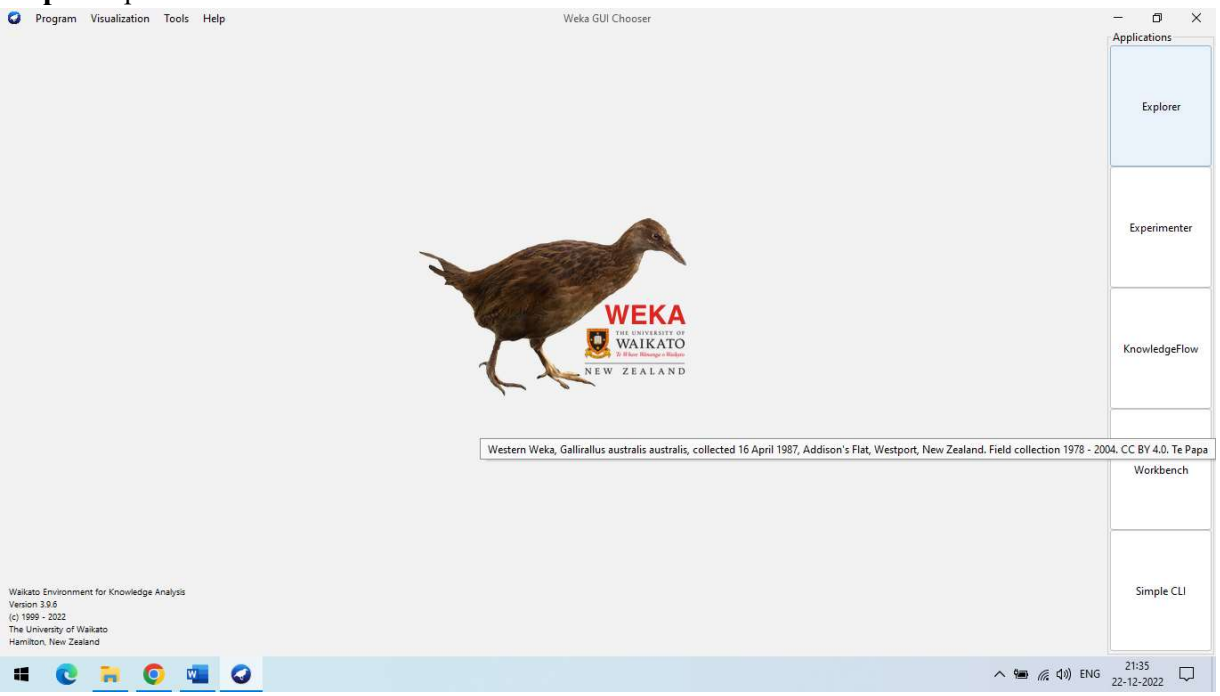
PRACTICAL-9

AIM: Perform classification with WEKA tool.
a. using Decision Tree Classifier
b. using Naïve Bayes Classifier
c. using Multilayer Perceptron.

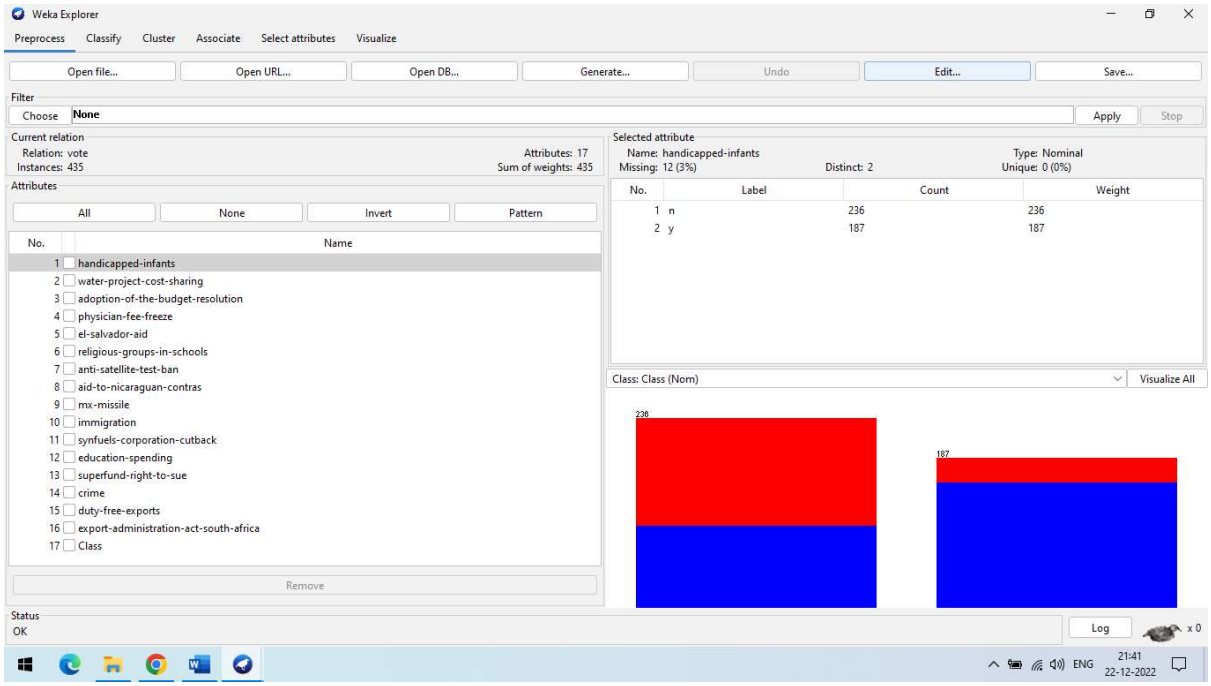
Steps:

(A) Using Decision Tree Classifier:- A decision tree is a class discriminator that recursively partitions the training set until each partition consists entirely or dominantly of examples from one class. Each non-leaf node of the tree contains a split point that is a test on one or more attributes and determines how the data is partitioned. A decision tree is a structure that includes a root node, branches, and leaf nodes. Each internal node denotes a test on an attribute, each branch denotes the outcome of a test, and each leaf node holds a class label. The topmost node in the tree is the root node. Decision Tree Mining is a type of data mining technique that is used to build Classification Models. It builds classification models in the form of a tree-like structure, just like its name. This type of mining belongs to supervised class learning.

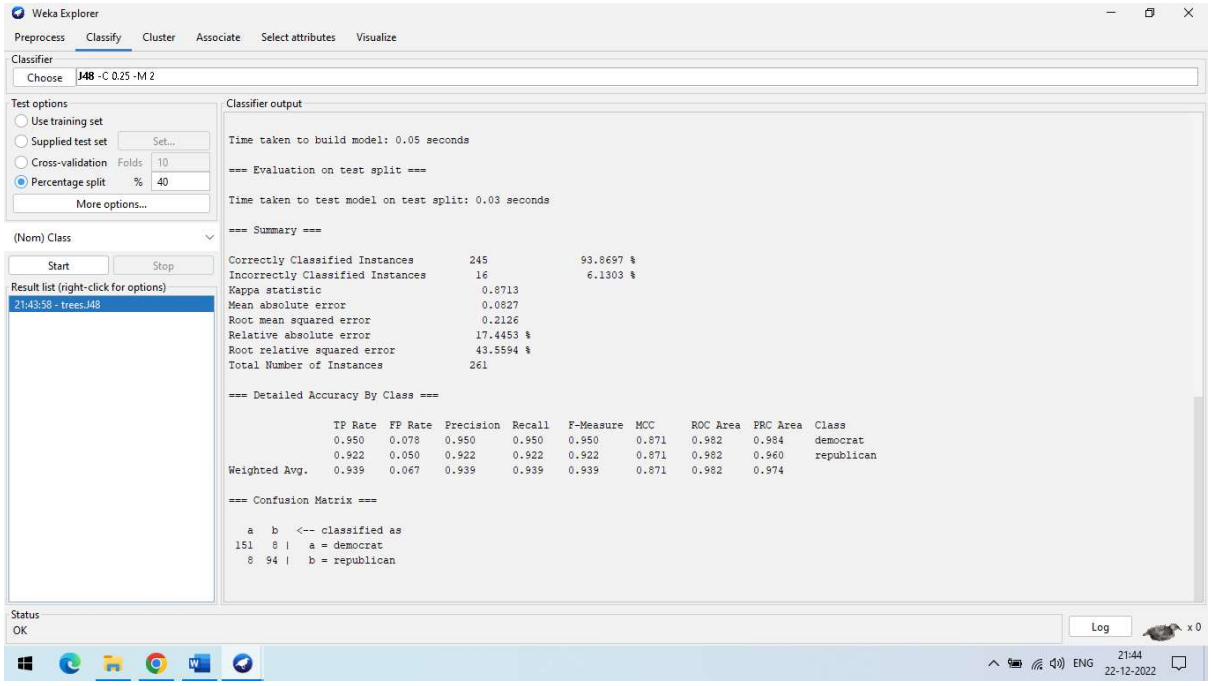
Step 1: Open Weka Tool



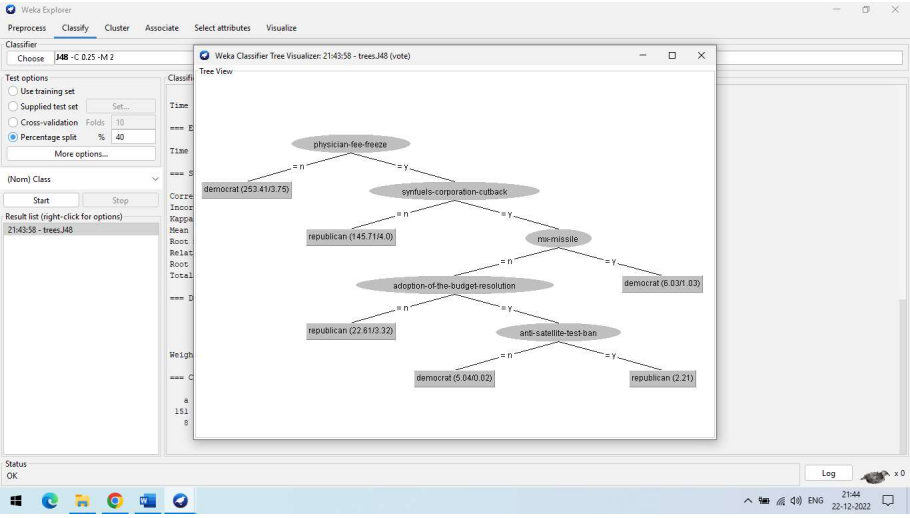
Step 2: weka→explorer→open file→ vote. Arff



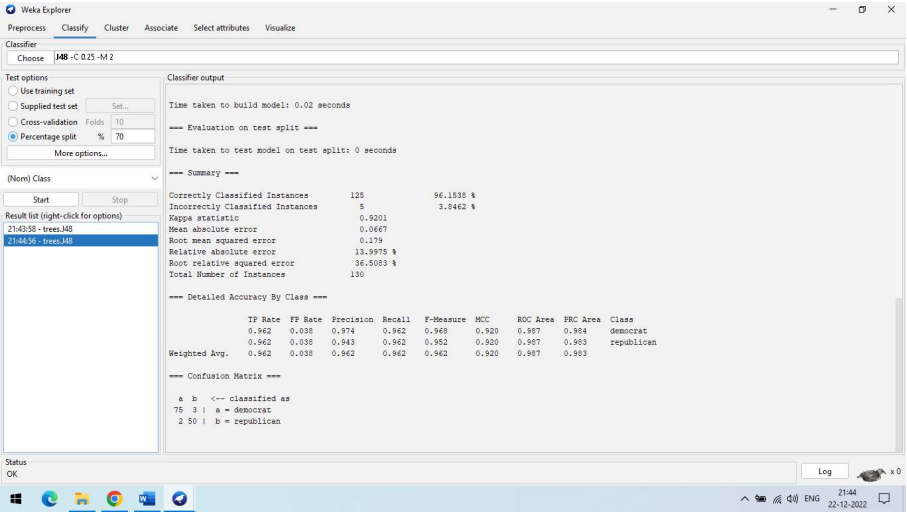
Step 3: Go to the classify >> choose filter j48 >> give percentage split(40%) >> click start



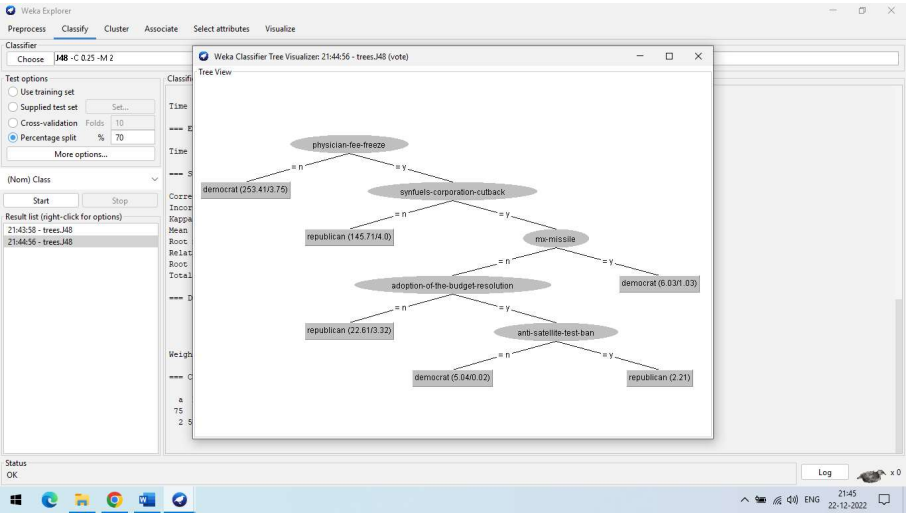
Step 4: right click on result list >> visualize tree



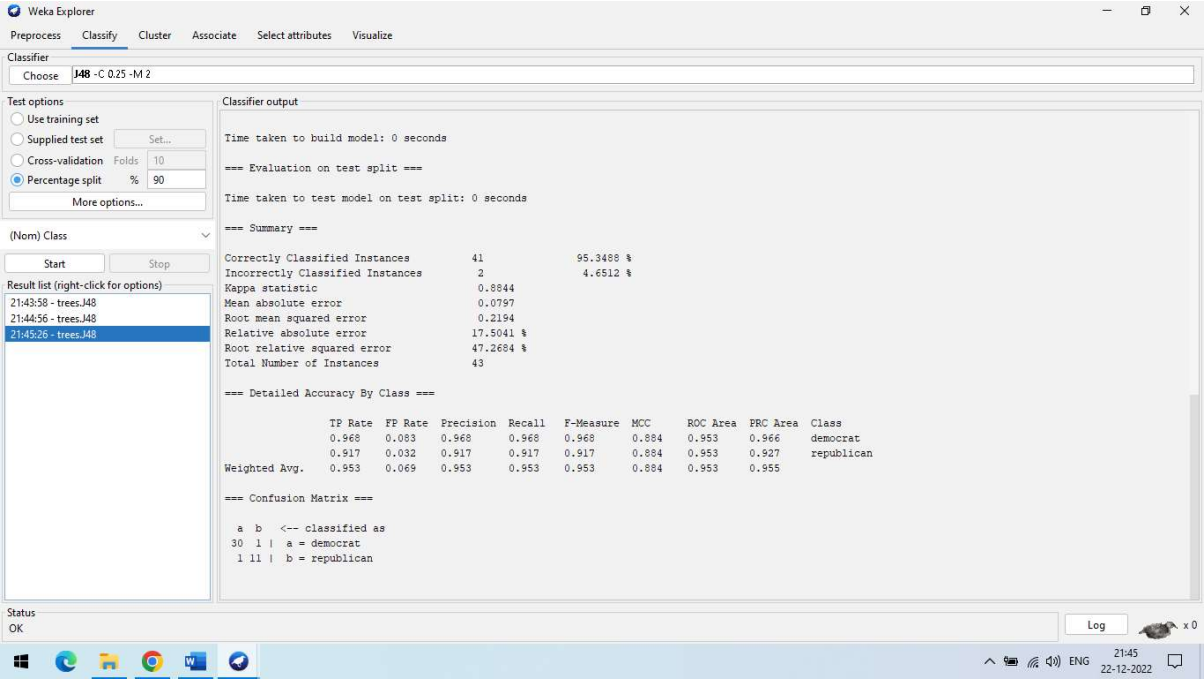
Step 5: Go to the classify >> choose filter j48 >> give percentage split(70%) >> click start



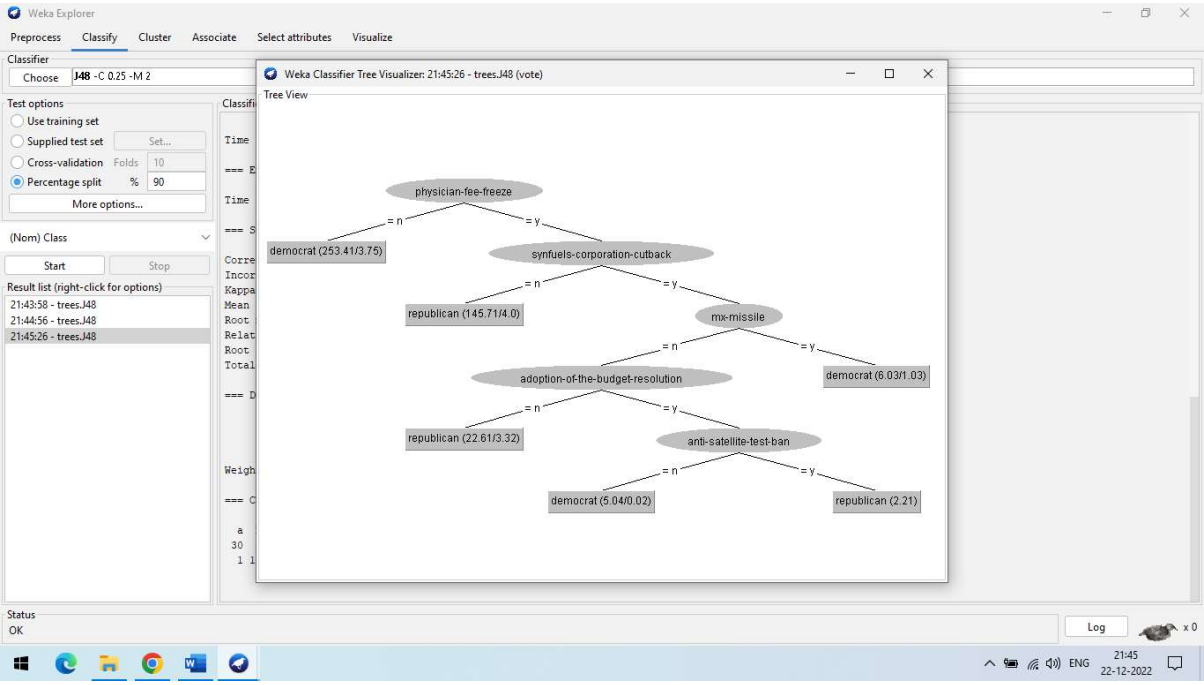
Step 6: right click on result list >> visualize tree



Step 7: Go to the classify >> choose filter j48 >> give percentage split(90%) >> click start



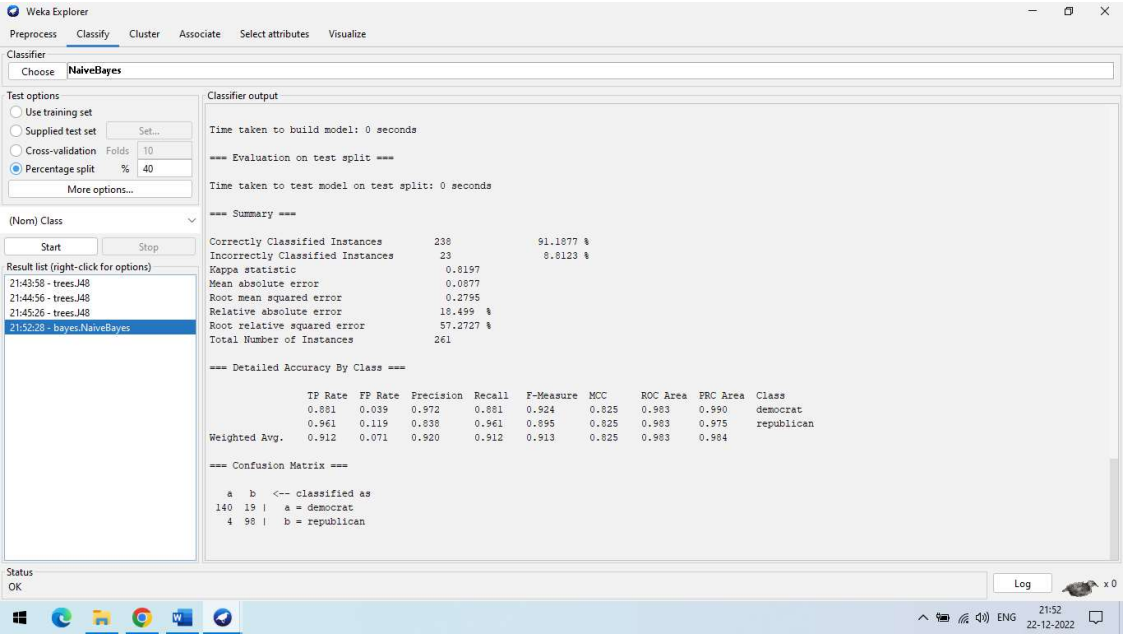
Step 8: right click on result list >> visualize tree



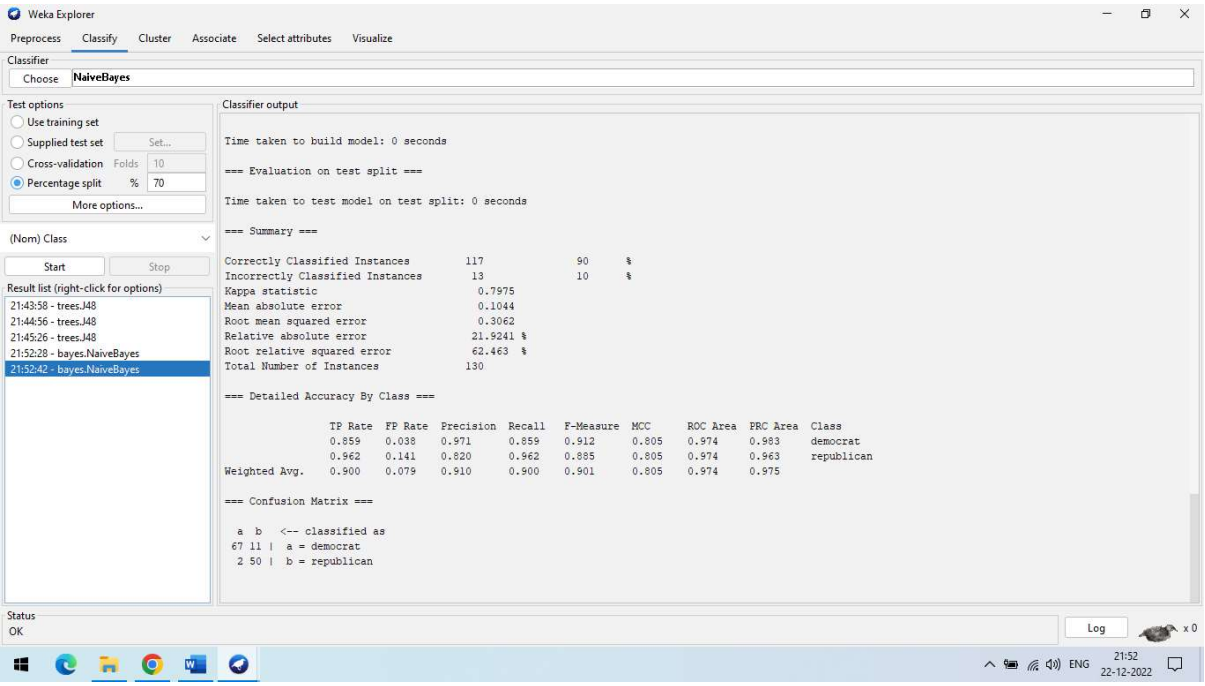
(B) Using Naïve Bayes Classifier: -

Naïve Bayes algorithm is a supervised learning algorithm, which is based on Bayes theorem and used for solving classification problems. It is mainly used in text classification that includes a high-dimensional training dataset. Naïve Bayes Classifier is one of the simple and most effective Classification algorithms which helps in building the fast machine learning models that can make quick predictions. It is a probabilistic classifier, which means it predicts based on the probability of an object. Some popular examples of Naïve Bayes Algorithm are spam filtration, Sentimental analysis, and classifying articles.

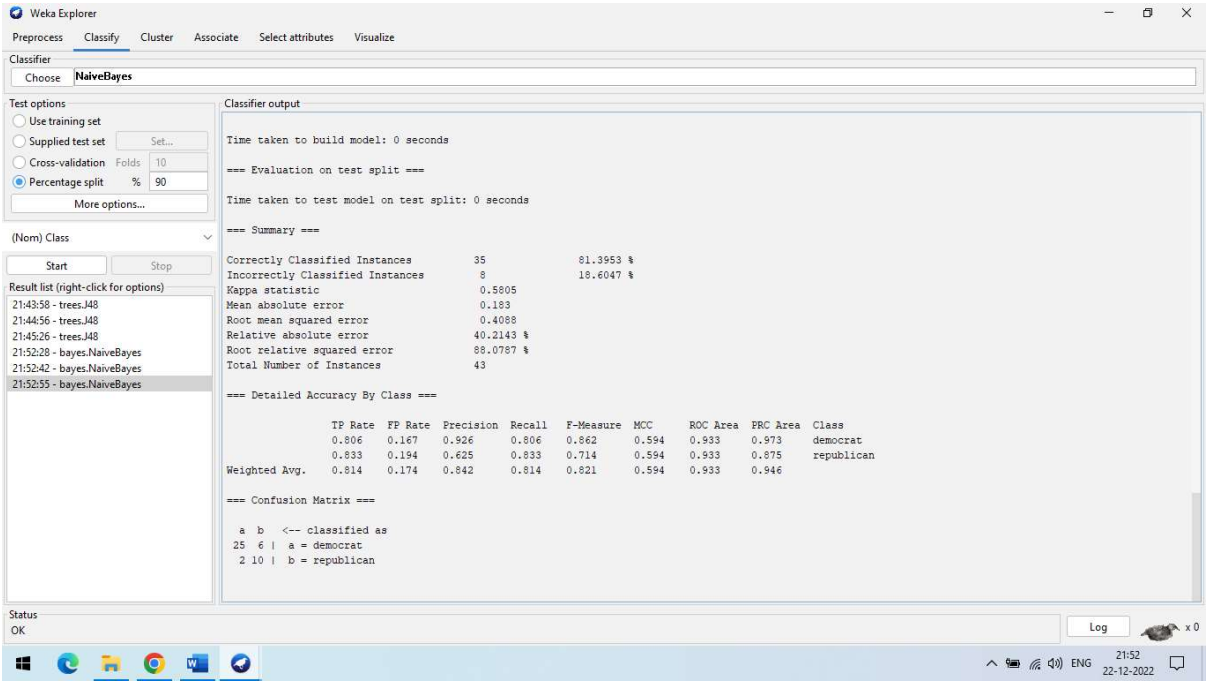
Step 1: Go to the classify >> choose filter NaiveBayes >> give percentage split(40%) >> click start.



Step 2: Go to the classify >> choose filter NaiveBayes >> give percentage split(70%) >> click start.



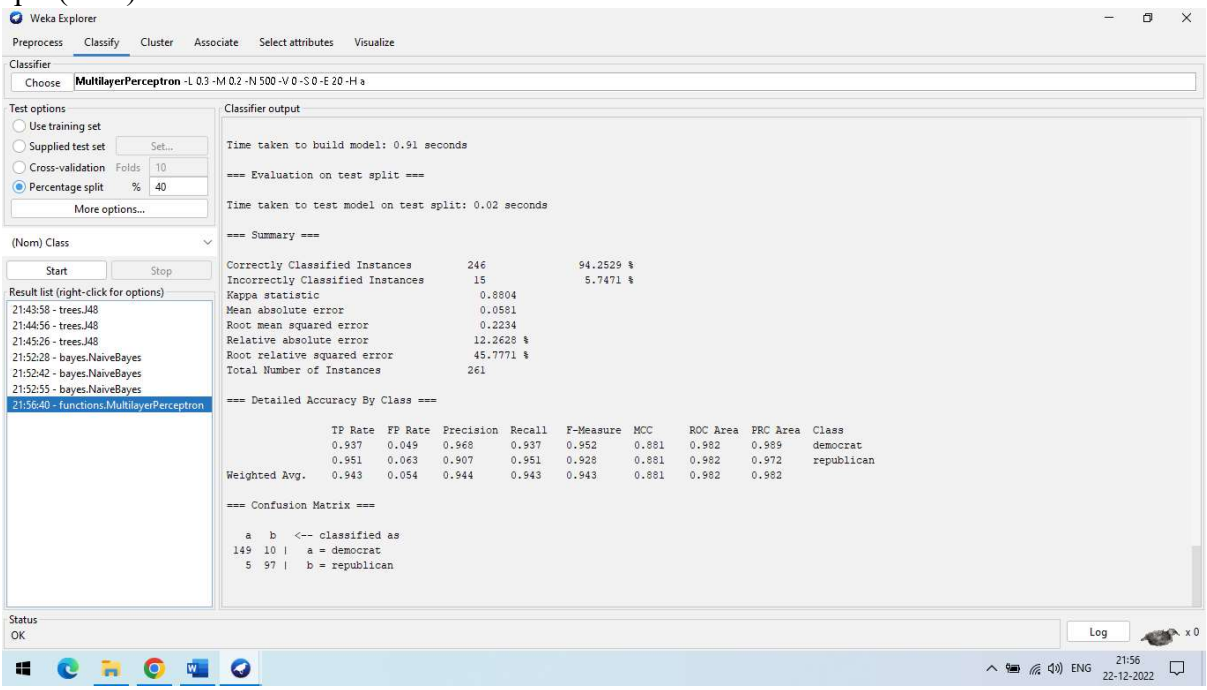
Step 3: Go to the classify >> choose filter NaiveBayes >> give percentage split(90%) >> click start.



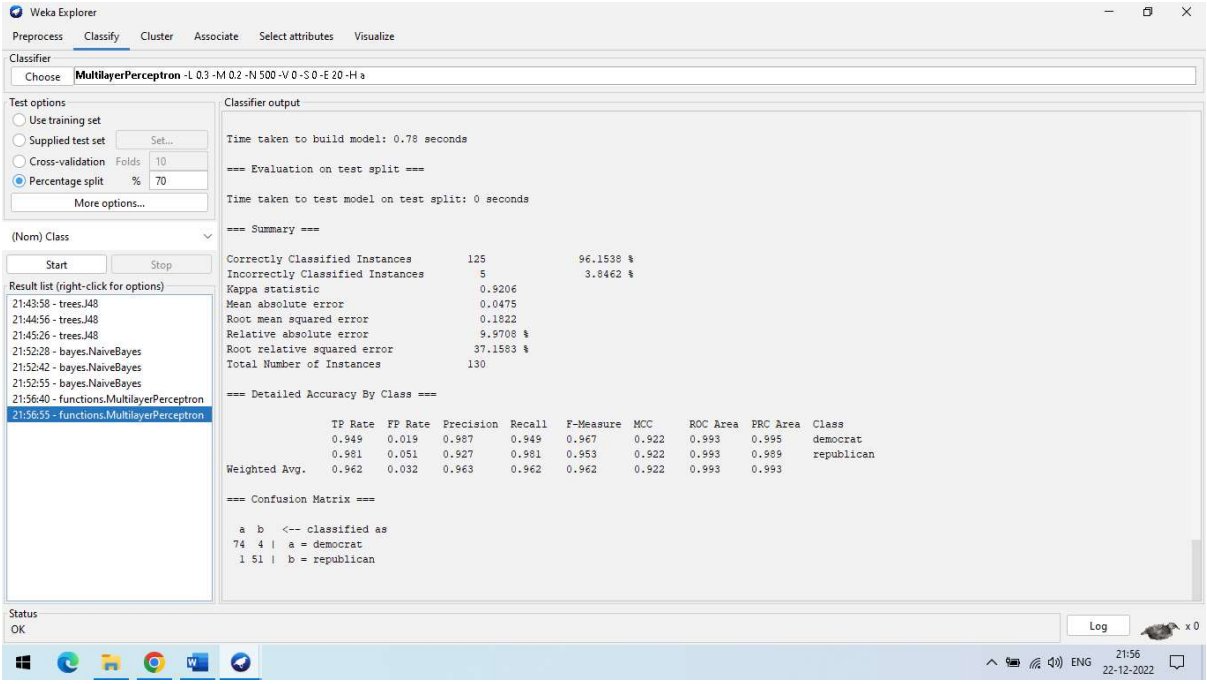
(c) Using Multilayer Perceptron:-

Multi-layer perception is also known as MLP. It is fully connected dense layers, which transform any input dimension to the desired dimension. A multi-layer perception is a neural network that has multiple layers. To create a neural network we combine neurons together so that the outputs of some neurons are inputs of other neurons. In the multi-layer perceptron diagram above, we can see that there are three inputs and thus three input nodes and the hidden layer has three nodes. The output layer gives two outputs, therefore there are two output nodes. The nodes in the input layer take input and forward it for further process, in the diagram above the nodes in the input layer forwards their output to each of the three nodes in the hidden layer, and in the same way, the hidden layer processes the information and passes it to the output layer. Every node in the multi-layer perception uses a sigmoid activation function. The sigmoid activation function takes real values as input and converts them to numbers between 0 and 1 using the sigmoid formula. Now that we are done with the theory part of multi-layer perception, let's go ahead and implement some code in python using the TensorFlow library.

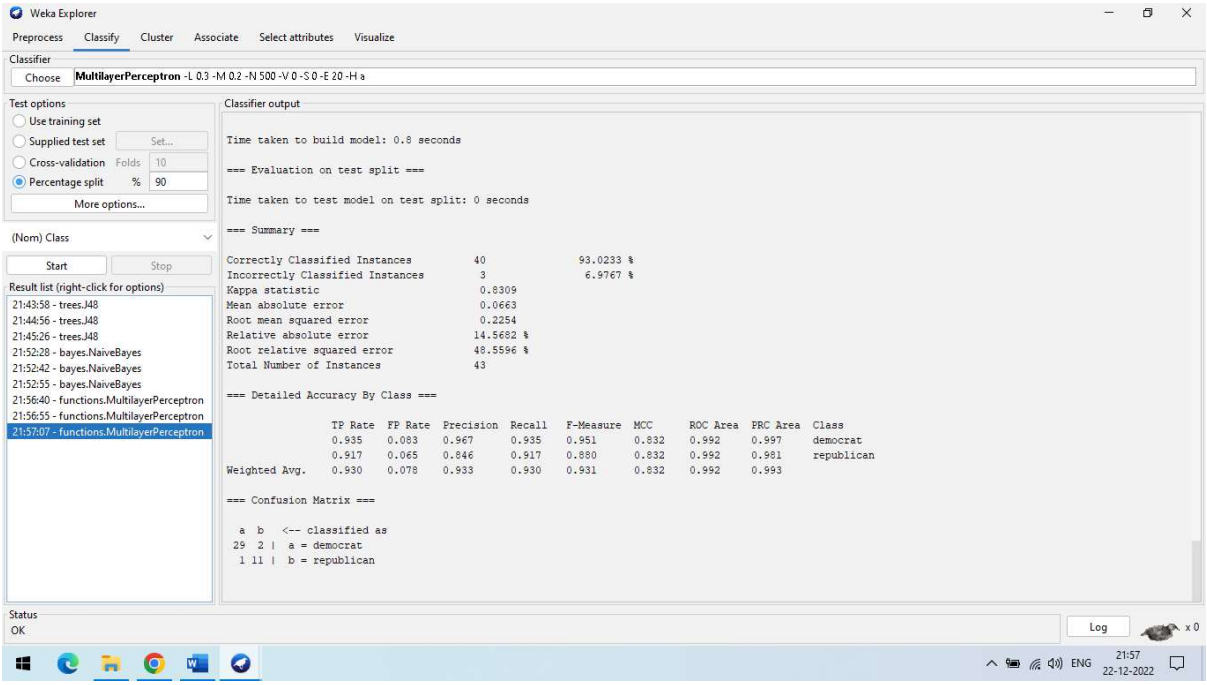
Step 1: Go to the classify >> choose filter MultilayerPerceptron >> give percentage split(40%) >> click start.



Step 2: Go to the classify >> choose filter MultilayerPerceptron >> give percentage split(70%) >> click start.



Step 3: Go to the classify >> choose filter MultilayerPerceptron >> give percentage split(90%) >> click start.



❖ Accuracy Table For Classification:

Split Percentage (%)	Accuracy (%)			Total instances					
	J48	Naïve Bayes	Multilayer Perceptron	J48		Naïve Bayes		Multilayer Perceptron	
				Correctly identified	Incorrectly identified	Correctly identified	Incorrectly identified	Correctly identified	Incorrectly identified
70	96.1538	90	96.1538	125	5	117	13	125	5
40	93.8697	91.1877	94.2529	245	16	238	23	246	15
90	95.3488	81.3953	93.0233	41	2	35	8	40	3

PRACTICAL-10

AIM: Perform Clustering using WEKA tool.

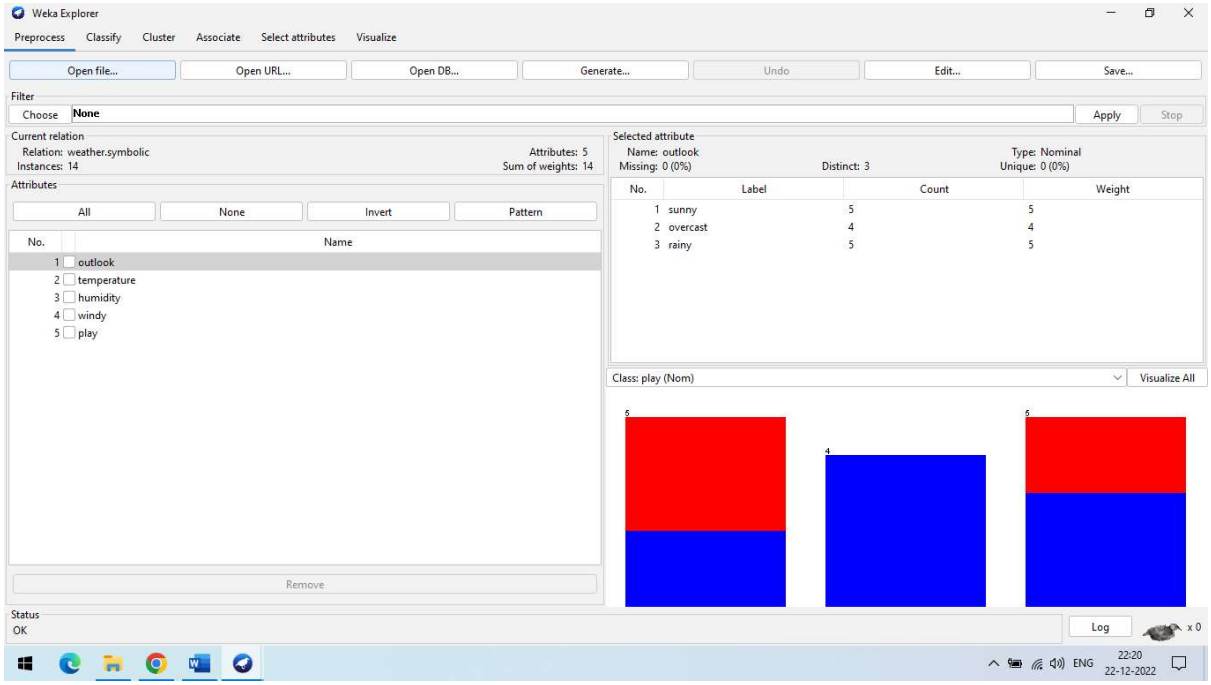
Steps:

A clustering algorithm finds groups of similar instances in the entire dataset.Clustering is the task of dividing the population or data points into a number of groups such that data points in the same groups are more similar to other data points in the same group than those in other groups. WEKA supports several clustering algorithms such as EM, FilteredClusterer, HierarchicalClusterer, SimpleKMeans and so on.

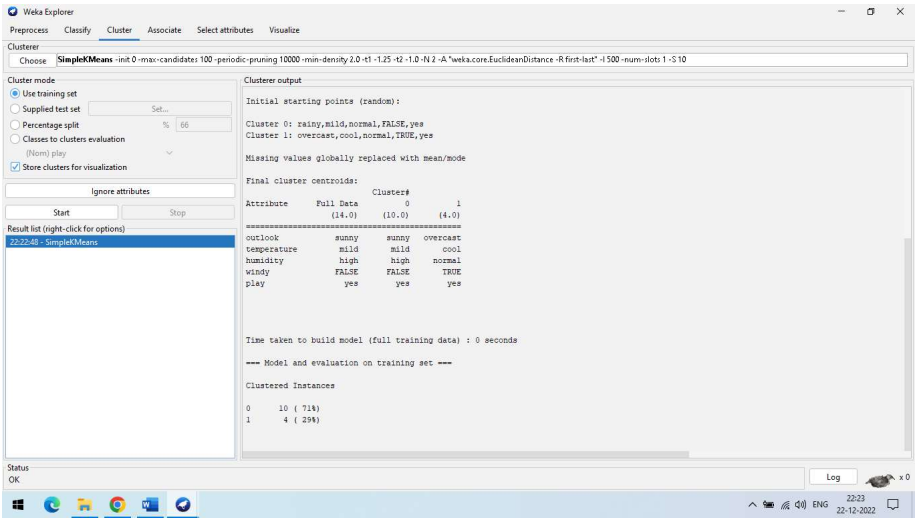
1.Using Simplekmeans

The WEKA SimpleKMeans algorithm uses Euclidean distance measure to compute distances between instances and clusters.

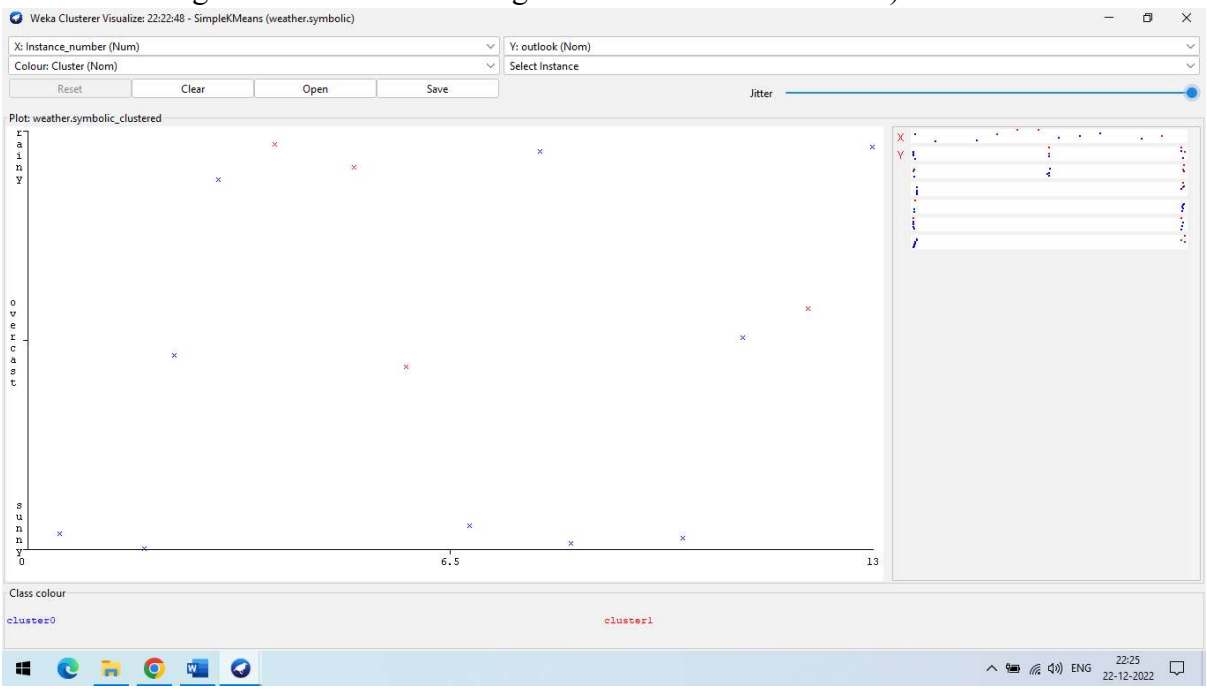
Step 1: open the WEKA tool and select the nominal data in the dataset



Step 2: To perform clustering, select the "Cluster" tab in the Explorer and click on the "Choose" button and choose a simpleKMeans algorithm.and then click start



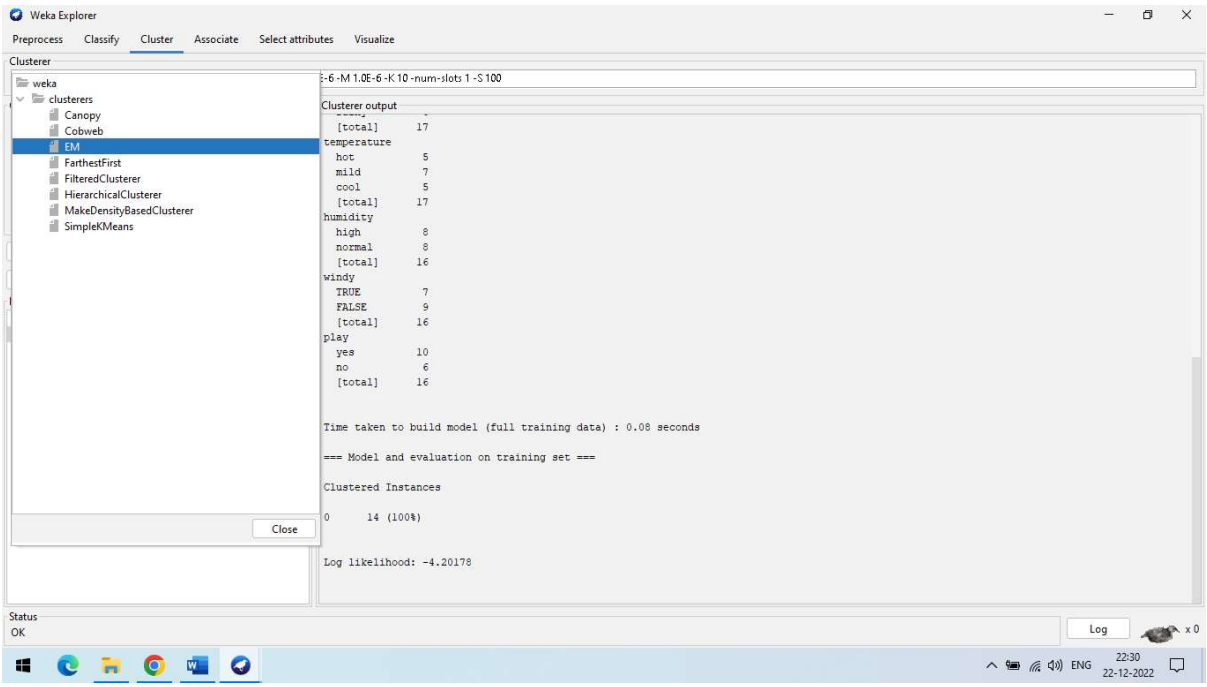
Step 3: Right click on simpleKMeans -> visualize cluster assignment(Another way to grasp the characteristics of each cluster is to visualize them. To do so, right-click the result set on the result. Selecting to visualize cluster assignments from the list column)



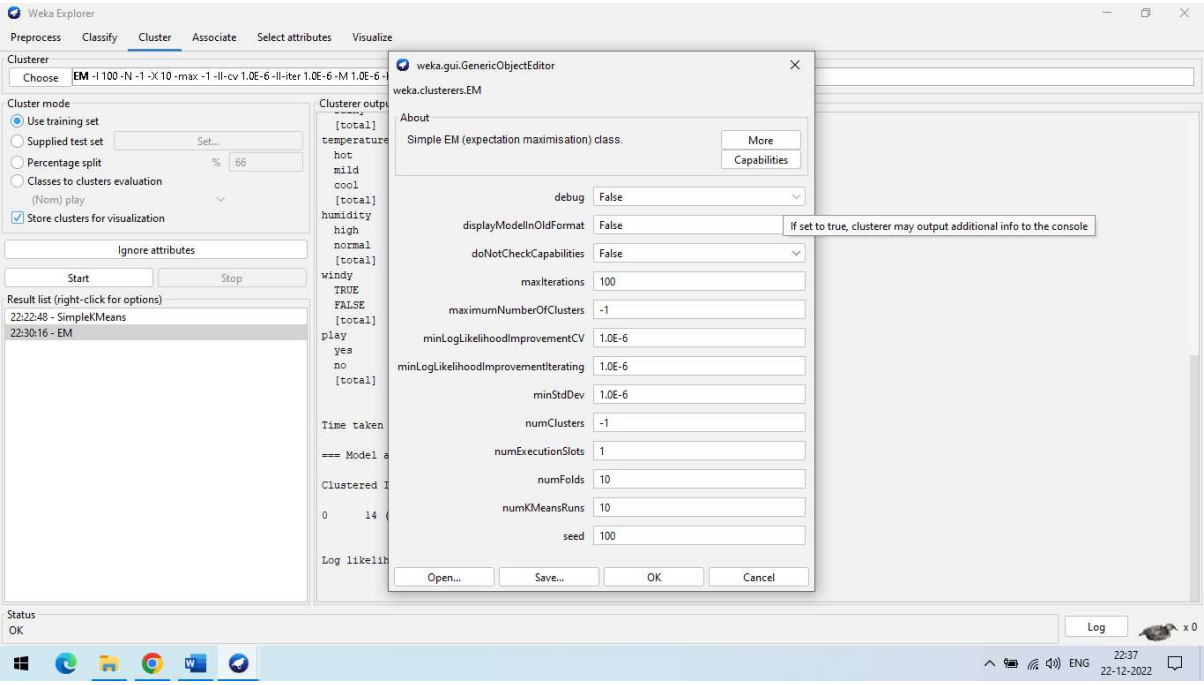
2. Using EM Clustering

In Weka EM selects the number of clusters automatically by maximizing the logarithm of the likelihood of future data, estimated using cross-validation. Beginning with one cluster, it continues to add clusters until the estimated log-likelihood decreases.

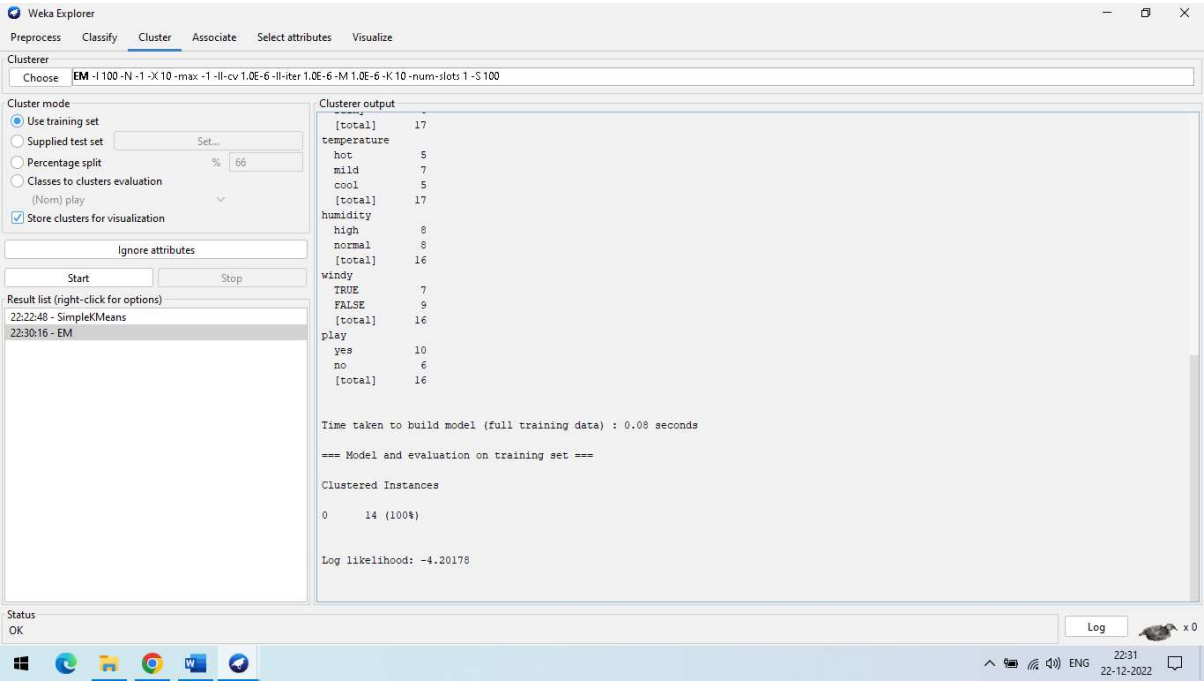
Step 1: weka→explorer→open file→weather.nominal.arff->cluster-> EM algorithm
(To perform clustering, select the "Cluster" tab in the Explorer and click on the "Choose" button and choose a EM algorithm.)



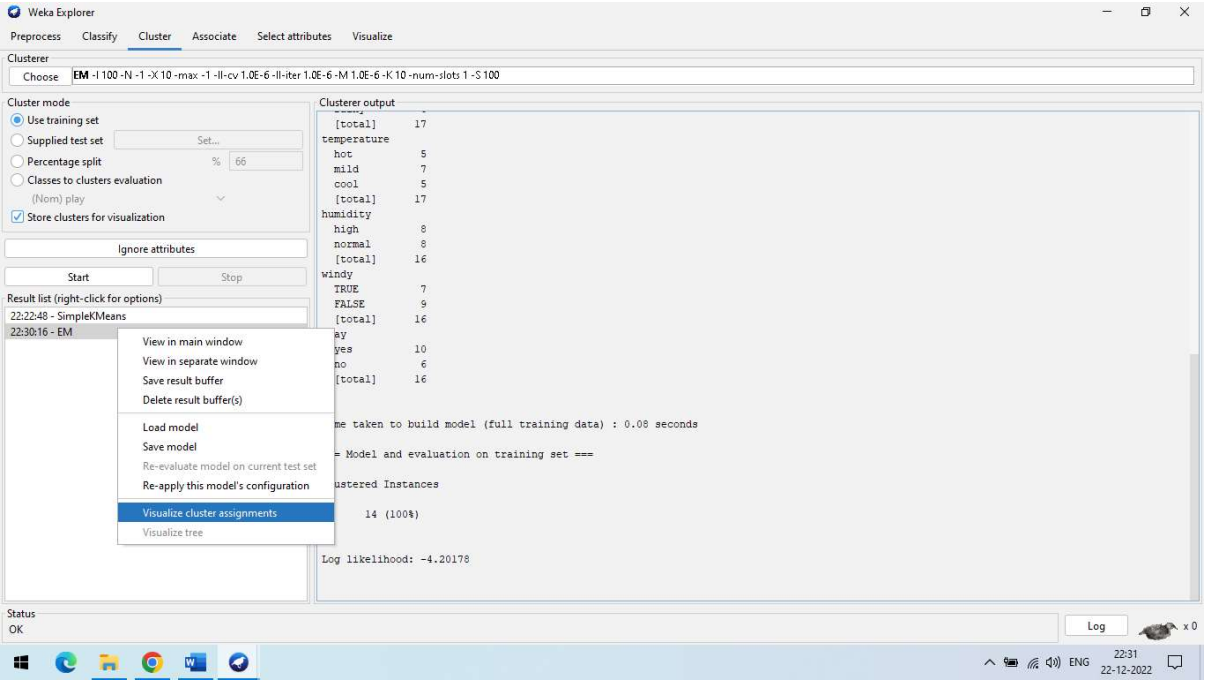
Step 2: Click Cluster to apply the clustering algorithm to our loaded data click on the choose button and change the value if you want**.**



Step 3: After that, Select EM to Start the Clustering.



Step 4 Right-click on EM in result section(Another way to grasp the characteristics of each cluster is to visualise them. To do so, right-click the result set on the result. Selecting to visualise cluster assignments from the list column.)



Step 5 Click on visualize cluster assignment .(Another way to grasp the characteristics of each cluster is to visualise them. To do so, right-click the result set on the result. Selecting to visualise cluster assignments from the list column.)