

## **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:**

```
/*
```

```
Program to implement random classification.
```

```
Developed by : BHARATH RAJ V
```

```
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```

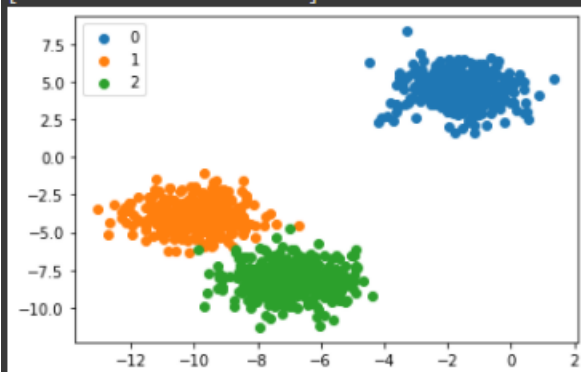
```
*/
```

```
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 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.