

Ex.No. 3

MULTI CLASS CLASSIFICATION

Aim:

To write python code to generate a synthetic dataset and perform multi class classification for the generated data set.

Concept:

Classification is a task that requires the use of algorithms that learns how to assign a class label to examples from the problem domain.

Ex: classifying emails as “spam” or “not spam.”

MULTI CLASS CLASSIFICATION refers to those classification tasks that have more than two class labels.

Examples: Face classification, Plant species classification, Optical character recognition.

Binary vs Multiclass classification:-

Unlike Binary Classification, Multi class classification does not have the notion of normal and abnormal outcomes. Instead, examples are classified as belonging to one among a range of known classes.

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

k-Nearest Neighbors.

Decision Trees.

Naive Bayes.

Random Forest.

Gradient Boosting.

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:

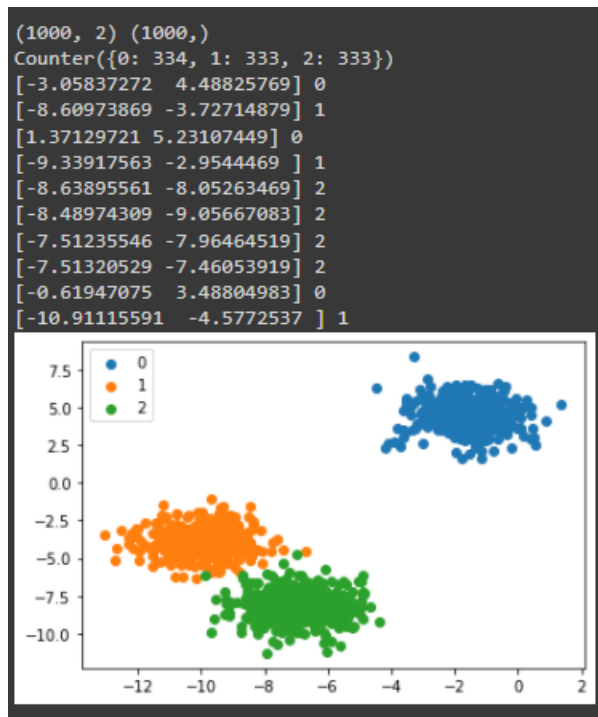
```
from numpy import where  
from collections import Counter
```

```

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 a Python code to generate a synthetic dataset and perform multi class classification for the generated data set generated a scatter plot for the input variables in generated dataset and colouring done on the class value basis.

