

Machine Learning: Project 2

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Description of Model:

1. Model generated with **24 features** with the given function using power=4.
Features like $x_1, x_2, x_1x_2, x_1^2 * x_2, \dots, x_1^4 * x_2^4$

2. **Initial values:**

Alpha = 0.05

Weights = w_0 to w_{24} all 0.0

Lambda = 2

J for first iteration = 0.6931471805599453

3. **Final values:**

- a. weights

$w_0 = [0.65986459],$

$w_1 = [0.47399186],$

$w_2 = [-1.08623394],$

$w_3 = [0.18351727],$

$w_4 = [-0.7426094],$

$w_5 = [0.47660308],$

$w_6 = [-0.36572101],$

$w_7 = [-0.20114836],$

$w_8 = [-0.00236923],$

$w_9 = [-0.1112873],$

$w_{10} = [-0.76439386],$

$w_{11} = [-0.11911695],$

$w_{12} = [-0.3336743],$

$w_{13} = [-0.01707496],$

$w_{14} = [-0.16607161],$

$w_{15} = [-0.38836278],$

$w_{16} = [-0.10582198],$

$w_{17} = [-0.1616662],$

$w_{18} = [0.00715456],$

$w_{19} = [-0.06595231],$

$w_{20} = [-0.79742014],$

$w_{21} = [-0.09252214],$

$w_{22} = [-0.16805384],$

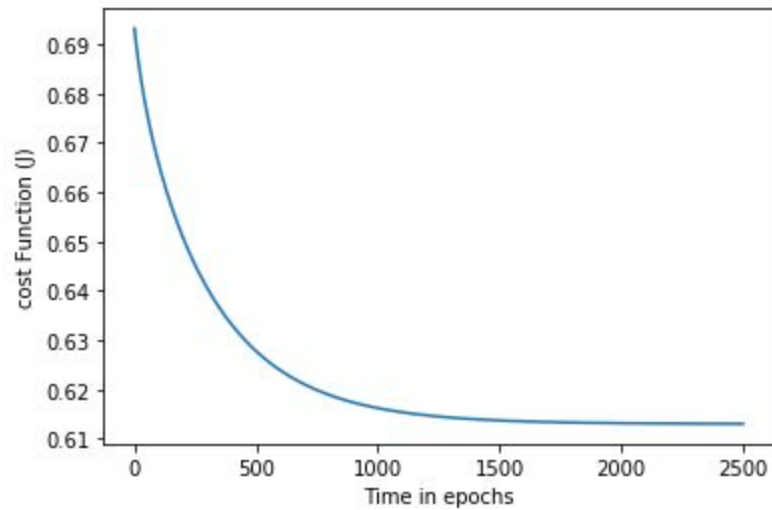
$w_{23} = [-0.00751239],$

$w_{24} = [-0.06817629]$

- b. Iterations =2500, although the value of cost function flattens out at ~1600 iterations

- c. Final J value = 0.6130328150826208

d. Plot of J vs number of iterations.



e. Value of J on test dataset = 0.694683094666304

Confusion Matrix:

		Predicted class	
		0	1
Actual Class	0	TN = 14	FP = 4
	1	FN = 2	TP = 15

Final Results:

accuracy = 0.8285714285714286

precision = 0.7894736842105263

recall = 0.8823529411764706

f_score = 0.8333333333333334