CSL-407 (Machine Learning)
Homework #2

Submitted By:
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Question 3:
Effect of varrying the degree and value of regularization parameter (lambda)

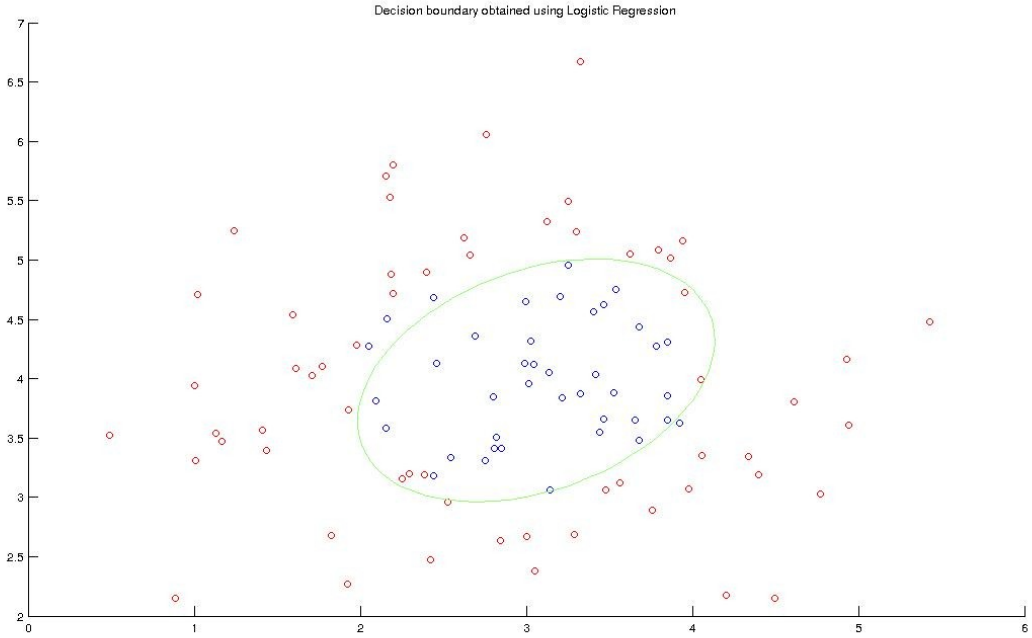

Fig 1: degree = 2 , lambda = 0, objval = 0.2029

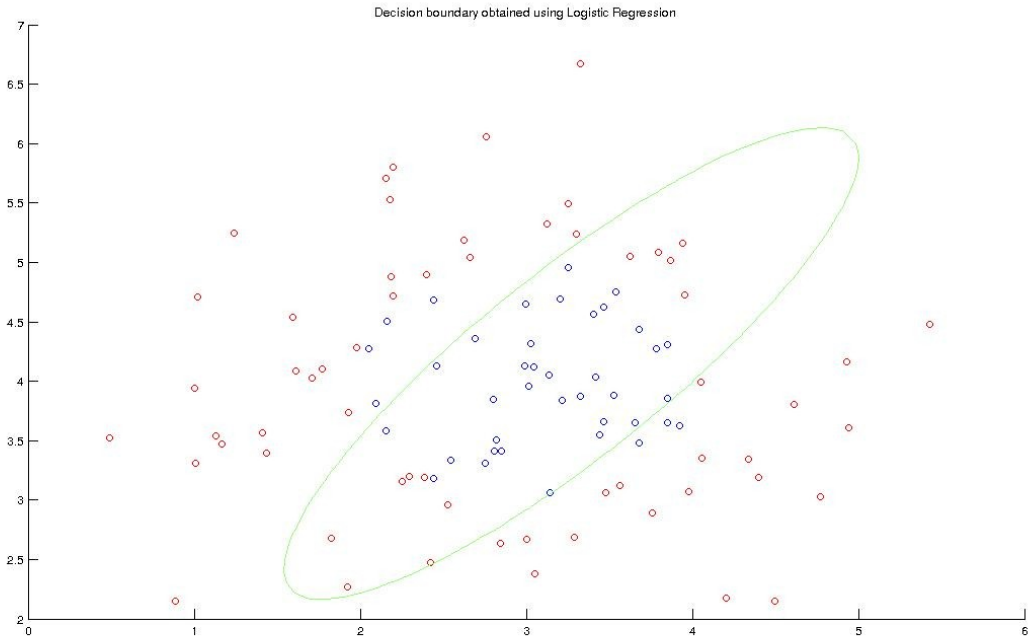

Fig 2: degree = 2, lambda = 0.2, objval = 0.4383

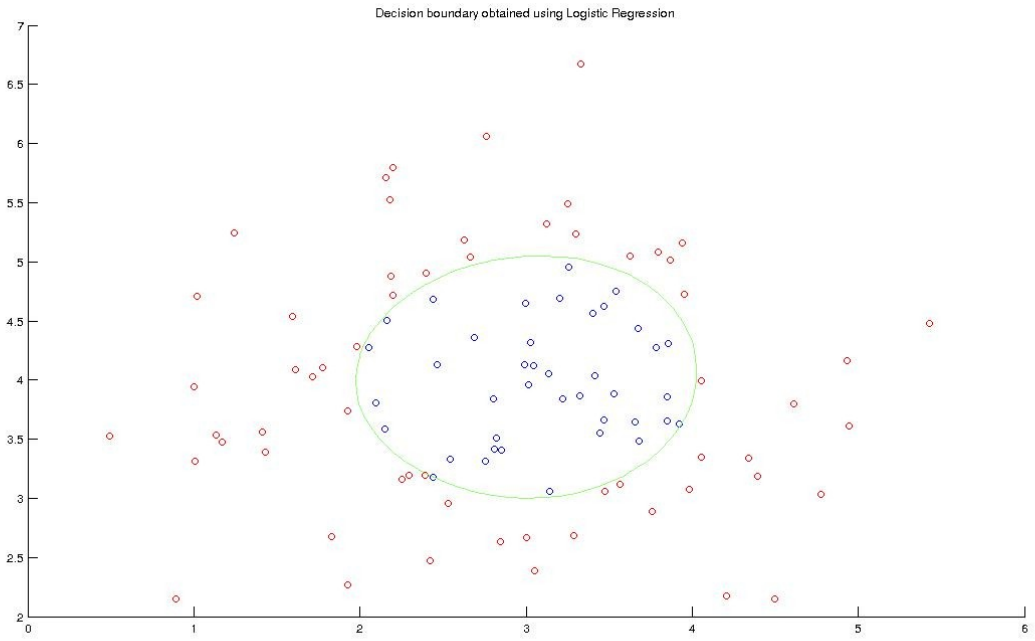

Fig3: Degree=3, lambda = 0, objval =0.0254

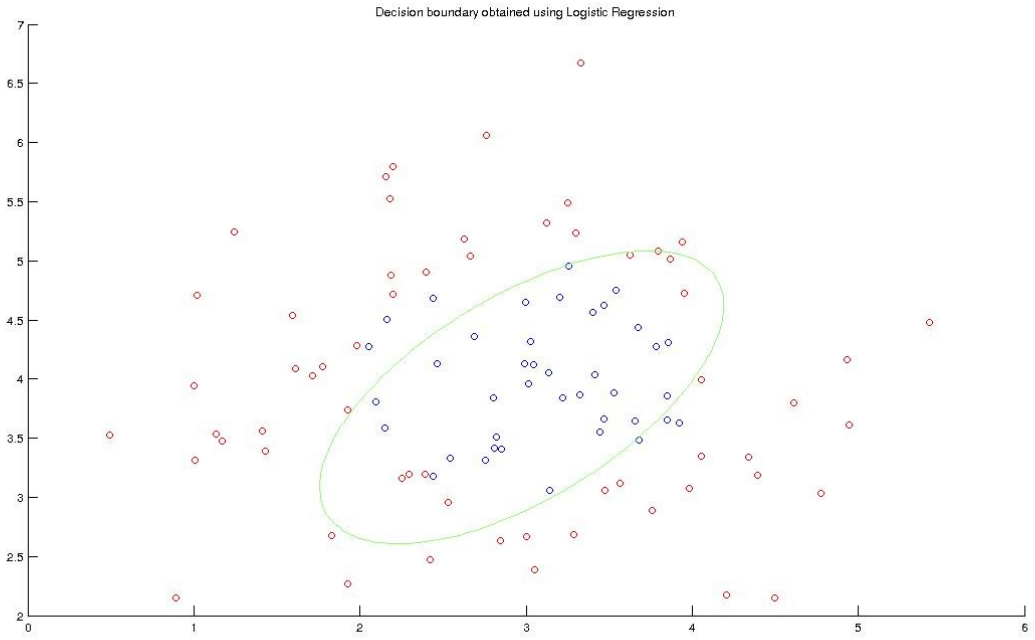

Fig:4 degree=3, lambda =1 (underfitting)

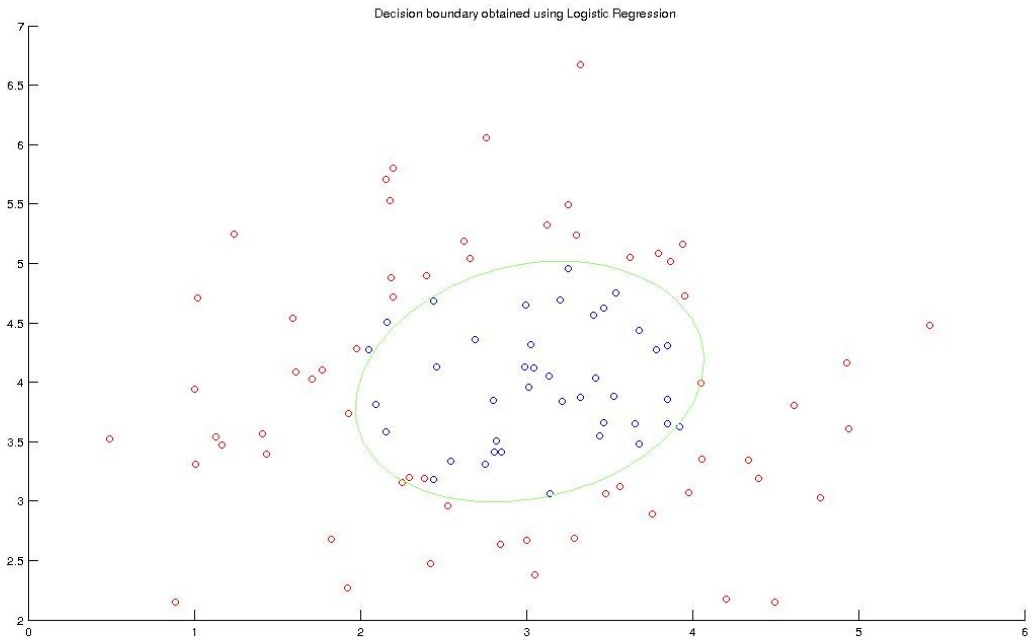

Fig: 5 Degree = 4, lambda = 0 (overfitting)

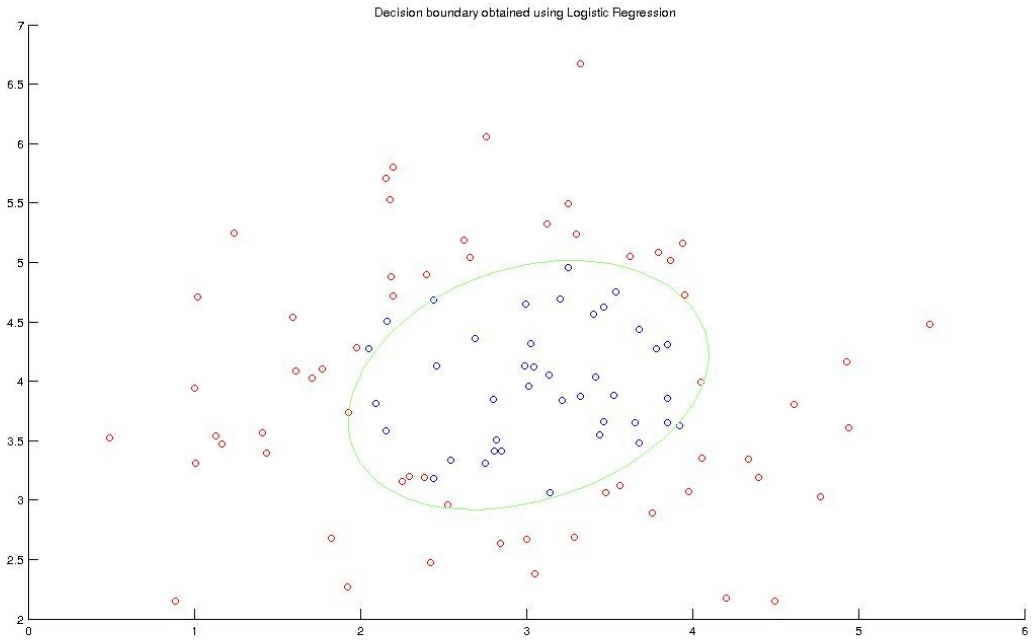

fig6: Degree= 4, lamdba = 2 (underfitting)

As the degree of the polynomial increases, the decision boundary starts fitting the training data better. But after a certain degree the polynomial starts overfitting the training data. From Fig 1 and Fig 2, we can say that a polynomial of degree 2, underfits the given training. In Fig 3, we can observe that a polynomial of degree 3 fits the training data reasonably well. But the polynomial of degree greater than 3 overfit the training data. (Fig 5). As observed from Fig:4, increasing lambda makes the curve underfit the training data.