Assignment

Logistic regression

In “data.txt” file, there are one hundred samples in a form of (x_1, x_2, y). x_1 and x_2 are inputs, and y is labels. Submit the solutions and python code together.

1. The model is $f(x_1, x_2) = w_2x_2 + w_1x_1 + w_0$

- The error, E, is the cross entropy. What are $\frac{\partial E}{\partial w_0}, \frac{\partial E}{\partial w_1}, \frac{\partial E}{\partial w_2}$? Present them using $\sum_{(\mathbf{x},y)\in Data}$ notation.
- Find the cross entropy values for (33, 81,1) and (33, 81, 0).
- Determine w_0, w_1, w_2 for the logistic regression. Write the code for training of the logistic regression.
- Determine the class of (33, 81).

2. **The model is $f(x_1, x_2) = w_5x_2^2 + w_4x_1^2 + w_3x_2x_1 + w_2x_2 + w_1x_1 + w_0$**

- The error, E, is the cross entropy. What are $\frac{\partial E}{\partial w_0}, \frac{\partial E}{\partial w_1}, \frac{\partial E}{\partial w_2}, \frac{\partial E}{\partial w_3}, \frac{\partial E}{\partial w_4}, \frac{\partial E}{\partial w_5}$? Present them using $\sum_{(\mathbf{x},y)\in Data}$ notation.
- Find the cross entropy values for (33, 81,1) and (33, 81, 0).
- Determine $w_0, w_1, w_2, w_3, w_4, w_5$ for the logistic regression. Write the code for training of the logistic regression.
- Determine the class of (33, 81).

Thank You