Stochastic Gradient Descent

Machine Learning Exercise 1

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Stochastic Gradient Descent

1. Different degrees of polynomials were tested to generate a model for linear regression of 100 (x,y) points. With an increase in degree D, more desired behaviour in the model was found and at **D=4** model adopted its ultimate position of improvement but for D>4 model started to adapt to sine function curve more than the scattered points on the graph, which was not the goal of our regression. Hence **polynomial of degree 4** was chosen as the model.

Initial values of θi parameters were randomly generated in the interval [−0.5,0.5]. Over **12000 iterations** we have managed to minimize the error through Stochastic Gradient Descent. Model’s initial and final parameters can be distinguished from following unlearnt and learnt model polynomials:





1. Different alpha values were tested for the polynomial but **α = 0.01** has been chosen due to following results:
   1. For α<0.01achieved model was not even close to our desired model and error didn’t stable even after 30000 iterations.
   2. For α=0.01model adapted its optimal curve just after 12000 iterations and error value got greatly stabilized.
   3. For α>0.01model curve started inclining towards every small cluster of points, hence created glitches in the curve like a noised/distorted sine function. Although, our model learnt very fast in a perfect slope just under 3000 iterations and then stabilize



