50.039 – Theory and Practice of Deep Learning

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Week 03: Logistic Regression

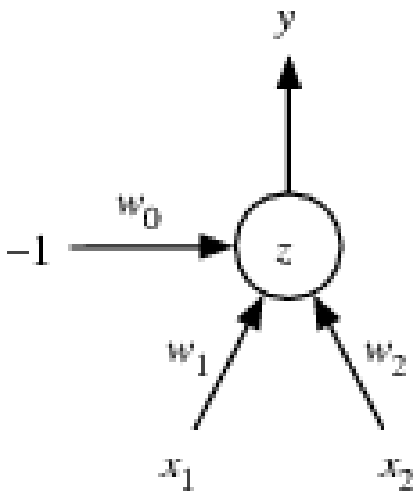
[The following notes are compiled from various sources such as textbooks, lecture materials, Web resources and are shared for academic purposes only, intended for use by students registered for a specific course. In the interest of brevity, every source is not cited. The compiler of these notes gratefully acknowledges all such sources.]

1 The prelude to neural nets: classification with some activation function

For this problem, we will consider the simple type of unit shown below. The output of the unit $g(z)$ is computed as follows:

$$g(z) = \begin{cases} z & \text{if } |z| < 1 \\ sign(z) & \text{otherwise} \end{cases}$$

$$z = -w_0 + w_1 x_1 + w_2 x_2$$



We can use this type of unit to classify our inputs by assigning any input for which the output is greater than or equal to 0 as positive and for which the output is less than 0 to negative.

Given the four data points: Positive: $(0, 0)$, $(0, 1)$ Negative: $(1, 0)$, $(1, 1)$, choose weights for this unit so the weights w_0, w_1, w_2 that can separate these points.