

Ex.No. 3

MULTI CLASS CLASSIFICATION

Aim:

To write a python program to implement the multi class classification algorithm .

Equipments Required:

1. Hardware – PCs
2. Anaconda – Python 3.7 Installation / Moodle-Code Runner / Google Colab

Concept:

- In Multi Class Classification, multiple class labels are present in the dataset.
- The number of classifier models depends on the classification technique we are applying to.
- One vs. All: N-class instances then N binary classifier models.
- One vs. One: N-class instances then $N * (N - 1) / 2$ binary classifier models.
- The Confusion matrix is easy to derive but complex to understand.
- Example : Check whether the fruit is apple, banana, or orange.

Popular algorithms that can be used for multi-class classification include:

k-Nearest Neighbors.

Decision Trees.

Naive Bayes.

Random Forest.

Gradient Boosting.

Libraries Used in the program:

NUMPY

NumPy is a library for the Python programming language, adding support for large, multidimensional arrays and matrices, along with a large collection of high-level mathematical functions to operate on these arrays.

SKLEARN

Scikit-learn is a free software machine learning library for the Python programming language. It features various classification, regression and clustering algorithms including support-vector machines.

MATPLOTLIB

Matplotlib is a plotting library for the Python programming language and its numerical mathematics extension NumPy. It provides an object-oriented API for embedding plots into applications using general purpose GUI toolkits like Tkinter, wxPython, Qt, or GTK

Counter

Counter tool to easily count words in a document or two. It also works well with pandas data frames, allowing us to make simple comparisons.

Algorithm:

1. Start the program.
2. Import libraries required as per requirement.
3. Define dataset use the make_blobs() function to generate a synthetic multi -class classification dataset.
4. summarize dataset shape .
5. summarize observations by class label.
6. summarize first few examples.
7. plot the dataset and color the by class label.
8. stop the program

Program:

/*

Program to implement the multi class classifier.

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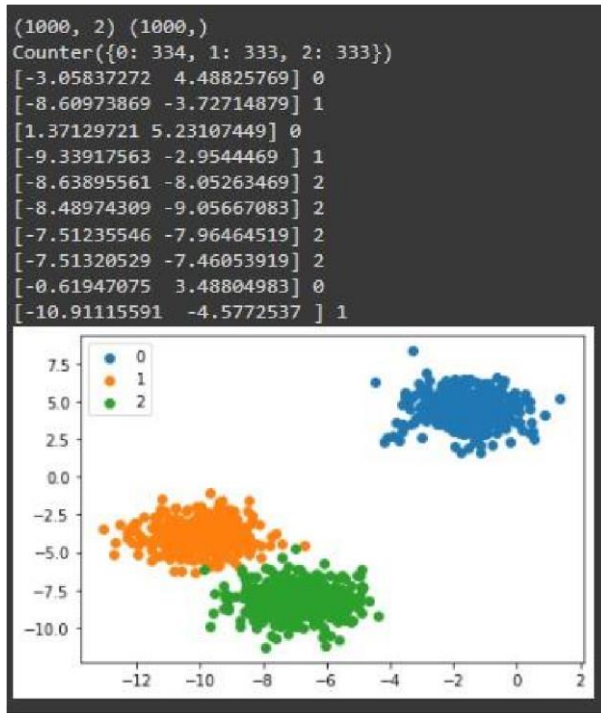
RegisterNumber: 212219040180

*/

```
from numpy import where
from collections import Counter
from sklearn.datasets import make_blobs
from matplotlib import pyplot
# define dataset--- use the make_blobs() function to generate a synthetic multi-class
classification dataset.
X, y = make_blobs(n_samples=1000, centers=3, random_state=1)
# summarize dataset shape print(X.shape, y.shape)
# summarize observations by class
label counter = Counter(y)
print(counter) # summarize first few
examples for i in range(10):
    print(X[i], y[i])
```

```
# plot the dataset and color the by class label for
label, _ in counter.items():
    row_ix = where(y == label)[0]
    pyplot.scatter(X[row_ix, 0], X[row_ix, 1], label=str(label)) pyplot.legend()
pyplot.show()
```

Output:



Result:

Thus the python program to implement the multi class classification was implemented successfully.