1 Result of the lab

My result of binary calssification of Gaussian densities with distinct means $\begin{bmatrix}0\\5\end{bmatrix}$ $\begin{bmatrix}5\\0\end{bmatrix}$

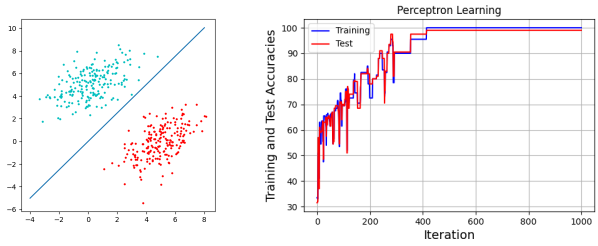

Figure 1: Result of the first mean

2 Difference between m1 and m2

For Gaussian densities with distinct means $\begin{bmatrix}2.5\\2.5\end{bmatrix}$ $\begin{bmatrix}10\\10\end{bmatrix}$ the previous perceptron can't work.
And I solve this problem by adding bias and running more iterration.
Followings are my result.

```
if y_train[r] * ((np.dot(w, np.transpose(x))) + bias) < 0:
            w += alpha * y_train[r] * x
            bias += alpha * y_train[r]
```

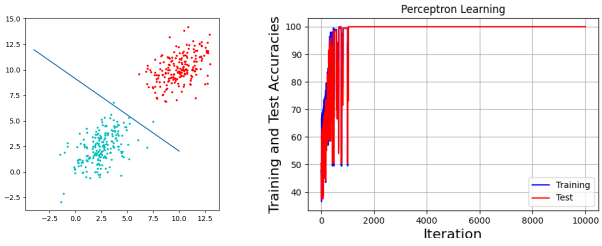

Figure 2: Result of the second mean

3 Deploy on the Iris Dataset

Four Attributes : sepal length in cm, sepal width in cm, petal length in cm and petal width in cm.
Three Classes:Iris Setosa, Iris Versicolour and Iris Virginica.

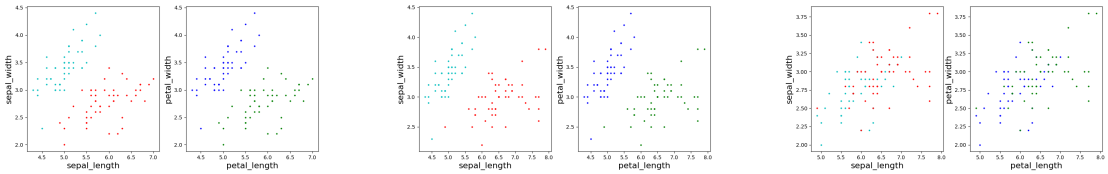

Figure 3: Data Analysis

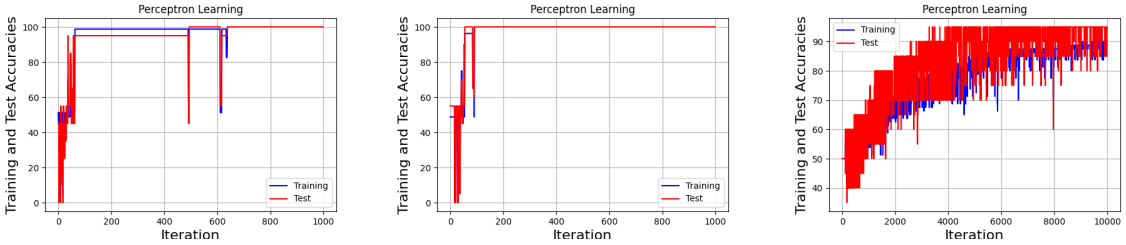

Figure 4: Perceptron Result

Perceptron is not that good on classification of Iris Versicolour and Iris Virginica.
To optimize, I apply pca to the data set which converts four features into two features and compare my results to sklearn results.

	Setosa/Versicolour	Setosa/Virginica	Versicolour/Virginica
accuracy on training set(%)	100.00	100.00	95.00
accuracy on test set(%)	100.00	100.00	95.00

Table 1: result of my perceptron

	Setosa/Versicolour	Setosa/Virginica	Versicolour/Virginica
accuracy on training set(%)	100.00	100.00	94.00
accuracy on test set(%)	100.00	100.00	95.00

Table 2: result of my sklearn

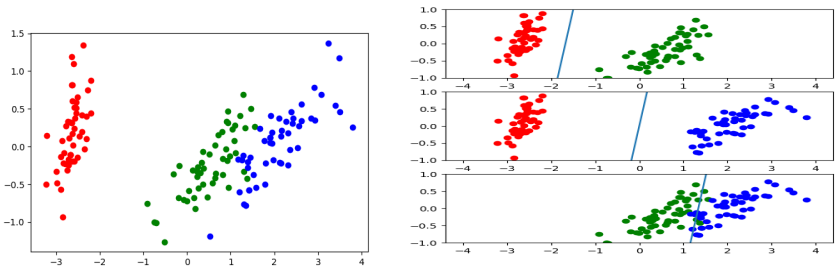

Figure 5: result of iris after PCA optimization