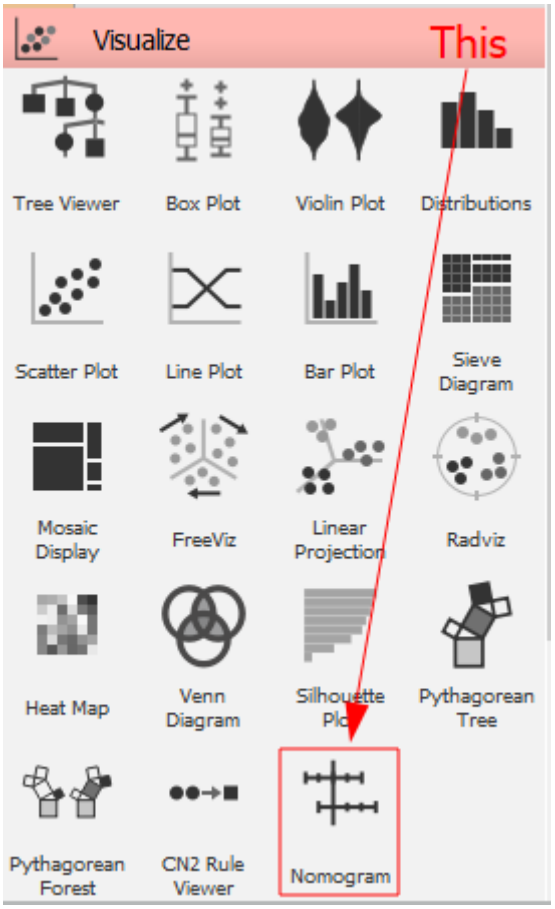


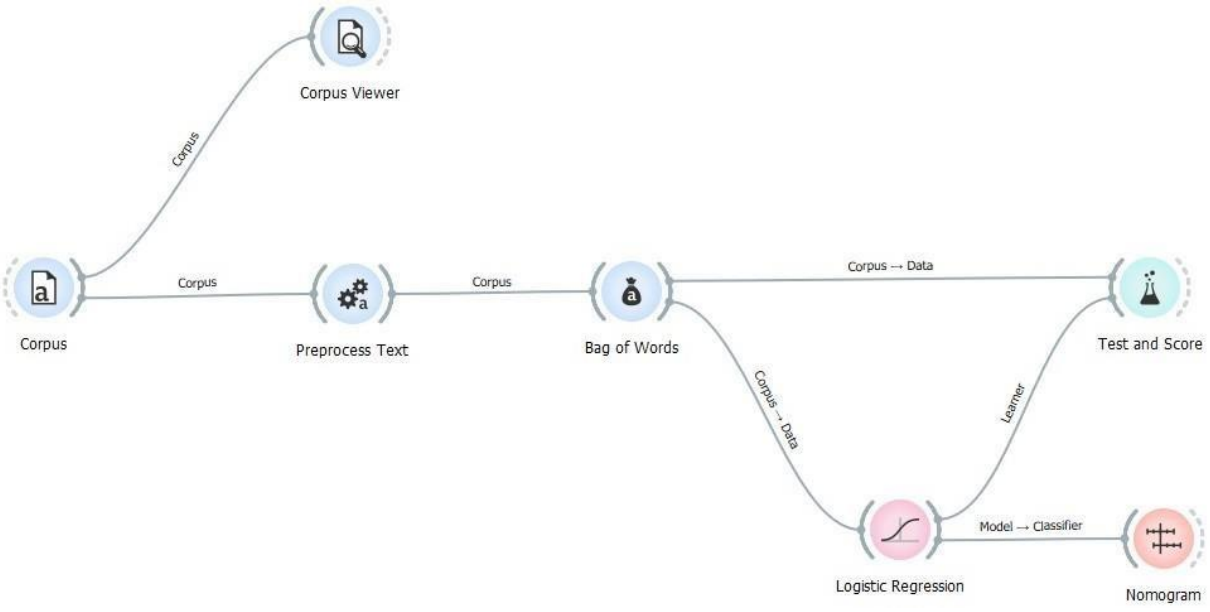


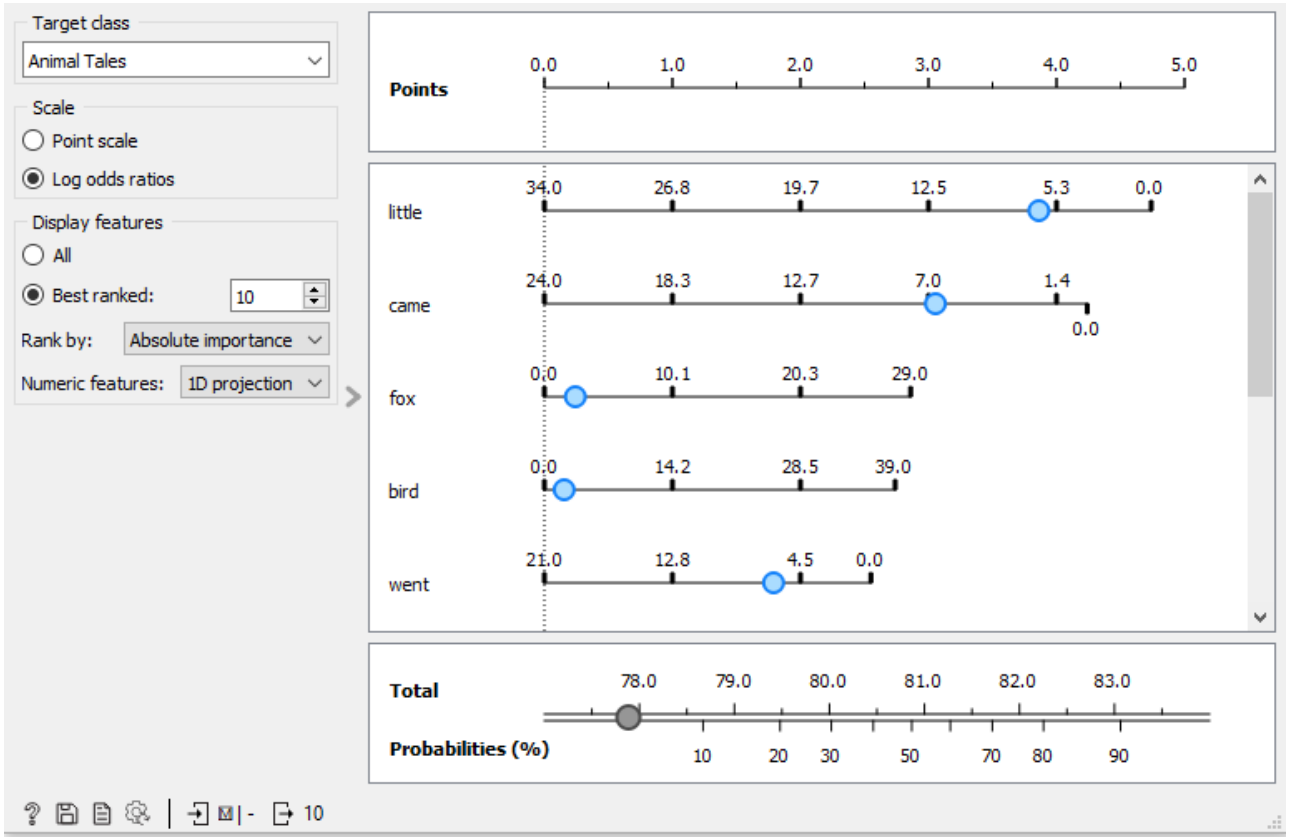
➢ Double-click the Test and Score widget after it finishes processing. It will provide you with data such as the accuracy of the model etc.



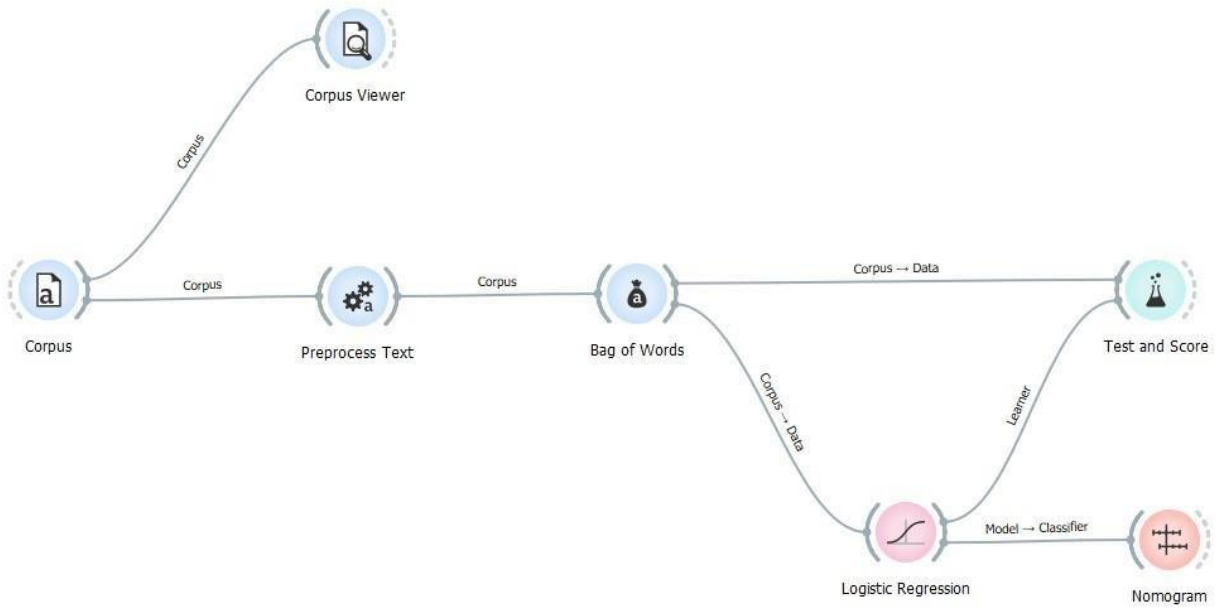
➢ We will use a Nomogram to visualize our model. Drag and drop it from the Visualize section onto the workspace and connect it to the Linear Regressionmodel.


Visualize
This
Tree Viewer
Box Plot
Violin Plot
Distributions
Scatter Plot
Line Plot
Bar Plot
Sieve Diagram
Mosaic Display
FreeViz
Linear Projection
Radviz
Heat Map
Venn Diagram
Silhouette Plot
Pythagorean Tree
Pythagorean Forest
CN2 Rule Viewer
Nomogram

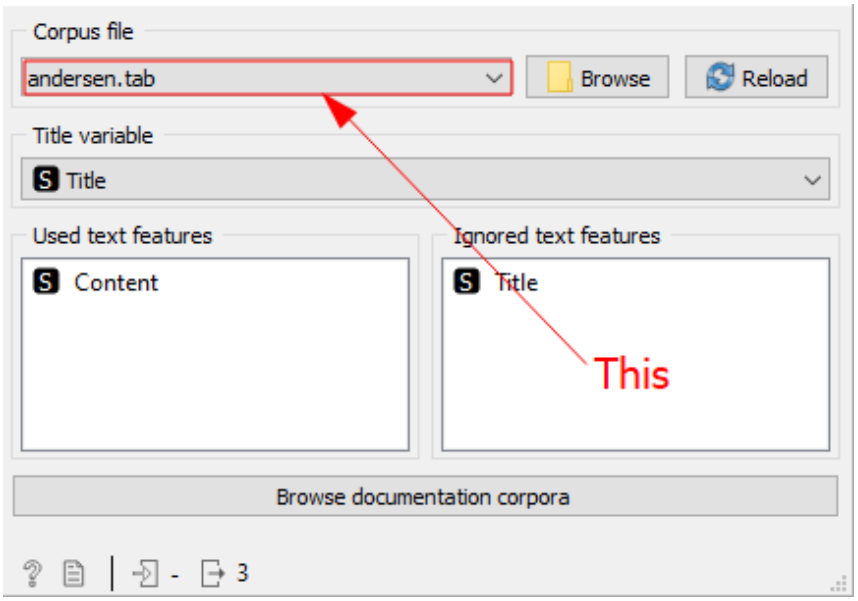

Corpus Viewer
Corpus
Corpus
Corpus
Corpus
Preprocess Text
Bag of Words
Corpus → Data
Test and Score
Corpus → Data
Learner
Model → Classifier
Logistic Regression
Nomogram



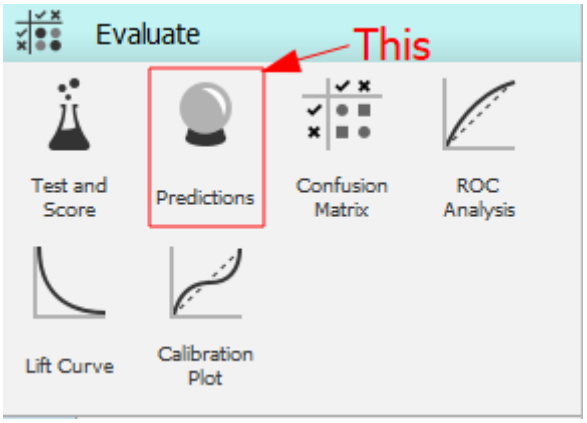
➢ To see whether the model works as intended, we create a new Corpuswidget and set the file to andersen.tab.

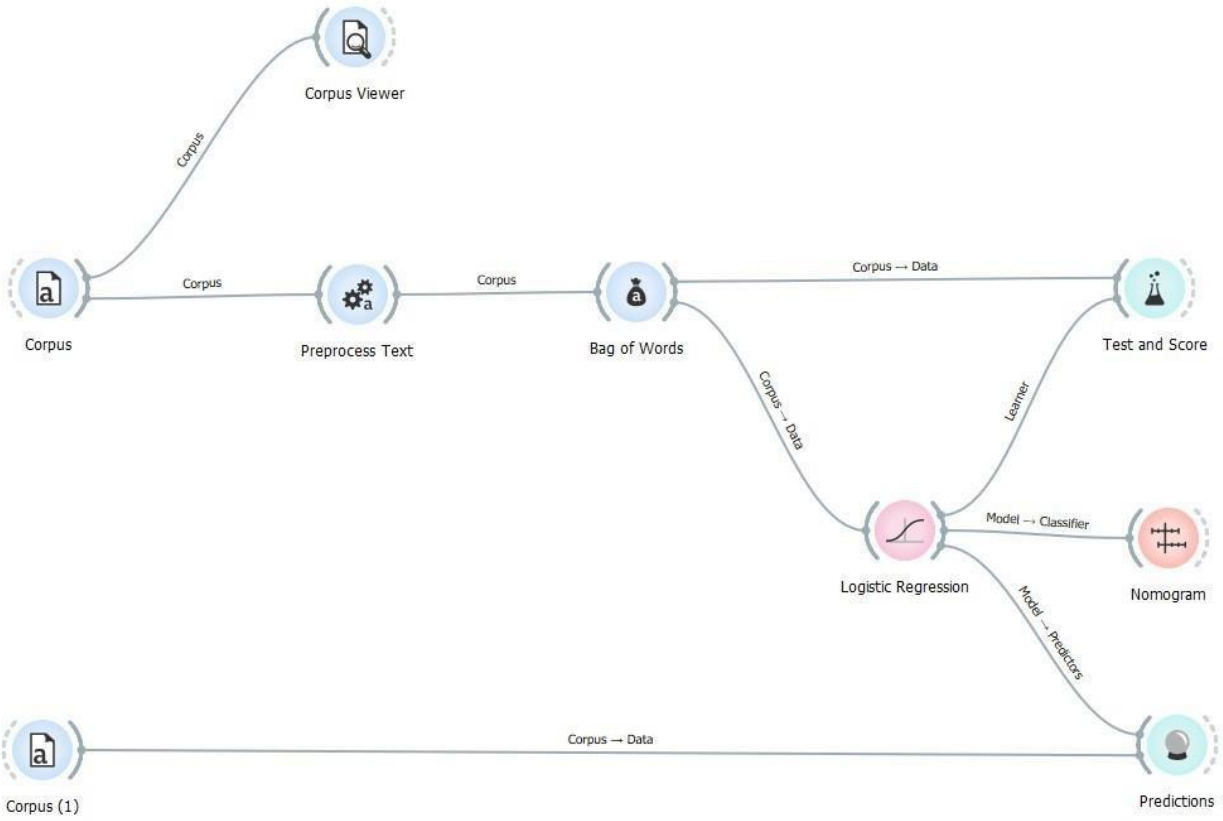

Corpus Viewer
Corpus
Corpus
Corpus
Corpus
Preprocess Text
Bag of Words
Corpus → Data
Test and Score
Corpus → Data
Learner
Model → Classifier
Logistic Regression
Nomogram

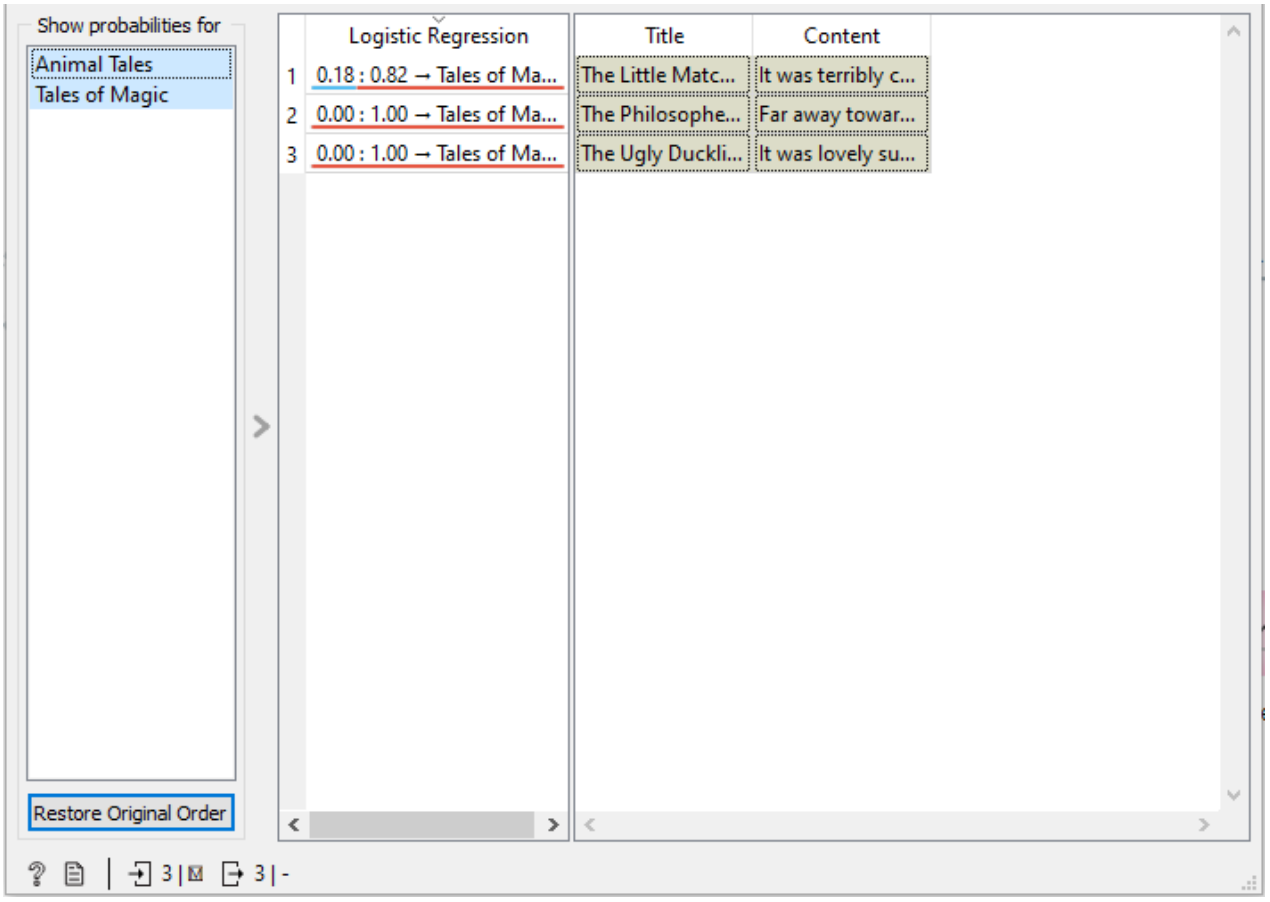

Corpus (1)


Corpus file
andersen.tab
Browse
Reload
Title variable
Title
Used text features
Content
Ignored text features
Title
This
Browse documentation corpora
3

➢ Now drag and drop a Predictions widget from the Evaluate section onto the workspace. Connect it to the model as well as the new Corpuswidget to visualise the results.





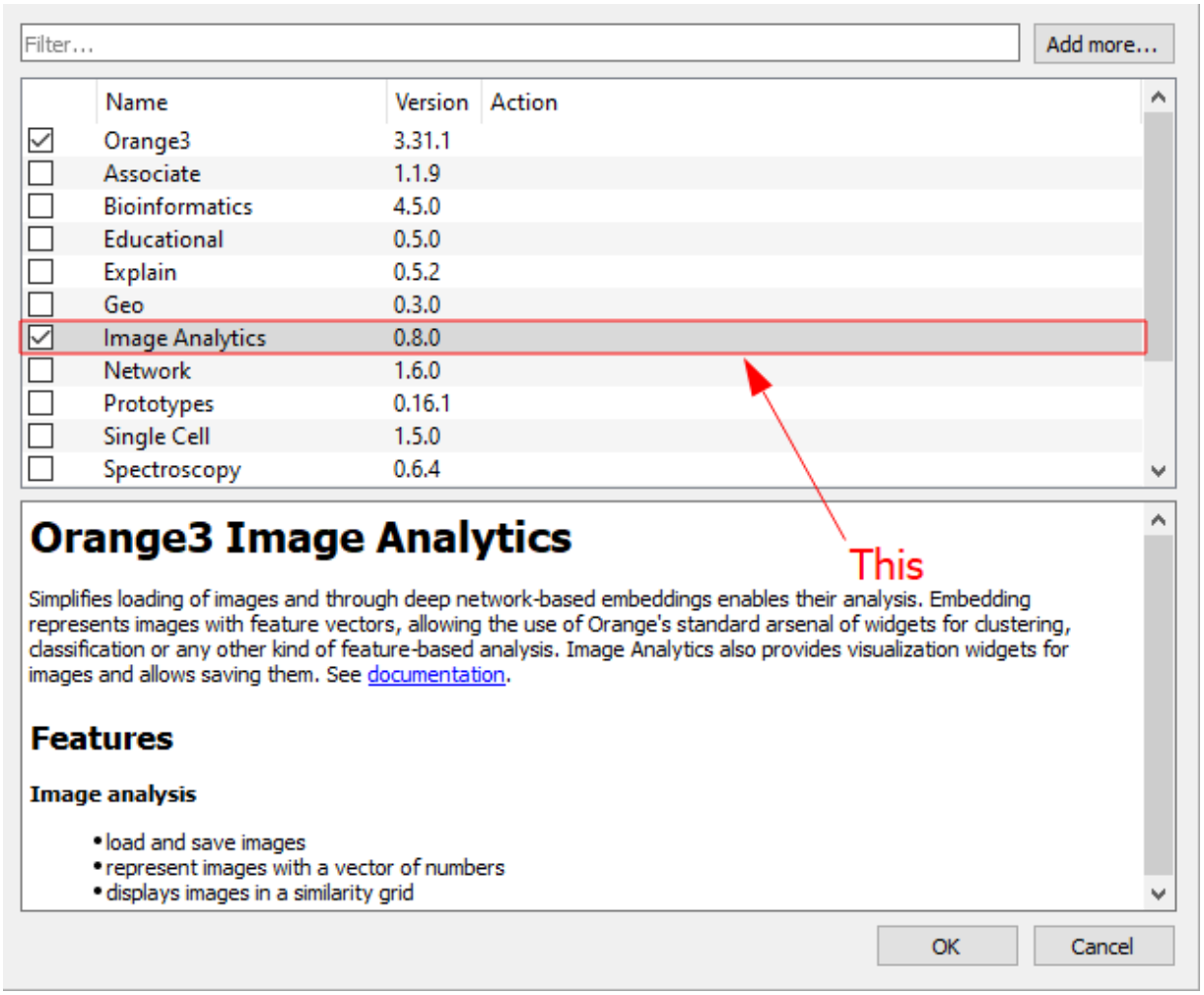

Show probabilities for
Animal Tales
Tales of Magic
Restore Original Order
Logistic Regression
1 0.18 : 0.82 → Tales of Ma...
2 0.00 : 1.00 → Tales of Ma...
3 0.00 : 1.00 → Tales of Ma...
Title
The Little Matc...
The Philosophe...
The Ugly Duckli...
Content
It was terribly c...
Far away towar...
It was lovely su...
3 | 3 | -

Practical 3

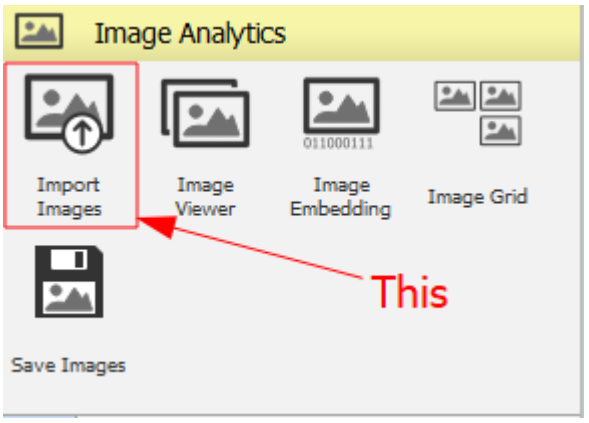
Aim: Image classification using orange.

Steps:

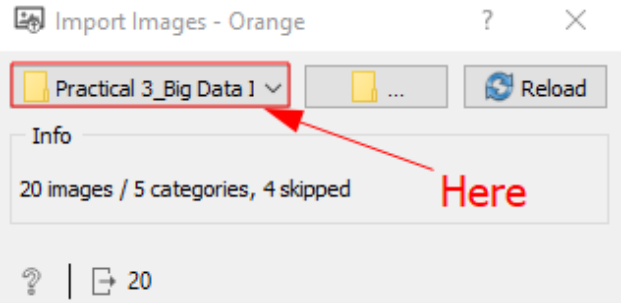
➢ Before starting, we need to install the `ImageProcessing` add-on. Install it by navigating to Options > Add ons…. You will be prompted to restart Orange after the installation completes. If it is already installed, skip this step.



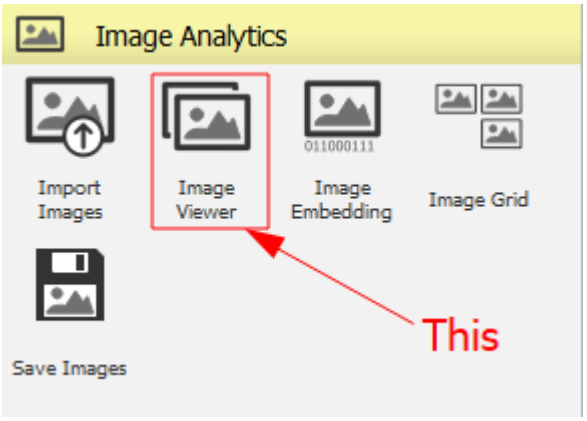
➢ Add a Import Images widget from the newly added Image Analytics section to the workspace.

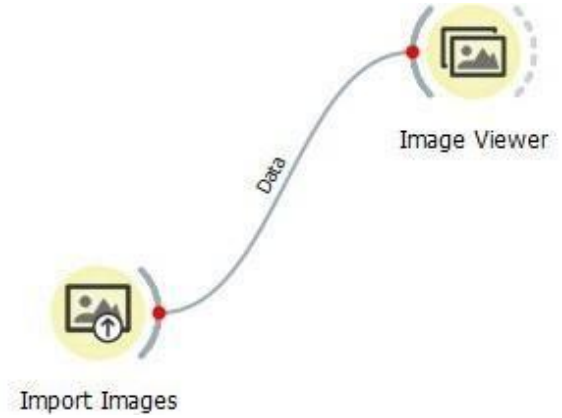


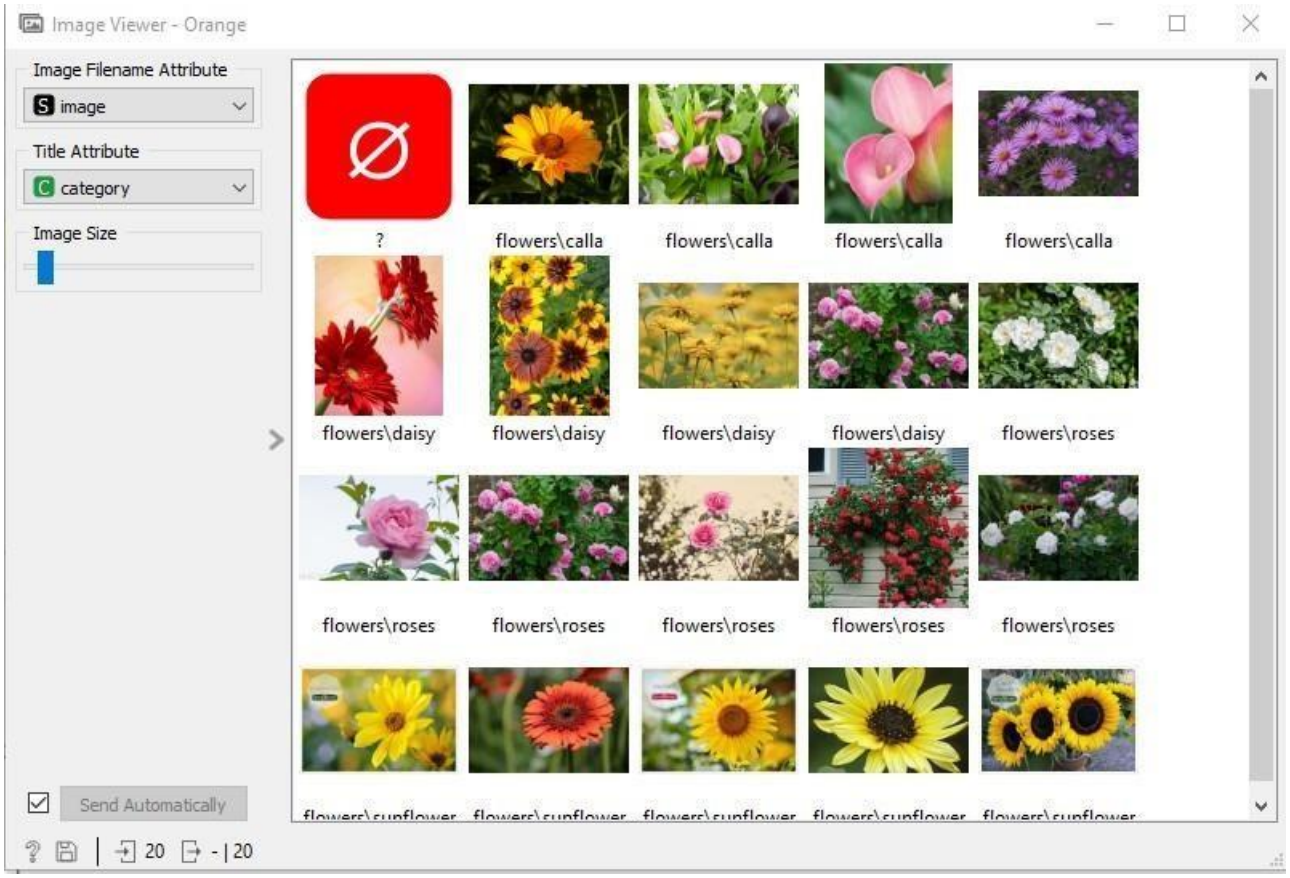
➢ Load the directory containing the images in the newly added Import Images widget by double clicking the widget.



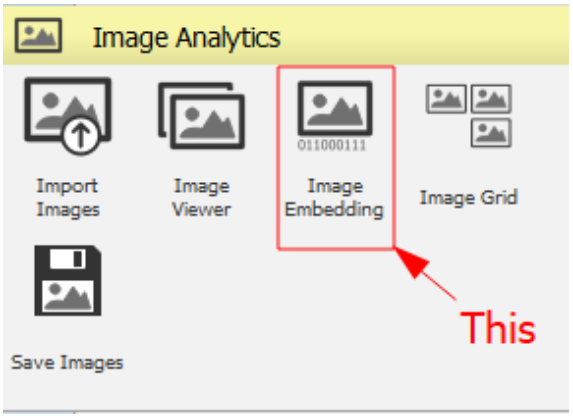
➢ We can view these images using the Image Viewerwidget found in the Image Analytics section. Drag and drop this widget onto the workspace and connect it to the Import Imageswidget.

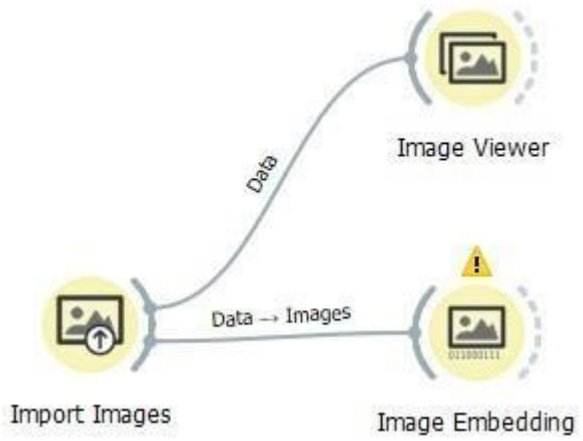




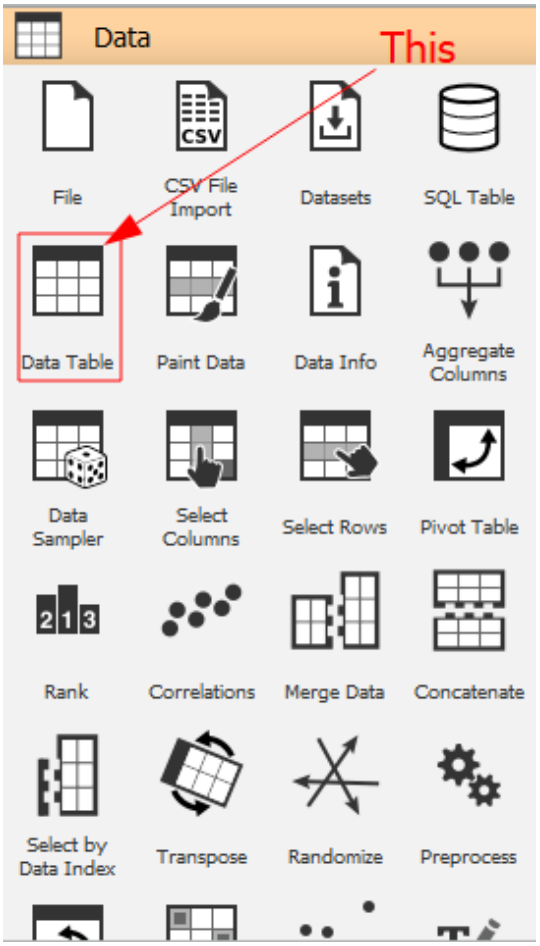


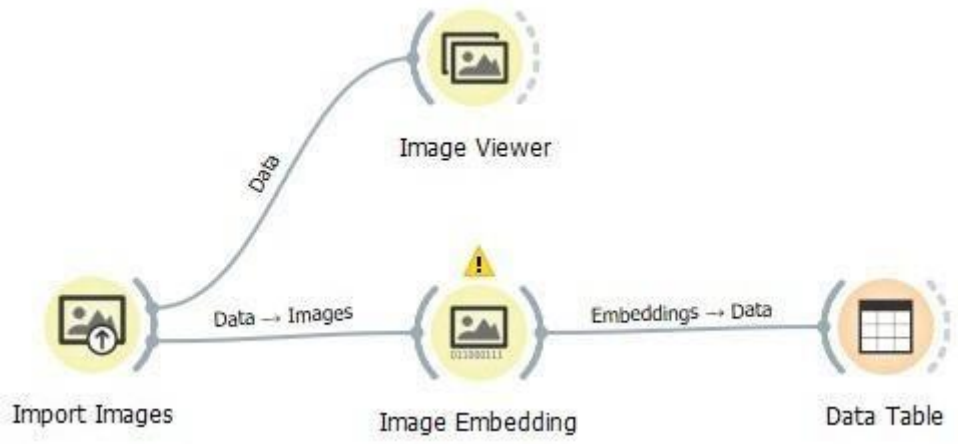
➢ As our models can only process numbers, we need to convert the images into numerical data. This is where Image Embedding comes into play. Drag and drop a Image Embeddingwidget from the Image Analytics section onto the workspace and connect it to the Import Imageswidget.





➢ We use a Data Table to visualise the tabular data generated by the Image Embeddingwidget. Drag and drop a Data Tablewidget from the Data section onto the workspace and connect it to the Image Embedding widget.





Info
18 instances (no missing data)
1000 features
Target with 5 values
5 meta attributes

Variables
- [x] Show variable labels (if present)
- [ ] Visualize numeric values
- [x] Color by instance classes

Selection
- [x] Select full rows

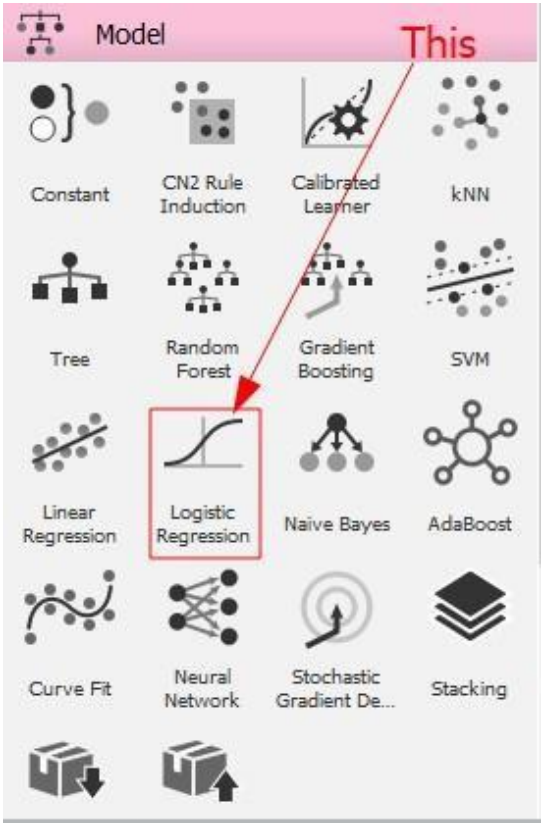
Restore Original Order

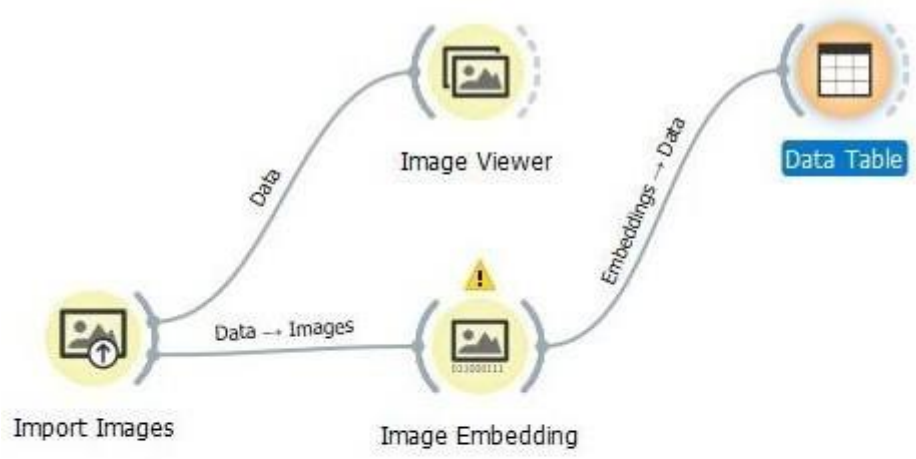
- [x] Send Automatically

18 | 18 | 18

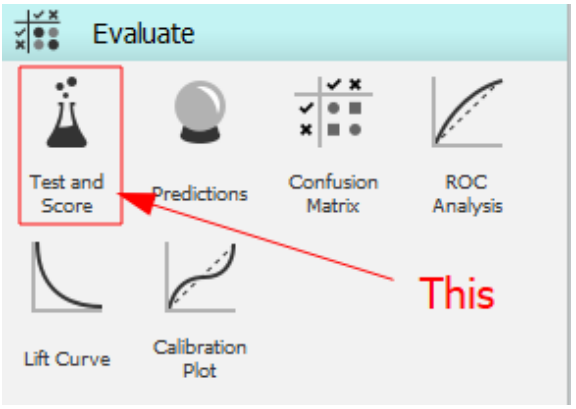
hidden origin	category	image name	image _Big Data Image An image	size	width
1	flowers\calla	calla	flowers\calla\c...	3429626	2560
2	flowers\calla	calla1	flowers\calla\c...	29712	400
3	flowers\calla	calla2	flowers\calla\c...	2890	105
4	flowers\daisy	daisy1	flowers\daisy\d...	39660	400
5	flowers\daisy	daisy4	flowers\daisy\d...	71325	375
6	flowers\daisy	daisy6	flowers\daisy\d...	3206304	2084
7	flowers\daisy	daisy8	flowers\daisy\d...	526653	933
8	flowers\roses	rose1	flowers\roses\r...	535368	933
9	flowers\roses	rose2	flowers\roses\r...	354357	933
10	flowers\roses	rose3	flowers\roses\r...	526653	933
11	flowers\roses	rose4	flowers\roses\r...	429411	933
12	flowers\roses	rose6	flowers\roses\r...	841733	700
13	flowers\roses	rose7	flowers\roses\r...	523616	933
14	flowers\sunflo...	sun1	flowers\sunflo...	6649	170
15	flowers\sunflo...	sun2	flowers\sunflo...	5481	176
16	flowers\sunflo...	sun3	flowers\sunflo...	7061	170
17	flowers\sunflo...	sun4	flowers\sunflo...	5808	177
18	flowers\sunflo...	sun5	flowers\sunflo...	222011	800

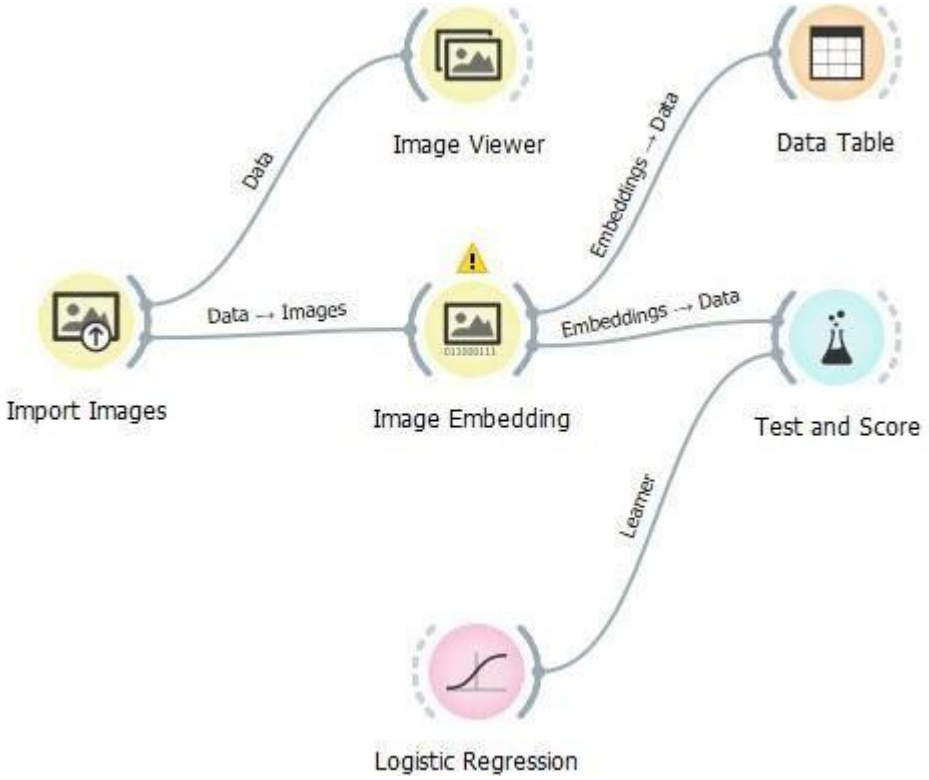
➢ We will use Logistic Regressionas our model. Drag and drop a Logistic Regression widget from the Model section onto the workspace.





➢ Drag and drop a Test and Scorewidget from the Evaluatesection onto the workspace. This widget will allow us to verify our model. Connect this widget to the Image Embedding and Logistic Regressionwidgets.





Sampling

- Cross validation
  - Number of folds: 3
  - Stratified
- Cross validation by feature
- Random sampling
  - Repeat train/test: 10
  - Training set size: 66 %
  - Stratified
- Leave one out
- Test on train data
- Test on test data

Target Class

(Average over classes)

Model Comparison

Area under ROC curve

Negligible difference: 0.1

Evaluation Results

Model	AUC	CA	F1	Precision	Recall
Logistic Regression	0.718	0.556	0.519	0.543	0.556

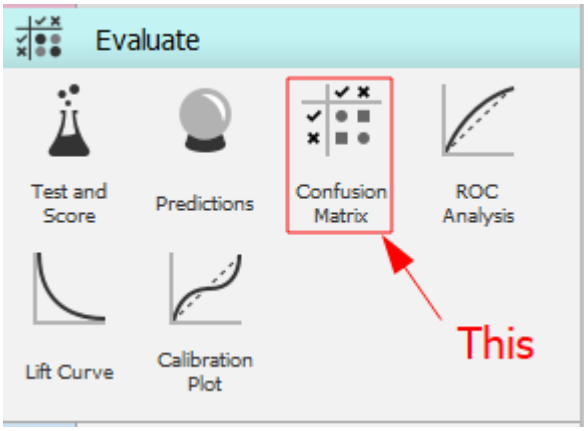
Model Comparison by AUC

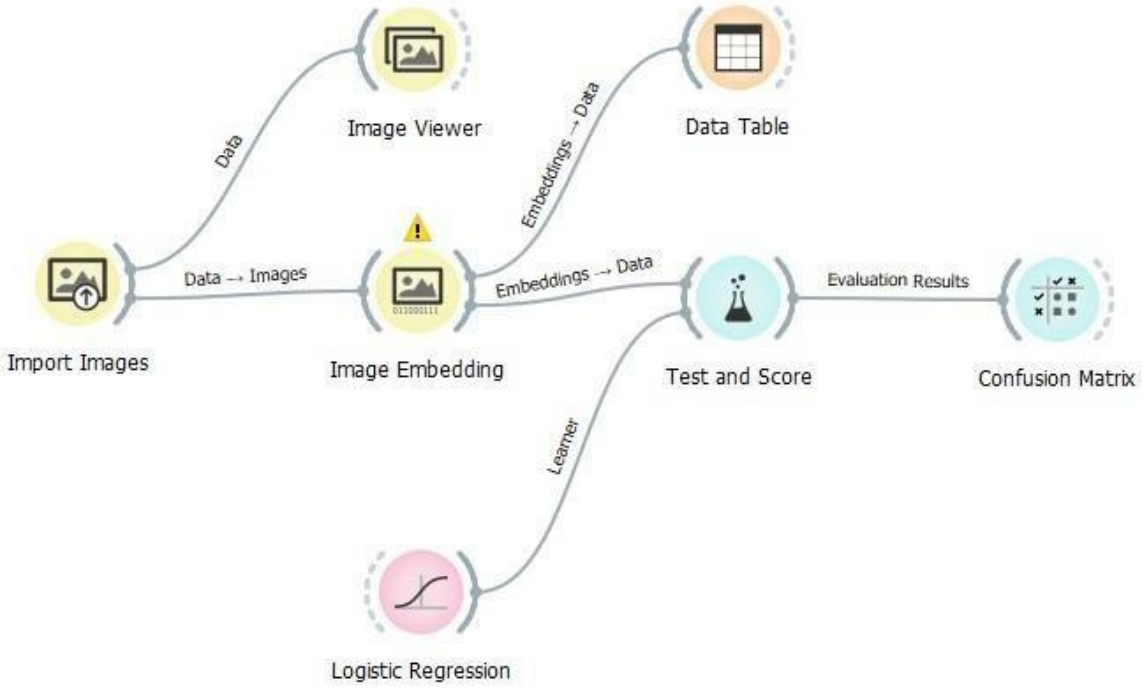
	Logistic ...
Logistic Regression	

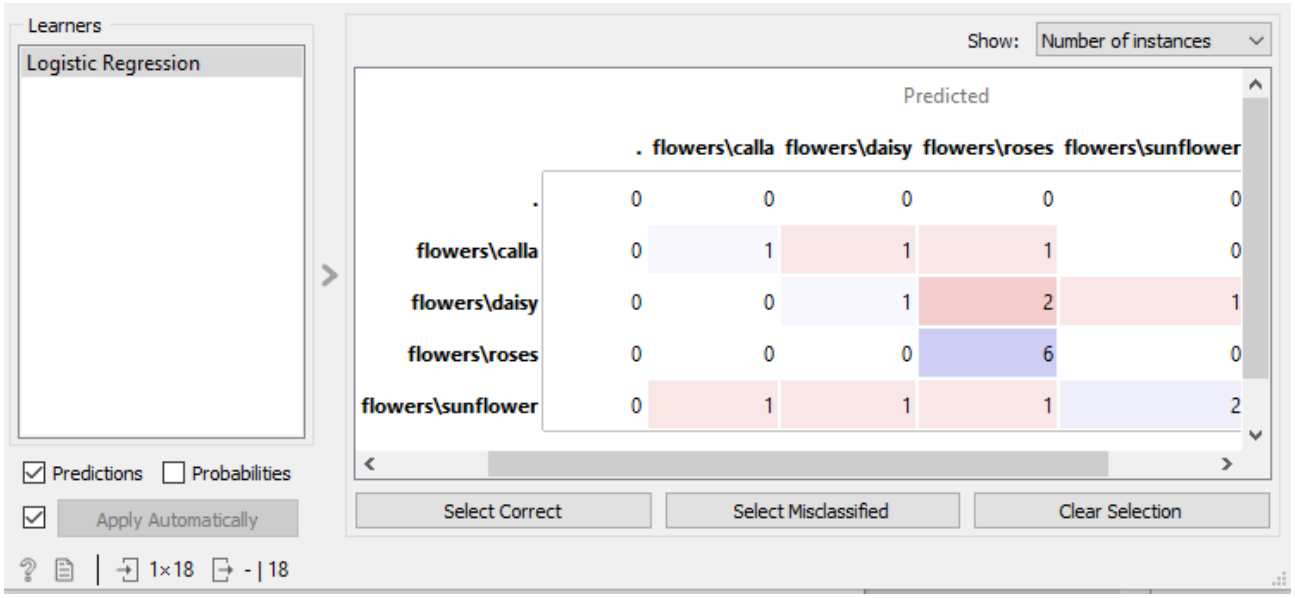
Table shows probabilities that the score for the model in the row is higher than that of the model in the column. Small numbers show the probability that the difference is negligible.

18 | - | - 18 | 1×18

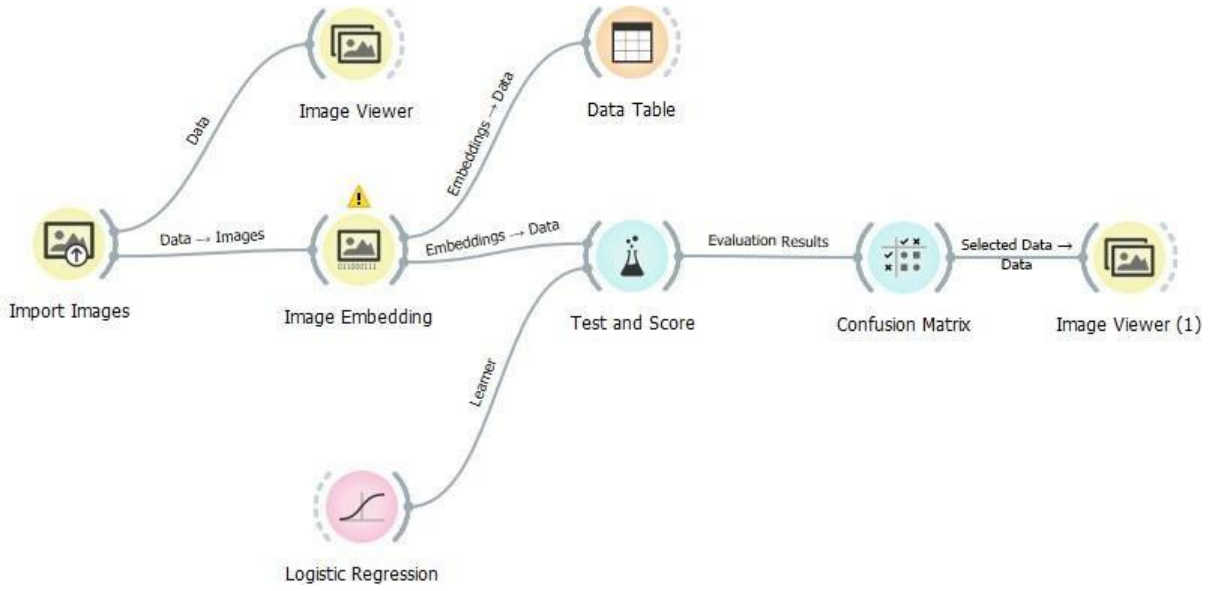
➢ We now drag and drop a Confusion Matrix widget from the Evaluate section onto the workspace and connect it to the Testand Score widget.

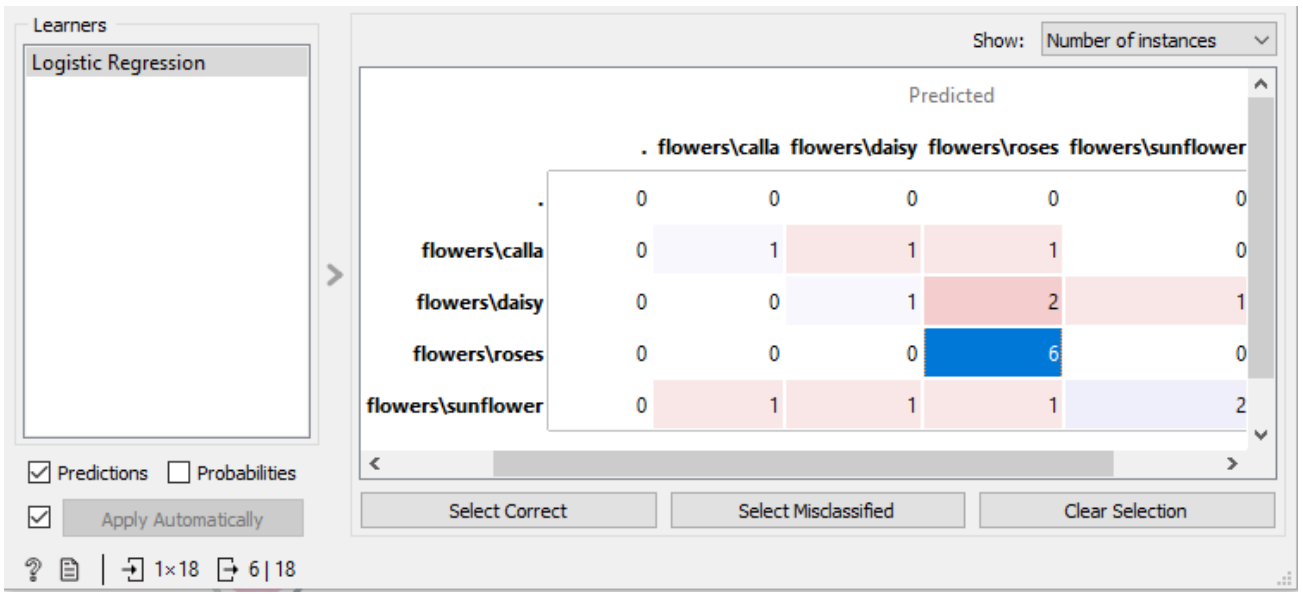






➢ Drag and drop another Image Viewerwidget to view the selected cell(s) from the Confusion Matrix.




Learners
Logistic Regression
Show:
Number of instances
Predicted
. flowers\calla flowers\daisy flowers\roses flowers\sunflower
. 0 0 0 0 0
flowers\calla 0 1 1 1 0
flowers\daisy 0 0 1 2 1
flowers\roses 0 0 0 6 0
flowers\sunflower 0 1 1 1 2
Predictions
Probabilities
Apply Automatically
1×18
6 | 18
Select Correct
Select Misclassified
Clear Selection

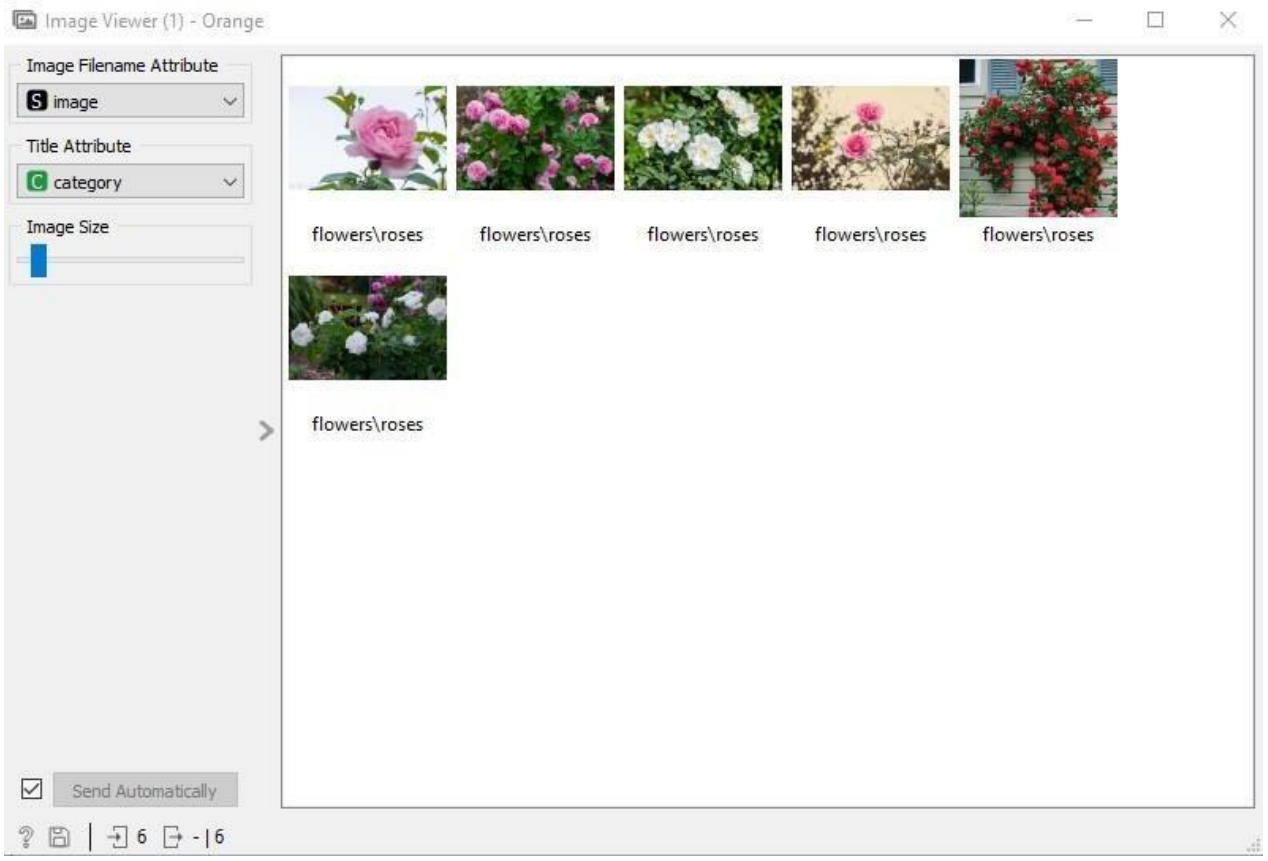


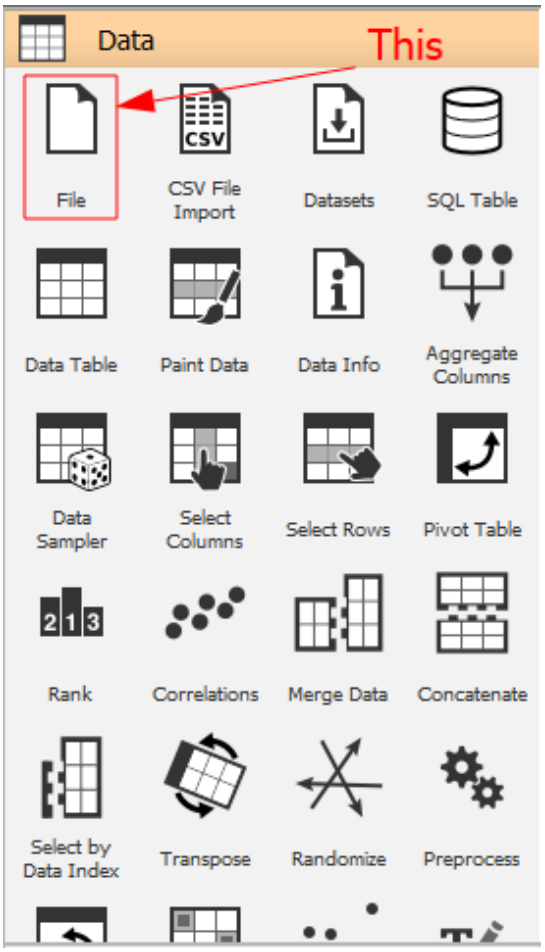
Image Viewer (1) - Orange
Image Filename Attribute
image
Title Attribute
category
Image Size
flowers\roses
flowers\roses
flowers\roses
flowers\roses
flowers\roses
flowers\roses
Send Automatically
6
- | 6

Practical 4

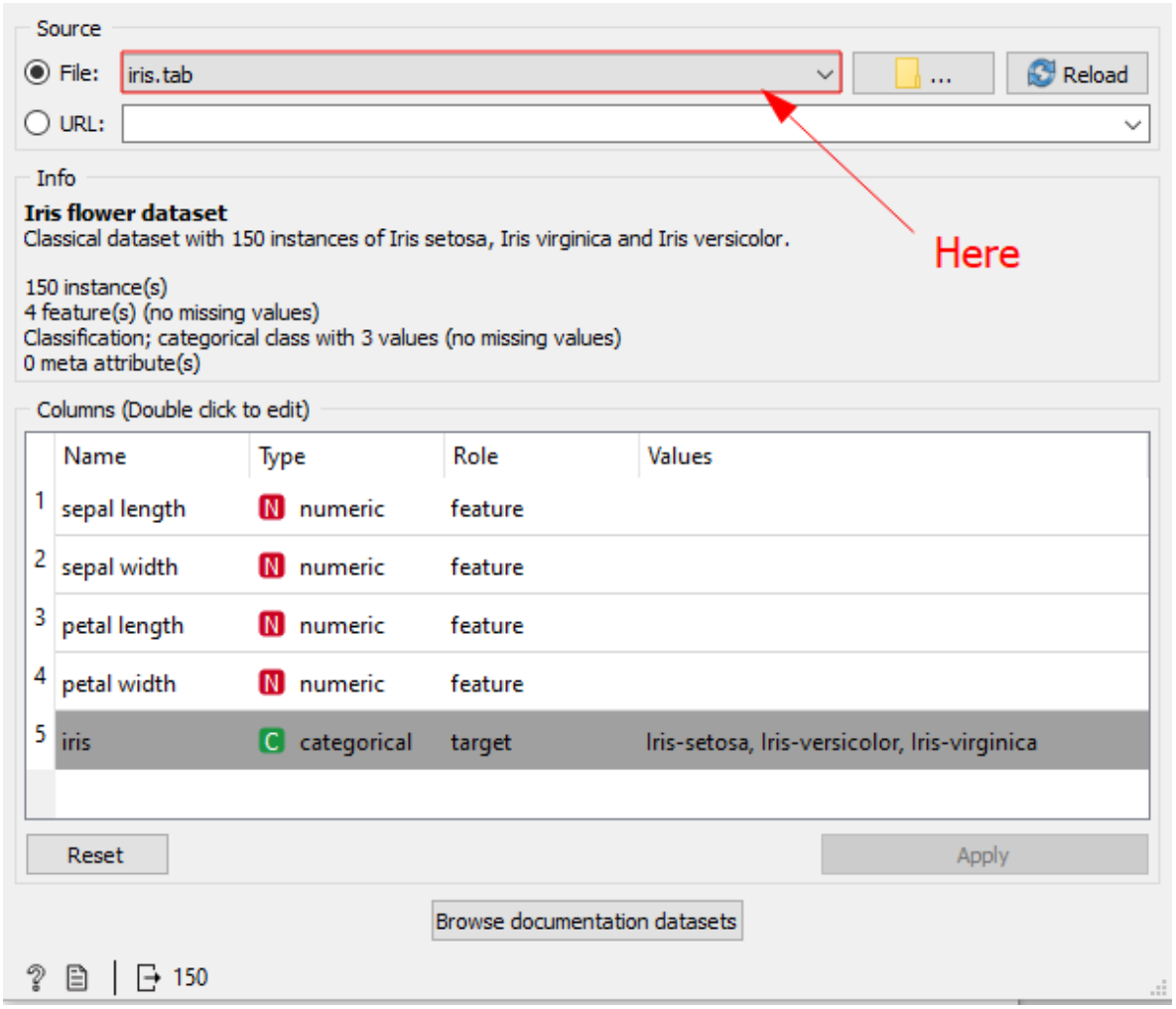
Aim: Hierarchical clustering using orange.

Steps:

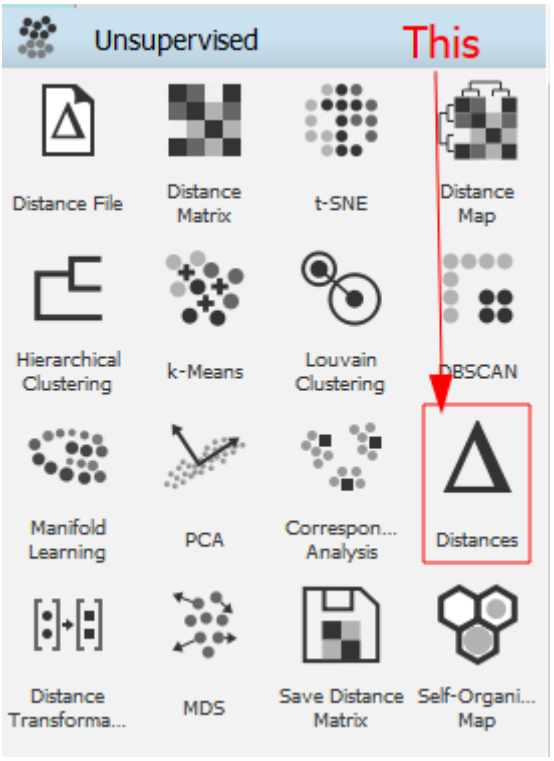
➢ Drag and drop a Filewidget from the Datasection onto the workspace.



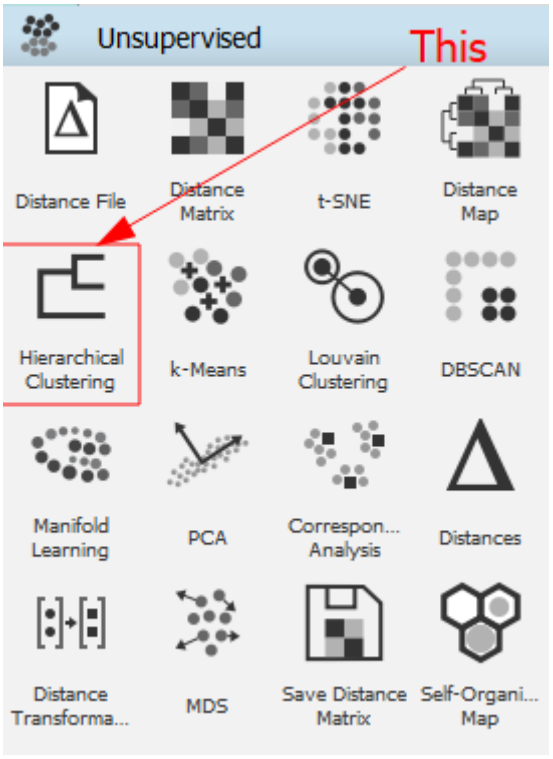
➢ Double click the Filewidget and set the name to iris.tab.



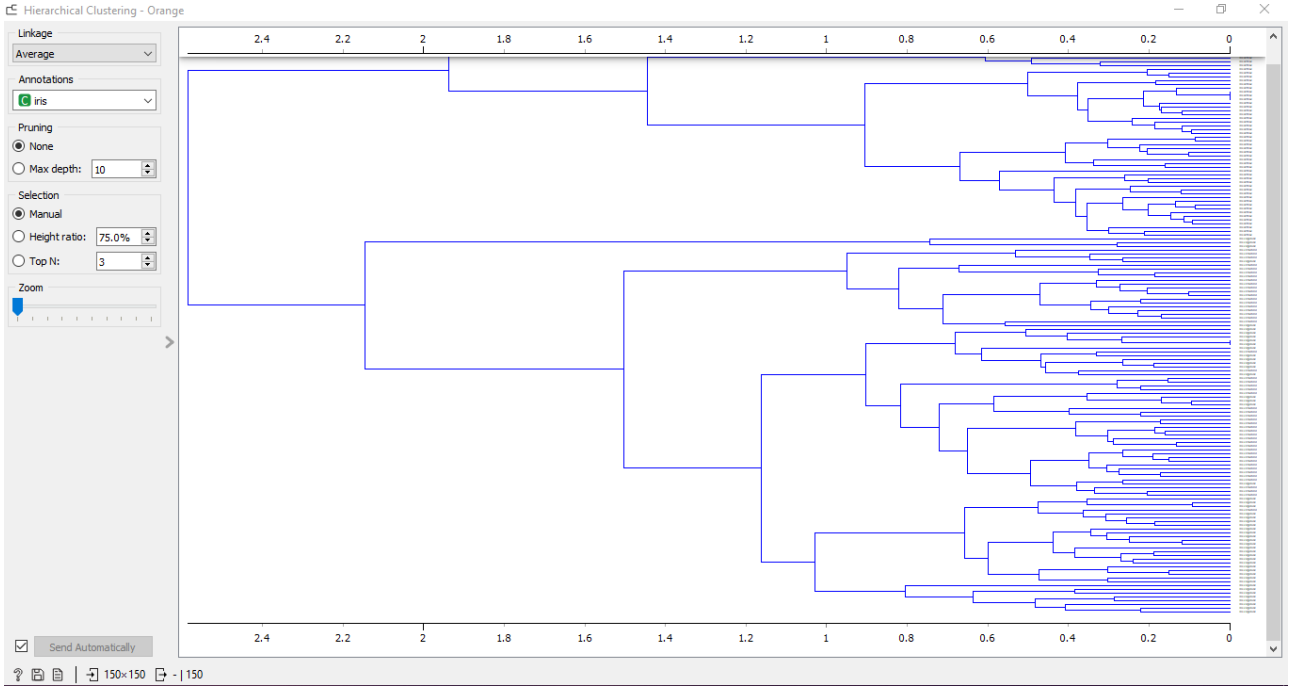
➢ Drag and drop the Distanceswidget from the Unsupervised section onto the workspace and connect it to the File widget.

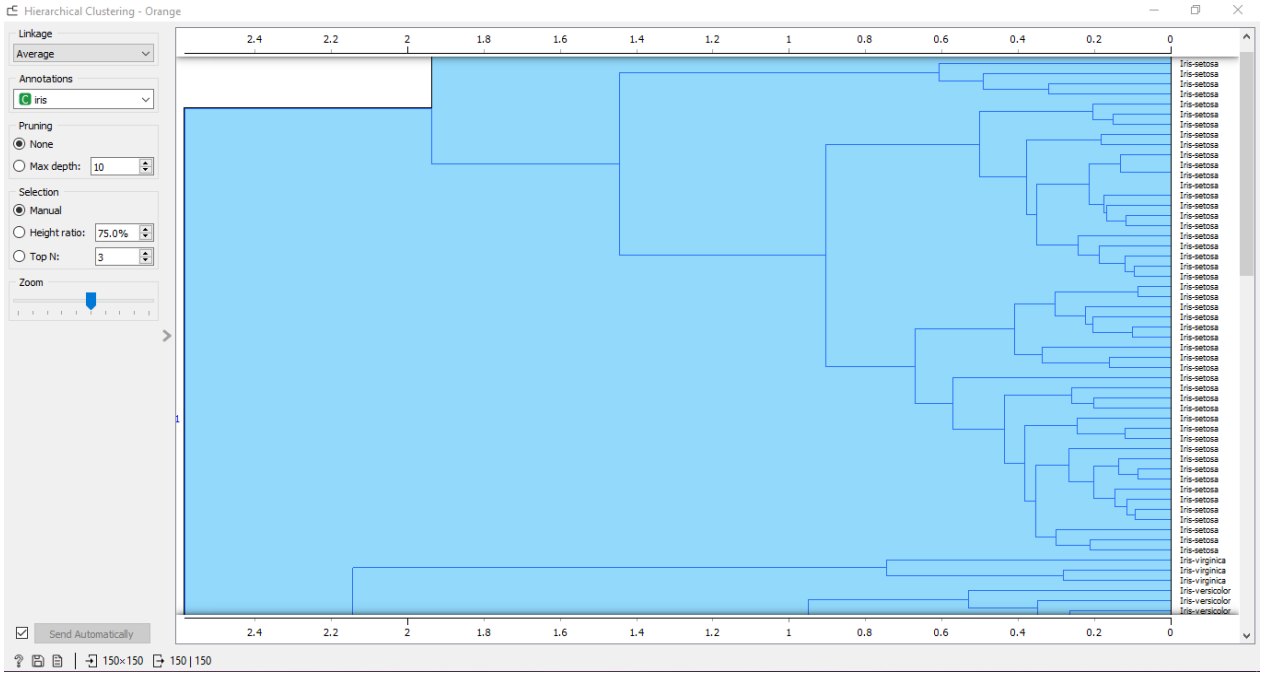


➢ Drag and drop a Hierarchical Clusteringwidget from the Unsupervised section to the workspace and connect it to the Distanceswidget.

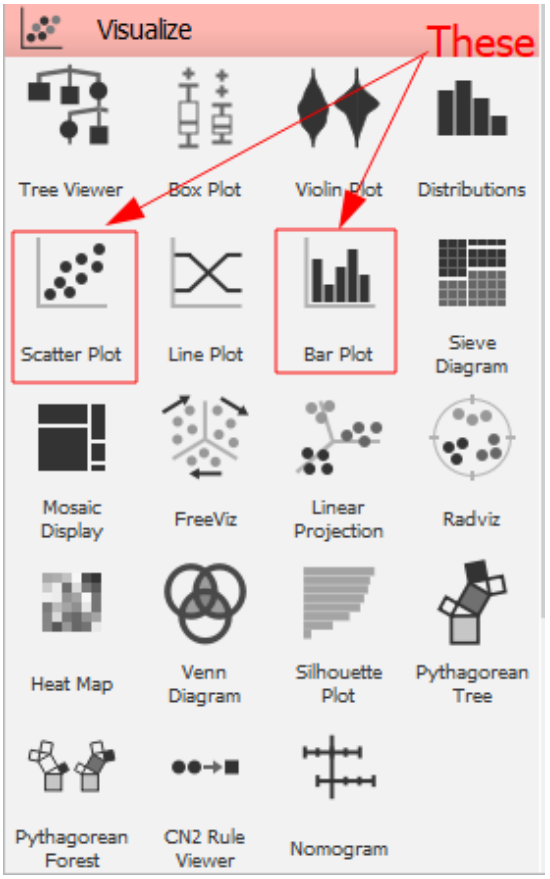


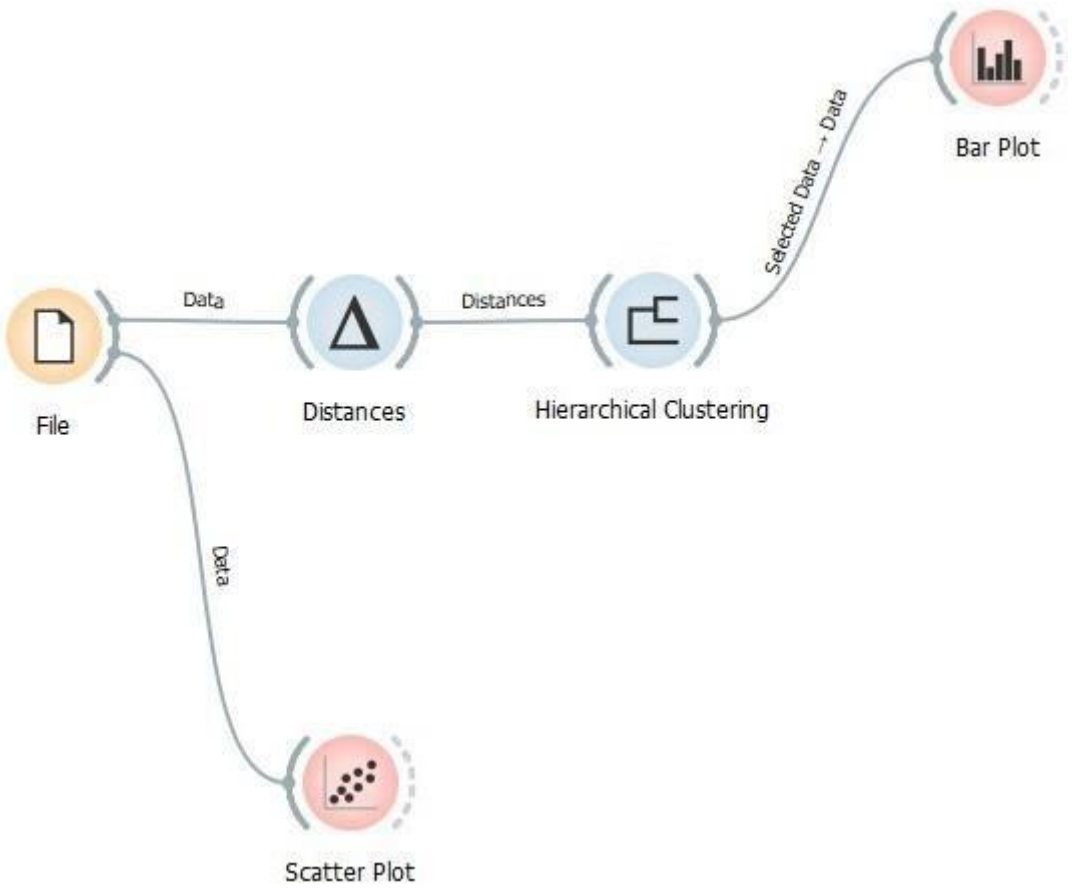
➢ Double click the Hierarchical Clustering widget to view the dendogram. Select any sub-cluster as per convenience.

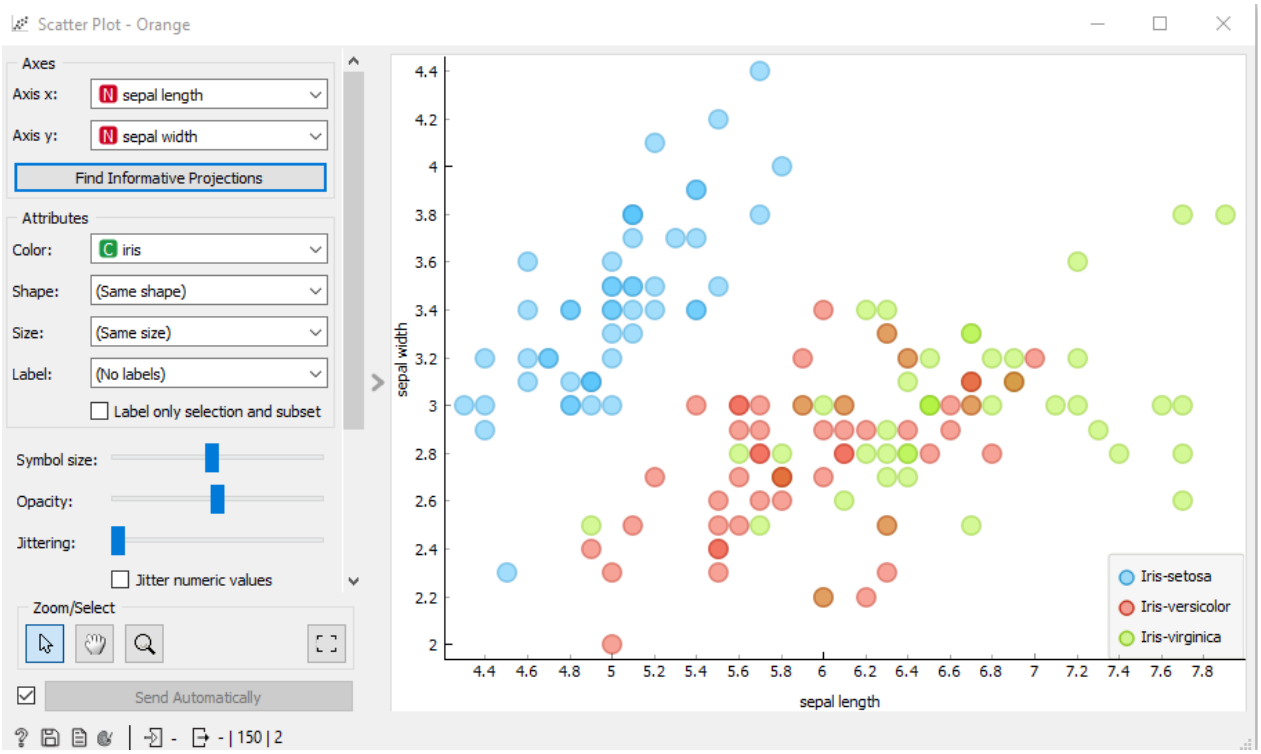


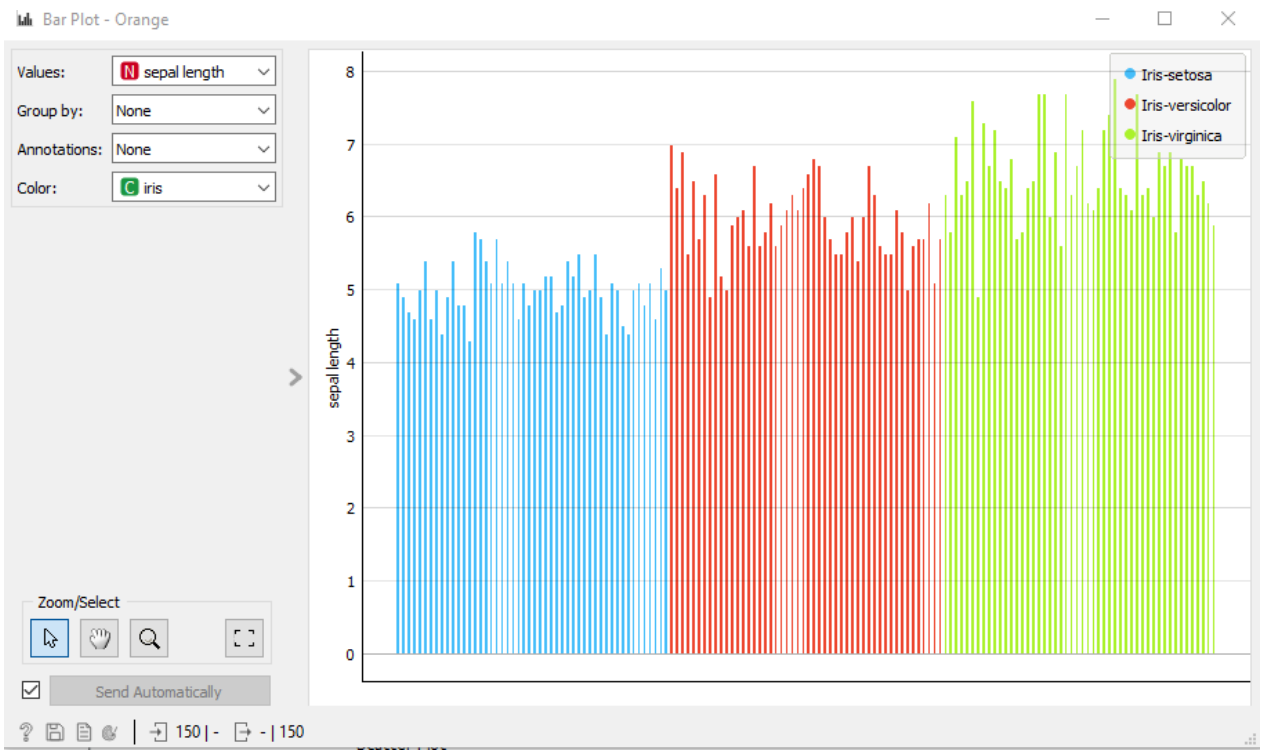


➢ Choose any visualization method of your choice. This example assumes a Bar Plotfor the sub-cluster and a Scatter Plotfor the source dataset. You can find both of these widgets in the Visualize section. Connect the Bar Plot to the Hierarchical Clustering widget and Scatter Plotto the Filewidget.




Bar Plot
Selected Data → Data
Data
Distances
File
Distances
Hierarchical Clustering
Data
Scatter Plot


Scatter Plot - Orange
Axes
Axis x: sepal length
Axis y: sepal width
Find Informative Projections
Attributes
Color: iris
Shape: (Same shape)
Size: (Same size)
Label: (No labels)
Label only selection and subset
Symbol size:
Opacity:
Jittering:
Jitter numeric values
Zoom/Select
Send Automatically
- | 150 | 2
sepal width
sepal length
Iris-setosa
Iris-versicolor
Iris-virginica

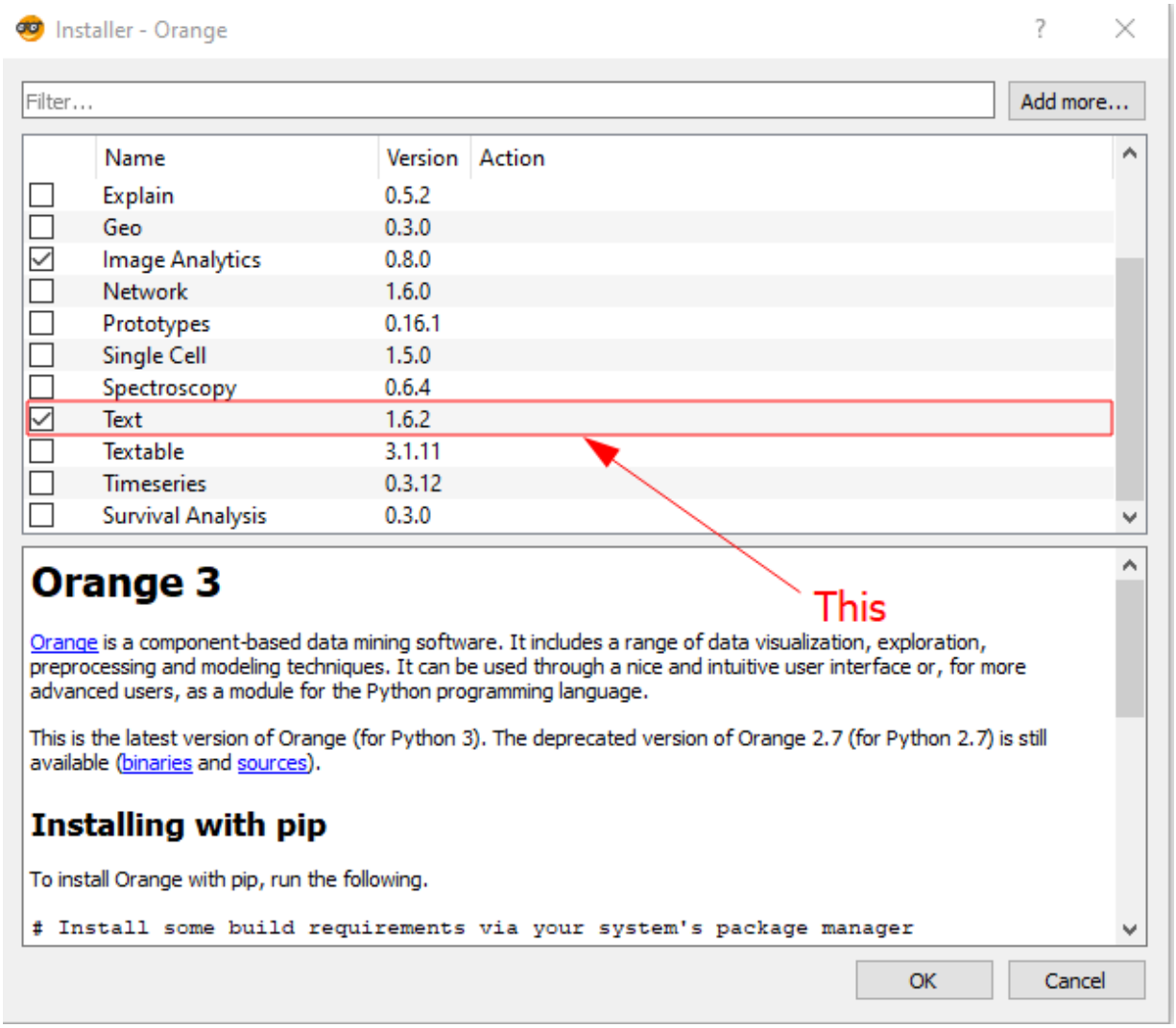

Bar Plot - Orange
Values:
sepal length
Group by:
None
Annotations:
None
Color:
iris
Zoom/Select
Send Automatically
150 | -
- | 150
sepal length
0
1
2
3
4
5
6
7
8
Iris-setosa
Iris-versicolor
Iris-virginica

Practical 5

Aim: Text Preprocessing using orange.

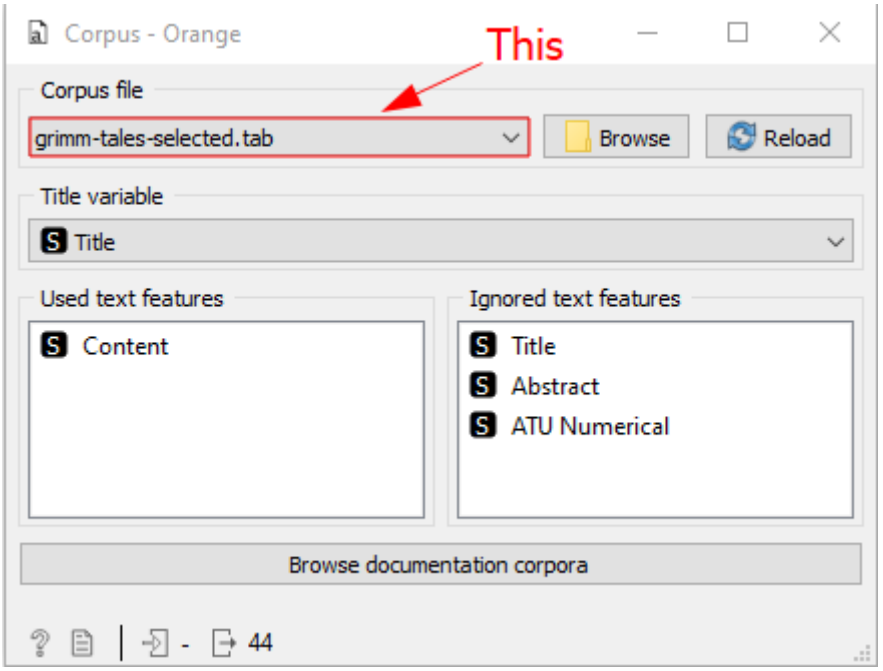
Steps:

➢ Before starting, we need to install the Text add-on. Install it by navigating to Options > Add ons…. You will be prompted to restart Orange after the installation completes. If it is already installed, skip this step.



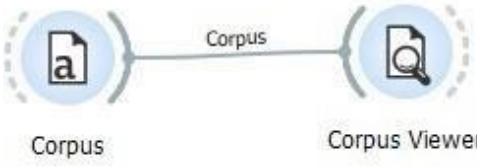
➢ Drag and drop a Corpuswidget to the workspace. It can be found in the newly added Text Mining section.

➢ Double click the Corpus widget and select the grimm-tales-selected.tab corpus file.

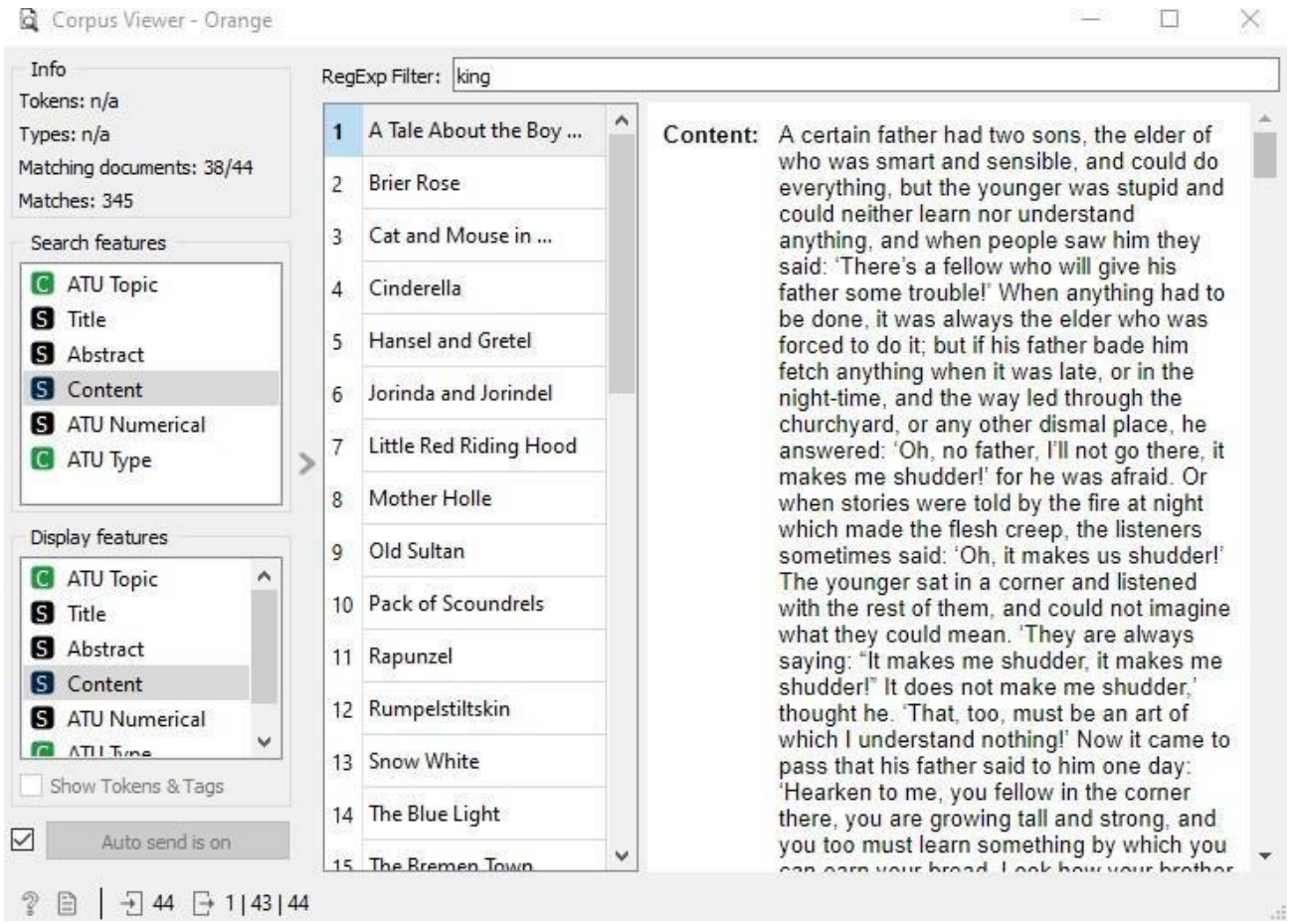


➢ Drag and drop a Corpus Viewer widget and connect it to the Corpus widget. The Corpus Viewer widget can be found in the Text Mining section.


Pubmed
Twitter
Preprocess Text
Corpus to Network
Bag of Words
Document Embedding
Similarity Hashing
Sentiment Analysis
Tweet Profiler
Topic Modelling
LDAvis
Corpus Viewer
Score Documents
Word Cloud
Concordance
Document Map
Word Enrichment
Duplicate Detection
Word List
Extract Keywords
Semantic Viewer
Statistics
This

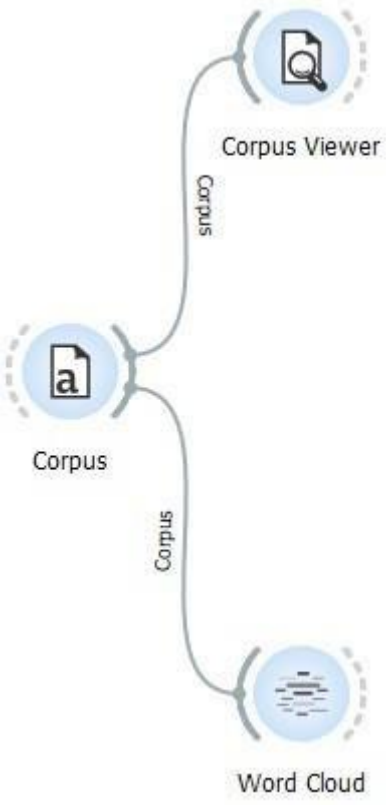

Corpus
Corpus
Corpus Viewer

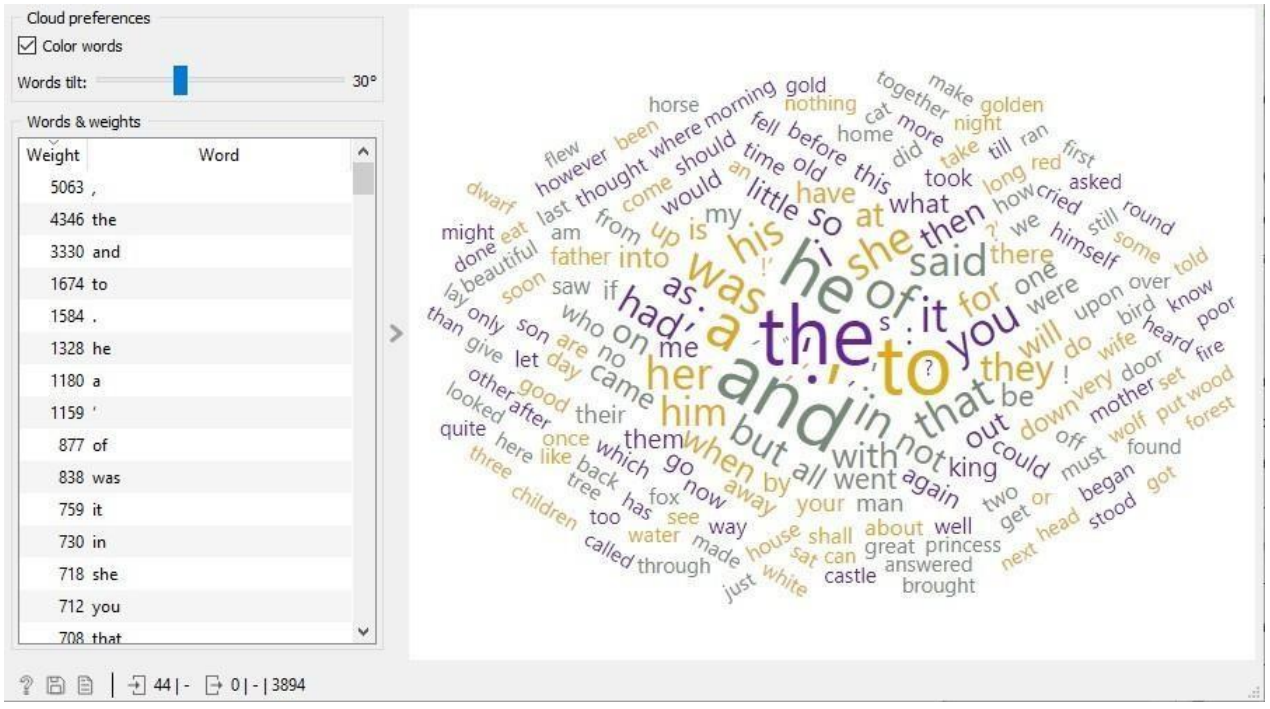
➢ Double-clicking the Corpus Viewer allows us to peek through the corpus and also allows us to filter text.



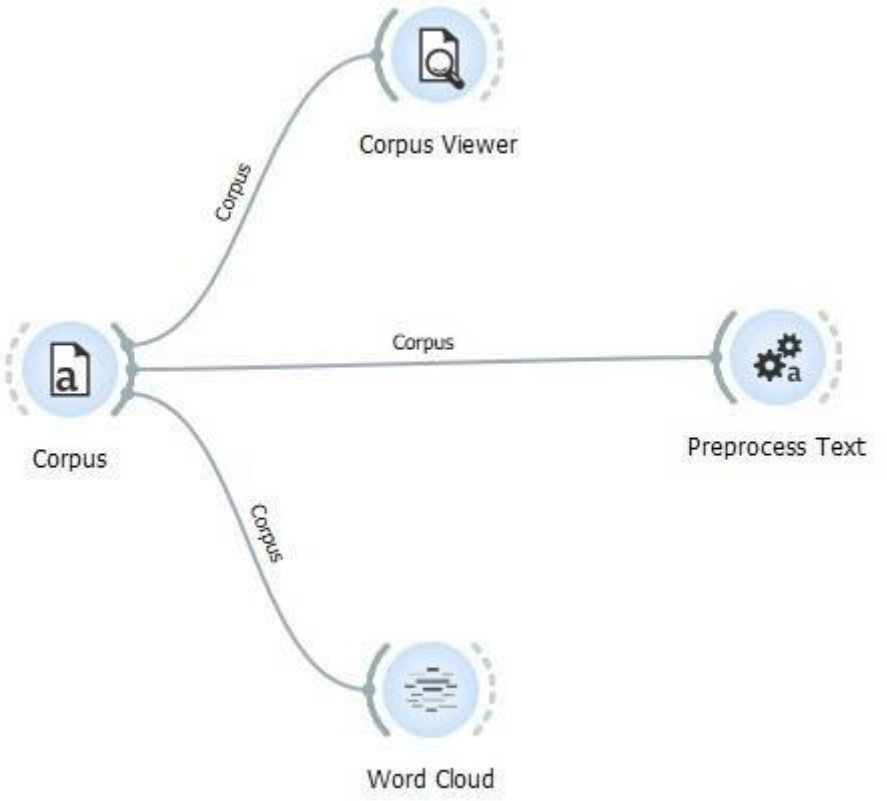
➢ Another method of visualizing data is though Word Clouds. Drag and drop a Word Cloud widget from the Text Mining section and connect it to the Corpuswidget.


Text Mining
This
Corpus
Import Documents
The Guardian
NY Times
Pubmed
Twitter
Preprocess Text
Corpus to Network
Bag of Words
Document Embedding
Similarity Hashing
Sentiment Analysis
Tweet Profiler
Topic Modelling
LDAvis
Corpus Viewer
Score Documents
Word Cloud
Concordance
Document Map

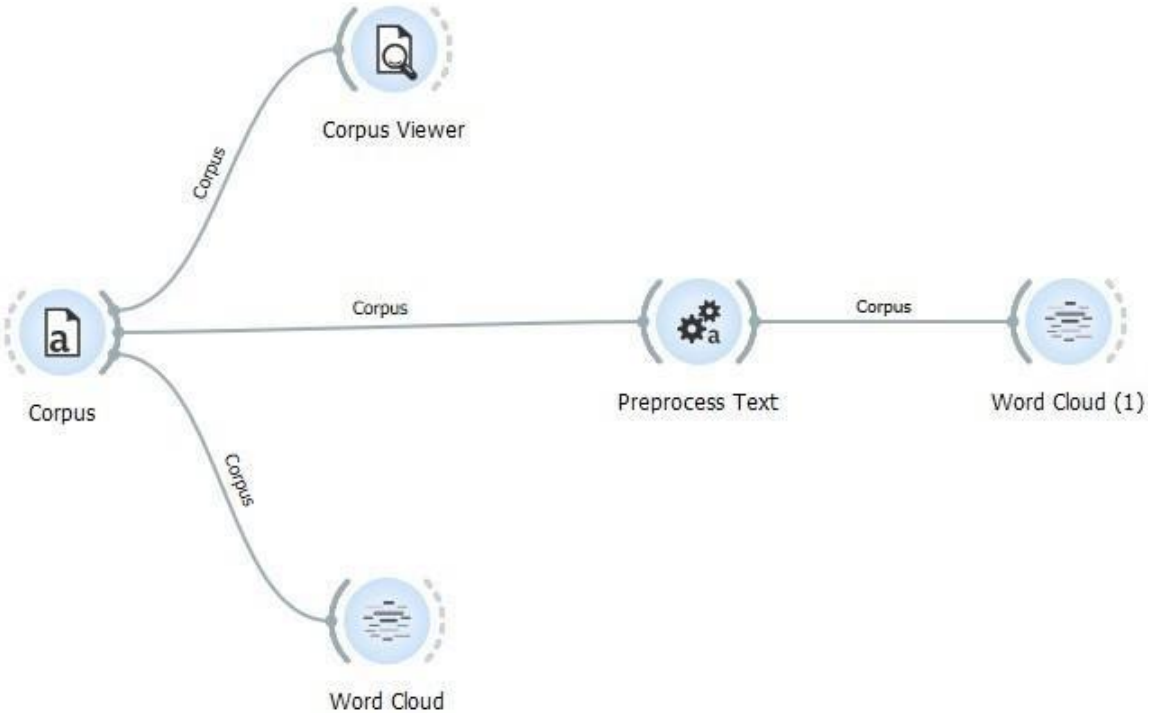

Corpus Viewer
Corpus
Corpus
Corpus
Word Cloud

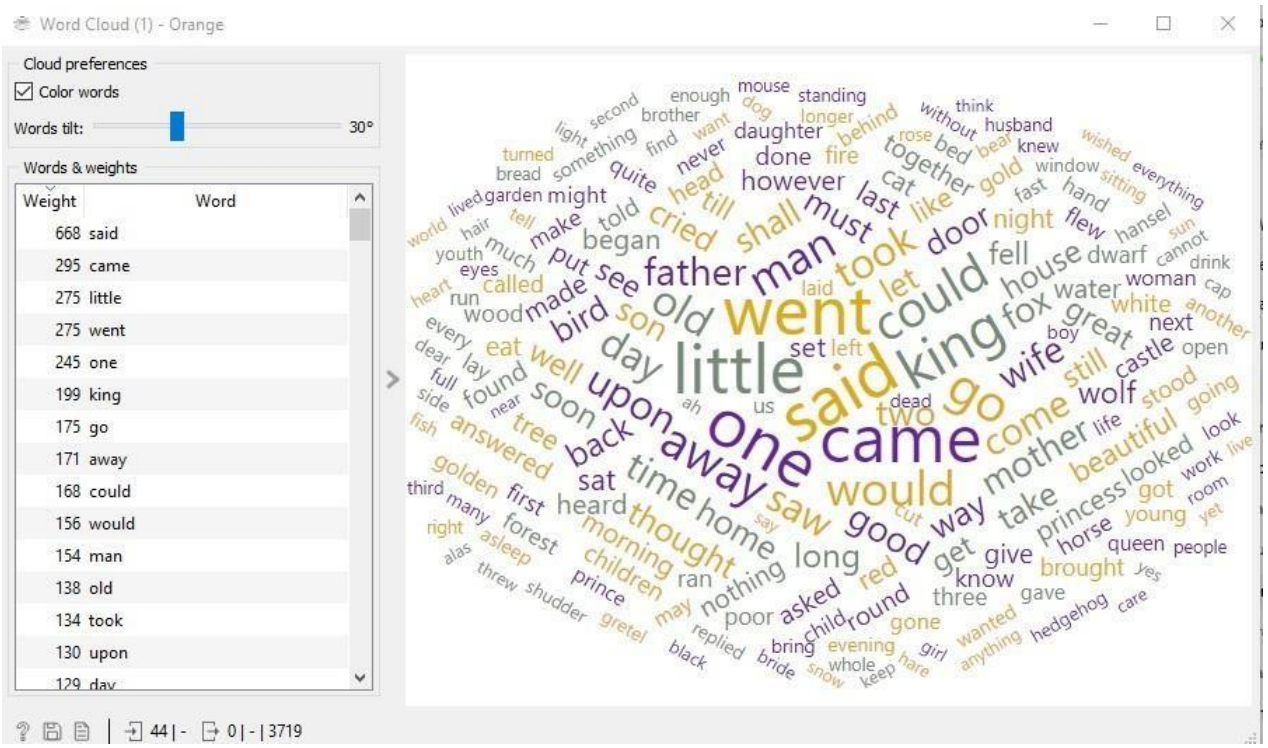

Cloud preferences
Color words
Words tilt:
30°
Words & weights
Weight
Word
5063 ,
4346 the
3330 and
1674 to
1584 .
1328 he
1180 a
1159 '
877 of
838 was
759 it
730 in
718 she
712 you
708 that
44 | -
0 | - | 3894

➢ We see that a lot of punctuation marks and uninformative words have made their way into the Word Cloud. In order to eliminate this, we have to use the Preprocess Text widget. Drag and drop a Preprocess Text widget from the Text Mining section onto the workspace and connect it to the Corpus widget.



➢ We now add another Word Cloud widget to see our updated cloud.


Corpus Viewer
Corpus
Corpus
Corpus
Corpus
Preprocess Text
Word Cloud (1)
Corpus
Word Cloud

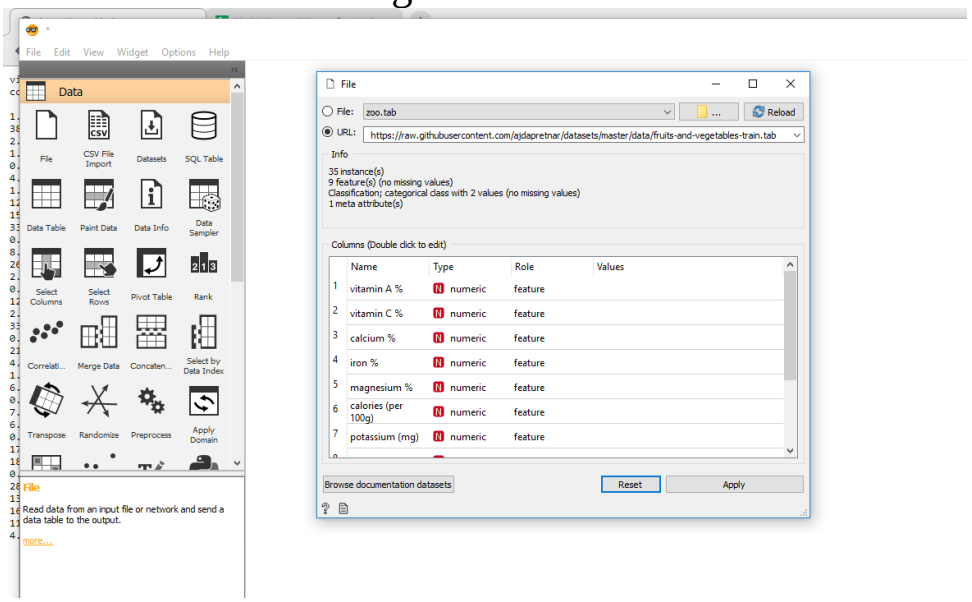

Word Cloud (1) - Orange
Cloud preferences
Color words
Words tilt:
30°
Words & weights
Weight
Word
668 said
295 came
275 little
275 went
245 one
199 king
175 go
171 away
168 could
156 would
154 man
138 old
134 took
130 upon
129 day
44 | -
0 | - | 3719

Practical 6

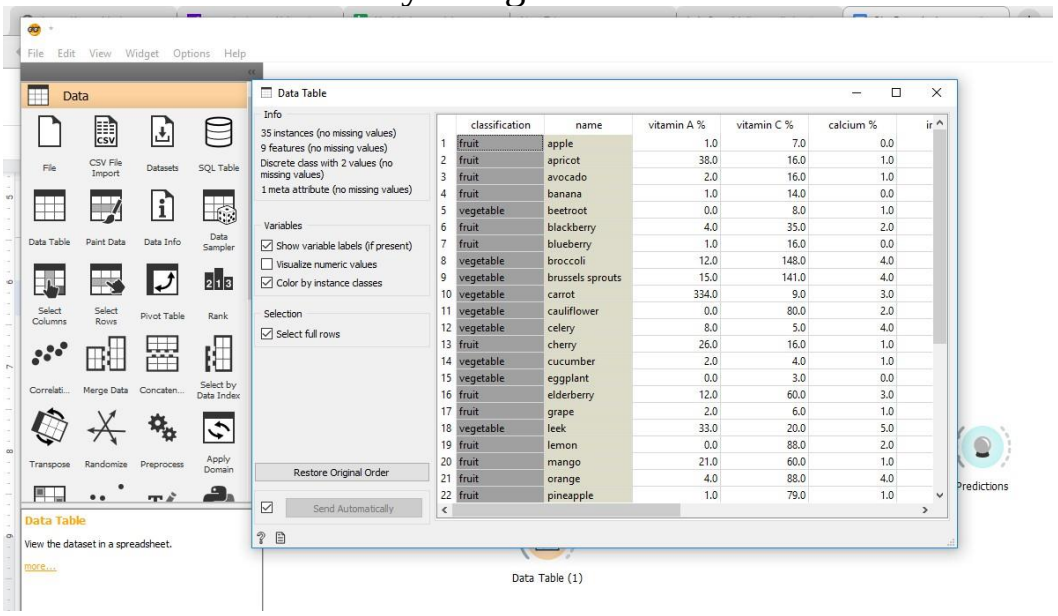
Aim: To predict whether the given dataset is of fruit or vegetable using orange.

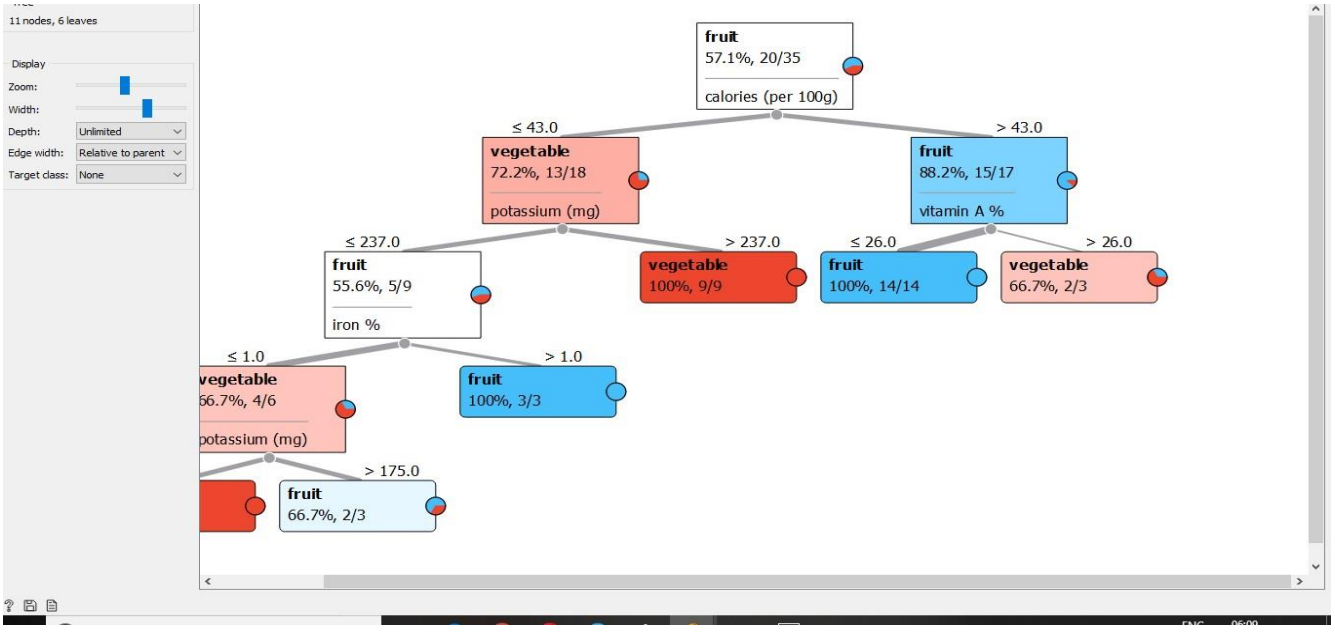
Description:
This dataset contain numerous feature which diffrenciate whether the given dataset is of vegetable or fruit. The target variable is classification i.e Is it fruit or vegetable.

Data selection:
We have given the url of the dataset which contain 35 instances and 9 features of fruit and vegetables.

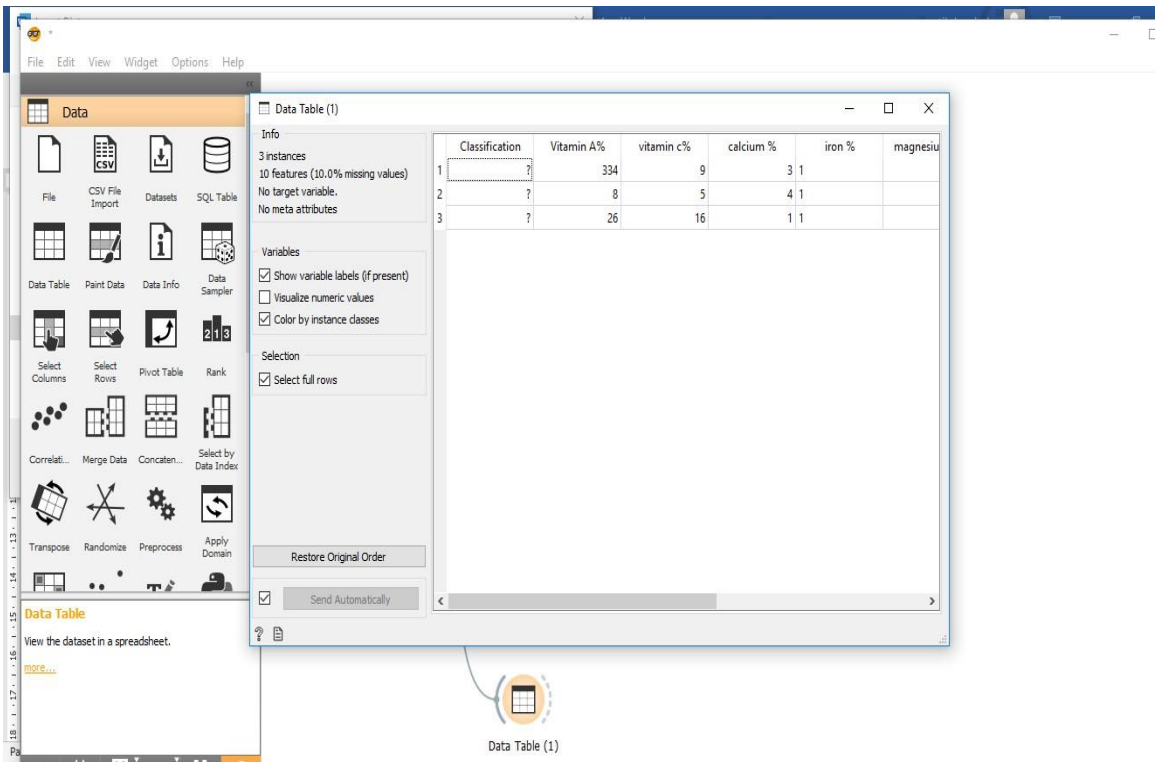


Data visualization:
We visualize the data by using data table and classification tree.

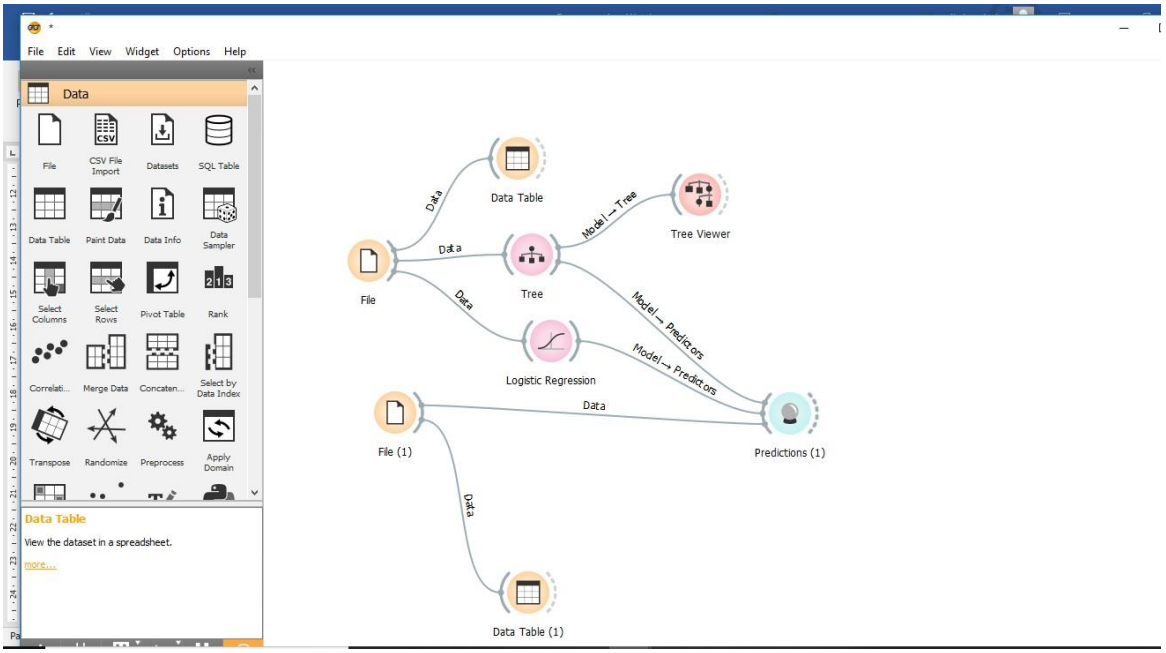


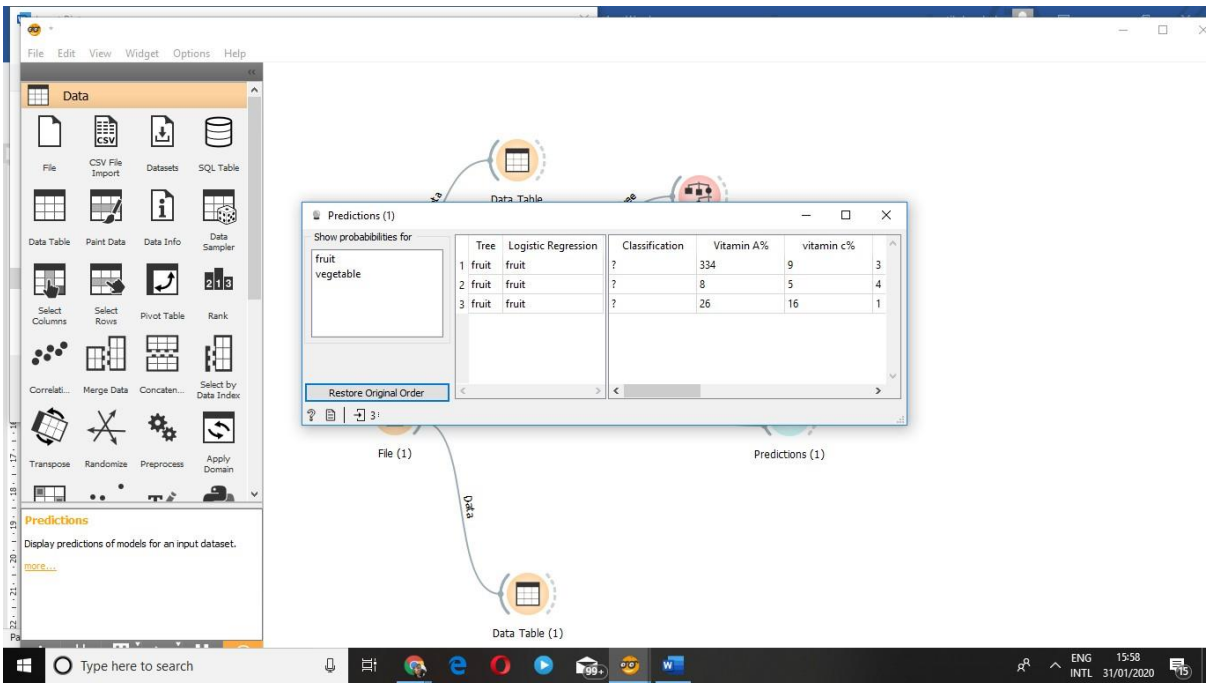


Again ,You have to create the the dataset of plants which you need to predict and visualize it in data table.



By using prediction widget you need to predict whether the plant is vegetable or fruit .





The given prediction is again checked by logistic regression.

Practical 7

Aim: Predict whether using orange.

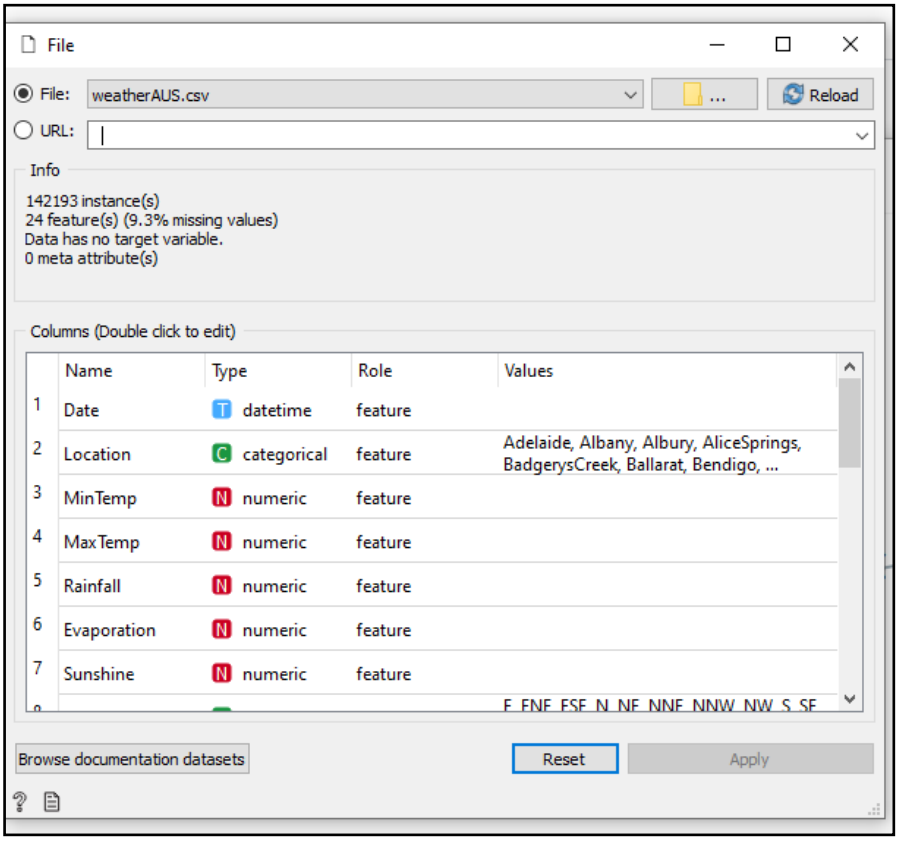
Description: This dataset contains daily weather observations from numerous Australian weather stations.

The target variable Rain Tomorrow means: Did it rain the next day?

Yes or No.

Data Selection:

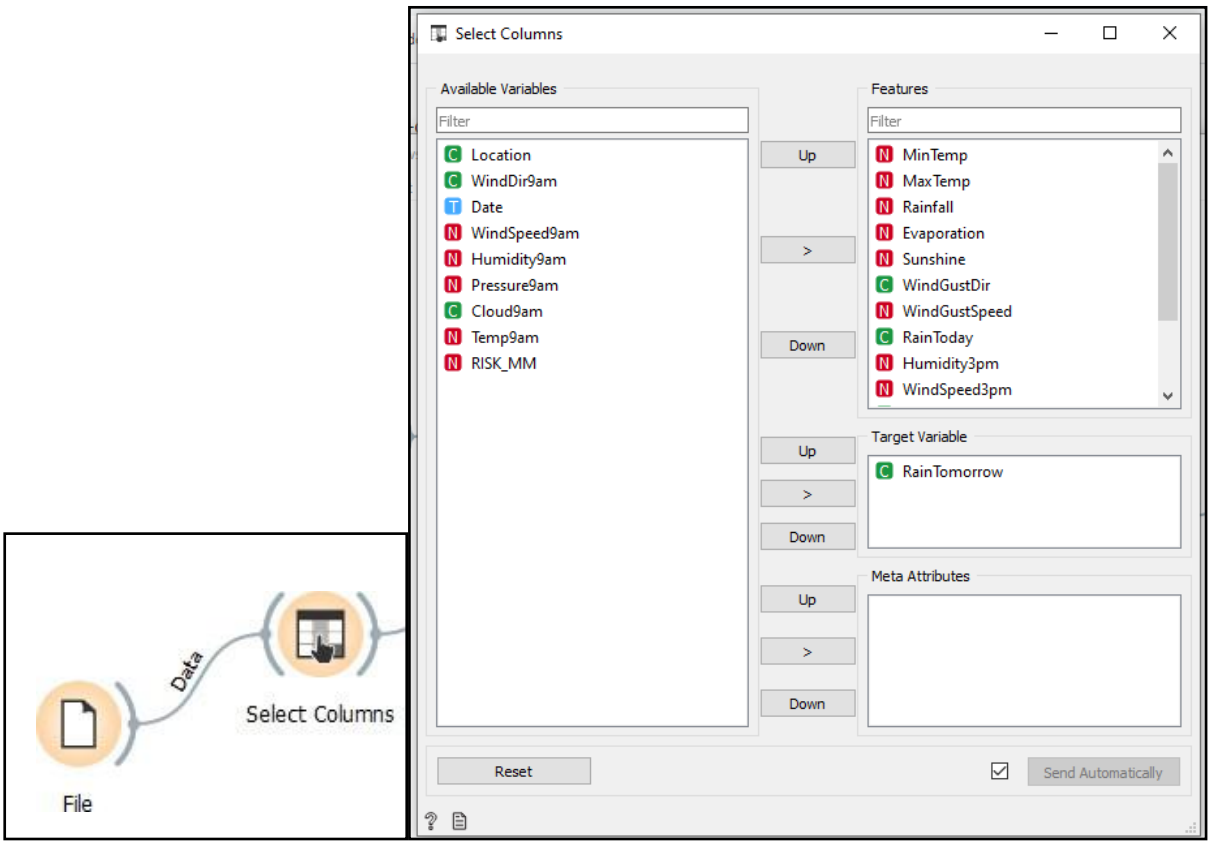
We have downloaded the dataset (weather dataset) of Australian weather stations which contains about 10 years of daily weather observations from numerous Australian weather stations.



Data Cleaning:

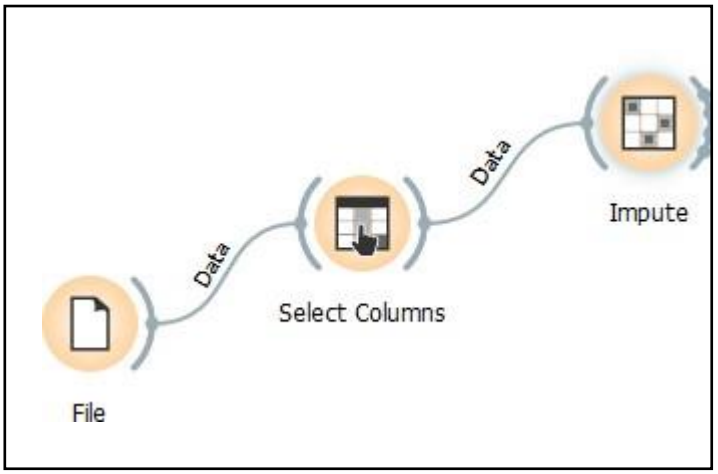
In data cleaning, we will select the required column and remove the rows with missing values as shown below:

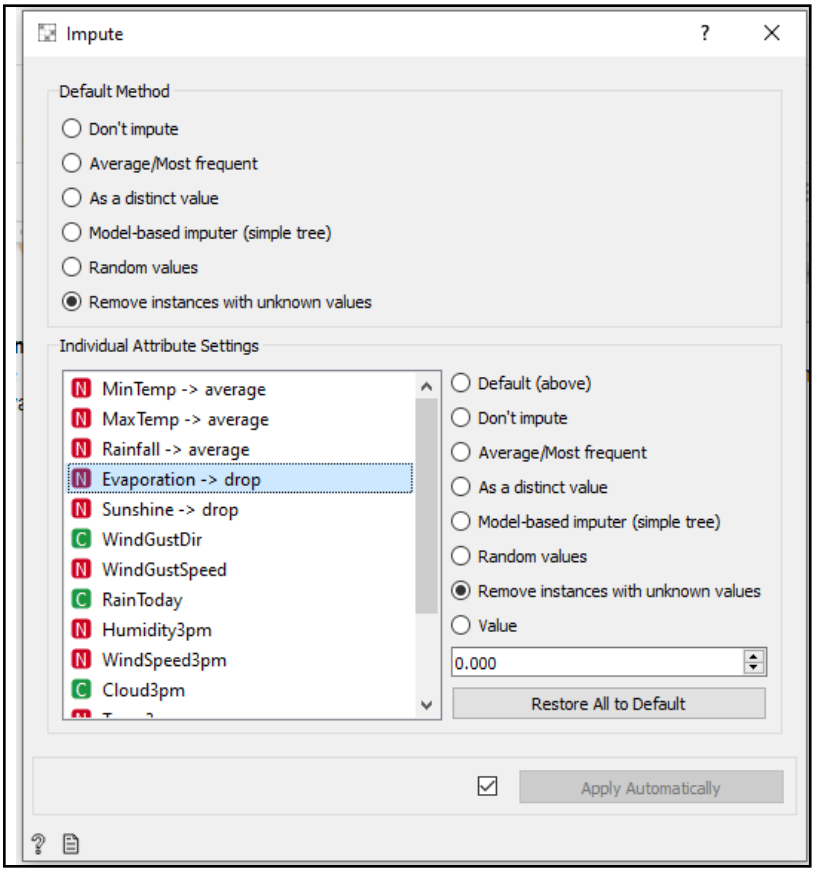
Column Selection



Removing rows with missing values

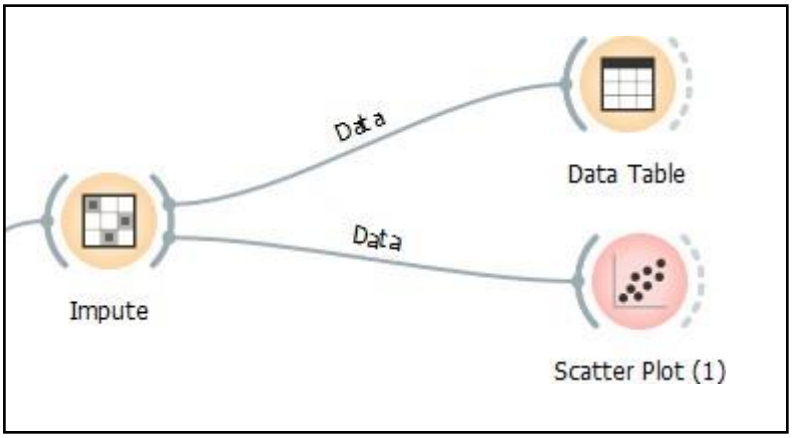
We will use the impute function to remove rows with missing values for columns “Sunshine” and “Evaporation”

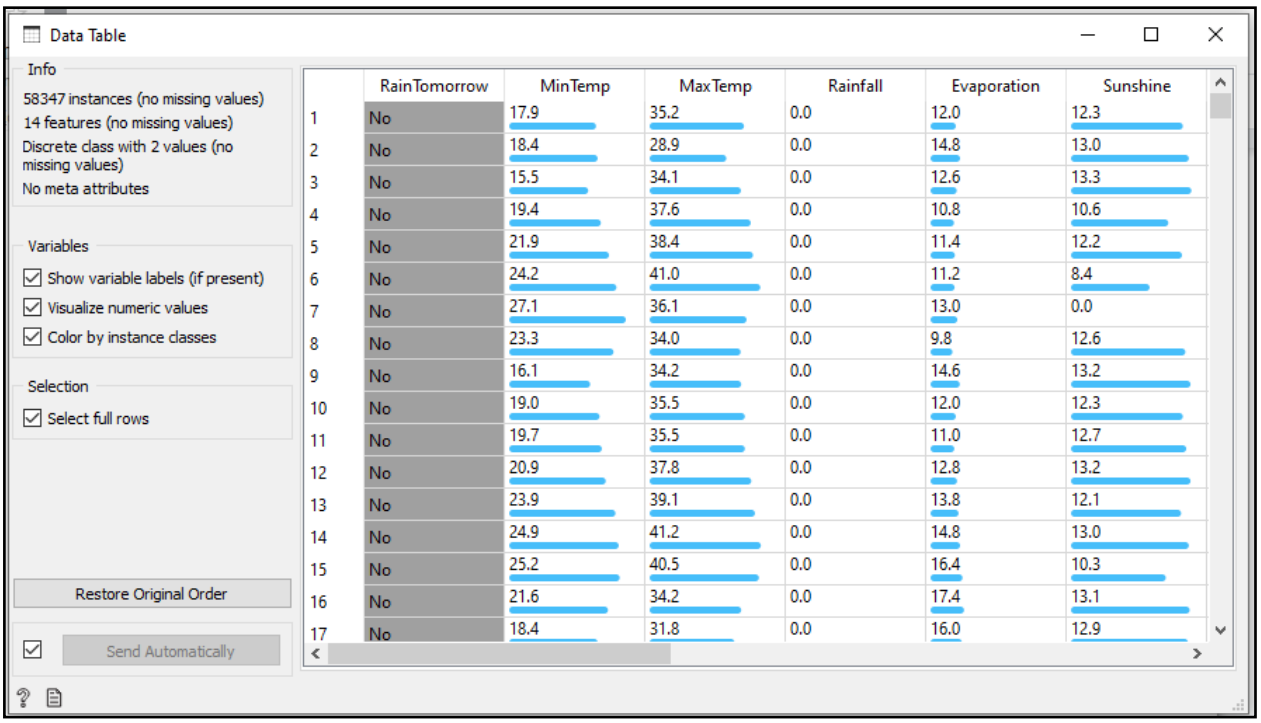


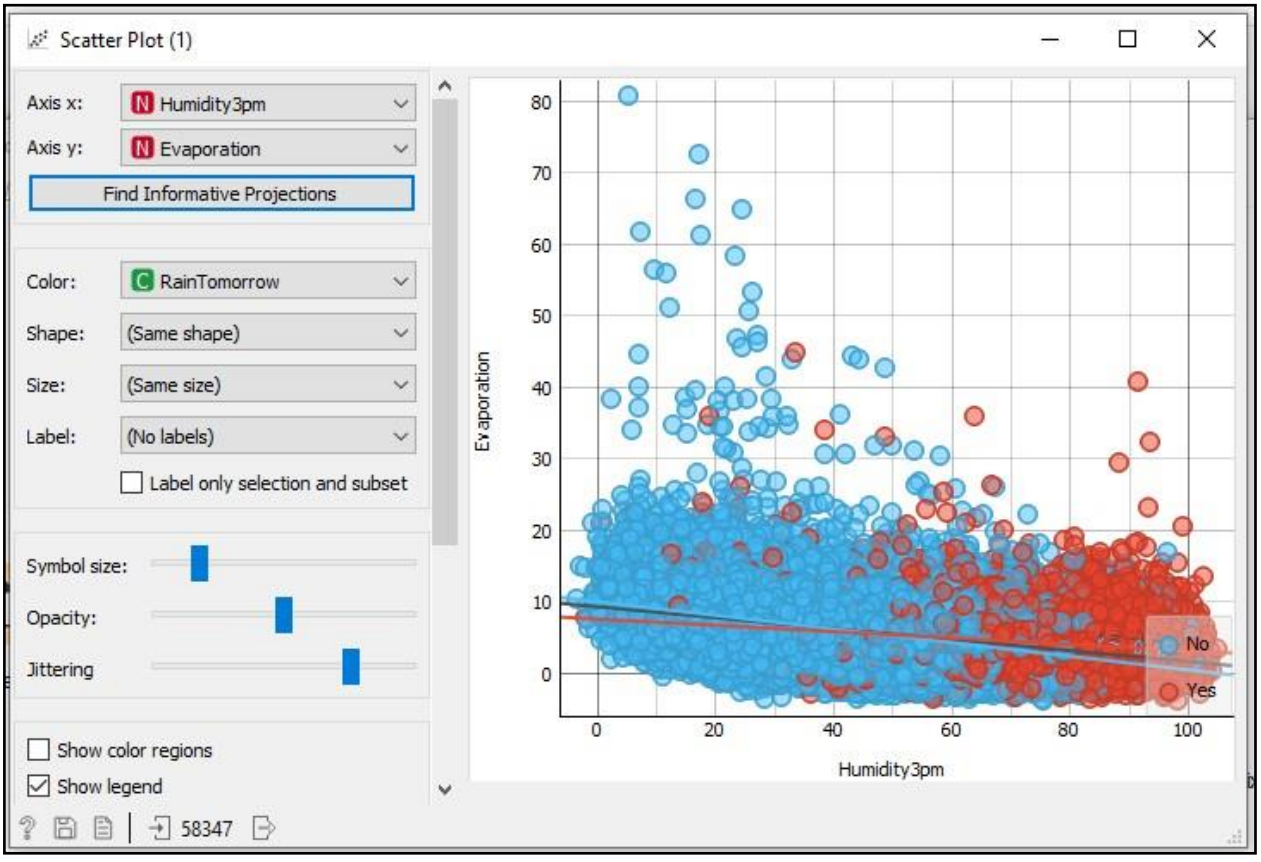


Data Visualization

In this step, we see the reflected data selection in data table. Then, we use scatter plot to visualize the data for better understanding of our dataset.



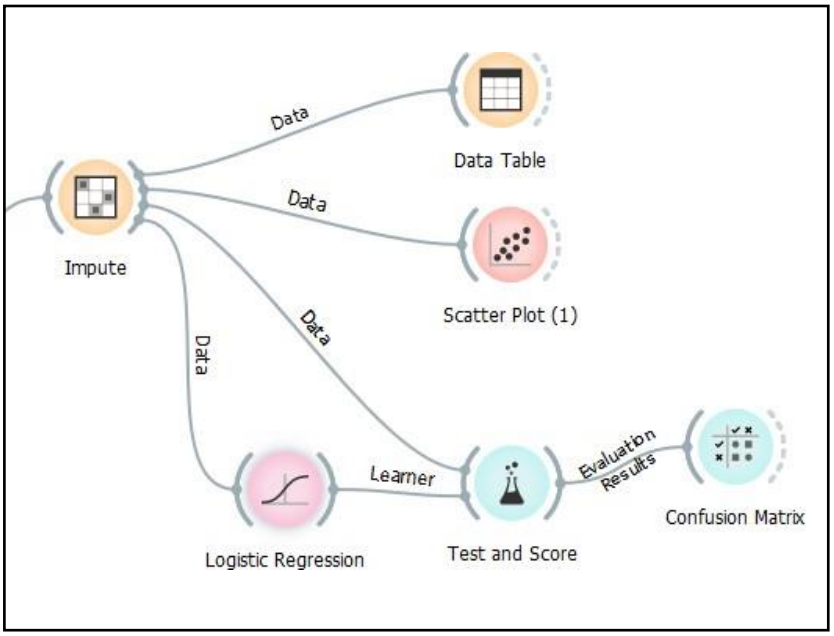


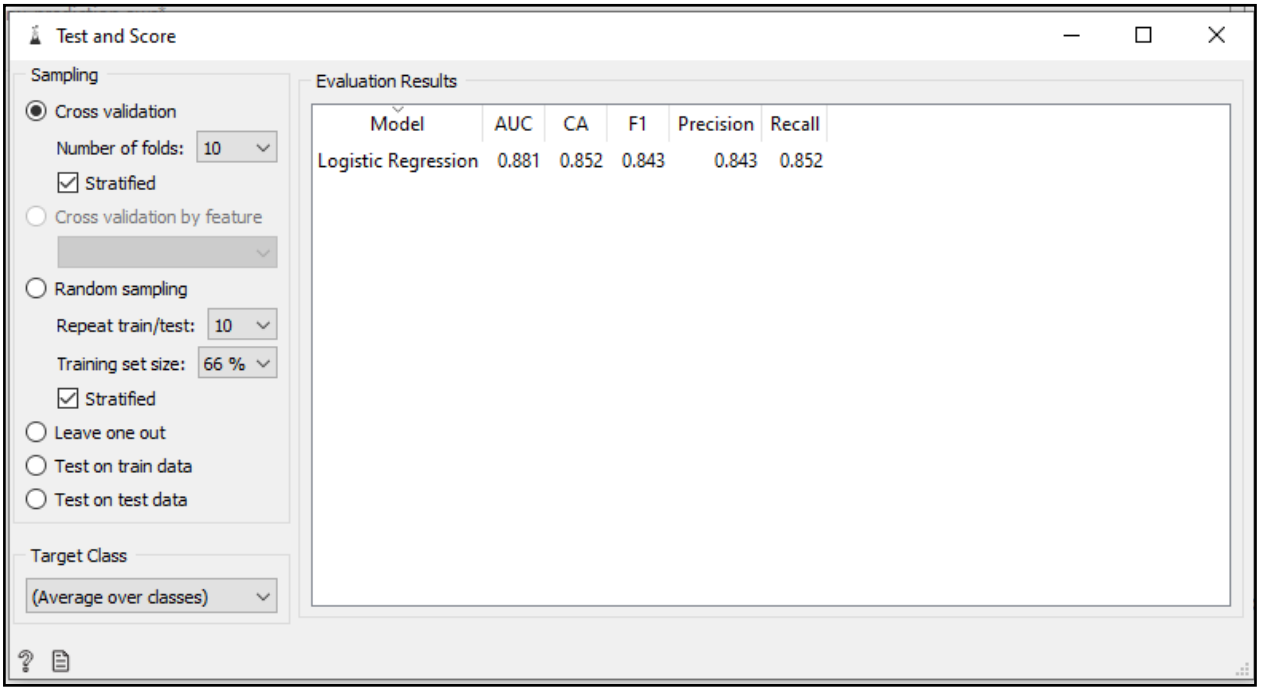


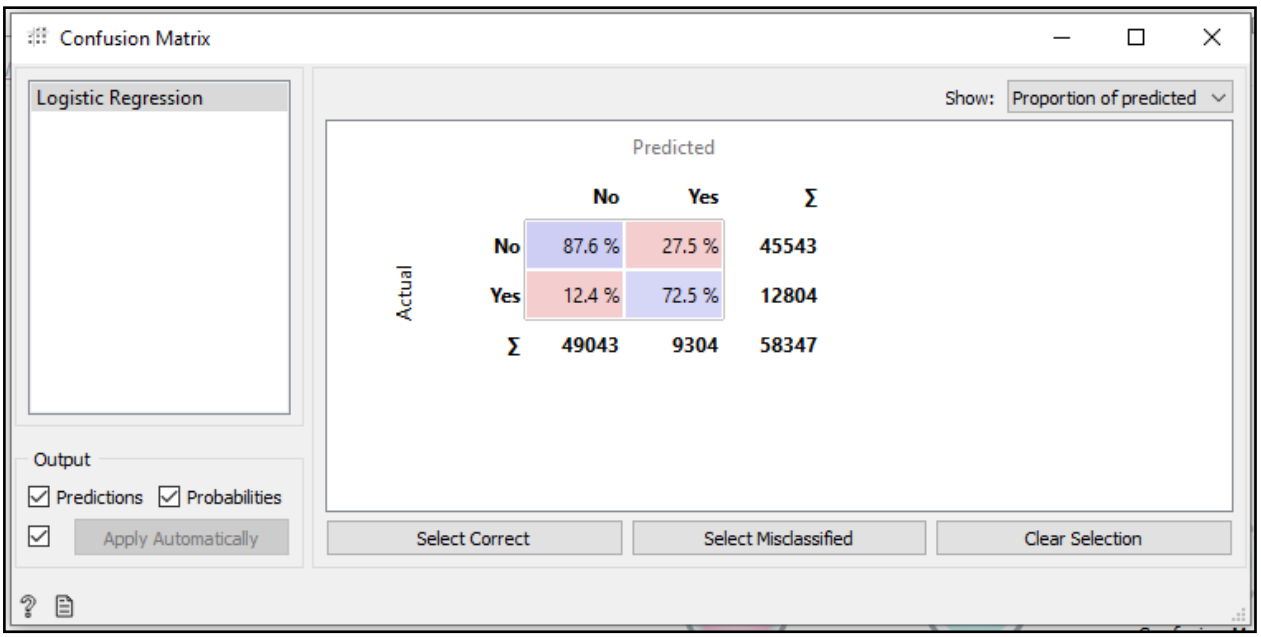
In the above scatter plot we see, as the humidity level increases and evaporation rates are low the chances of rainfall increases (red dots)

Data Modeling

In this step, we use **Logistic regression** to model our data. Then, we use "test and score" function to evaluate the performance of our model. Finally, we use "confusion matrix" to understand the prediction.






Confusion Matrix
Logistic Regression
Show:
Proportion of predicted
Predicted
No
Yes
Σ
Actual
No
87.6 %
27.5 %
45543
Yes
12.4 %
72.5 %
12804
Σ
49043
9304
58347
Output
Predictions
Probabilities
Apply Automatically
Select Correct
Select Misclassified
Clear Selection

Practical 8

Aim: Write a java program to Calculate the Alon Matias Szegedy Algorithm for given stream.

Input:

```
import java.io.*;
import java.util.*;

public class AMSA {

   public static int findCharCount(String stream, char XE, int random, int length) {
      int countOccurence = 0;

      for(int i = random; i < length; i++)
      {
         if(stream.charAt(i) == XE)
         {
            countOccurence++;
         }
      }



      return countOccurence;
   }

   public static int estimateValue(int XV1, int n) {
      int expValue;

      expValue = n * (2 * XV1 - 1);
      return expValue;
   }

   public static void main(String[] args) {
      int n = 15;
      String stream = "abcbdacdabdcaab";
```

```
        int randomValues[] = {3, 8, 13};
        char[] XE = new char[3];
        int[] XV = new int[3];
        int[] expValue = new int[3]; int
        apprSecondMomentValue;

        for(int i = 0; i < randomValues.length; i++)
        {
           XE[i] = stream.charAt(randomValues[i] - 1);
        }

        for(int i = 0; i < randomValues.length; i++)
        {
           XV[i] = findCharCount(stream, XE[i], randomValues[i] - 1, n);
        }

        System.out.println(XE[0] + "=" + XV[0] + " " + XE[1] + "=" + XV[1] + " " + XE[2] +
"=" + XV[2]);

        for(int i = 0; i < randomValues.length; i++)
        {
           expValue[i] = estimateValue(XV[i], n);
        }

        for(int i = 0; i < randomValues.length; i++)
        {
           System.out.println("Expected value for "+XE[i]+" is :: "+expValue[i]);
        }


        apprSecondMomentValue = Arrays.stream(expValue).sum() / 3;
        System.out.println("Second moment is:" + apprSecondMomentValue);
     }
}
```

Output:

```
[Running] cd "c:\Users\USER\Downloads\" && javac AMSA.java && java AMSA
c=3 d=2 a=2
Expected value for c is :: 75
Expected value for d is :: 45
Expected value for a is :: 45
Second moment is:55

[Done] exited with code=0 in 18.944 seconds
```

Practical 9

Aim: Write a Program to Construct different types of K-shingles for a given document

Source code:

```
require("tm")

kshingle<-function(){
  k<- as.integer(readline("Enter a value for k - 1"))

  u1<- readLines("BIBD_1.txt")

  shingle<-i<-0
  while(i<nchar(u1)-k+1)
  {
    shingle[i]<-substr(u1,i,i+k)
    print(shingle[i])

    i<-i+1
  }
}

if(interactive())kshingle()
```

Output:

```
> require("tm")
>
> kshingle<-function(){
+   k<- as.integer(readline("Enter a value for k - 1"))
+
+   u1<- readLines("BIBD1.txt")
+
+   shingle<-i<-0
+   while(i<nchar(u1)-k+1)
+   {
+     shingle[i]<-substr(u1,i,i+k)
+     print(shingle[i])
+
+     i<-i+1
+   }
+ }
>
> if(interactive())kshingle()
Enter a value for k - 12
character(0)
[1] "Lor"
[1] "ore"
[1] "rem"
[1] "em "
[1] "m i"
[1] " ip"
[1] "ips"
[1] "psu"
[1] "sum"
[1] "um "
[1] "m d"
[1] " do"
[1] "dol"
[1] "olo"
[1] "lor"
[1] "or "
[1] "r s"
[1] " si"
[1] "sit"
[1] "it "
[1] "t a"
[1] " am"
[1] "ame"
[1] "met"
[1] "et,"
[1] "t, "
[1] ", c"
[1] " co"
[1] "con"
[1] "ons"
[1] "nse"
[1] "sec"
[1] "ect"
[1] "cte"
[1] "tet"
[1] "etu"
[1] "tur"
[1] "ur "
[1] "r a"
[1] " ad"
[1] "adi"
[1] "dip"
[1] "ipi"
[1] "pis"
[1] "isc"
[1] "sci"
[1] "cin"
[1] "ing"
[1] "ng "
[1] "g e"
[1] " el"
[1] "eli"
[1] "lit"
[1] "it,"
[1] "t, "
[1] ", s"
[1] " se"
[1] "sed"
[1] "ed "
[1] "d d"
[1] " do"
[1] "do "
[1] "o e"
[1] " ei"
[1] "eiu"
[1] "ius"
[1] "usm"
[1] "smo"
[1] "mod"
[1] "od "
[1] "d t"
[1] " te"
[1] "tem"
[1] "emp"
[1] "mpo"
[1] "por"
[1] "or "
[1] "r i"
[1] " in"
[1] "inc"
[1] "nci"
[1] "cid"
[1] "idi"
[1] "did"
[1] "idu"
[1] "dun"
[1] "unt"
[1] "nt "
[1] "t u"
[1] " ut"
[1] "ut "
[1] "t l"
[1] " la"
```

```
[1] "lab"
[1] "abo"
[1] "bor"
[1] "ore"
[1] "re "
[1] "e e"
[1] " et"
[1] "et "
[1] "t d"
[1] " do"
[1] "dol"
[1] "olo"
[1] "lor"
[1] "ore"
[1] "re "
[1] "e m"
[1] " ma"
[1] "mag"
[1] "agn"
[1] "gna"
[1] "na "
[1] "a a"
[1] " al"
[1] "ali"
[1] "liq"
[1] "iqu"
[1] "qua"
[1] "ua."
[1] "a. "
[1] ". U"
[1] " Ut"
[1] "Ut "
[1] "t e"
[1] " en"
[1] "eni"
[1] "nim"
[1] "im "
[1] "m a"
```

```
[1] " ad"
[1] "ad "
[1] "d m"
[1] " mi"
[1] "min"
[1] "ini"
[1] "nim"
[1] "im "
[1] "m v"
[1] " ve"
[1] "ven"
[1] "eni"
[1] "nia"
[1] "iam"
[1] "am,"
[1] "m, "
[1] ", q"
[1] " qu"
[1] "qui"
[1] "uis"
[1] "is "
[1] "s n"
[1] " no"
[1] "nos"
[1] "ost"
[1] "str"
[1] "tru"
[1] "rud"
[1] "ud "
[1] "d e"
[1] " ex"
[1] "exe"
[1] "xer"
[1] "erc"
[1] "rci"
[1] "cit"
[1] "ita"
[1] "tat"
```

```
[1] "ati"
[1] "tio"
[1] "ion"
[1] "on "
[1] "n u"
[1] " ul"
[1] "ull"
[1] "lla"
[1] "lam"
[1] "amc"
[1] "mco"
[1] "co "
[1] "o l"
[1] " la"
[1] "lab"
[1] "abo"
[1] "bor"
[1] "ori"
[1] "ris"
[1] "is "
[1] "s n"
[1] " ni"
[1] "nis"
[1] "isi"
[1] "si "
[1] "i u"
[1] " ut"
[1] "ut "
[1] "t a"
[1] " al"
[1] "ali"
[1] "liq"
[1] "iqu"
[1] "qui"
[1] "uip"
[1] "ip "
[1] "p e"
[1] " ex"
```

```
[1] "x e"
[1] " ea"
[1] "ea "
[1] "a c"
[1] " co"
[1] "com"
[1] "omm"
[1] "mmo"
[1] "mod"
[1] "odo"
[1] "do "
[1] "o c"
[1] " co"
[1] "con"
[1] "ons"
[1] "nse"
[1] "seq"
[1] "equ"
[1] "qua"
[1] "uat"
[1] "at."
[1] "t. "
[1] ". D"
[1] " Du"
[1] "Dui"
[1] "uis"
[1] "is "
[1] "s a"
[1] " au"
[1] "aut"
[1] "ute"
[1] "te "
[1] "e i"
[1] " ir"
[1] "iru"
[1] "rur"
[1] "ure"
[1] "re "
```

```
[1] "e d"
[1] " do"
[1] "dol"
[1] "olo"
[1] "lor"
[1] "or "
[1] "r i"
[1] " in"
[1] "in "
[1] "n r"
[1] " re"
[1] "rep"
[1] "epr"
[1] "pre"
[1] "reh"
[1] "ehe"
[1] "hen"
[1] "end"
[1] "nde"
[1] "der"
[1] "eri"
[1] "rit"
[1] "it "
[1] "t i"
[1] " in"
[1] "in "
[1] "n v"
[1] " vo"
[1] "vol"
[1] "olu"
[1] "lup"
[1] "upt"
[1] "pta"
[1] "tat"
[1] "ate"
[1] "te "
[1] "e v"
[1] " ve"
```

```
[1] "vel"
[1] "eli"
[1] "lit"
[1] "it "
[1] "t e"
[1] " es"
[1] "ess"
[1] "sse"
[1] "se "
[1] "e c"
[1] " ci"
[1] "cil"
[1] "ill"
[1] "llu"
[1] "lum"
[1] "um "
[1] "m d"
[1] " do"
[1] "dol"
[1] "olo"
[1] "lor"
[1] "ore"
[1] "re "
[1] "e e"
[1] " eu"
[1] "eu "
[1] "u f"
[1] " fu"
[1] "fug"
[1] "ugi"
[1] "gia"
[1] "iat"
[1] "at "
[1] "t n"
[1] " nu"
[1] "nul"
[1] "ull"
[1] "lla"
```

```
[1] "la "       [1] "upi"       [1] "ui "
[1] "a p"       [1] "pid"       [1] "i o"
[1] " pa"       [1] "ida"       [1] " of"
[1] "par"       [1] "dat"       [1] "off"
[1] "ari"       [1] "ata"       [1] "ffi"
[1] "ria"       [1] "tat"       [1] "fic"
[1] "iat"       [1] "at "       [1] "ici"
[1] "atu"       [1] "t n"       [1] "cia"
[1] "tur"       [1] " no"       [1] "ia "
[1] "ur."       [1] "non"       [1] "a d"
[1] "r. "       [1] "on "       [1] " de"
[1] ". E"       [1] "n p"       [1] "des"
[1] " Ex"       [1] " pr"       [1] "ese"
[1] "Exc"       [1] "pro"       [1] "ser"
[1] "xce"       [1] "roi"       [1] "eru"
[1] "cep"       [1] "oid"       [1] "run"
[1] "ept"       [1] "ide"       [1] "unt"
[1] "pte"       [1] "den"       [1] "nt "
[1] "teu"       [1] "ent"       [1] "t m"
[1] "eur"       [1] "nt,"       [1] " mo"
[1] "ur "       [1] "t, "       [1] "mol"
[1] "r s"       [1] ", s"       [1] "oll"
[1] " si"       [1] " su"       [1] "lli"
[1] "sin"       [1] "sun"       [1] "lit"
[1] "int"       [1] "unt"       [1] "it "
[1] "nt "       [1] "nt "       [1] "t a"
[1] "t o"       [1] "t i"       [1] " an"
[1] " oc"       [1] " in"       [1] "ani"
[1] "occ"       [1] "in "       [1] "nim"
[1] "cca"       [1] "n c"       [1] "im "
[1] "cae"       [1] " cu"       [1] "m i"
[1] "aec"       [1] "cul"       [1] " id"
[1] "eca"       [1] "ulp"       [1] "id "
[1] "cat"       [1] "lpa"       [1] "d e"
[1] "at "       [1] "pa "       [1] " es"
[1] "t c"       [1] "a q"       [1] "est"
[1] " cu"       [1] " qu"       [1] "st "
[1] "cup"       [1] "qui"       [1] "t l"
[1] " la"
[1] "lab"
[1] "abo"
[1] "bor"
[1] "oru"
[1] "rum"
[1] "um."
Warning message:
In readLines("BIBD1.txt") : incomplete final line found on 'BIBD1.txt'
>
```

Practical 10

Aim: Write a program for measuring similarity among documents and detecting passages which have been reused.

Installation of required packages before executing program:-

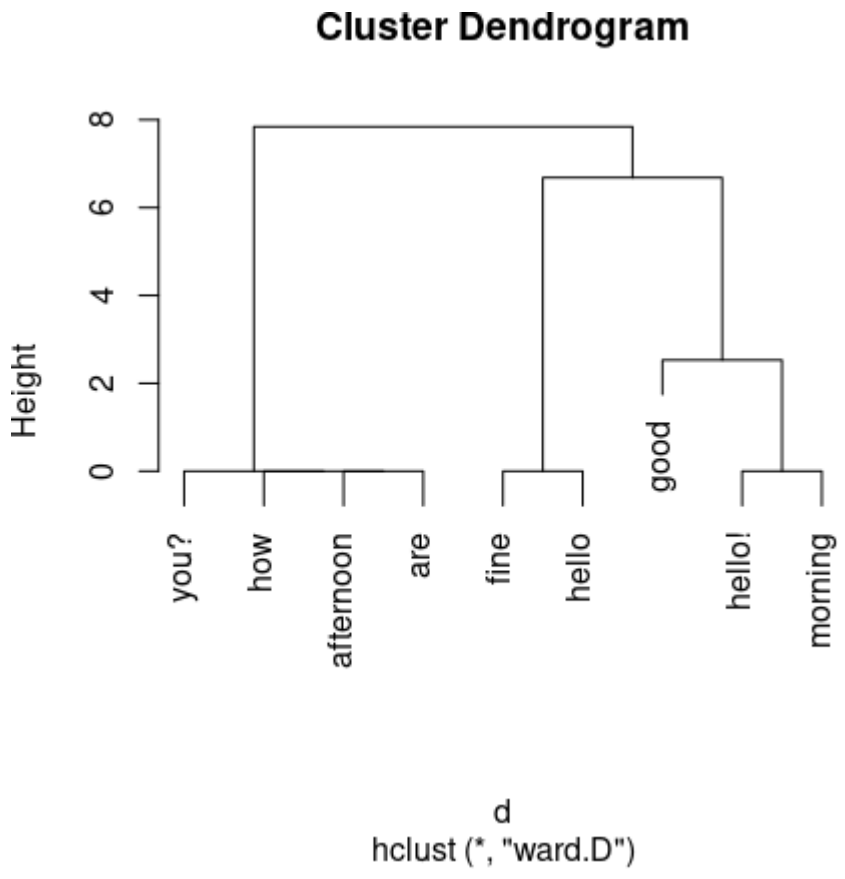
```
install.packages("tm")
require("tm")
install.packages("ggplot2")
install.packages("textreuse")
install.packages("devtools")
```

Source Code a:-

```
require("tm")
my.corpus<-Corpus(DirSource("files"))
my.corpus<-tm_map(my.corpus,removeWords,stopWords("english"))
my.tdm<-TermDocumentMatrix(my.corpus)
#inspect(my.tdm)
my.dtm<-
DocumentTermMatrix(my.corpus,control=list(weighting=weightTfldf,stopw
ords=TRUE))
#inspect(my.dtm)
my.df<-as.data.frame(inspect(my.tdm))
my.df.scale<-scale(my.df)
d<-dist(my.df.scale,method = "euclidean")
fit<-hclust(d,method = "ward.D")
plot(fit)
```

Output:

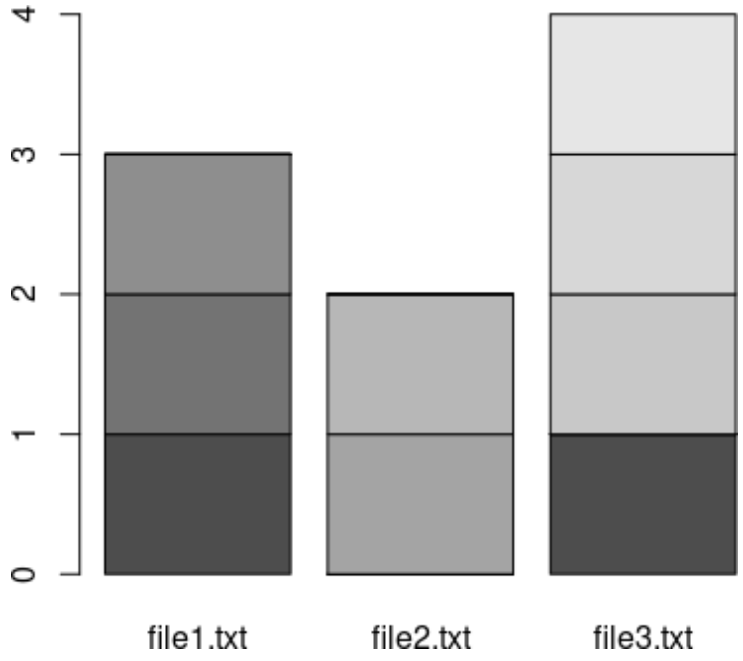
```
<<TermDocumentMatrix (terms: 9, documents: 3)>>
Non-/sparse entries: 10/17
Sparsity           : 63%
Maximal term length: 9
Weighting          : term frequency (tf)
Sample             :
           Docs
Terms       file1.txt file2.txt file3.txt
  afternoon         0         0         1
  are               0         0         1
  fine              0         1         0
  good              1         0         1
  hello             0         1         0
  hello!            1         0         0
  how               0         0         1
  morning           1         0         0
  you?              0         0         1
> my.df.scale<-scale(my.df)
> d<-dist(my.df.scale,method = "euclidean")
> fit<-hclust(d,method = "ward.D")
> plot(fit)
>
```

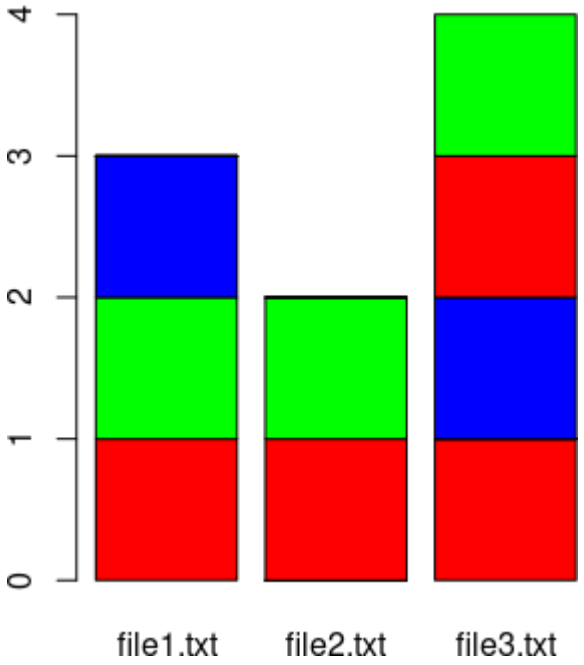


Source code b (using bar plot with and without color):-

```
my.corpus<-Corpus(DirSource("/cloud/project/files"))
my.corpus<-tm_map(my.corpus,removeWords,stopwords("english"))
my.tdm<-TermDocumentMatrix(my.corpus)
inspect(my.tdm)
my.df<-as.data.frame(inspect(my.tdm))
barplot(as.matrix(my.tdm))
#barplot(as.matrix(my.tdm),col=color)
barplot(as.matrix(my.tdm),col= c("Red","Green","Blue"))
```

Output:





Source code c (using minhash and jaccard similarity):-

```
library("textreuse")
```

Source Code

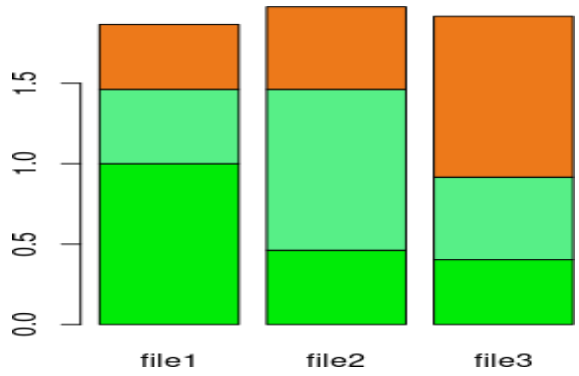
```
minhash <- minhash_generator(200, seed = 235)
ats <- TextReuseCorpus(dir = "files", tokenizer = tokenize_ngrams, n = 5,
minhash_func = minhash)

buckets <- lsh(ats, bands = 50, progress = interactive())
candidates <- lsh_candidates(buckets)
scores <- lsh_compare(candidates, ats, jaccard_similarity, progress = F)
scores

barplot(as.matrix(scores), col = c("#00eb07", "#57ef87", "#ed791a",
"#5e5fff", "#1cf1c6", "#5e035b"))
```

Output:

```
# A tibble: 3 x 3
  a     b     score
  <chr> <chr> <dbl>
1 file1 file2 0.462
2 file1 file3 0.403
3 file2 file3 0.513
```



Practical 11

Aim: Write a java Program to demonstrate the k-moments for zeroth, first and second moments

Input:

```
import java.io.*;
import java.util.*;

class KMoments
{
                                public static void main(String[] args)
                                {
                                int n = 15;
                                String stream[] =
{"a","b","c","b","d","a","c","d","a","b","d","c","a","a","b"};
                                int zerothMoment = 0, firstMoment = 0, secondMoment = 0,
count = 1, flag = 0;
                                ArrayList<Integer> arrayList = new ArrayList();

                                for(String character : stream)
                                {
                                        System.out.print(character + "\t\t\t");
                                }
                                System.out.println();
                                Arrays.sort(stream);

                                for(int i = 1; i < n; i++)
                                {
                                        if(stream[i] == stream[i - 1])
                                                count++;
                                        else
                                        {
                                                arrayList.add(count);
                                                count = 1;
                                        }
                                }
                                arrayList.add(count);
                                System.out.println("Zeroth moment:\t\t\t" +
zerothMoment);
```

```
                        for(int i : arrayList)
                        {
                                firstMoment += i;
                                secondMoment += i * i;
                        }
                        System.out.println("First Moment:\t\t\t" + firstMoment);
                        System.out.println("Second Moment:\t\t\t" +
secondMoment);


                        }
}
```

Output: