CO544

Machine Learning and Data Mining

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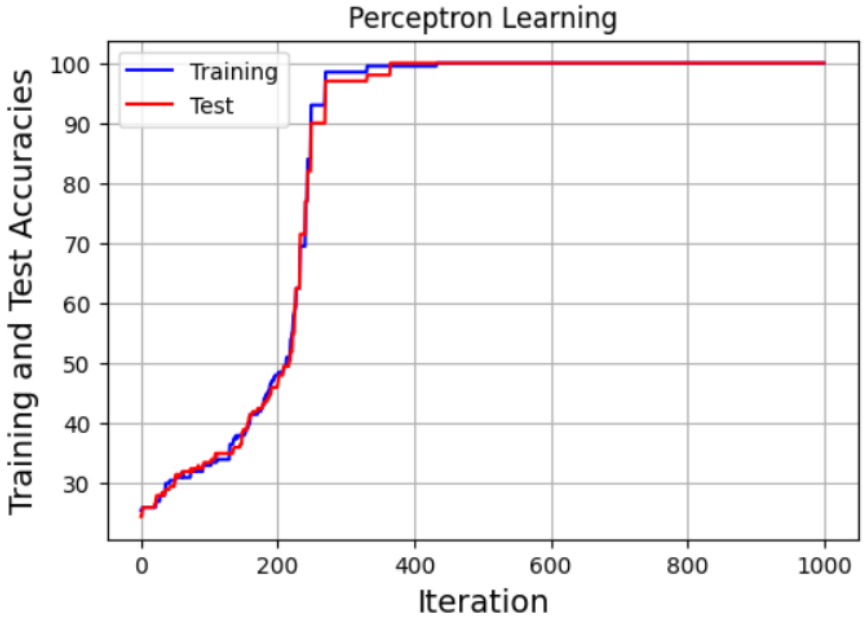
E/19/095

Lab 02

(1) – (7)

```
(200, 2) (200,) (200, 2) (200,)
[ 1.26965422 -0.00295863]
Initial Percentage Correct:  25.50
Percentage Correct After Training: 100.00 100.00
```



This graph shows the number of iterations required for an accurate model. According to the graphs, around 400 iterations are required for a better model.

In the lab, we perform 1000 operations.

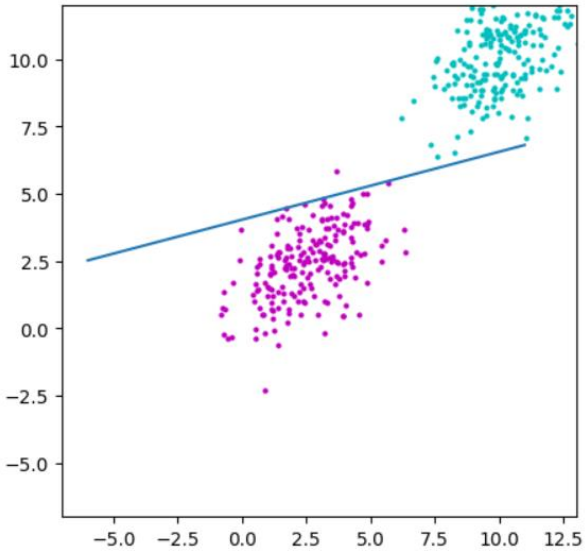
(8)

```
Accuracy on training set:   1.00
Accuracy on test set:   1.00
Wow, Perfect Classification on Separable dataset!
```

(9)

The perceptron algorithm **might not** solve the problem as is because the classes' means are close together.

To improve separation, we can modify the perceptron to include a **bias** term. This bias term allows the perceptron to learn a decision boundary that is not forced to pass through the origin, which can help in cases where the classes are not perfectly linearly separable.



10)

Output:

```
Model correctness on training data: 91.93172049613165
Model correctness on testing data: 97.89868667917449
```

Model Training Python code link:
https://github.com/lakshithaKaveen/MachineLearningLab/blob/30a2bada92e31f2a9cedd44ef56fa557b300b6af/LAB%2002/Question10.ipynb

Dataset Link: Occupancy Detection - UCI Machine Learning Repository