Green University of Bangladesh
Department of Computer Science and Engineering (CSE)
Faculty of Sciences and Engineering
Semester: (Spring, Year: 2024), B.Sc. in CSE (Day)

Lab Report NO 03
Course Title: Artificial Intelligence Lab
Course Code: CSE 316   Section: 213_D4

Lab Experiment Name: Open new data file and configure WEKA for that particular file. Now run the above mentioned methods in section 2 observe the results and generate inner reflection.

Student Details

	Name	ID
1.	Md.Rabby Khan	213902037

Lab Date   : 25-05-24
Submission Date   : 12-06-24
Course Teacher's Name   : Md Fahimul Islam

Lab Report Status
Marks: ……………………………
Signature:....................
Comments:..
Date:..............................

1. TITLE OF THE LAB REPORT EXPERIMENT

Open new data file and configure WEKA for that particular file. Now run the above mentioned methods in section 2 observe the results and generate inner reflection.

2. OBJECTIVES/AIM

- Learn to use the WEKA GUI efficiently.
- Load, preprocess, and visualize datasets.
- Apply and assess different classification methods.
- Identify data clusters and analyze their significance.
- Uncover relationships between dataset attributes.
- Select key attributes to enhance model accuracy.
- Generate and interpret visual data representations.
- Gain hands-on experience with WEKA tools.
- Improve data analysis and decision-making abilities.

3. PROCEDURE / ANALYSIS / DESIGN

- Start WEKA, open Explorer, and load `weather.numeric.arff`.
- Visualize attributes, apply filters for cleaning and transformation.
- Select a classifier (e.g., ZeroR), configure test settings, and evaluate performance metrics.
- Choose a clustering algorithm (e.g., EM), execute it, and analyze cluster results.
- Apply Apriori algorithm to discover attribute relationships.
- Use CfsSubsetEval and BestFirst methods to identify relevant attributes.
- Utilize the Visualize tab for scatter plot analysis and data exploration.

4. IMPLEMENTATION

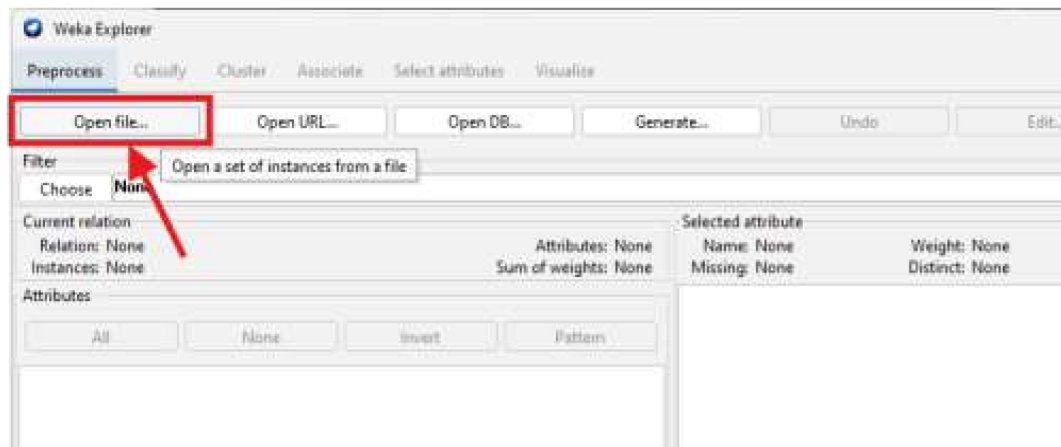*Figure 1.1: Click on the explorer button in WEKA.*

Figure 1.2: Click on the open file button to select a dataset.
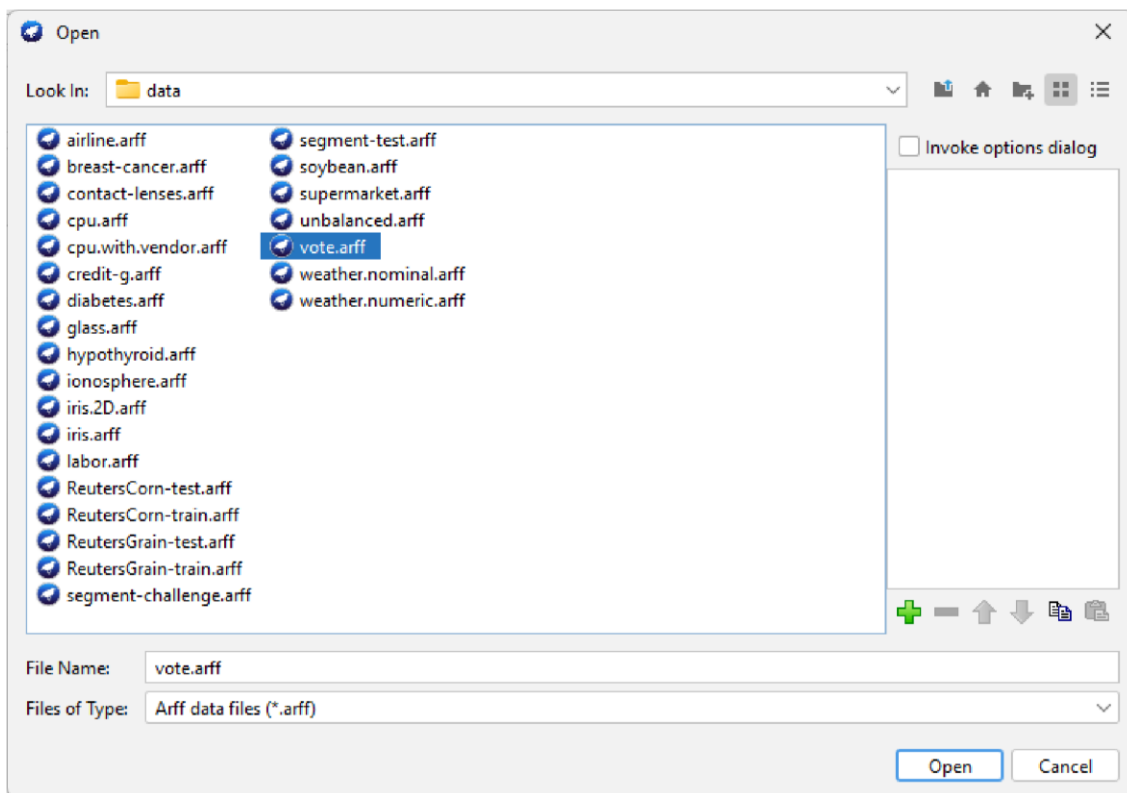
Figure 1.3: Select a dataset from directory and click open.
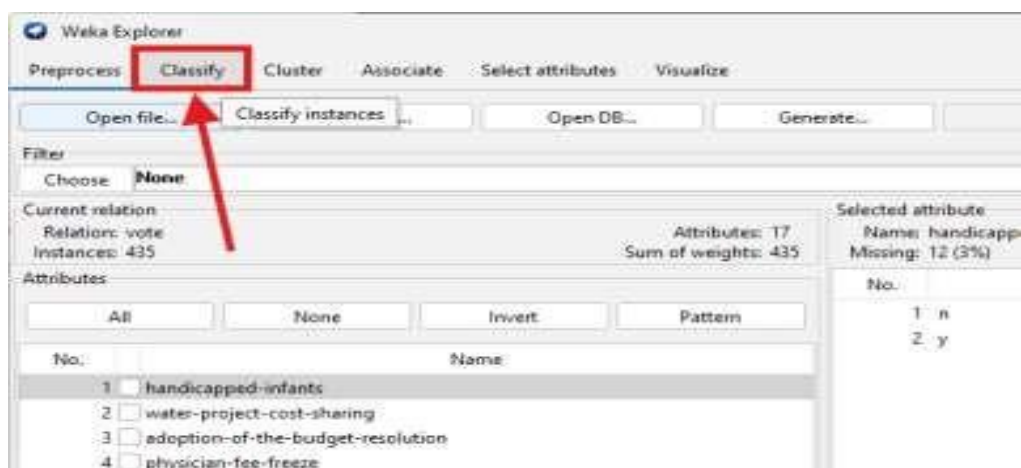

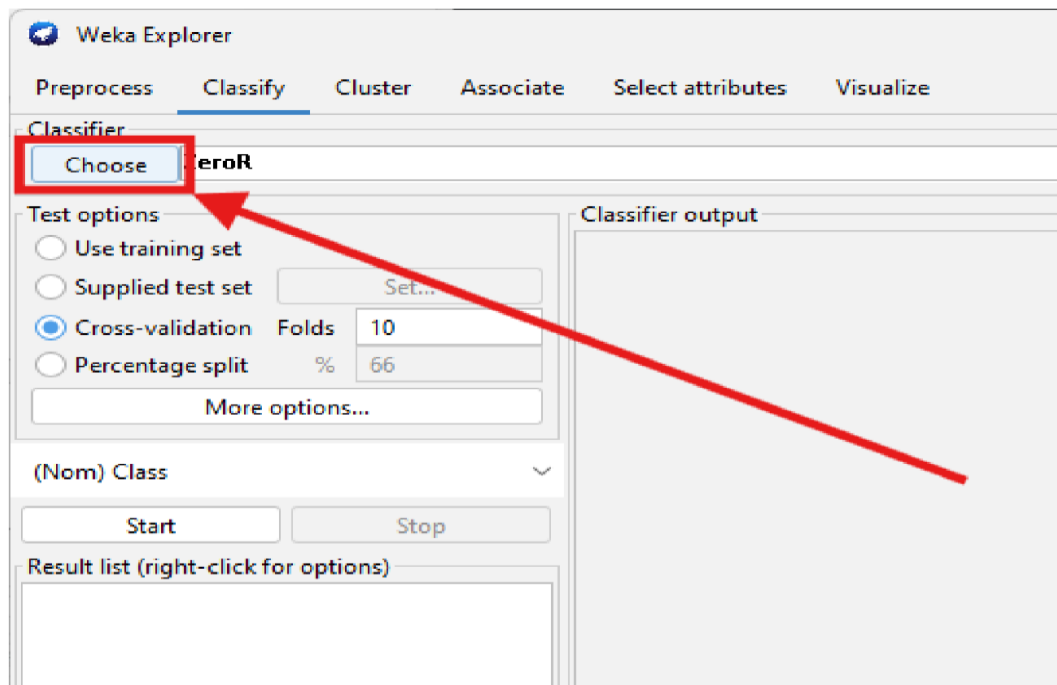*Figure 1.4: Click on classify button to apply the classification algorithms.*

Figure 1.5: Click on choose button to choose the classification algorithm.
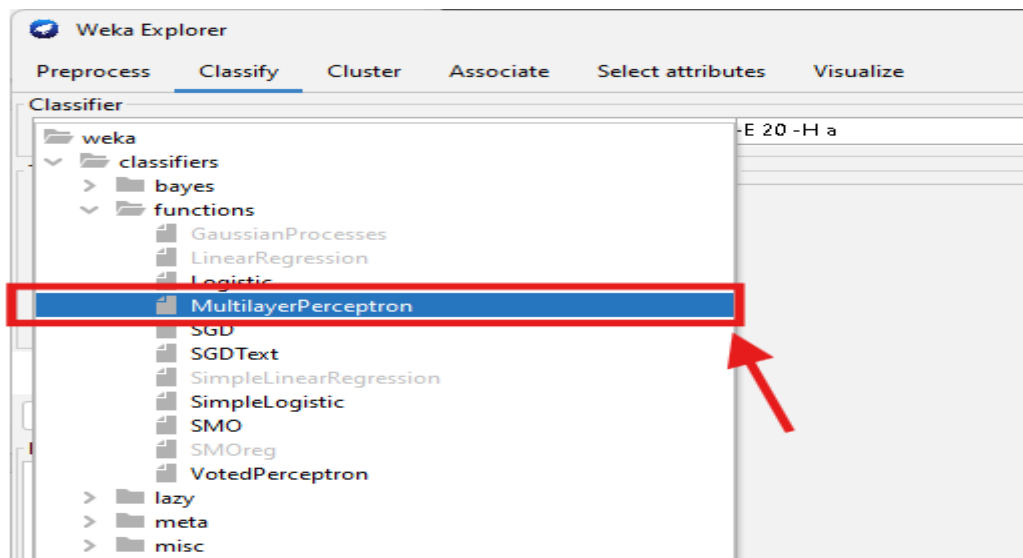

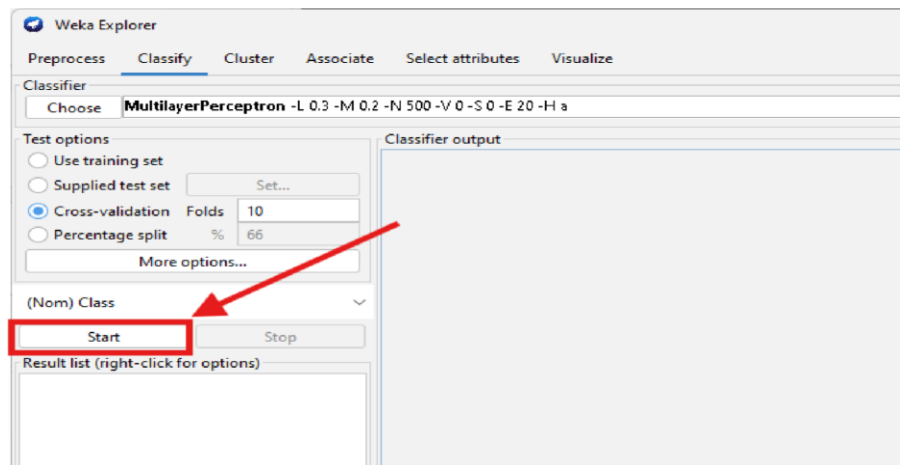*Figure 1.6: Select MultilayerPerception algorithm.*

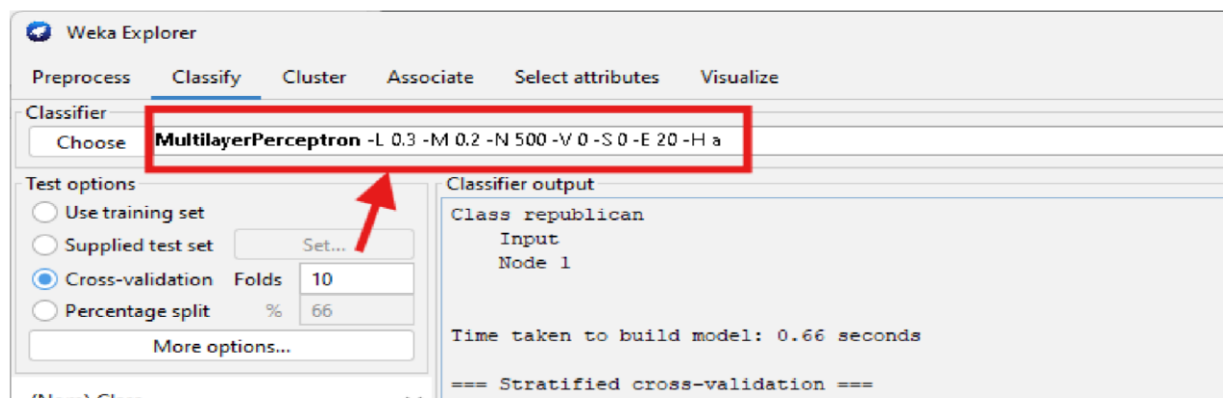Figure 1.7: Click on start button to apply multilayer perception algorithm.

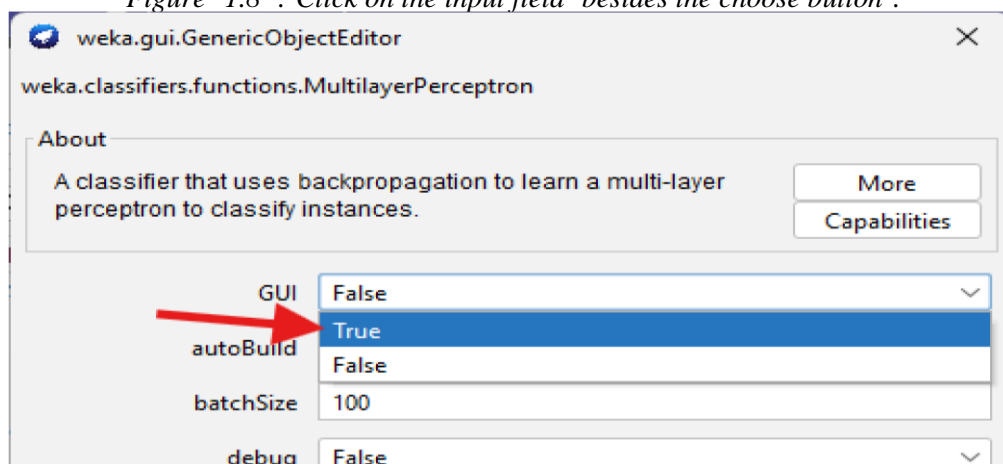*Figure 1.8 : Click on the input field besides the choose button .*

Figure 1. 9 : Change the GUI checkbox from false to   true.

Figure 1.10: Click on ok to make the changes to be applied in WEKA.
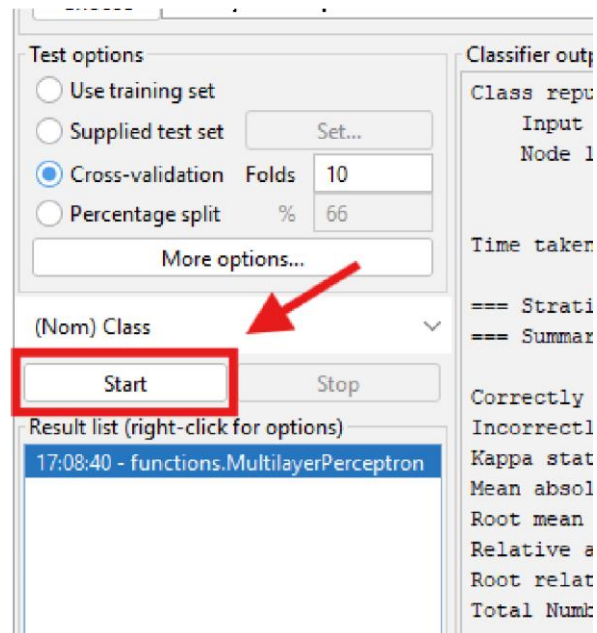

Figure 1.11: Click on start button to run the Neural Network.

5. TEST RESULT / OUTPUT

```
Time taken to build model: 0.66 seconds

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

Correctly Classified Instances         412                94.7126 %
Incorrectly Classified Instances        23                 5.2874 %
Kappa statistic                          0.8888
Mean absolute error                      0.0528
Root mean squared error                  0.2078
Relative absolute error                 11.135  %
Root relative squared error             42.6788 %
Total Number of Instances              435

=== Detailed Accuracy By Class ===

                TP Rate  FP Rate  Precision  Recall  F-Measure  MCC    ROC Area  PRC Area  Class
                0.951    0.060    0.962      0.951   0.957      0.889  0.991     0.995     democrat
                0.940    0.049    0.924      0.940   0.932      0.889  0.991     0.984     republican
Weighted Avg.   0.947    0.055    0.947      0.947   0.947      0.889  0.991     0.991

=== Confusion Matrix ===

   a   b   <-- classified as
 254  13 |   a = democrat
  10 158 |   b = republican
```

6. ANALYSIS AND DISCUSSION

In analysis using WEKA, classifier performance is assessed with metrics like accuracy and precision. Clustering reveals data patterns and their segmentation relevance. Association rules mining uncovers attribute relationships via support and confidence measures, enhancing data understanding. Attribute selection optimizes model efficiency by prioritizing predictive attributes. Visual interpretations, like scatter plots, reveal data trends and outliers. Practical applications translate insights into decision-making, guiding future research for advancing data analysis methodologies.