

ADALINE

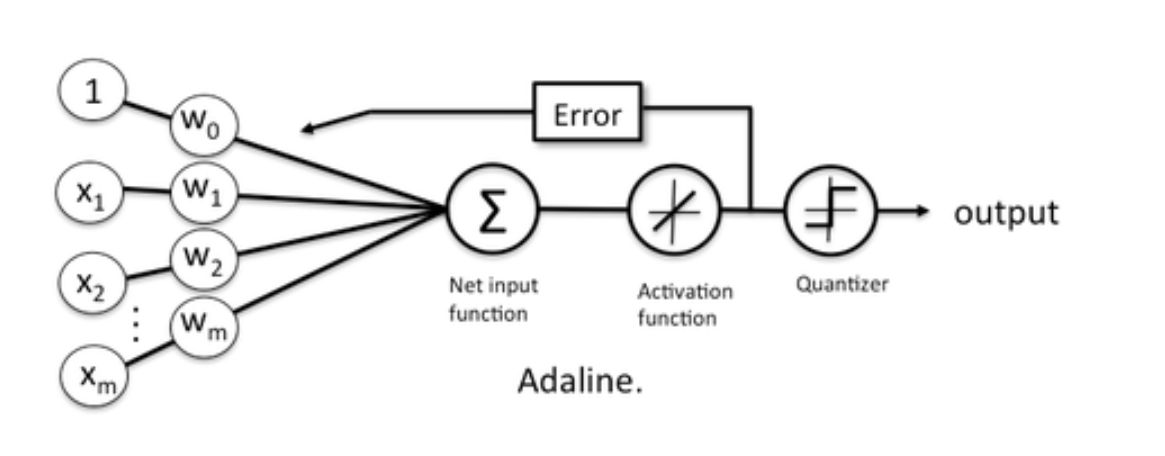
AND, OR logic gates and training on sample dataset



Sri sai vijaya aditya nittala

177163

841775

The training of ADALINE follows the below diagram:

The algorithm is:

1. Initialize the weights and bias to a random number.
2. For each training iteration:
   1. Calculate the prediction Z as:
      1. Where:
         1. Z = prediction
         2. W = weights
         3. X = Feature Vector
         4. b = bias
   2. Apply the activation function, which here is an identity function.
   3. Apply the Quantizer function, which is analogous to *threshold* in Perceptron learning algorithm, to get class labels for the training examples as O.
   4. Update the weights by performing backpropagation as:
      1. Where:
         1. Z = prediction
         2. Y = Correct labels
         3. X = Feature Vector
         4. α = learning rate
         5. m = no. of training examples.
3. Repeat for given number of iterations.

This algorithm is called ***Gradient Descent***, which finds the global minimum of the cost function J(W, b) with respect to the parameters W(weights) and b(bias):

* The code below implements the above algorithm on a sample data set as well as AND, OR gate.
* The sample training dataset has been normalized as it helps with performance as well as improves accuracy. ***Z-score*** normalization was used:
* Parameters chosen:
  + α = 0.1
  + Number of iterations = 25