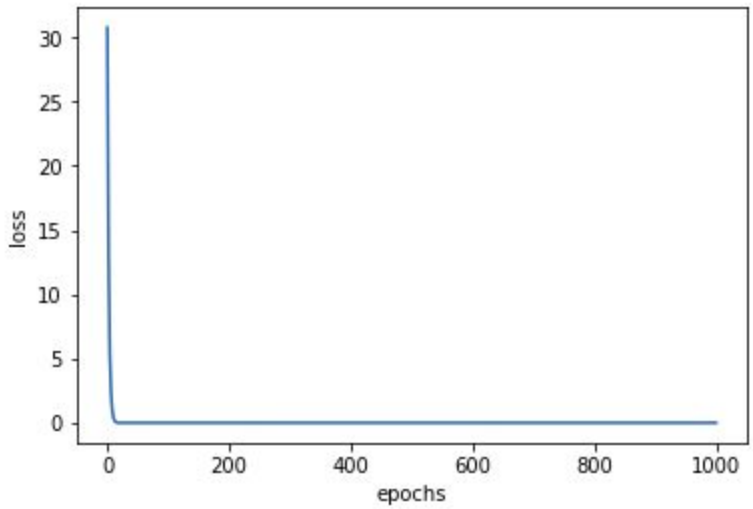
Report on Assignment#2

Observations after implementing the linear regression using gradient descent algorithm and normal equations and regularization.

Gradient Descent Algorithm:

1. The algorithm works by minimising the loss function, by finding the gradient and deciding the direction to move. The algorithm has a parameter alpha which is the learning rate which decides how big the jump every time the algorithm should take. Regularization term helps tune parameter further by smoothing the curve.
2. Usually the regularization term is taken as large number, in our case the regularization term was taken to 100. This selection of parameter gave better results although it was observed that further the parameter was increased the results became poorer.
3. The loss vs epochs curve was observed as follows:



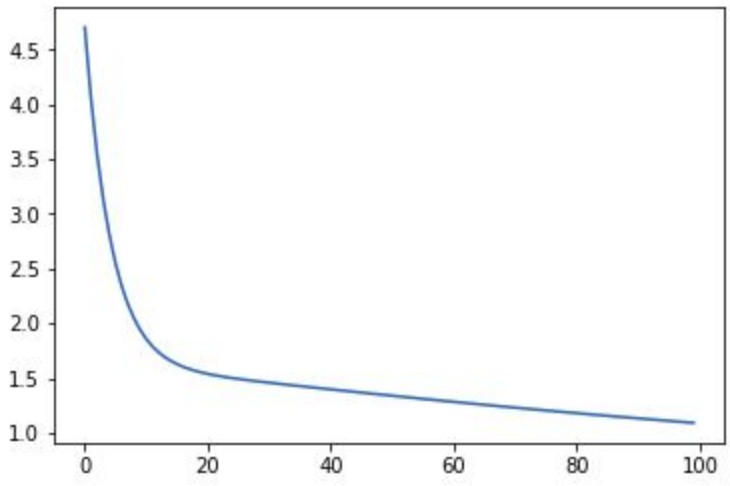
4. Accuracy was around 80%.

Normal Equations:

1. The linear regression using normal equations was done. This was done similarly as in last assignment but here regularisation term was added. The regularisation term was set to 100 it was observed that this selection of parameter was most effective.
2. It was observed that the performance of the algorithm was better with the regularisation parameter then without it.
3. Accuracy was around 80%.

Locally weighted regression:

1. In locally weighted regression we consider only the training examples which are in vicinity of the example to be predicted. Different weights are given to training examples with respect to their distance from the example.
2. It is required to run the whole algorithm everytime we need to predict for a new value. So this algorithm is not very computation friendly.
3. The performance of the algorithm is good as it only gives more weight to neighbours.
4. Loss vs epochs curve was as follows:



The curve changes for everytime a new training is done.