Notes 1.0

When you are Implementing a neural network with M training sets , we usually use a loop to iterate over all the training sets, however you will soon realize that this is a bad implementation as your training set gets bigger. And Taking the Vector approach is much more appropriate and way faster than loops.

Logistic Regression is an algorithm for binary classification. So lets say our problem is that we get an input of an image and we have to output 1 or 0 where 1 = image of cat and 0 = not a cat .

So an image in a computer is stored in 3 separate matrix corresponding to the RED , GREEN , BLUE color channel for the image. So if our image is 64pixles X 64pixles then we would have a total of 3 separate 64 by 64 Matrix, corresponding to the Red , green and blue pixel intensity value.

So, to Turn this pixel intensity value into a feature vector we un-row all the matrix Values into a input feature vector “X”.

$$R = \begin{pmatrix} 255 & \cdots & 22 \\ \vdots & \ddots & \vdots \\ 222 & \cdots & 123 \end{pmatrix}$$

$$G = \begin{pmatrix} 200 & \cdots & 222 \\ \vdots & \ddots & \vdots \\ 242 & \cdots & 23 \end{pmatrix}$$

$$B = \begin{pmatrix} 2 & \cdots & 193 \\ \vdots & \ddots & \vdots \\ 30 & \cdots & 142 \end{pmatrix}$$

$$X = \begin{bmatrix} 255 \\ \vdots \\ 23 \\ \vdots \\ 142 \end{bmatrix}$$

The Length of the Input Matrix will be 64 x 64 x 3 = 12288 = n

Notation for Binary Classification.

A single training example is represented by a pair (x,y) where $x \varepsilon \mathbb{R}^n$ and $y \varepsilon \{0,1\}$

m will be the training set or the number of training example, and m_{test} will be the number of test set.

X will be the matrix of all the training set. So

$$X = \begin{bmatrix} \vdots & \vdots & \vdots \\ x1 & x2 & xm \\ \vdots & \vdots & \vdots \end{bmatrix}$$

where the high of the vector will be "n" and the length will be "m" so X is n by m matrix repressing the set of all training set.

We will also define Y , which represents all the output value.

$$Y = [y1, y2, ym]$$

and Y will be a 1 by m dimensional matrix.