Shawn Picardy
Dr. Larry Hodges
Cpsc 6430 - Project 2

This report is intended to relay the training and testing of provided capacitor data. The purpose of this logistic regression model is to assist in predicting whether a capacitor will pass a Quality Check.

The model comprises eight features, six of which were derived from the original two features. A description of the model is provide below:

Features

x_1	x_1^2	x_2	x_1x_2	$x_1x_2^2$	x_2^2	$x_1^2x_2$	$x_1^2x_2^2$

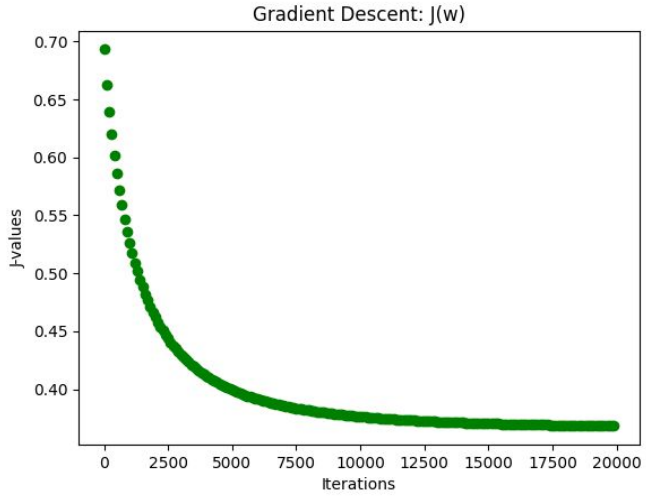
Initial Values Training Set

Weights = [1, 1, 1, 1, 1, 1, 1, 1]	alpha = 0.01	J = 0.69314718

Final Values Training Set

Weights = [4.14537938, 2.98701043, -9.52873027, 3.71042637, -5.8662198, -1.67571193, -9.31353456, -0.45497631, -2.63344659]	alpha = 0.095	J = 0.36830777	Iterations = 20,000

Plot of gradient descent **Testing Data J = 0.34156966**



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Confusion Matrix

	Predicted Class	
Actual Class	**No**	**Yes**
No	**tn = 15**	**fp = 3**
Yes	**fn = 3**	**tp = 14**

Final Results

accuracy = 0.6170212765957447	**precision = 0.8235294117647058**	**recall = 0.8235294117647058**	**F1 score = 0.8235294117647058**