

Define a class named Perceptron in Python, having the following data members: Weights, Bias, Learning_Rate and Epochs. The class constructor must take the Learning_Rate and Epochs as input, where Epochs is used to signify the number of iterations to be executed by the program. Initialize the values of Weights and Bias. The data member Weights must be initialized as a 3-dimensional vector, each element having a value of 0. The variable Bias must be initialized to a value of 0. Define a function FIT that will take a 2-dimensional matrix M as input having the given structure:

X1	X2	X3	Y
23	34	12	0
26	31	11	0
28	36	5	1
27	38	7	1
29	39	6	1

The columns X1, X2, X3 represents the features of the data while column Y represents the decision taken (0- False, 1- True). Normalize the given M matrix as input by performing

$$X_i = \frac{X_i - \min(X_i)}{\max(X_i) - \min(X_i)}$$

Each row of the matrix M represents one data sample.

Define the FIT function such that:

- a. The Epochs (Iterations) are executed inside the function.
- b. In each epoch, for every data sample i, compute
 - a. $Z = \sum X_{ij} \cdot W_j + B$, where X_{ij} represents the j-th feature of the i-th data sample.
 - b. $Y_{\text{pred}} = \frac{1}{1+e^{-z}}$
 - c. $W_j = W_j + \text{learning_rate} * (Y_i - Y_{\text{pred}}) * X_{ij}$
 - d. $B = B + \text{learning_rate} * (Y_i - Y_{\text{pred}})$
- c. Return the values of Weights and Bias variable after loop termination.