ENGR 421

HW2

REPORT

First, I divided the given data set of 1000 into two parts. First 500 to the training set and the rest of it to the test set.

Then I used the given learning parameters to learn a discrimination by regression algorithm using the sigmoid function.

I defined the gradient functions.

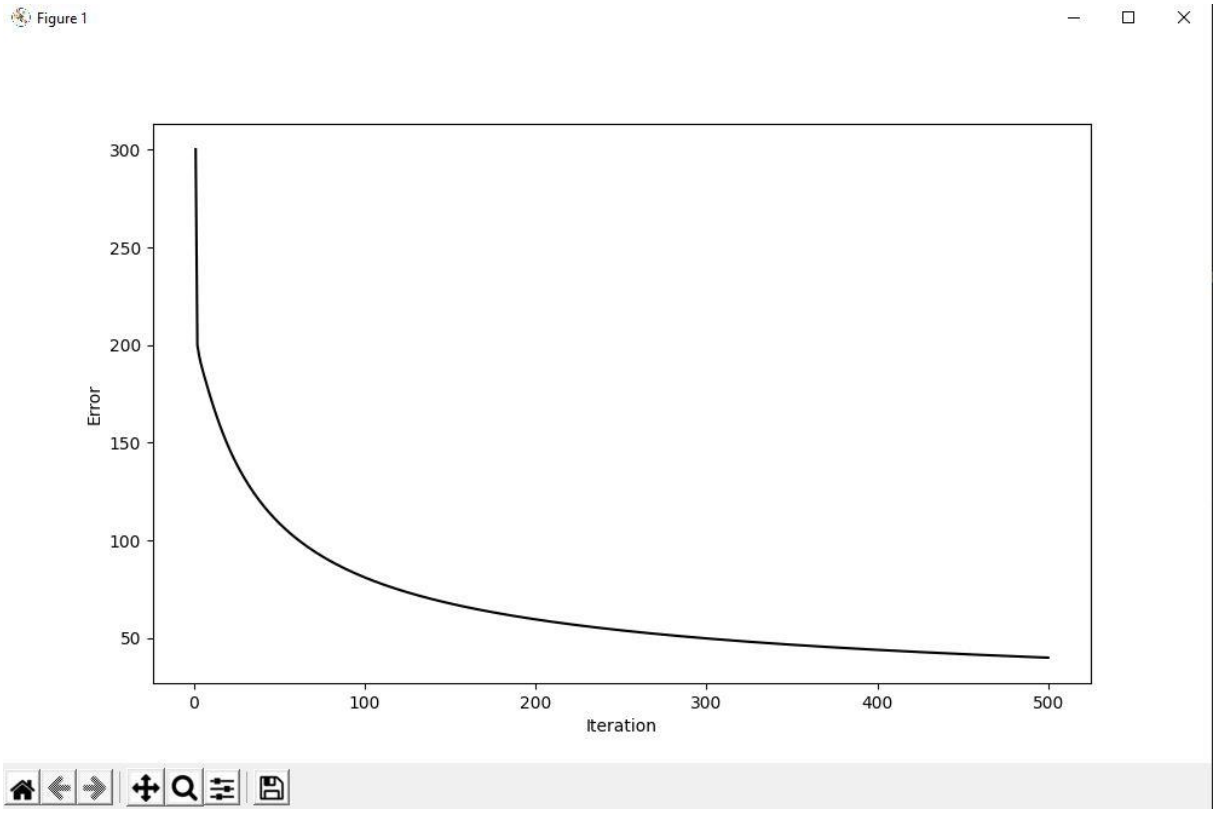
```
eta = 0.0001
epsilon = 1e-3
max_iteration = 500

def sigmoid(X, w, w0):
    res = 1 / (1 + np.exp(-(np.matmul(X, w) + np.transpose(w0))))
    return res

def gradient_w(X, Y_truth, y_predicted):
    a = (Y_truth - y_predicted)*y_predicted*(1-y_predicted)
    res = -np.matmul(np.transpose(X), np.array(a))
    return res

def gradient_w0(Y_truth, y_predicted):
    res = -np.sum((Y_truth - y_predicted))
    return res
```

I have driven the objection function values for the iterations. My figure became very similar to what is shown in the homework description.



Although I had most of data points for my confusion matrix right, some of them came out wrong.