

Vectorized Newton's Method:

Number of iterations = 10

Elapsed time is 1.634047 seconds.

Gradient(10th Iteration) = [-4.8000e-17 -5.8290e-15 -7.6050e-15]

Theta(10th Iteration) = [-16.3787 0.1483 0.1589]

For, Data Set Row [1 20 80],

$z = [1 \ 20 \ 80] * \text{theta}'$; % Theta(10th Iteration)

Sigmoid Function, $h = 1.0 / 1.0 + \exp(-z)$;

Probability = 1-h

Probability = 0.6680

Cost Function, 1st 10 iterations =

J(1) = 0.6931

J(2) = 0.4409

J(3) = 0.4089

J(4) = 0.4055

J(5) = 0.4054

J(6) = 0.4054

J(7) = 0.4054

J(8) = 0.4054

J(9) = 0.4054

J(10) = 0.4054

Weights for First 10 Iterations,

Theta(1) = -9.0803 0.0832 0.0880

Theta(2) = -13.8500 0.1252 0.1348

Theta(3) = -16.0217 0.1450 0.1556

Theta(4) = -16.3711 0.1483 0.1588

Theta(5) = -16.3787 0.1483 0.1589

Theta(6) = -16.3787 0.1483 0.1589

Theta(7) = -16.3787 0.1483 0.1589

Theta(8) = -16.3787 0.1483 0.1589

Theta(9) = -16.3787 0.1483 0.1589

Theta(10) = -16.3787 0.1483 0.1589

Non Vectorized Newton's Method:

Number of iterations = 150000

Elapsed time is 26.981770 seconds.

Theta(150000th Iteration) = [-16.0562 0.1452 0.1559]

For, Data Set Row [1 20 80],

$z = [1 \ 20 \ 80] * \text{theta}'$; % Theta(150000th Iteration)

Sigmoid Function, $h = 1.0 / 1.0 + \exp(-z)$;

Probability = 1-h

Probability = 0.6630

Gradient(150000th Iteration) = [1.9930e-04 0 0]

Cost function = minimum value 0.4055 and maximum value 0.6931 out of 150000 Iteration.

Cost Function, 1st 10 iterations =

J(1) = 0.6931

J(2) = 0.6927

J(3) = 0.6924

J(4) = 0.6920

J(5) = 0.6917

J(6) = 0.6915

J(7) = 0.6912

J(8) = 0.6910

J(9) = 0.6908

J(10) = 0.6906

Weights for First 10 Iterations,

Theta(1) =	0	8.3550e-05	0
Theta(2) =	-1.0520e-04	1.6160e-04	7.8000e-05
Theta(3) =	-3.0780e-04	2.3470e-04	1.5130e-04
Theta(4) =	-6.0040e-04	3.0300e-04	2.2020e-04
Theta(5) =	-9.7640e-07	3.6700e-07	2.8510e-07
Theta(6) =	-1.4000e-06	4.0000e-07	3.0000e-07
Theta(7) =	-2.0000e-06	5.0000e-07	4.0000e-07
Theta(8) =	-2.5000e-06	5.0000e-07	5.0000e-07
Theta(9) =	-3.2000e-06	6.0000e-07	5.0000e-07
Theta(10) =	-3.9000e-06	6.0000e-07	6.0000e-07