IMPLEMENTATION OF THE MULTI CLASS CLASSIFICATION ALGORITHM

Aim:

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

Equipment's Required:

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

Related Theoretical Concept:

- **NUMPY**

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

- **SK LEARN**

  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.

Algorithm

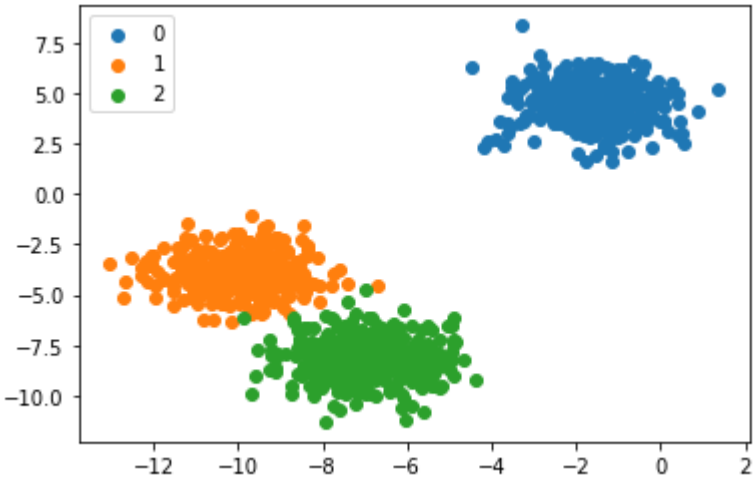
1. Start the program
2. Import libraries required as per requirement.
3. Definedataset use the make_blobs() function to generate a synthetic multi -class classification dataset.
4. summarize dataset shape
5. summarize observations by class label
6. summarize first few examples
7. plot the dataset and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

Program:

```
#Multi class classification
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:

```
(1000, 2) (1000,)
Counter({0: 334, 1: 333, 2: 333})
[-3.05837272  4.48825769] 0
[-8.60973869 -3.72714879] 1
[1.37129721 5.23107449] 0
[-9.33917563 -2.9544469 ] 1
[-8.63895561 -8.05263469] 2
[-8.48974309 -9.05667083] 2
[-7.51235546 -7.96464519] 2
[-7.51320529 -7.46053919] 2
[-0.61947075  3.48804983] 0
[-10.91115591  -4.5772537 ] 1
```



Result:

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