LAB 2 : Multi Class Classification Using Perceptron

Name :

Roll Number :

Problem 1 : Demonstrate the 2-input, 2-output neural network, to perform 4 class, classification task.

1. Generate appropriate data synthetically (Ex: Multivariate Gaussian data with dif ferent mean vectors and Identity covariance matrix can be used)
2. Have to convert the class labels (0, 1, 2, 3) to its corresponding binary value.
3. Use appropriate activation function and learning rule .
4. Draw the learned separating hyper planes in each iteration. (using the information from the learned weights).
5. After the network is learned, a independent test set can be used to validate the per formance. (Performance can be shown through accuracy/error percentage, justify the error by drawing the separating hyper-plane over the test set data (use different color code for different class label))

Write down the Objectives, Hypothesis and Experimental description for the above problem

=== Write your answer here ===

Programming :

Please write a program to demonstrate the same

```
import numpy as np
import matplotlib.pyplot as plt

def GenerateData(No_training,mean,variance):

  data = []
  ## Write your code here

  return data
```

```
## Define Mean and Variance for all the data points


```

```
## Augment the Data


```

```
## Define Target Labels


```

```
def perceptron_learning_loop():

  ## Write your code here
```

```
## Testing


```

Inferences and Conclusion : State all the key observations and conclusion

=== Write your answer here ===