Learning Report

Zhang Heartbright

May 27, 2018

1 Section 1

Now we are given a picture, so how can we judge whether it is a cat?

Here are some concepts of the algorithms we are to use:

Binary Classification: return either 1 or 0;This is the ensemble idea

Logistic Regression: function on a linear function of the input X to get the result between 0 and 1

Here, the linear function is: $W^T X + b$ (W and X are two matrix)

the Logistic Regression is: $\hat{y} = \sigma(z) = \frac{1}{1+e^{-z}}$

Logistic Regression Cost Function: $\mathfrak{L}(\hat{y}, y) = -(y * log(\hat{y}) + (1-y) * log(1-\hat{y}))$

Gradient Descent:$J(W, b) = \frac{1}{m} \sum_{i=1}^{m} \mathfrak{L}(\hat{y}, y)$

2 Section 2

Now, our ambition is to find the W and b to minimize the J(W,b)

So, how?

By continuously updating $w := w - \alpha \frac{dJw}{dw}$

and so it is with b

3 Section 3

For example we are given the feature number x_1, x_2

Now, we have to find the$w_1, w_2, and b$

$z = w_1 x_1 + w_2 x_2 + b \quad ; \quad a = \sigma(z) \quad ; \quad \mathfrak{L}(a, y)$

by calculating, we can get that:$dz = a - y$

4 Section 4

The above are for the single sample, here we apply them to m samples:(Fake Python Codes)

import numpy as np

$Z = W^T X + b = np.dot(W^T, X) + b$

$A = \sigma(Z)$

$dw = \frac{1}{m} dZ^T$

$db = \frac{1}{m} np.sum(dZ)$

$w := w - \alpha dw$

$b := b - \alpha db$

5 Section 5

During this week, I get clear about how the Neural Network works, and learned how it permutes the possibility.
In addition, python is really charming, though I'm still not accustomed to it, which needs no declaration of a variable.
Though it costs me some efforts to get understand the concept and that of the vectorizing Logistic Regression, yet, I managed it finally
So, keep on going