Deep Panchal
TY - 9 - B - 38

Experiment no : 8

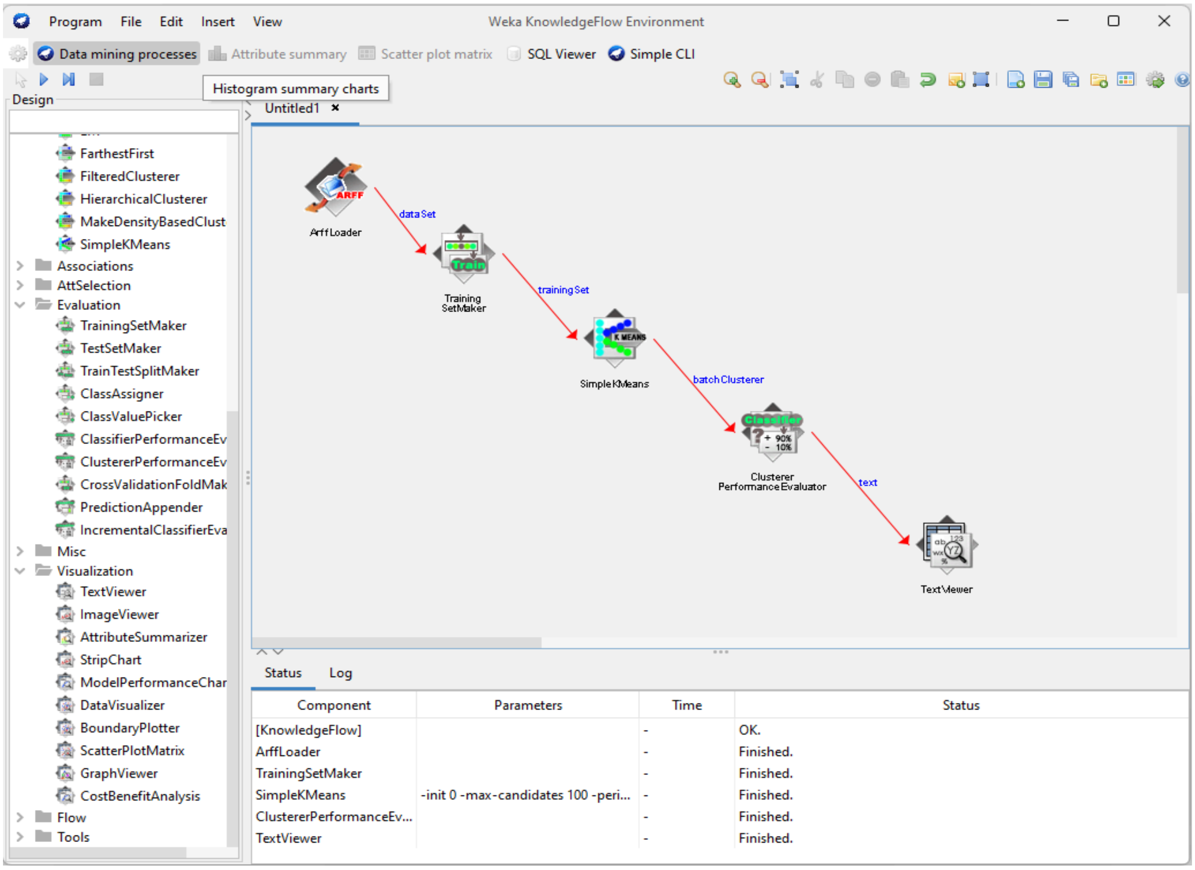
Aim: Perform data Pre-processing task and Demonstrate Classification algorithm on data sets using data mining tools (WEKA)

What is WEKA

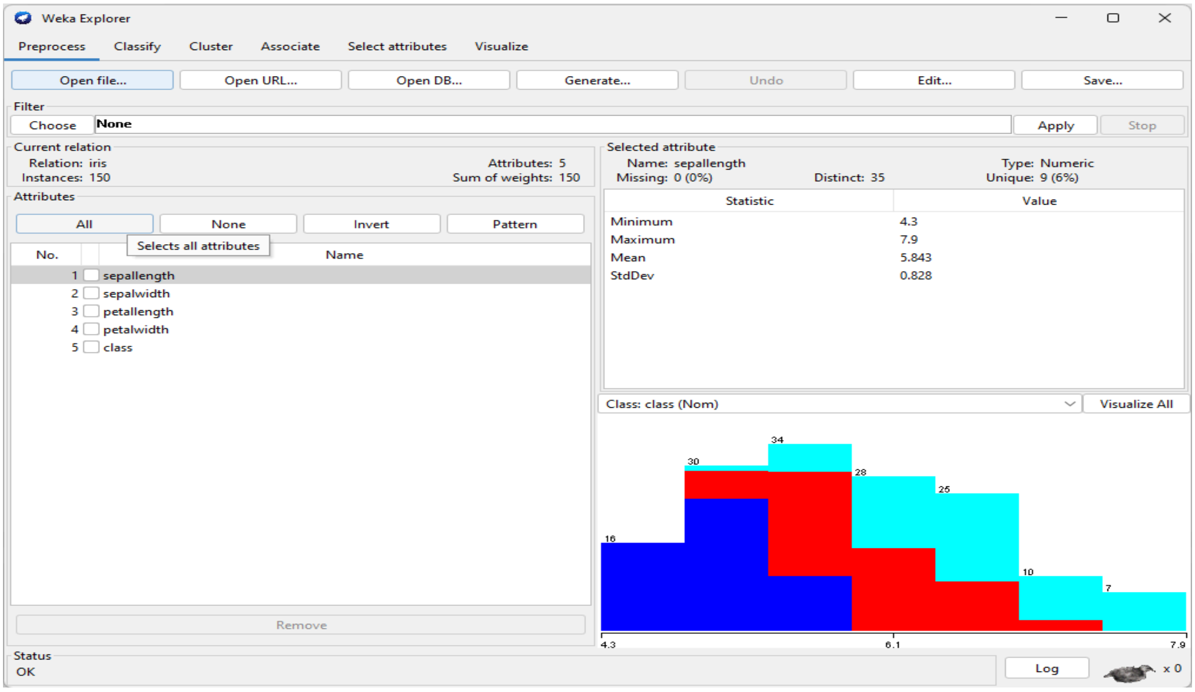
Weka is an open-source software suite for machine learning and data mining. It offers tools for data preprocessing, classification, regression, clustering, and visualization. It provides a user-friendly graphical interface and supports a wide range of algorithms like decision trees, and k-means. Weka is widely used for educational and research purposes due to its ease of use and extensibility.

1. Install Weka.
2. Load a Dataset into Weka.
3. Preprocess the Data (cleaning, feature selection, normalization).
4. Choose an Algorithm (classification, clustering, etc.).
5. Train the Model using cross-validation or split data.
6. Evaluate the Model (accuracy, confusion matrix, etc.).
7. Visualize the model if applicable (e.g., decision trees).
8. Save the Model or make predictions on new data.

OUTPUT:



Component	Parameters	Time	Status
[KnowledgeFlow]		-	OK.
ArffLoader		-	Finished.
TrainingSetMaker		-	Finished.
SimpleKMeans	-init 0 -max-candidates 100 -peri...	-	Finished.
ClustererPerformanceEv...		-	Finished.
TextViewer		-	Finished.



Filter: None

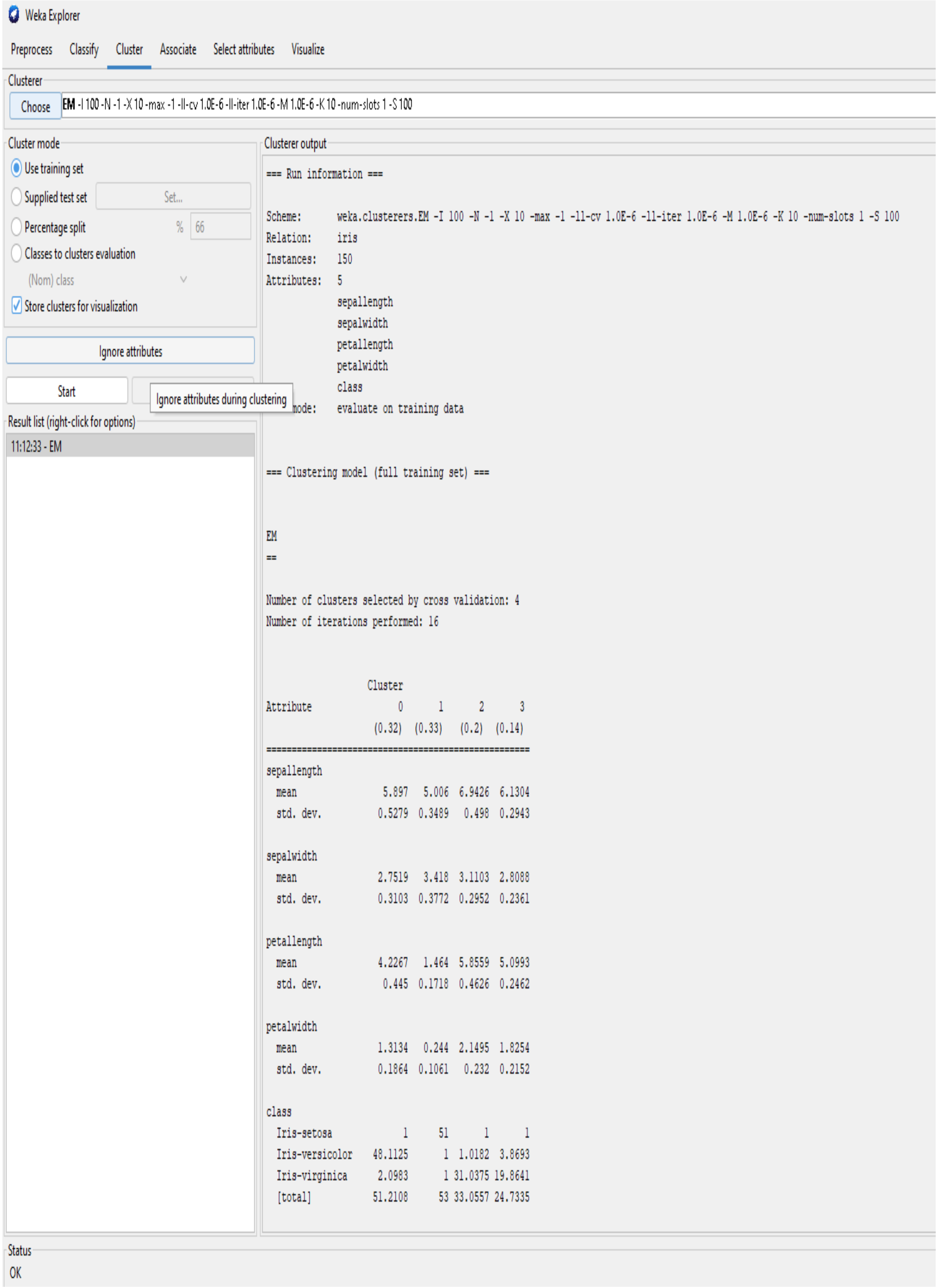
Current relation
Relation: iris
Instances: 150
Attributes: 5
Sum of weights: 150

Selected attribute
Name: sepallength
Missing: 0 (0%)
Distinct: 35
Type: Numeric
Unique: 9 (6%)

No.		Name
1	□	sepallength
2	□	sepalwidth
3	□	petallength
4	□	petalwidth
5	□	class

Statistic	Value
Minimum	4.3
Maximum	7.9
Mean	5.843
StdDev	0.828

Status
OK



EM -I 100 -N -1 -X 10 -max -1 -ll-cv 1.0E-6 -ll-iter 1.0E-6 -M 1.0E-6 -K 10 -num-slots 1 -S 100

● Use training set
○ Supplied test set Set...
○ Percentage split % 66
○ Classes to clusters evaluation
(Nom) class
☑ Store clusters for visualization

11:12:33 - EM

```
=== Run information ===

Scheme:       weka.clusterers.EM -I 100 -N -1 -X 10 -max -1 -ll-cv 1.0E-6 -ll-iter 1.0E-6 -M 1.0E-6 -K 10 -num-slots 1 -S 100
Relation:     iris
Instances:    150
Attributes:   5
              sepallength
              sepalwidth
              petallength
              petalwidth
              class
        mode:   evaluate on training data


=== Clustering model (full training set) ===


EM
==

Number of clusters selected by cross validation: 4
Number of iterations performed: 16


                   Cluster
Attribute                0       1       2       3
                    (0.32)  (0.33)   (0.2)  (0.14)
===================================================
sepallength
  mean               5.897   5.006  6.9426  6.1304
  std. dev.         0.5279  0.3489   0.498  0.2943

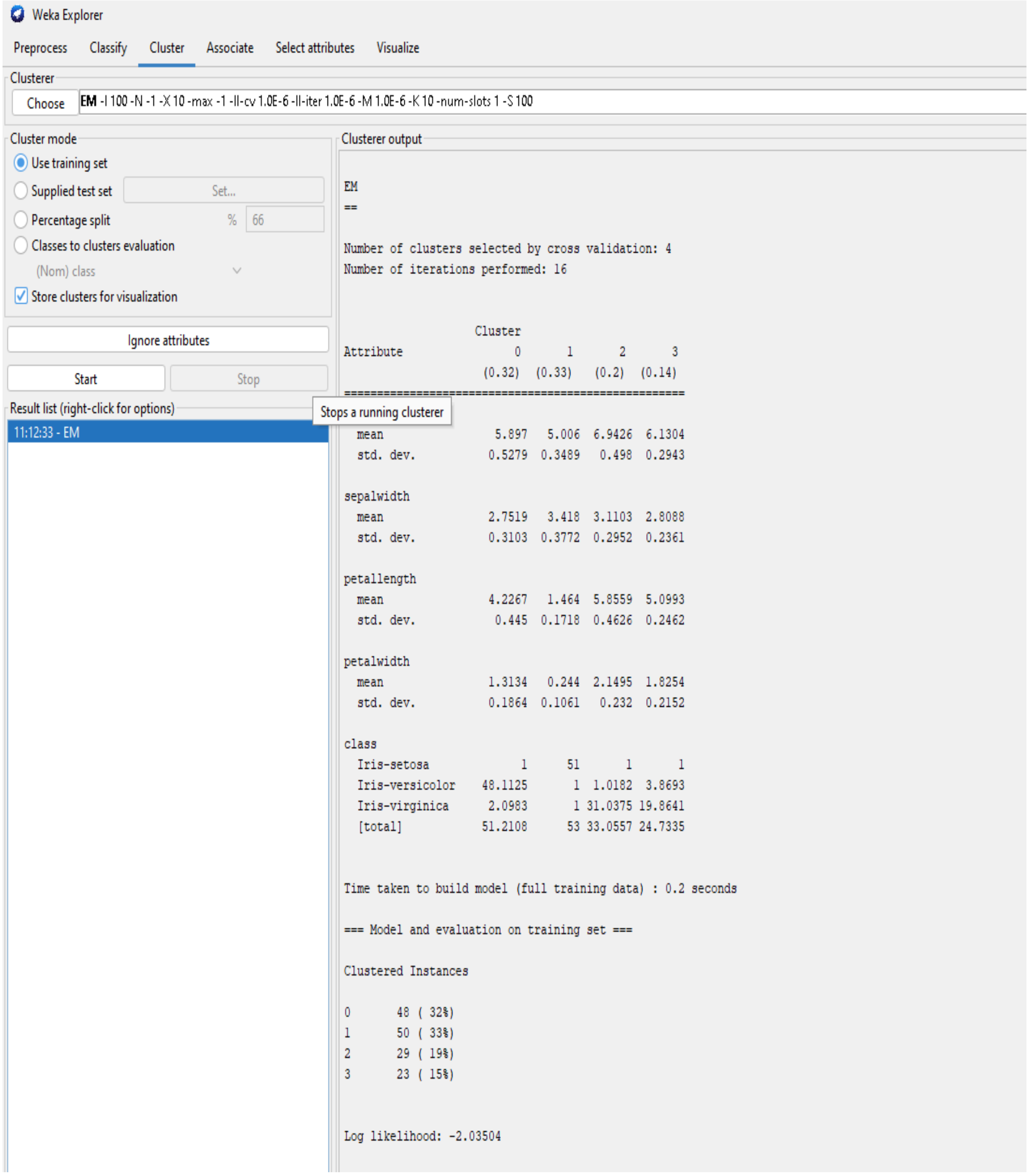
sepalwidth
  mean              2.7519   3.418  3.1103  2.8088
  std. dev.         0.3103  0.3772  0.2952  0.2361

petallength
  mean              4.2267   1.464  5.8559  5.0993
  std. dev.          0.445  0.1718  0.4626  0.2462

petalwidth
  mean              1.3134   0.244  2.1495  1.8254
  std. dev.         0.1864  0.1061   0.232  0.2152

class
  Iris-setosa            1      51       1       1
  Iris-versicolor  48.1125       1  1.0182  3.8693
  Iris-virginica    2.0983       1 31.0375 19.8641
  [total]          51.2108      53 33.0557 24.7335
```

OK



EM -I 100 -N -1 -X 10 -max -1 -ll-cv 1.0E-6 -ll-iter 1.0E-6 -M 1.0E-6 -K 10 -num-slots 1 -S 100

● Use training set
○ Supplied test set
○ Percentage split % 66
○ Classes to clusters evaluation
(Nom) class
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11:12:33 - EM

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EM
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  Iris-virginica     2.0983       1 31.0375 19.8641
  [total]           51.2108      53 33.0557 24.7335


Time taken to build model (full training data) : 0.2 seconds

=== Model and evaluation on training set ===

Clustered Instances

0       48 ( 32%)
1       50 ( 33%)
2       29 ( 19%)
3       23 ( 15%)


Log likelihood: -2.03504
```

Conclusion

Using WEKA, we performed data preprocessing and applied classification algorithms on a dataset. Proper preprocessing improved model performance. This demonstrates how essential clean data and the right algorithm are for successful classification in data mining.

GITHUB : https://github.com/panchaldeep1123/dwm